UNIVERSIDADE ESTADUAL DE CAMPINAS
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LETÍCIA KAORI HANADA

ESTUDO EXPERIMENTAL DA EXPRESSÃO DE FOCO DE INFORMAÇÃO NOVA E FOCO CONTRASTIVO (DE SUBSTITUIÇÃO) NA LIBRAS

EXPERIMENTAL STUDY OF THE EXPRESSION OF FOCUS OF NEW INFORMATION AND REPLACING CONTRASTIVE FOCUS IN BRAZILIAN SIGN LANGUAGE (LIBRAS)

Campinas
2024

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Dissertação apresentada ao Instituto de Estudos da Linguagem da Universidade Estadual de Campinas como parte dos requisitos exigidos para a obtenção do título de Mestra em Linguística.

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Supervisor/Orientador: Plinio Almeida Barbosa

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DEDICATION

I dedicate this work to my nephew, Yuri Yusuke, so he knows that he can choose his own path. My sweetheart, you will always have me to support you to be(come) any version of yourself on any and every occasion. I love you, do not forget that whatever the situation you are in or came from, it does not define you in any sense.

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EPIGRAPH

WANT

LEARN?

EMPATHY

EMPATHY

Poets signing in Libras
(MANOS E MINAS, 2017)

RESUMO

O presente estudo faz parte da Fonética Experimental e tem como objetivo analisar e descrever o uso de Sinais Manuais (SMs) e Marcadores Não-Manuais (MNMs) por sinalizantes da Língua Brasileira de Sinais (Libras) da comunidade surda de São Carlos (São Paulo, Brasil), ao expressarem Foco de Informação Nova (FIN) e Foco Contrastivo (FC). Para essa análise, foi construído um corpus composto por 20 enunciados-controle e 20 perguntas referentes a esses enunciados, com o intuito de elicitar a produção enfática de sinais-chave, selecionados das categorias de sujeito, verbo, objeto, adjetivos de cor e locativos. Também foram elaborados enunciados distratores com outras formas de foco. Os valores de duração dos SMs foram transcritos no programa ELAN (versão 6.1) e os dados de expressões faciais (Action Units – AUs) e movimentos da cabeça foram extraídos, automaticamente, do programa FaceReader. Eles, então, foram tabulados e analisados quantitativamente, através de testes de Análise de Variância (ANOVA), rodados no programa R Core Team. Após, com o intuito de possibilitar uma comparação, foram marcados cada um dos MNMs significativamente diferentes na transcrição feita no ELAN. De forma complementar, também foi feita uma análise qualitativa dos dados. Nossos resultados apontam que, em ambos os contextos focalizados, participantes adotaram, principalmente, a estratégia de "respostas diretas"; os dois focos foram marcados com um levantar de sobrancelha e um balanceamento da cabeça para frente e para trás; seus sinais foram produzidos com durações mais longas e ambos os focos pressupõem informações do discurso anterior e passam por mudanças fonéticas. Especificamente no FIN, a estratégia de "detalhamento" foi adotada com mais frequência do que o FC e seus sinais foram, frequentemente, acompanhados por movimentos mais amplos de inclinação lateral da cabeça, sinalizando um senso de conclusão ou "é isso". Os sinais do FC, por sua vez, exibiram durações mais longas, MNMs ligeiramente mais intensificados, assim como uma maior prevalência de estruturas de destaque do que o FIN, especialmente construções semelhantes à clivagem. Espera-se que os resultados deste estudo contribuam, principalmente, em quatro áreas: a) em pesquisas que envolvem línguas de sinais; b) na compreensão do uso dos MNMs na Libras como recurso para expressar FIN e FC; c) ressaltar a importância do ensino de MNMs para aprendizes de Libras, uma vez que são características linguísticas essenciais para fluência na Libras; e d) enfatizar a relevância da metodologia da Fonética Experimental em estudos da prosódia da Libras.

Palavras-chave: foco de informação nova; foco contrastivo; marcadores não-manuais, sinais manuais; Libras.

ABSTRACT

The present study is part of Experimental Phonetics and aims to analyze and describe the use of Manual Signs (MSs) and Non-Manual Markers (NMMs) by Brazilian Sign Language (Libras) signers from the deaf community of São Carlos (São Paulo, Brazil) when expressing Focus of New Information Focus (FNI) and Contrastive Focus (CF). For this analysis, a corpus was constructed consisting of 20 control utterances and 20 questions related to these utterances, with the purpose of eliciting emphatic production of key signs selected from the categories of subject, verb, object, color adjectives, and locatives. Distractor utterances with other focus forms were also created. The duration values of MSs were transcribed in the ELAN program (version 6.1), and facial expressions data (Action Units - AUs) and head movements were automatically extracted from the FaceReader program. They were then tabulated, and quantitatively analyzed through Analysis of Variance (ANOVA) tests, run in the R Core Team program. Subsequently, to enable comparison, each of the significantly different NMMs was marked in the transcription made in ELAN. In addition, a qualitative analysis of the data was also conducted. Our results indicate that, in both focused contexts, participants mainly adopted the "direct answer" strategy; both foci were marked with a raised eyebrow and a head nodd; signs were produced with longer durations, and both foci presuppose information from the previous discourse and undergo phonetic changes. In the FNI contexts, the "detailing" strategy was adopted more frequently than the in CF contexts, and its signs were often accompanied by broader lateral head tilts, signaling a sense of conclusion or "that's it". The CF signs, on the other hand, exhibited longer durations, slightly intensified NMMs, as well as a greater prevalence of foregrounding structures than the NIF, especially cleft-like constructions. It is expected that the results of this study will contribute primarily in four areas: a) in research involving sign languages; b) in understanding the use of NMMs in Libras as a resource for expressing FNI and CF; c) emphasizing the importance of teaching NMMs to Libras learners, as they are essential linguistic features for fluency in Libras; and d) emphasizing the relevance of Experimental Phonetics methodology in Libras prosody studies.

Keywords: focus of new information; contrastive focus; non-manual markers; manual signs; Libras.

RESUMO EM LIBRAS / ABSTRACT IN LIBRAS

(https://drive.google.com/file/d/1lWbkKAjQU30Q1zsZw1L8e0YhjuOZobzI/view?usp=sharing)

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SUMMARY

1 Introduction

Although linguistic studies of sign languages have been growing since Stokoe's American Sign Language (ASL) first phonological description (1960) (cf. Ann, 2005; Eccarius; Brentari, 2010; Healy, 2011; Liddell, 1989; Nyst; Baker, 2003; Russell; Wilkinson; Janzen; 2011), research on the focusing phenomenon on sign languages are typically associated with topic-comment constructions, in which the topic-comment contains the focused element (Crasborn; van der Kooij, 2013). In this regard, there has been much work on prosodic topic marking, stemming from Liddell's early work on ASL (Aarons, 1994; Coerts, 1992; Liddell, 1980; Neidle *et al.*, 2000; Sandler; Lillo-Martin, 2006). However, research on sign language focus remains limited among linguistic studies. Furthermore, all previous perspectives on focus have already been extensively described for several spoken languages (cf. de Moraes; Carnaval, 2015; de Moraes; Orsini, 2003; Gussenhoven, 2004; Ladd, 1996; Steedman, 2000; Swart; Hoop, 1995; Vallduvi, 1992), but not to the same extent in sign language linguistics. Focus was previously characterized by its diverse and multifaceted nature, serving as the object of research in several linguistics areas, including phonology, syntax, semantics, pragmatics, prosody, discourse, or computation (Büring, 2007; de Swart; de Hoop, 1995; Jackendoff, 1972; Vallduví; Engdahl, 1996; Zubizarreta, 1998).

Spoken languages utilize a range of syntactic, morphological, and prosodic means of conveying focus. While some spoken languages, such as Yucatec Maya (Kugler; Skopeteas; Verhoeven, 2007; Gussenhoven; Teeuw, 2008) and Northern Sotho (Zerbian, 2007), may not employ prosody to express focus, we anticipate that Brazilian Sign Language (Língua Brasileira de Sinais – Libras) will use it, considering that sign languages have an abundant set of prosodic features.

Given this, the principal aim of the present study is to delineate the information structural notions of Focus of New Information and Contrastive Focus in Brazilian sign language (Libras), by analyzing alterations in the production of manual and non-manual markers. To structure this M.A. thesis, we have segmented the content into five chapters. In the initial chapter, we will review the literature on the Phonetics of signed languages, presenting discussions about layering, non-manual markers, and prosody (subcategorized into intonation, stress and rhythm).

Then, in Chapter 2, we will delve deeper into information structure's theory, including "cognitive representations of referents in the pragmatic discourse", such as identifiability and activation of discourse referents. Additionally, we will explore pragmatic

relations between propositions and referents, including common ground, presupposition, and topic-comment structure; and we will introduce our object of study, 'Focus', while referencing various types of focuses found in the signed literature (restricting, selecting, expanding, attentive, parallel focuses, etc.). Chapter 2 plays a crucial role in enabling the reader to comprehend the pragmatic relations that can evoke the focus of new information and contrastive focus in naturalistic conversations.

In Chapter 3, we outlined the methodology employed in this study. Initially, we selected the target signs and formulated the utterances used in the experimental task. We detailed the ethical considerations and experimental decisions, and explained the data collection process, the editing of the collected videos, and the extracted of data. Additionally, we elucidated the methods employed for the quantitative analysis.

In Chapter 4, we provided a comprehensive description of all the strategies – syntactic, prosodic, semantic, and pragmatic – adopted to evoke focus of new information and contrastive focus. This description was grounded in the quantitative results, and we supplemented these findings with a qualitative analysis. The strategies adopted were: direct answer (literal glosses reproduction, (S)(V)(O)(A/L), and only the target sign), foregrounding structures (cleft-like, pseudocleft-like, doubled construction, and topicalization), and detailing (lexical enhancement, and explanation of the target sign). Furthermore, we pointed out considerations regarding the inter-individual variations identified in our corpus and summarize all the findings.

Finally, in Chapter 5, we delve into the final considerations, revisiting the main points of the work, indicating possible conclusions, and pointing for remaining questions.

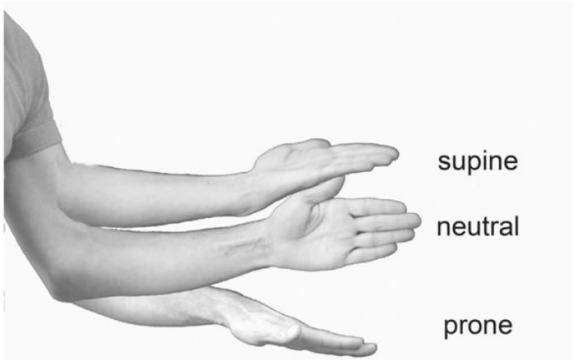
The idea for this research came from my major's study (a scientific initiation), in which Prof. Plinio and I looked closer at the difference in the production of the non-manual signs (NMMs) produced by fluent signers in Libras as a first or a second language[1] (Hanada; Barbosa, 2022). This previous research analyzed the eyebrows, eyes, nose, cheeks, mouth, head, and torso movements in affirmative negative assertions, in partial interrogatives (WH-question) and imperatives, including sentences with intensity and topicalization. Its results point that signers were topicalizing not only the initial word but also other words containing information that seemed to be cognitively important to them.

[1] Process nº 2019/14326-1, Sao Paulo Research Foundation (Fundação de Amparo à Pesquisa do Estado de São Paulo, FAPESP).

2 Sign language's phonetics

In the Linguistics field, Stokoe and colleagues (Stokoe, 1960) work was the first to propose a phonological scheme for American Sign Language (ASL) that describes the lexical contrast and formation of signs, sign compounds, and phrases. "In doing so, he presented a linguistic model of sign structure that displayed the complex hierarchical organization and duality of patterning characteristics considered to be the hallmarks of natural language" (Wilbur, 2003a, p. 351). One example is his categorization of the forearm rotation around its length axis in articulatory groups such as 'prone', 'neutral' and 'supine', presented in Figure 1.

Figure 1 – Rotation states of the forearm



Source: Crasborn (2012, p. 11).

He suggested that signs could be classified based on a restricted set of simultaneous recurring characteristics (Stokoe, 1960; Stokoe; Casterline; Croneberg, 1965). Later, these characteristics were named as parameters that did not carry any meaning on their own: hand configuration, location, and movement. Supported by Klima and Bellugi (1979), his work was fundamental in the Linguistics field to prove that signed languages are human natural languages, since:

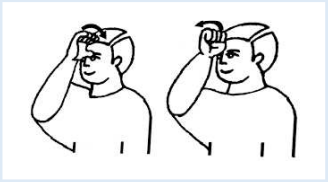
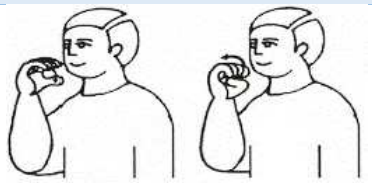
> One might say that the design features of a natural language include, but may not be limited to, a hierarchically organized, constituent-based system of symbol use that serves the needs of communities of users to efficiently produce and understand infinite numbers of novel messages and that is capable of being learned by babies from birth (Wilbur, 2003a, p. 351).

When we say that he described signs phonologically, it means that his description provided a perceptual target of the underlying form (*vs.* a surface form) of the sign and it

"contains global phonetic information on the realization of that sign" (Crasborn, 2012, p. 11-12), but it doesn't provide any specific information about how the movement is executed.

This can also be observed in pairs of signs that exclusively differ in the specifications of one of their constitutive parameters (minimal pairs), indicating that the phonological structure of signed languages is not dictated by sequence (as observed in spoken languages), but by variations in one of the three simultaneous articulatory parameters. In an attempt to illustrate these differences, one can say that the phonological form of the Libras' signs APRENDER 'to learn' and LARANJA 'orange' (Table 1) have a hand configuration in C and S letters (before and after the movement, respectively), with a hand movement "opening and closing", differing from each other only in the hand location: APRENDER 'to learn' is located on the forehead area, while LARANJA 'orange' is located in the neutral space in the area in front of the mouth. The examples presented below in "Canonical (phonological) form" are not prototypical sign articulation that can be taken as a reference for every Libras signer, we are only utilizing them in the present study to illustrate the underling form of Libras signs for APRENDER 'to learn' and LARANJA 'orange'.

Table 1 – Example of canonical and surface forms of the Libras signs APRENDER (LEARN) and LARANJA (ORANGE)

Sign	Canonical (phonological) form	Surface (phonetic) form
APRENDER 'to learn'	 Source: Capovilla et al (2017, p. 244) dictionary.	  Source: Sinais […] (2018) / Academia […] (2022).
LARANJA 'orange'	 Source: Capovilla et al (2017, p. 1643) dictionary.	  Source: Sinal […] (2020) / Dicionário […] (2018).

Source: Prepared by the author.

In this table, we can also visualize an example of a concrete phonetic articulation that can be highly variable, which means that there might exist different forms that correspond to a singular phonological form. Different sign forms (phonetic variation) are mainly

distributed according to: handedness (is the signer right or left handed dominant?); handshape (dissimilation and assimilation processes); hand height and movement (preceding and subsequent location) (Crasborn, 2012). Therefore,

> The phonetics of sign languages will deal with all units of production and perception of manual and non-manual articulators expressed in a gradient manner in their physical expression (Quadros, 2019, p. 41).

However, in order to be understood, the signer will have to produce a concrete phonetic sign that could be influenced by the surrounding phonetic context, showing coarticulation[1] effects (Ormel; Crasborn; van der Kooij, 2012). However, this signer could be expressed differently depending on sociolinguistic and practical factors (Crasborn, 2001). This sign production will have to be characterized both in terms of articulation and perception.

After Stokoe, other analyses suggested the addition of other parameters to the study of sign phonology, in which Battison (1974, 1978) and Friedman (1975) suggested the addition of hand orientation and Baker-Shenk and Cokely (1980) the addition of non-manuals. To address the expression of focus, we first need to discuss the articulators that are most commonly cited in the prosodic descriptions about it: the non-manual markers.

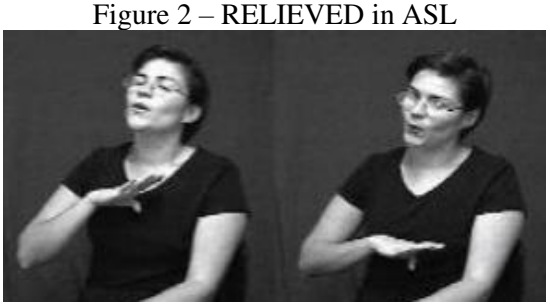
2.1 Non-manual markers

The term “non-manual markers” (NMMs) was introduced to describe aspects of signing that go beyond the actions of the hands, such as body movements and facial expressions (Liddell, 2003). NMMs consists of independent channels (eyebrows, eyes, eyelids, nose, mouth, tongue, cheeks, chin, head, torso, and shoulders) that can “provide lexical or morphemic information on lexical items or indicate the ends of phrases or phrasal extent” (Wilbur, 2003a, p. 356). Lexical NMs are considered crucial component of sign’s phonological description, since like other parameters as handshape, movement, and location, they must be described in the lexical entry of a sign (Pfau *et al.*, 2010).

[1] An utterance in sign language can be perceived as a continuous flow of motion, encompassing the signs and the movements or transitions between them. Like spoken language, coarticulation plays a significant role in sign language. In fact, the signs are influenced by the context: their shape and particularly the transitions are heavily influenced by the neighboring signs. (Naert; Larboulette; Gibet, 2017). For example, when the head is turned to the right, the hand must likewise be shifted in the same direction, possibly achieved through the outward rotation of the upper arm (Crasborn, 2012).

'Multi-channel signs' were described by Johnston and Schembri (1999) as a set of signs that are accompanied by obligatory non-manual expressions (e.g. Brennan, 1992). A significant portion of these signs appears to fall within the subcategory of lexemes referred to as 'interactives,' resembling interjections and exclamations found in spoken languages. Figure 2 provides an illustration of a straightforward sign that demands specific combination of non-manual expressions for its accurate production.

Figure 2 – RELIEVED in ASL



Source: Liddell (2003, p. 09).

To properly produce RELIEVED, the hand must move as illustrated, the lips must be rounded and pursed throughout the sign, and the signer must blow out a puff of air as the hand moves downward.

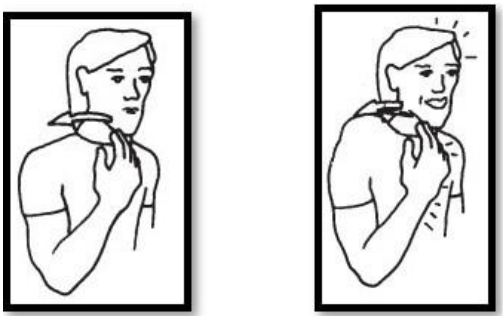
Figure 3 – RECENTLY in ASL

Source: Liddell (2003, p. 09).

To produce RECENTLY in ASL (Figure 3), the signer must slightly turn their head to the side and tense the cheek muscles on that side (or both sides) of the face (Liddell, 2003, p. 13-14). In this description, the ‘nonmanual adverb’ RECENTLY is described by the literature as containing facial components considered mandatory and contrastive. However, Johnston and Schembri (1999), in their analysis of Australian sign language (Auslan), argue

that nonmanual adverbs do not seem to be lexically productive[2]. So AGO and RECENTLY are treated by them as one lexeme with non-manual changes, through intensification, instead of two separate lexemes, as observed in Figure 4:

Figure 4 – Nonmanual adverbs AGO and JUST RECENTLY in Auslan

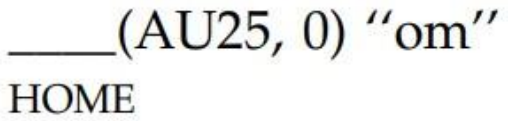


AGO LITTLE–WHILE–AGO/JUST RECENTLY

Source: Johnston and Schembri (1999, p.154).

Other Linguistics fields, such as language acquisition, have explored whether NMMs should be treated as a parameter with a lexical differentiation function or not. The Reilly (2006) study analyzes the development of affective and linguistic facial expressions. In their study, they present the following production of a child that is, approximately, 2 years old: as s/he manually signs HOME in ASL (Figure 5), s/he opens and then closes her/his mouth, mimicking the 'om' of 'home':

Figure 5 – ASL sign HOME accompanied by the mouthing "om"



Source: Reilly (2006, p.270).

According to the author, it seems that the child has seen both behaviors (mouthing and manual sign) co-occurring by the adults that usually sign to her since they don't produce the English word "home". This means that they encoded both facial and manual movements as one single unanalyzed package.

[2] Changes involving manner of production do not seem to be lexically productive (number of repetitions, muscle tension, speed of movement, presence, and length of hold at onset and offset, etc.) (Johnston; Schembri, 1999).

2.1.1 Layering

The big difference between spoken and signed languages is modality: while sign languages are visual-spatial, spoken languages are oral-auditory. This difference in modality**,** both of perception and production, brings some challenges to their users, and this difference contributes to characteristics that are unique to sign languages, making them somehow different from spoken languages. Let us address some of these differences here.

For the articulation of spoken words, hearing people rely on three systems to produce speech: articulatory system (which includes the pharynx, the nasal, and oral cavities), the phonatory system (which includes the larynx, the glottis, and the vocal folds) and the respiratory system (which includes the trachea, lungs, bronchi, and the diaphragm) (Freitas; Toledo; Ivo, 2019). In contrast, to produce signs, deaf people must use two hands, fingers, arms, head and torso, and the space in front of them. When comparing the muscles responsible for the articulation of different language modalities, we can see that while spoken languages use only one vocal apparatus, sign languages rely on two hands, making it possible for sign languages phonemes to be articulated simultaneously, whereas spoken languages phonemes must be ordered linearly.

> The view that articulation and perception involve the same interface (phonetic representation) is controversial, and the obscure problems related to the C-I (conceptual-intentional) interface are even more so. The term "articulatory" is so restricted as to suggest that the language faculty has a specific modality, with a special relationship to the vocal organs. Work in recent years on sign languages shows that this conception is very restricted. I will continue to use the term, but without any implications about output system specificity, keeping the case for spoken languages (Chosmky, 1995, p.434).

Another difference found by Bellugi and Fischer (1972) is that signs take longer to be produced than words. They claim that one possible reason for such is that signs are articulated in a wide area (from the top of the head to the waist), resulting in complex and time-consuming movements. In other words, signers need to maximize information and minimize the number of signs in a message (Frishberg, 1975). Following this perspective, since time is a crucial factor and both spoken and signed languages are governed by the same entity (brain), we need to investigate the unique properties of sign languages that make it possible for signers to express the same amount of information in the same timeframe as spoken words, even when signers have extensive muscles to perform this activity. The strategies, described by Bellugi and Fischer (1972), are: 1) signing without function words

(prepositions, conjunctions, auxiliaries, etc.) and packing various information into one sign, 2) incorporation (location, number, manner, size and shape), and 3) bodily or facial shifts.

Wilbur (2003) also cites "layering" as one option of simultaneously expressing and maximizing information. However, specific choices of NMMs and its functions will vary from one language to another. According to her,

> 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.352).

From this standpoint, by layering NMMs, it is possible to create different combinations of information. This phenomenon is referred by Sandler (1999b) as 'superaticulation[3]' (sign language equivalent of suprasegmentals). In traditional studies of ASL, the head, body and upper face were linked to specific syntactic structures. For example, at the syntax level, NMMs serve various functions. They have the capacity to alter the polarity of a sentence, establish the type of sentence, and mark topicalized signs. They also accompany various types of embedded clauses and can convey agreement, as well as person distinctions in pronominals (Pfau *et al.*, 2010). However, the studies of Baker and Padden (1978), Baker-Shenk (1983) and Liddell (1978, 1980) did not analyze separately each NMM. One of the first studies to investigate individual functions of componential NMMs was the study of Coulter (1979). After him, subsequently studies identified functions for other NMMs (Aarons, 1994; Bahan, 1996; Baker-Shenk, 1983; Liddell, 1986; Wilbur, 1994a, 1994b, 1995a, 1995b). It is important to mention that since one can layer NM articulation for affective or grammatical purposes (Baker; Padden, 1978; Coulter, 1978, 1979; Liddell, 1978; Weast, 2008), it is important to address the main differences between these markings.

2.1.2 NMMs: affective vs grammatical

People can easily visualize emotional states in other people's facial expressions during speech (Ekman, 1993), interactional cues in various head movements (McClave, 2000), and manual gestures in numerous functions that complement the spoken content of utterances, as discussed by Kendon (2004). Signers also modify their NMMs to express

[3] Regarding the IP, Nespor and Sandler (1999) and Sandler (1999b) concluded that superarticulatory arrays of NMs consistently undergo changes at the IntP boundaries.

personal feelings, such as joy, doubt, excitement, anxiety, disapproval, etc. From this perspective, every study working with sign languages must consider the existence of affective and grammatical NMMs. According to Pfau et al (2010), lexically specified NMMs are related to the sign semantics: signs such as HAPPY, ANGRY, and SURPRISED are produced with facial expressions that reflect their meaning/ emotional states. Ekman (1992) established six prototypic emotional facial expressions that are present in different cultures around the globe (Figure 6). However, this "universal" / "basic" emotions concept has been strongly discussed lately (Jack *et al.*, 2014; Mansourian et al, 2016, Gu et al, 2015, 2016; Wang; Pereira, 2016).

Figure 6 – Prototypic six emotional facial expressions: Anger[4], Disgust, Fear, Joy, Sadness, and Surprise (from left to right).

Source: Cohn-Kanade database (Kanade; Cohn; Tian, 2000, *apud* Shan; Braspenning, 2010, p. 03).

Reilly (2006) argues that affective (emotional) and grammatical facial morphology use the same facial muscles, but have different contexts, timing, and scope. The main differences, pointed out by the authors, are displayed in Table *2*, below:

Table 2 – Differences in affective and grammatical facial morphology

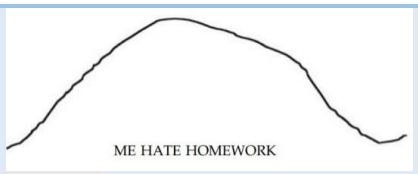
	Affective/emotional NMMs	**Grammatical NMMs**
Context	Although affective NMMs expressions can co-occur with an utterance, they are variable and do not depend on linguistic behaviors.	Grammatical NMMs co-occur with an utterance that is manually signed, and are governed by linguistic rules.
Intensity and timing	They are inconsistent in both intensity and time (Scherer, 1986).	Starts "milliseconds before the initiation of the manually signed string over which it has scope, and immediately attains apex intensity that is maintained until the termination of the manual string" (Baker-Schenk, 1983, *apud* Reilly, 2006, p. 266-267).

Source: Based on Reilly (2006).

[4] Affective facial expressions are responsible for setting the range of motion within which grammatical facial expressions can be generated. For example, happy face will allow more extensive movement of grammatical brow raise when compared to angry face (Weast, 2008).

To illustrate the differences in context, intensity, and timing, the authors provide the following examples:

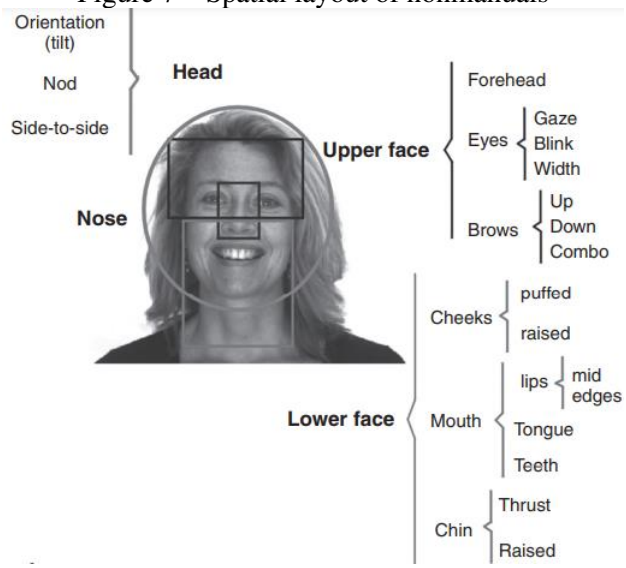
Table 3 – Examples of the difference between affective and grammatical facial morphology

	Affective/emotional NMMs	**Grammatical NMMs**
NMMs production	 Reilly (2006, p.267)	 Reilly (2006, p.267)
Context	Someone produces the manual signs "I HATE HOMEWORK" with an expression of anger.	Someone produces the manual utterance "BOY WRITE LETTER" with an adverbial facial expression.
Timing and Intensity	• The expression of anger starts before the signed utterance and ends sometime after it was expressed. The curvilinear form (one of many possible shapes) represents the changes in intensity; • The articulation of onset and offset occur gradually (Baker-Shenk, 1983; Liddell, 1978, 1980).	• They start just before the manually signed utterance, reach, immediately, the apex intensity, and maintain this level, just before the end of LETTER; • The articulation of start (onset) and stop (offset) occur abruptly and is coordinated with the syntactic function (Baker-Shenk, 1983; Liddell, 1978, 1980; Wilbur, 2017).

Source: Prepared by the author.

Another design feature of linguistic NMMs (spatially distributed across the face, head and shoulders) is that they create distinct and clear channels for conveying information (Wilbur, 2003a), as observed in Figure 7.

Figure 7 – Spatial layout of nonmanuals



Source: Wilbur (2003a, p. 359).

In NMMs acquisition, this separation becomes more evident, since facial expressions are initially employed for emotional purposes and later for linguistic purposes (Anderson; Reilly, 1997, 1998; Reilly, 2000; Reilly; Bellugi, 1996; Reilly; McIntire; Bellugi, 1991; Reilly; McIntire; Seago, 1992). Furthermore, there is a difference between signers that produce grammatical NMMs and non-signing hearing people that use co-speech facial gestures (Wilbur; Patschke, 1999), as well as a distinct developmental progression in children that signs *vs.* non-signing children (Anderson; Reilly, 1998).

Although the categorization of NMMs has been in constant debate, here we are interested in analyzing the grammatical NMMs that have scope over a focused utterance and not in affective NMMs.

2.1.3 Prosody

Prosody is commonly defined as the set of all phonetic or phonological phenomena that extend beyond the segmental level in spoken languages (Ladd, 1996; Gussenhoven, 2004). For instance, prosody is characterized by Rietveld and van Heuven (1997, p.231) as “the entirety of temporal and melodic properties in speech utterances not attributed to the arrangement of vowels”. Prosody can highlight prominence and differentiate parts of an utterance or the distinct functions of different utterances. The proper use of prosody depends on a shared knowledge between the speaker and the interlocutor. The study of prosody is *important* for understanding linguistic interactions, not only to comprehend what is said, but also how it is said.

In spoken languages, prosody is characterized by the division of intonation into rhythmic segments, the relative emphasis placed on these segments, and the significant modulation of the sound signal through intonation (Sandler, 2012) (see Barbosa, 2019). Based on Wilcox and Wilcox (2005), we can say that NMMs would be like prosodic changes, such as voice qualities, intonation, and rhythm in spoken languages, in which there are several articulators in the prosodic-linguistic system responsible for the adequate production of prosody, including two hands, parts of the face, head, trunk, and body. In other words, signed utterances are structured in chunks distinguished by stress, rhythm and intonation (Pfau *et al.*, 2010).

In this section, we will mention three different aspects of prosody: intonation, rhythm, and stress that are important for our analysis, as we will look closer at the NMs focus markers (intonation), prominent signs that select a unit that contains new information, or signs

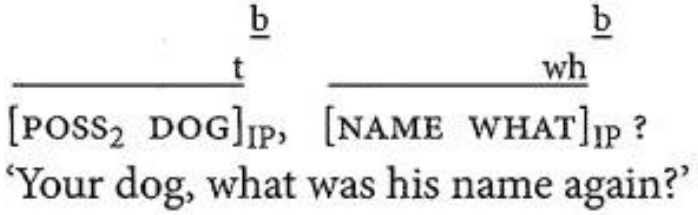
that are being contrasted with another already existent unit (stress), as well as sign/utterance duration and final lengthening (rhythm).

2.1.3.1 Intonation

In Ladd's opinion (1996, p. 04), intonation can be understood as "the use of suprasegmental phonetic features to convey 'post lexical' or sentence-level attic meanings in a linguistically structured way". For him, suprasegmental features, such as Fundamental Frequency (f0), intensity, and duration can overlap words, phrases, or entire utterances. Their main function is to convey meanings and relationships related to the information structure (such as the type of sentence, speech act, and focus). In spoken languages, the suprasegmental contour involves both high tones (H) and low tones (L) that are associated with tone-carrying units, most often vowels (van der Kooij; Crasborn, 2016).

In sign languages, an intonational contour (characterized by NMs markers) becomes suprasegmental (a layer on top of the segmental layer), since it extends throughout the prosodic constituent, as illustrated in Figure 8:

Figure 8 – *wh*-interrogative with a topic noun phrase in German sign language



Source: van der Kooij and Crasborn (2016, p. 274).

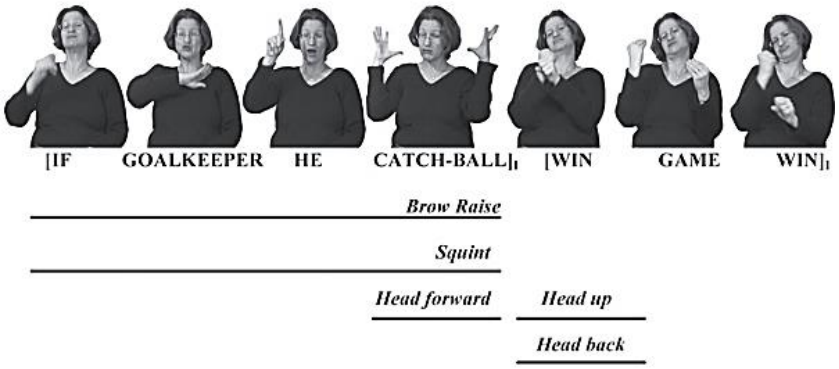
This example illustrates the separation between the topic with the possessive phrase $POSS_2$ DOG and the question NAME WHAT, in which each of them is constitutes its own intonational phrase (IP), with its own set of NMMs. According to van der Kooij and Crasborn (2016), in a first moment, both IPs are produced with their own NMs that extend over the prosodic constituent (domain marker[5]) (the topic marking[6] is produced over $POSS_2$ DOG and the question marking[7] is produced over NAME WHAT) and then, the right

[5] When NMMs are held during a signed phrase, it is possible to observe what signed information is layered. They differ from edge NMMs that are responsible for marking the end of a phrase (Wilbur, 2003a).
[6] Topic is usually marked in ASL with raised brows and head slightly back (Liddell, 1980).
[7] The "*Wh-"* question is marked with furrowed eyebrows and the head tilted back, while the body might lean forward a bit (Vicars, 2005).

boundary of both IPs is marked with an eye blink[8] (boundary/edge marker[9]) or with a pause (prosodic break), in which the final sign of the IP may be held longer.

Signers can modify the position of the torso and shoulders with movements up, down, sides, front, or back, representing the intonational contour and allowing a specific sign to be highlighted, for example, with stress (Dachkovsky; Sandler, 2009). As reported by Wilbur *et al.* (2022), signers can also alter their facial expressions and head movements to mark an intonational contour. Head positions or movements tend to syntactically mark topics, negation, and questions. Eyes and eyebrows can represent conditional statements, yes-no questions, and pronominal references. The mouth and cheeks can indicate adverbial or adjectival information at the sentence level, while the nose can express evaluation. Regardless of the hands' articulation and the NMMs that appear during the phrase, they all fall within the limits of intonation phrases (IPs), as seen in Figure 9, in which there are two IPs marked with different non-manual articulations:

Figure 9 – Distribution of intonation arrays in two IPs
(If the goalkeeper had caught the ball, (the team) would have won the game)



Source: Dachkovsky and Sandler (2009, p. 292).

In this conditional sentence of Israeli sign language (ISL) (Figure 9), the signer raised her eyebrows and squinted during the entire first intonational phrase (IF GOALKEEPER HE CATCH-BALL), ending with a head forward. She began the second IP (WIN GAME WIN) with the head up and back. This Figure also illustrates that, generally, there are independent intonational articulators (group of NMs responsible for marking

[8] According to Wilbur (1994a), exist two types of eye blinks that differ in duration and tenseness: periodic eyeblinks (used to mark the conclusion of the IP), and voluntary eye blinks (slower, deeper and co-occuring with a manual sign, used to mark emphasis).
[9] Wilbur (2003a) points out that some NMMs can serve as edge markers or domain markers. In these situations, they can be differentiated by number of occurrences (e.g. one head nod can mark an edge, while repeated head nodding can serve as domain marker of assertion (Wilbur, 1994a)).

boundary and different domains) in ISL, in which the facial system can exploit its potential and the eyebrows may be activated at the same time with another element that is activating the eyelids[10] (Dachkovsky; Sandler, 2009). In Dachkovsky and Sandler's (2009) study, they also observed signers relaxing manual signs at the intonational boundary. Figure 10 demonstrates the drastic difference between the articulation of the first and second intonational phrases:

Figure 10 – Visual intonation change at IP limit in a counterfactual conditional sentence in ISL

Source: Dachkovsky and Sandler (2009, p. 293).

Ladd (1996) emphasizes that NMMs can have an intonational role, but they are not limited to that. In addition to linguistic-prosodic functions, NMMs can also represent the grammatical system, such as the phonology of lexical signs, the marking of adverbial or adjectival phrases (Anderson; Reilly, 1998; Liddell, 1980; Meir; Sandler, 2008), attribute with mimetic character or iconic gestures (especially those involving the mouth; Sandler, 2003), and emotions, as discussed in the previous section.

2.1.3.2 Stress

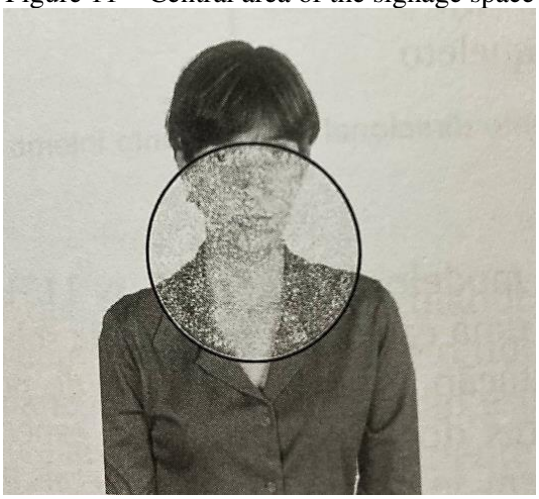
The literature describes stress been used to highlight information, for example, to emphasize a constituent within a sentence or to contrast it with information already available in the discourse. As stated by van der Kooij and Crasborn (2016), stress is usually associated with spoken languages definitions such as pitch, loudness, and vowel lengthening. In sign languages, according to them, accent/stress may be expressed in one or more of the following ways: increased amplitude, duration, and speed, with a sharper beginning and end, with repetition, a higher location in space, and accompanying NMMs, such as raised eyebrows, puffy cheeks, inclined torso, or nod. Some of these features are present in Sign Language of

[10] Meanwhile, in spoken languages, intonational tunes must include sequence of tones, since the vocal folds are not able to simultaneously produce more than one pitch (Dachkovsky; Sandler, 2009).

Netherlands (Nederlandse Gebarentaal – NGT). Analyzing these changes requires considering the phonological form of the sign, including its hand configuration, the existence and the different kinds of movement.

In 1987, Wilbur and Schick described additional modifications to express stress in ASL, such as movement along a stressed sign's trajectory (for signs without movement), other movements before or after the lexical movement, changes in rhythmic pattern, and increased tension of articulation (e.g. hand configuration). Some of these modifications are consistent with the idea that the face is the area with greatest visual acuity, while the signing space (area in front of the chest) is the least, as it is only targeted by peripheral vision[11] (Siple, 1978[12]) (Figure 11).

Figure 11 – Central area of the signage space



Source: Quadros and Karnopp, 2004, p. 78, (based on Battison, 1978, p. 44).

For example, when there is a dialog, instead of signer A focusing attention on B's hands, they will look at the face area of signer B, where important grammatical information is encoded (Siple, 1978; Swisher; Christie; Miller, 1989). If signer A wants to mark a sign as stressed, they would add movement to those signs that do not move in their canonical production (since it is easier to notice small differences in hand configuration, location, or

[11] Compared to the trunk region, there are many different locations and complex (marked) hand configurations in the facial region (Battison, 1978, *apud* Quadros; Karnopp, 2004).

[12] From 1978 onwards, there have been scarce, if any, eye-tracking studies that have specifically examined the extent to which eye gaze remains relatively stationary and directed towards the chin during sign language perception. Moreover, it remains unknown whether this phenomenon varies among different sign languages or if there are differences in the perceptual patterns between individuals who acquire sign language early and those who learned it later. Another hypothesis that remains untested is whether there exist a greater number of more intricate handshape distinctions in the lexicon of any sign language for facial locations compared to lower locations (Crasborn, 2012).

movement in the area of greatest visual acuity). This would make a wider and visible production of the sign to signer B. The addition of movement is not the only resource signer A has to increase the sign's visibility; they could also add repetition to increase the sign temporal duration, produce a tenser sign that results in a sign with more strength, or add NMMs to mark this linguistic stress. All these strategies would serve the same purpose as prosodic changes in a spoken language.

2.1.3.3 Rhythm

Rhythm can be understood in spoken languages as:

> The combination of two perceptions: syllabic regularity and alternation of strong and weak syllables. In 1919, Whitehead said: the essence of rhythm is the fusion of identity and novelty. This identity refers to the afore mentioned regularity, while the novelty refers to the strong syllables, which catch the listener's attention by emerging from a 'background' of weak syllables (Barbosa, 2019, our translation).

In other words, we can understand "rhythm" as a regular "beat"/stress (Braem, 1999), perceived by the pitch, duration, and loudness (Couper-Kuhlen,1993). In sign languages, the cues for the perception of this regular stress involve notions such as pause, hold, and greater amplitude and duration of signs. In different studies, simultaneous components of a sign were associated with sequential segments characterized as: movement and hold (Liddell; Johnson, 1989), movement and location (Sandler, 1990), and sequence of static target location (Hayes, 1993; Miller, 1997; Uyechi, 1994). Other research has placed emphasis on the duration of signs as components of a phrase.

It has been documented that signs can have extended duration when they receive emphatic stress[13], and additional duration when they are in the initial position of the sentence, to function as topics (Liddell, 1977b) or as a head of a relative clause (Liddell, 1980). Signs are shorter in duration when they are in the middle position of the phrase or (Liddell, 1978) or come before a sign with emphatic stress (Coulter, 1990). Similar to spoken languages, the phenomenon of phrase-final lengthening has been observed in various studies conducted on sign languages as well. (Coulter, 1990; Grosjean, 1979; Liddell, 1980; Perlmutter, 1992, 1993; Wilbur; Nolen, 1986).

[13] In ASL, phrasal prominence is often achieved by moving the element to the final position, where phrase-final reduplication takes place (Covington, 1973; Wilbur, 1990; Wilbur; Nolen, 1986; Wilbur; Schick, 1987).

Other studies about rhythm, such as Grosjean and Lane (1977), pointed out that, in a spoken language, interlocutors usually catch their breath during intonation pauses and never in the middle of a word. Interlocutors who express themselves in sign languages, however, can breathe at any time. On the other hand, Baker and Padden (1978) noted that signers generally blink only during intonational pauses, whereas interlocutors of spoken languages can blink whenever they want, including when they are pronouncing a word.

The notion of "sign motion mirroring" is also cited in Wilbur and Schick's (1987) study of ASL, in which the movements of facial expressions, head, and torso would follow the same rhythm or the same direction of hand movement for linguistic stress marking. The marking of intonational phrases allows the signer to express more than one function at the same time. For example, they can emphasize a specific sign while expressing the phrase conditional status. In other words, this allows sign languages to take full advantage of the multiple channels available in the visual modality.

In this chapter, we first briefly introduced to the fields of Phonology and Phonetics fields in signed languages. Within Phonetics, there is a subfield named Prosody, where three different phenomena are important: intonation, rhythm and stress. Our expectation is that participants' signing production will be altered in contexts of Focus of New Information (FNI) and Contrastive Focus (CF). In other words, to mark distinct focuses, we expect that participants will modify their intonation, stress, and rhythmic patterns, along with their Manual Signs (MSs) and Non-Manual Markers (NMMs). This expectation arises from the different pragmatic purposes of both types of focus. In FNI context, signers aim to provide a new information to the addressee. On the other hand, in CF (replacing contrastive focus) contexts, signers must negate a previous information mistakenly produced by the addressee and then correct it, by contrasting both information. Following this perspective, we hope to find emphatic responses in both cases, but with greater emphasis in CF utterances, as the purpose of negating and correcting information by contrast appears to require more energy than simply providing the requested new information.

In the following chapter, we will explain in greater details how new and contrasted information are structured. We finish this chapter by highlighting that all the concepts and discussions presented here aim to provide theoretical support to the linguistics data analysis, even if not all of them are cited or referred in the analysis chapter.

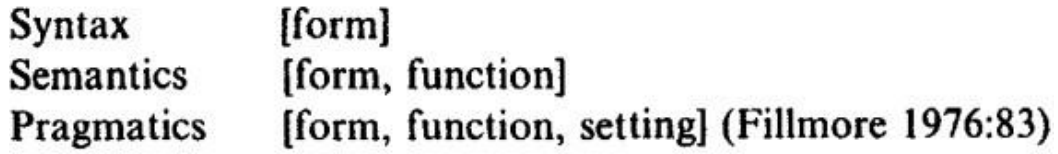
Summarizing this chapter, it is highly probable that obscuring the face of a signer in a video recording would result in a significant loss of meaning. This is because crucial

lexical distinctions, morphological modifications, and syntactic structures might no longer be discernible (Pfau *et al.*, 2010), as well as prosodic changes.

3 Information structure

Before discussing the object of study, it is necessary to understand the different aspects included in the informational structure, namely syntactic, prosodic, pragmatic and psycholinguistic, and to determine which of these concepts will be addressed in this work. It is also necessary to understand how one utterance is semantically, but not pragmatically equivalent to another. Although we do not plan to revisit all the following concepts in our analysis, it is important to describe them as they support the understanding of how information is naturally conveyed in everyday contexts. This description will help the reader to comprehend our experiment methodology in Chapter 3 and it will help us gain insights into the cognitive and pragmatic causative phenomena that enable the production of Focus of New Information (FNI) and Contrastive Focus (CF). Fillmore (1976, p. 83) divides the information structure into:

Figure 12 – Fillmore diagram.



Source: Fillmore (1976, p. 83).

We will start addressing the information structure from the pragmatic point of view since, based on Fillmore's diagram, it combines form, function, and setting. This diagram is described by him, as follows:

> Syntax, in short, characterizes the grammatical forms that occur in a language, whereas semantics pairs these forms with their potential communicative functions. Pragmatics is concerned with the three termed relation that unites (i) linguistic form and (ii) the communicative functions that these forms are capable of serving, with (iii) the contexts or settings in which those linguistic forms can have those communicative functions (Fillmore, 1976, p. 83).

An element can be prominent in the discourse for various reasons. Vallduvi (1992) classified prominence into three categories: 'link', 'focus' and 'tail'. The link, also known as 'topic' expresses the old or given information, selects an element from the preceding discourse, and establishes a connection between two discourses. The focus represents new or contrastive information that can be related to the topic, while the tail comprises all other information. However, Lambrecht (1994) has a different understanding of information prominence. For him, it is necessary to distinguish between two functional types

of prosodic contrast: one represents the discourse referents in the speaker's minds (activation and identifiability), while the other represents the pragmatic relationships between referents and propositions (topic and focus). In this work, we will follow Lambrecht's framework for structuring information.

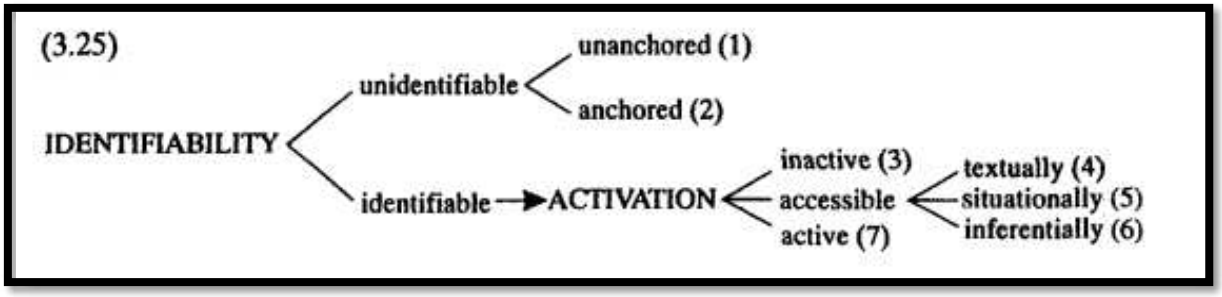
3.1 Cognitive representations of referents in the pragmatic discourse

3.1.1 Identifiability – mental representations of discourse referents

When someone intends to communicate something about a referent that they assume is not yet present in the addressee's mind and cannot be indicated deictically, it is essential that they create a representation of this referent in the discourse. Lambrecht (1994) refers to this type of discourse as a new "file", to which other elements containing various information about it can be added during the conversation and which can be revisited in future discourses. The author emphasizes that what matters is not whether the addressee is already familiar with the new referent, but whether they can select it from other referents that have been introduced, and then identify the one that the speaker intends to convey.

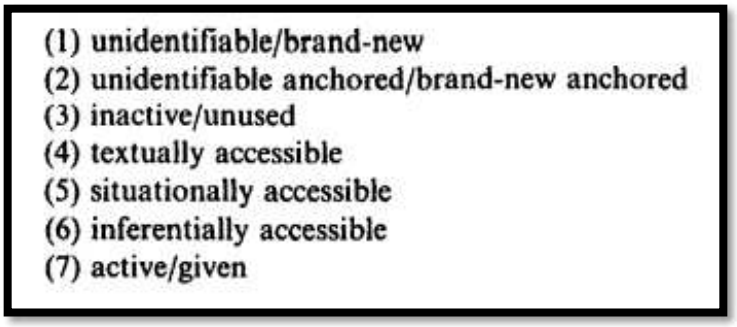
To support the understanding of this process, Lambrecht (1994) created the following diagram, in which the numbers in Figure 14 represent the different stages of identifiability (and activation) in Figure 13:

Figure 13 – Diagram of identifiability and activation systems



Source: Lambrecht (1994, p. 109).

Figure 14 – Identifiability and activation stages



Source: Lambrecht (1994, p. 109).

The addressee will not be able to identify a referent as identifiable if it is brand-new, which means if it was never mentioned in the discourse before. These brand-new items can be either anchored or unanchored (Prince, 1981). For example, in the following phrase: "I got on a store last week and the shopman was busy and a guy I study with said he knows my boyfriend", the NP "a guy I study with" represents the discourse referent and is a brand-new referent anchored to some other discourse NP containing it (number 2 in Figure 13 and Figure 14). On the other hand, "store" is unanchored (1) since it is simply brand-new. All in all, a referent is identifiable when it goes through the process of activation, which is explored in the following section.

3.1.2 Activation

We store a very large amount of information in our minds, and when we start talking, we can only focus or activate a very small part of this information. Chafe (1987) argues that a specific concept can be activated, semi-activated, or inactivated. An active element (7), according to Lambrecht (1994), is the one that, in a specific situation, is focused on the person's consciousness.

> A term is active if it is "currently" lit up" in our consciousness, to use Chafe's expression, and activation normally ceases as soon as some other item is lit up instead. It is possible, for example, to use the unaccented pronoun "she" to refer to a particular female referent only as long as that referent is the current center of attention of the speech participants (Lambrecht, 1994, p. 94).

A semi-active element (accessible: number 4, 5, and 6 in Figure 14) would be the one in the peripheral consciousness, an element that is in the person's background awareness but is not being focused on. When we receive information from a discourse topic, we evoke

some concepts. As an example, in the schema of “family members” as a “fille”, we could semi-activate concepts (in this case, “fille items”) like “mother”, “father”, “siblings”, etc. Finally, an inactive element (3) is the one that the speaker stores in the long-term memory but is not being focused on, nor is in the background awareness in the moment of the discourse.

Chafe (1987) postulated the idea of “iconism of intonation”. This idea hypothesizes the existence of a correlation between mental states and different phonetic intensity or word length. Lambrecht (1994) indicates that although the referent of a nominal or pronominal expression with attenuated pronunciation is very likely to be active, it is not the case that an active referent is necessarily pronounced with attenuation. He illustrates this with the concept of “contrastiveness”: the active pronoun can be prosodically more prominent in a contrastive rather than in a non-contrastive sentence. According to him, “the only one-to-one correlation between a formal category and a cognitive state is the one between lack of prosodic prominence and/or pronominal coding and activeness” (Lambrecht, 1994, p. 108). He also mentions that when an active referent is pronounced with prosodic prominence, this is due to the speaker’s intent to mark it with the proposition in which it occurs and not because it is a result of their activation.

3.2 Pragmatic relations between propositions and referents

3.2.1 Common ground

Chafe (1976) first introduced the idea of ‘information packaging’ to discuss how information is conveyed; in other words, which aspects of language help a speaker/signer to consider the addressee’s current information and facilitate the flow of communication. To do that, the signer and the addressee must continuously change the information that they both know. This is what Krifka and Musan (2012) referred to as ‘common ground’. To illustrate that, they provide the following example:

(1) I have a cat and I had to bring my cat to the vet.

Source: Krifka and Musan (2012, p. 01).

By saying “I have a cat”, the speaker/signer introduce the idea that they have a cat into the common ground, and the “cat” becomes salient. The clause that follows “and I had to bring my cat to the vet” adds new information to the common ground: that the speaker had to

bring their cat to the vet. This new information is now in the common ground and is shared by both the speaker and the addressee. The common ground tends to be continuously enriched during the conversation (Krifka; Musan, 2012), and does not only consist of information presumed to be mutually shared and accepted, but also of entities that have already been introduced before.

3.2.2 Presupposition

In every conversation, the speaker's main intention is to give information that they believe is new in the addressee's mind. To do so, it is necessary to create a proposition that relates the new information to something that can be taken for granted (the old information), since every new information is new only in contrast with the old. In this study, the old information is referred to as presuppositions, and the relation between presuppositions and new information is referred to as assertions. It is important to highlight that the concept of presupposition here is pragmatic, not semantic, since speakers have presuppositions, not sentences. Therefore, instead of saying that a sentence "has" a presupposition, linguists would say that sentences "require" presupposition structure (Stalnaker, 1973). Following this perspective, we have:

> PRAGMATIC PRESUPPOSITION: The set of propositions lexicogrammatically evoked in a sentence which the speaker assumes the hearer already knows or is ready to take for granted at the time the sentence is uttered.
> PRAGMATIC ASSERTION: The proposition expressed by a sentence which the hearer is expected to know or take for granted as a result of hearing the sentence uttered (Lambrecht, 1994, p. 52).

3.2.3 Topic-comment structure

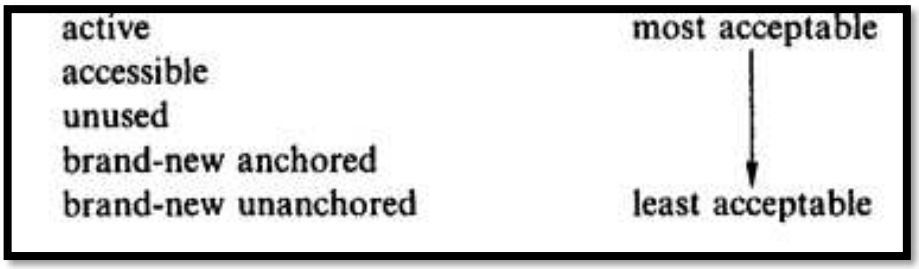
The definition of topic, adopted here, is "subject" in the traditional grammar – what the sentence is about. Following this logic, the topic-comment structure is the relation between a discourse entity/referent (topic) and a proposition (comment), in which the proposition expresses or adds relevant information about the topic to the addressee's knowledge. This topic must exist in the discourse universe independently of the information being predicated about it, which means that, for the addressee to understand the information conveyed by the topic-comment structure, the topic must be identifiable and have a certain level of activeness in the discourse.

Mathesius (1975) and Mithun (1991) claim that topic-comment structures organize the discourse by creating a common ground for the interlocutors: when a sentence has a topic, it is expected that it will be completed by a comment. Dachkovsky and Sandler (2009) affirm that this structure is marked in ISL by NMMs: a brow raises on the first intonational phrase that contains the topic, indicating continuation and dependency, just like the high tone in topic structures in spoken languages. This marking shows the relation of dependency between two intonational sentences (Dachkovsky, 2005).

Prince (1983) acknowledges that the topicalization indicates that the entity represented by the NP has either been evoked previously or holds a significant relationship to something already inferable from the discourse. It is possible to imply, thus, that topic can be understood as an old information, that can be more or less accessible in the addressee's mind. The comment, consequently, would be the new information related to the topic.

When we think that topics help to create a relationship between new and old information (what is accessible or already known to the addressee), we could also assert that topics themselves can have different accessibility levels. The topic acceptability (what is more or less acceptable to be a topic) can be seen in the following scale (Figure 15), in which 'unused' can be understood as 'inactive':

Figure 15 – The topic acceptability scale



Source: Lambrecht (1994, p. 165).

Lambrecht (1994) observed that active referents represent cognitively preferred topics, since their interpretation usually does not require effort from the addressee to understand the proposition. Considering that the one-to-one correlation of activeness and intonation is a lack of prominence, and that referents are usually coded with pronouns, we can now understand that the cognitively preferred topic would be unaccented pronouns (Lambrecht, 1994).

This author also suggests that accessible referents are those that are still acceptable, but less easily interpretable, since they require both mental effort from the addressee to interpret the new information, and to infer the topic referent. It turns out to be

even harder to interpret new information about an unused/inactive (but still identifiable) topic referent, since the cognitive effort requires the addressee to infer it (not available in the conversation) and to process the information about a topic. This cognitive effort can be considered “high cost”, and its acceptability varies according to discourse modality, speech situation, and language.

Considering that brand-new referents are unidentifiable for the addressee, they are also clearly unacceptable as topics. If the addressee cannot identify the topic referent, then they cannot determine if the information about the referent is true or not, which means they cannot interpret it. In all the low accessibility contexts, we can understand that “the specific context supplying the required antecedent is not just given, but is to be actively searched for” (Sperber; Wilson, 1986, *apud* Dachkovsky; Sandler, 2009, p. 17). A strategy for these situations is to use squint. Based on Dachkovsky and Sandler’s (2009) study of ISL, a signer can give clues to the addressee that the information is not immediately accessible and needs to be retrieved from their mind. These authors allege that this ISL squint topic marking can be a pragmatic device to promote a referent from accessible to active status, in which it characterizes mutually retrievable or shared information. They explain that this may occur because the accessibility to a specific referent also depends on the distance from the immediate situation in which the discourse is being produced, because topics are often in competition with other potential topics.

To avoid ambiguity, for example, it is quite often the case that one of these referents will be topicalized or coded in the lexical form, rather than unaccented pronouns, to mark shift in attention from one to another active topic referents (Lambrecht, 1994). This is also the case in contrastive focus sentences, when the speaker’s intention is to mark the element that they are focusing on and when a topic referent is not accessible enough in the discourse, since fully active referents are preferred topics. To promote the referent to the active status, the speaker signs a topic-promoting construction, like the structure just presented, called “presentational construction” (example 1).

Presentational constructions are what Lambrecht (1994) calls “bi-clausal sentences”: there are NP detachment constructions that result in the referential noun phrase appearing somewhere else in the phrase, but not in the position assigned to it. In this non-canonical configuration, the signer separates the noun phrase referring function from the relational role as a proposition argument. This separation of the topic referent from the designated role as an argument is called “Principle of the separation of reference and role”

(PSRR) by Lambrecht. He defines PSRR as “Do not introduce a referent and talk about it in the same clause” (Lambrecht, 1994, p. 185).

3.2.4 Distinguishing topic and focus

The focused phenomenon is usually mentioned in topic-comment discussions, where the focused element is integrated at the comment structure (Crasborn; van der Kooij, 2013). So, before discussing focus, it is necessary to distinguish it from the topic notion. In this section, we will briefly explain the main differences between the two of them, highlighting what focus is not on this relationship, in order to understand what defines it.

In both topic and focus sentences, the speaker indicates to the addressee, with a sentence accent, that they must establish a pragmatic relation between a *denotatum* and a proposition. The focus accent marks, prosodically or morpho syntactically, a proposition turning into an assertion (a potential piece of information) and the topic accent marks the element that the proposition is about and it might cooccur with a focus accent, but the opposite is not true (Lambrecht, 1994).

As presented in the previous section about PSRR, the topic can have two different functions: to name a topic referent, marked by lexical noun phrases, and to create a semantic relation between topic and predicate, marked by unstressed pronominals, in which the topic must have a referent that is both identifiable and have a certain degree of activation. That is not the case of the focus constituent: it is free of identifiability and activation. We explained in the previous discussions that brand-new referents are very unlikely to be selected as topics constituents (see Figure 15). There is evidence, confirmed by the distribution of topic and focus constituents on texts, that pragmatically inaccessible referents are most likely to be coded as focal constituents (Lambrecht, 1994).

While a topic referent is usually unaccented or phonologically null and has to be referential, the focus item is always accented and expressed and does not have to be referential. Lambrecht (1994, p. 114) summarizes the differences, pointing out “the existence of a three-termed relation between accessibility, subject, and topic on the one hand, and inactiveness, object, and focus on the other”.

3.3 Focus

The definition of focus has been expressed in so many different terms that it becomes difficult to trace back the linguistic understanding of it, since there wasn't even a consensus to begin with. The first mention of it was in the Prague School, where it was related to newness and it was used as a complementary notion to 'topic' (Sgall; Hajičová; Benešová, 1973; Sgall; Hajičová; Panenova, 1986).

In 1967, Halliday (1967, 1970) introduced this concept into the English-speaking linguistic world. Authors like Jackendoff (1972) and Chomsky (1970) used this term as notion complementary to 'presupposition', and Gabelentz (1869) proposed 'psychological predicate', a related concept with a different name. Paul (1891 [1880]) refined this concept by citing one of its uses, probably the most prominent, that is "identifying the part in an answer to a *wh*-question that corresponds to the *wh*-constituent in the question – in a sense, what is new in the answer" (Paul, 1880, *apud* Krifka; Musan, 2012, p. 6).

According to Jackendoff (1972), focus is the informational structure of a sentence that can be highlighted due to different reasons, such as: because it is a new information, a recurring element in the narrative, or an element that is in contrast in the interlocutors' mind. In all these cases, the focus is an important or unexpected information that the speaker/signer assumes not to be shared with the addressee (Jackendoff, 1972; Krifka, 2008). Lambrecht (1994, p. 58) defines focus as the "portion of an utterance whereby the presupposition and the assertion differ from each other". Generally, the concept of focus is described intuitively as the most new or important information that is highlighted in an utterance.

Focus has been defined according to phonology, syntax, semantics, pragmatics, discourse, or computation (Büring, 2007; de Swart; de Hoop, 1995; Jackendoff, 1972; Vallduví; Engdahl, 1996; Zubizarreta, 1998). The explanations for 'focus' are so many and so different that it is crucial here to select only one able to embrace the situations of focus that we will work with. Thus, before starting to discuss different aspects of 'focus', we would like to assume the following definition that is able to subsume other concepts: focus is the existence of alternatives that are relevant for the interpretation of a linguistic expression by (Rooth, 1985, 1992). To illustrate this concept, one can imagine:

> In a sentence like John [MARried]f Sue, the verb married is focused and hence indicates alternatives to marrying someone – like, for instance,carrying someone, beating someone, or meeting someone. But of course there are also alternatives to John as well as alternatives to Sue that are relevant for the interpretation of the sentence (Krifka; Musan, 2012, p. 7).

From a prosodic point of view, there are two types of focus: narrow and broad focus. Narrow focus occurs when the focused constituent is smaller than a phrase. The speaker uses this type of focus to express prominence and highlight the unit in focus (stressed sign) (Barbosa, 2019; Jackendoff, 1972). For example, in the sentence "Mary bought a **yellow** house", if "yellow" is stressed, it indicates that the sentence is an answer to the question "what is the color of the house that Mary bought?". On the other hand, broad focus is also the unit in focus, but the prominence is in the prosodically smaller unit in the focused larger unit, in a standard stress phrasal position. In the same example, "Mary bought a yellow **house**", if "a yellow house" is a broad focus phrase, it represents an answer to the question "What did Mary buy?". However, the prominence of this answer would be only on the last word, "house". Another important concept for our study is "emphasis", which is the realization of a narrow focus defined in the syntactic or semantic domains. It is called contrastive emphasis when the emphasis performs a contrastive focus, as defined by Barbosa (2019) and Jackendoff (1972).

As previously discussed, the topic referent must be identifiable and have a certain degree of activeness in the discourse, while a focus is unpredictable or pragmatically non-recoverable in the utterance. This means that focus is the part of the proposition that cannot be taken for granted during the talking (Lambrecht, 1994).

Lambrecht (1994) postulated three types of focus structures, expressed in formal categories, based on different focus functions in both semantic domain of the proposition and the syntactic domain of the sentence. Sometimes, the argument and sentence focus structures are nearly homophonous:

a) predicate focus (topic-comment): predicating a characteristic of a topic;
b) argument focus (identification): identifying an argument of a given proposition;
c) sentence focus (presentational or event-reporting function): reporting an event or introducing a new referent.

In the present study, we will work with the idea of narrow focus, when a sign is stressed to convey focus of information. It can be new information, in the case of focus of new information, or it can be a contrastive emphasis, in the case of contrastive focus. In relation to the three different types of focus described by Lambrecht (1994), considering all the information discussed so far, we will work mainly with the idea of argument focus.

3.3.1 Types of focus

3.3.1.1 Focus of new information

Dik (1989) categorizes two types of focus: completive and contrastive Focus. The Focus of new information (or completive focus) is used to provide the requested information, that is, it is the assertion of a proposition (Mioto, 2004). This type of focus is relevant to assess the truth of an expression (Crasborn; van der Kooij, 2013), and it is most observed in questions that seek confirmation by repeating it (Wilbur; Patschke, 1998). The following example illustrates this type of focus:

(2) A: [says something about driving a car but speaker B misses the name]
B: WHO was driving that car?
A: KAY was.

Source: Wilbur and Patschke (1998, p. 292).

In (2), B knows (presupposes) that someone was driving a car but does not know who this person is. A provides the missing information by saying that this 'someone' is 'Kay. This example illustrates that new information is expressed with stress.

If a signer wants to express extra stress in the focused constituent, they could "double" the sign, producing it in both its original and in final position, as we can observe in Figure 16. We have a doubled construction when, before the duplicated element, there is no significant pause (Petronio; Lillo-Martin, 1997). Wilbur (1994b) points out that constituents that can be doubled seem to be the same constituents that can be focused by the pseudocleft (see more in section 5.1.2.2). This duplicated element in final position seems to be accompanied by a head nod (Figure 17) on Libras (Quadros; Karnopp, 2004).

Figure 16 – Formation of a sentence in focus in Libras

I CAN GO <CAN>
I can go (somewhere)

Source: Quadros and Karnopp (2004, p. 171).

Figure 17 – Head nod in Libras

Source: Quadros and Karnop (2004, p. 132).

According to Puupponen (2018), in ASL, head nods are used to align with the boundaries of discourse, syntactic or prosodic sequences (Puupponen *et al.*, 2016; Sandler *et al.*, 2011; Wilbur, 2000) and to increase the prominence of single signs (Puupponen *et al.* 2015; Wilbur, 2000):

3.3.1.2 Contrastive focus

In the contrastive focus, the information element is already known or given, and the focus only serves to emphasize it further. This type of focus is used by speakers to change the topic of discourse, to contrast different referents implicitly or explicitly, or to redirect the addressee's attention. For Mioto (2004), contrastive focus involves the assertion of a proposition and the denial of at least one alternative proposition, often correcting previous information. There are five different types of contrastive focuses: restricting, expanding, selecting, replacing, and parallel focus (Wilbur; Patschke, 1998).

3.3.1.2.1 Replacing focus

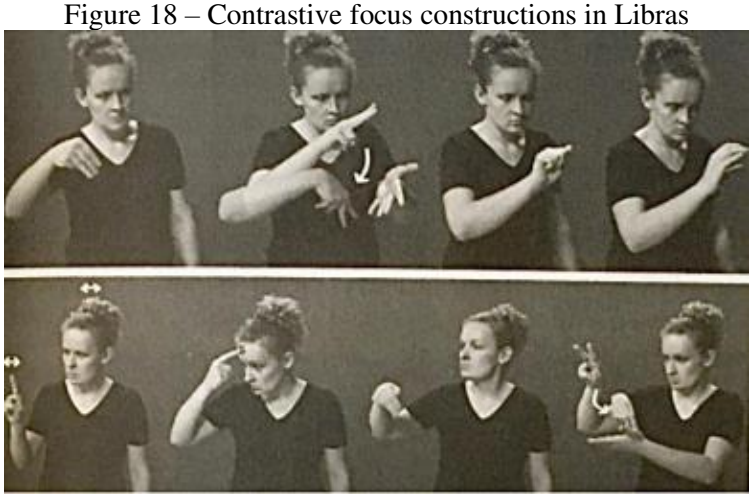
It is used when the signer’s purpose is to correct mistaken information, since the focus rejects a particular element of the previous discourse and replaces it with another (Wilbur; Patschke, 1998).

(3) A: Joseph brought cake to the party.
B: No, he brought JUICE, (not cake).

In Libras, replacing contrastive focus is marked with the elevation of the eyebrows and associated with the lowering of the head. It is produced when a statement is

denied by means of another substituting the first (Quadros, 2019), as observed in Figure 18b, second movement (HARRY-POTTER):

Figure 18 – Contrastive focus constructions in Libras



a: MARY READ AGATHA CHRISTIE (Mary read Agatha Christie)
b: NO, HARRY-POTTER MARY READ (No, Mary read Harry Potter)
Source: Quadros (2019, p. 97).

2.3.1.2.2 Restricting focus

As suggested by its name, this focus restricts a set of possible presupposed values, making it smaller, typically used with the particle "only" (Dik, 1989):

(4) A: Joseph brought juice and cake to the party.
B: No, he only bought JUICE.

Next, we can observe an ASL restricting focus example, in which the signer uses the particle ONLY-ONE to express exclusivity, and leans back:

(5) "Context: I was in a car accident last night – it was awful.
English: 'Thank God, though, only John was injured'
_____br lean back
ASL: LUCKY #WHAT **ONLY-ONE** JOHN HURT."
Source: Wilbur and Patschke (1998, p. 294).

2.3.1.2.3 Expanding focus

Expanding focus adds information to the presupposition, with the use of "also" or "too":

(6) A: Last night, there was dancing at the party.
B: Yes, but there was also singing.

Although EVEN can express an information that is 'contrary to what you might expect', it fulfills the pragmatic role of adding information (Konig, 1991). Ferro (1992) inserted this type of construction into the category “Attentive Focus”. Next, it is possible to observe an ASL example of such focus:

(7) A: My grandmother died last month, and we all got an inheritance '...even the cat.' (English) /
lean forward
...#EVEN 1° CAT PT (ASL).
Source: Wilbur and Patschke (1998, p. 294).

2.3.1.2.4 Selecting focus

Selecting focus is produced when there is a set of possible alternatives, and the signer needs to identify and select only one (8). (9) represents an ASL selecting focus example.

(8) A: Did Joseph bring juice or cake to the party?
B: He bought JUICE

(9) A: Kay and Kim got in a wreck Saturday. I think she wasn’t wearing her glasses or something.
B: WHO wasn’t wearing her glasses?
A: ‘*Kay* wasn’t.’ (English) / KAY. (ASL)
Source: Wilbur and Patschke (1998, p. 295).

2.3.1.2.5 Parallel focus

In parallel focus, two pieces of information are contrasted with each other in the same utterance. This is the only type of focus that does not require a presupposition, since both pieces of information are asserted (Wilbur; Patschke, 1998).

(10) A: Joseph brought a JUICE, but Jim brought a CAKE.

In our study, we opted to compare the focus of new information with the replacing contrastive focus. This choice stems from the fact that, among the contrastive focuses, the

replacing focus stands out as the only one where the argument of the presupposed[1] information from the preceding discourse (the question in the examples presented) is entirely wrong. In other words, within the possible contrastive focuses (restricting, expanding, selecting, and parallel), the signer needs to correct (by contrasting) information, but this need to be done partially, since part of the presupposed argument's information is correct. These other types of focus described by Wilbur and Patschke (1998), as well as the broad focus will be used as distractors in the experimental task (see more sections 4.1 and 4.2).

[1] Parallel focus was also not selected as our object of study since it does not require any presupposition.

4 Methodology

4.1 Target signs selection

We have selected ten target signs that pertain to the categories of subject, verb, direct object, color adjective and locative. Our expectation is that these functions will answer questions such as 'who performed the action? (subject)', 'what action was taken? (verb)', 'who received the action? (object)', 'what is the color of the object involved?' (color adjective)' and where does the action take place? (locatives)'. With the exception of the verbs (which were both selected as transitive verbs), the criteria for the selection of the other signs were semantic: subjects signs within the group of professions, direct objects within the food category, adjectives that were colors, and adverbial adjuncts that were locations. Any phonological differences between these signs were considered in the data analyses.

Table 4 – Experiment target signs

Target signs		
Subject	1	ADVOGAD@ (LAWYER)
	2	PEDAGOG@ (PEDAGOGUE)
Verb	3	ABRAÇAR (TO HUG)
	4	LER (TO READ)
Direct Object	5	PÃO (BREAD)
	6	DOCE (CANDY)
Color adjective	7	LILÁS (LIGHT-PURPLE)
	8	MARROM (BROWN)
Locative	9	BAR (BAR)
	10	EMPRESA (COMPANY)

Source: Prepared by the author.

All selected target and non-target signs are lexemes. In Australian Sign Language (Auslan), Johnston and Schembri (1999) described 'lexemes' as signs that have "a clearly identifiable and replicable citation form which is regularly and strongly associated with a meaning which is (a) unpredictable […] and/or (b) quite unrelated to its componential meaning potential" (Johnston; Schembri, 1999, p.126).

Lexemes usually belong to five classes of signs that are not mutually exclusive (nominals, verbals, interrogatives, linking, and interactives[1]), as many of them can be simultaneously part of two classes or more without necessary change in form (Johnston; Schembri, 1999). Despite that, most of them seem to have a primary function. Signs that

[1] See more in Johnston and Schembri (1999, p.132-133).

function as ‘subject’, ‘direct object’ and ‘color adjective’ are nominal lexemes and signs that function as ‘verb’ are verbal lexemes. Johnston and Schembri (1999) define ‘verbals’ as lexemes that represent states and processes (actions, attributes and qualities) that involve participants. For us, verbals are lexemes representing mainly actions.

Following this perspective, our experiment selected target signs that one can find in the Libras dictionary (Capovilla *et al.*, 2017). That means we avoided classifiers[2] (or productive signs, according to Johnston and Schembri (1999)), manual code (fingerspelling[3]), deictics[4], interactives[5] and numbers[6], in attempting to minimize variation in the production of signs and achieve a more precise comparison between sign production in FNI and CF contexts.

To elicit the Contrastive Focus, alternative signs (Appendix A), phonetically similar to the target signs (with only one parameter differentiating them), were selected. These signs were used in the questions (Appendix B). One potential reason for the addressee’s inquiry could be the confusion in understanding the interlocutor's message, stemming from a sign being phonetically similar to another sign. For instance, 'cat' might be mistaken for 'rat' in the following example:

(11) A: “I saw a cat” (control-statement)
B: “You saw a rat?” (question)
A: “No, I saw a **cat**”. (expected answer with Contrastive Focus)

4.2 Utterances elaboration

With the target signs and alternative signs selected, 20 control statements[7] (CS) (without focus) and 20 echo-questions (Q) about these statements were created[8], with the aim

[2] Classifiers is a type of layering and can be described as “certain handshapes in particular orientations to stand for certain semantic features of noun arguments” (Frishberg, 1975, p. 715). Their production is subjected to intra- and inter-signer variation.
[3] Fingerspelling is a manual representation of the orthography of the country’s spoken language (in the case of Brazil, it is Brazilian Portuguese), in which a specific hand configuration represents a written language letter in the country’s legal spoken language (Quadros; Karnopp, 2004).
[4] Deictics were excluded from our analysis because they require presupposition. They represent referents that “are introduced in the space in front of the sign, by pointing at different locations. The verb forms for person are established through the beginning and end of the movement and the direction of the verb, incorporating these points previously indicated in the space for certain referents.” (Quadros; Karnopp, 2004, p. 112).
[5] Interactives appear to be similar to interjections and exclamations in spoken languages.
[6] Numbers are a flexion that indicates if the sign is singular dual, trial or multiple (e.g. one month, two months, three months, in which the hand configuration changes according).
[7] The citation form represents the most basic form of a lexeme that uniquely identifies it and conveys its core or essential meaning (Johnston; Schembri, 1999).

of eliciting FNI (Appendix B) and CF (Appendix C) in the Participants' Responses[9] (R). The following table illustrates the experiment:

Table 5 – Experiment example

	FNI	**CF**
CS (written in BP glosses)	MAN SELL BREAD	
Q (Libras)	MAN SELL WHAT[10]?	MAN SELL BUS?
R (Libras)	MAN SELL **BREAD**	(NO) MAN SELL **BREAD**

Source: Prepared by the author.

As observed, the FNI is the constituent that replaces the *wh*-element in the question (Q), since the traditional pragmatic use of focus involves highlight the portion of a response that corresponds to the *wh*-element of a constituent question. The CF, on the other hand, is the element that replaces the mistaken information by another possible alternative, with the purpose of pragmatic correction. This experiment structure can collect other types of information in FNI and CF cases: by using other *wh*-elements in the case of FNI and by replacing other constituents in the CF (e.g., other possible direct objects instead of BREAD in Table 5). The target signs, *wh*-words (in FNI questions), and the alternative signs (in the CF questions) in the experimental task are situated in the same phrase position relative to other signs: all subjects are in the initial position, verbs in the second position, objects in the third position, and color adjectives and locatives in the fourth/final position of the sentence (for examples, refer to Appendix B and C), following the SVO(A) order. In relation to the questions in our experiment, we opted for echo-questions[11] to express that the individual asking the questions correctly presupposes part of the information (the old information) (e.g., that a man is selling something), but encounters difficulty understanding another part of it (the target sign / the new information) (specifically, that the item being sold is bread).

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[8] The CS and questions were created by the student investigator and reviewed in collaboration with the interpreter responsible for translating the research terms. We chose this particular interpreter because she has been actively working in the Sao Carlos Deaf Community, holding a professional position at the Municipal City Hall of Sao Carlos, and is experienced in interpreting in conferences, speeches, and other academic and educational events. Additionally, she had her first contact with the Deaf community when she was 13 years old, she has been formally studying Libras for the past 8 years, and she graduated in Libras interpretation and translation from the Federal University of Sao Carlos.

[9] The question-answer pair is frequently used to discern how information is linguistically treated (Lillo-martin; Quadros, 2008).

[10] To elicit FNI, we maintained the same *wh*-constituent for the different target signs classes (e.g. WHO (QUEM) to elicit subjects, WHAT to elicit objects (O QUE) and color adjectives (QUAL), DO-WHAT (FAZER O-QUE) to elicit verbs, and WHERE (ONDE) to elicit locatives).

[11] A direct question, in which the sentence or part of the sentence is repeated, in order to clarify or confirm (part of) the information.

These sentences included different forms of focus, such as broad, parallel, restricting, selecting and expanding focus. Every experimental sentence, including the distractors, was written in simplified glosses[12]. In previous studies in which the student investigator participated, deaf participants faced difficulties in understanding glosses. The issue arises from the use of a notation that involves symbols and other conventions that can be complicated for non-experts to comprehend. For instance, the sentence "eu fui para a escola" ("I went to the school") would be represented in conventional Libras glosses (Paiva *et al.*, 2016) as follows: "$_1$IR CASA^ESTUDAR" ("$_1$GO HOUSE^STUDY"). Anticipating this difficulty, for the participation of the deaf community in our experiment, we would gloss this sentence as "EU IR ESCOLA", for example, facilitating their understanding. When the experimental task was applied to the deaf participants, none of them encountered difficulties in understanding the glossed sentences, except for a few sentences that were considered ambiguous and couldn't be predicted beforehand. Some of the ambiguous sentences were removed from our analysis. Moreover, the conventional Libras notation was utilized (Paiva *et al.*, 2016), but only for transcription purposes (Appendix E).

4.3 Ethical research

4.3.1 Research terms

To guarantee that the participants were aware of all legal information in the experiment task, the guidelines, and in the research, two different documents were recorded by a Libras interpreter: the Image Use Authorization Term (Attachment A) and the Informed Consent Term (Attachment B). The Libras version of these terms can be accessed through the QR Code provided in the respective Attachments. The Participant form is available in Attachment C, and the Research ethics committee's Approval term can be viewed in the Attachment D.

Copies of these terms, written in Brazilian Portuguese, were also available to them. However, it is important to highlight that written Portuguese is not their first language and each of them may have different levels of proficiency in Portuguese reading. Considering this, we attached the links just presented in those copies, so they have access to watch it whenever they prefer and ask questions if needed. The research was approved by the Research

[12] A conventional notation that has the function of representing signs of a sign language.

Ethics Committee (CAAE number: 47780021.4.0000.8142). Every participant signed the Informed Consent Term and the Use of Image Authorization Term. The interpreter also signed the Use of Image Authorization Term.

The Use of Image Authorization Term is important since one of the most important challenges found in signed research. Given that Libras is a visual-gestural language, anonymizing our analyses is a challenging task as each NMM, mainly the facial expressions, conveys important pragmatic and grammatical information. Due to our focus on analyzing NMMs, we collected, annotated, analyzed, and described complex visual information in form of video data. Consequently, presenting our results to others may lead to the clear identification of our participants.

4.3.2 Experiment

The questions of the experiment were also recorded in Libras by the same interpreter[13], but not the CS, since it is not possible to use Libras to elicit Libras, as we intend to analyze and compare the CS productions with the participants' responses (R). The decision of eliciting data was made as the exact contrast between FNI/CF in the same contexts is not easily found in spontaneous data, at least not for the direct purpose of comparing both type of focuses, which necessitates the research method of eliciting data. However, Libras, like other sign languages, does not have a widely accepted written form for representing signs within the Deaf Community. This complicates the task of eliciting specific grammatical phenomena. Thus, although the use of glosses is usually not recommended for signed linguistic analyses, we chose to use simplifying glosses to elicit the signs in the present study. This decision was based on our belief that images and videos could evoke a greater number of interpretations and, consequently, a broader range of signs. On the other hand, we were advised to use images of avatars producing the signs, such as those found in Capovilla *et al.*'s dictionary (2017). However, as our study includes prosodic analysis, presenting an image of a sign being produced in its citation form could potentially influence the way participants produce signs. Additionally, using Libras to evoke Libras was not feasible, as participants would only choose

[13] Given that the student investigator is an intermediate signer of Libras, we chose to have a proficient signer recording the Libras questions. The Department of Linguistics at the State University of Campinas (UNICAMP) funded the interpreter services for the translation of the research's ethical documents and the experiment's questions. Nevertheless, we acknowledge the potential for bias from a second language user.

to imitate the sign production (at least its main features[14]) from the video presented to them. It would be the same as, in a spoken language such as English, saying: “Please say/pronounce the following statement: 'My grandfather died two days ago and now I am sad'”, in which the participants would only imitate the prosody of the interviewer voice. If there wasn't a need to capture the precise contrast between FNI and CF, then a good option would be a semi-structured interview, in which the student investigator would be able to follow a script with questions or tasks, but the participant would have more flexibility to respond and explore topics as the interview progresses. There are other possibilities as well to collect more naturalistic data within the experimental methodology, but in the present study we opted for the elicitation one based on the arguments just presented.

Thus, to balance this scenario, we opted to use simplified glosses with the support of images to evoke the CS, and videos with questions in Libras to evoke the answers. Most of the recorded participants understood the task and successfully completed the experimental questions, with only one not comprehending the task and subsequently being excluded from our analysis. However, it is important to note that linguistic glosses used in studies of sign languages are merely simplified linguistic representations of the multidimensional visual information captured in a corresponding video (Frishberg *et al.*, 2012; Crasborn, 2015).

This led us to the conclusion that more signed data corpora are needed to ensure that future research is not contingent on the methodology of eliciting data, providing data that better represent the language’s functions.

> Given that information structure is most visible when sentences are analyzed as a part of discourse, and given the recent increase in the development of sign language corpora, much more research in this field should be done using naturalistic corpus data (Kimmelman; Pfau, 2021, p.20).

However, the questions were recorded in Libras by the interpreter, because, from the prosodic point of view, a question mark (Figure 19) is different from the signing of an assertive sentence[15]. The final version of the experiment can be seen in Figure 20:

[14] As observed in studies on various spoken languages (Amin; Marzilian; German, 2012; Catani; Hanada, 2022; Delvaux *et al.*, 2018; Kitamura, 2008), when the aim is to imitate someone’s voice, the speaker tends to approximate (or even exaggerate) their acoustic parameters to those of the target speaker.

[15] When marking affirmations in Libras, signer nod their heads. Generally, affirmative NMMs are related to structures with focus (Pizzio *et al.*, 2009).

Figure 19 – *wh*-question marking in Libras

Source: Quadros and Karnopp (2004, p.133).

Figure 20 – Data collection experiment

CS: MAN SELL BREAD (written in modified glosses in Brazilian Portuguese)
Q: MAN SELL WHAT (recorded by the interpreter, in Libras)
R: MAN SELL **BREAD** (Produced by the participants, in Libras) (Expected answer)
Source: Prepared by the author.

4.4 List of libras glosses

Before the experiment, participants were asked to read and sign a list of glosses that typically can result in more than one sign. That means there are different signs for the same meaning. This task was designed to ensure that every participant produced the same signs elicited by the glosses, since different signs result in different coarticulations. If the sign produced was not the expected one, the researcher then asked them to think of another possible sign to represent that meaning. If the participant could not reach the expected sign by themselves, the researcher would then sign it for them.

4.5 Data collection

We collected linguistic data from ten deaf participants (six men and four women), aged between 20-46 y.o., from Sao Carlos Deaf Association (‘Associação de Surdos de São Carlos’, ASSC). The data from one man was discarded, since he was unable to effectively understand the experimental task. Thus, the total number of participants is nine (five men and 4 women, all born deaf). One woman had her data collected virtually through the Zoom platform, as she was not available to participate in person during the data collection period in the city of Sao Carlos. All these participants were born deaf, with nine participants with profound hearing loss and one participant with severe hearing loss. They use Libras every day with their families, hearing and deaf friends, at work/university, etc. They self-declared themselves as fluent in Libras. On a scale from 0 to 5, 1 participant checked option “4” and 9 of them checked the maximum option “5” in the following question: “On a scale of 0 to 5, what do you think is your level of fluency in Libras?”. The age at which they acquired Libras and the duration of oralization therapy varies among the participants (for more information, refer to Attachment F).

On the data collection day, videos of the interpreter giving instructions about the experiment were shown to the participants. Then they were asked to sign the legal terms and review a list of Libras glosses. Finally, the experiment began. All instructions can be accessed through the following QR Code:

(https://drive.google.com/file/d/1TUAxUWF4HBsyQTxeE7izy3DsI3unMvZX/view)

The interaction between the student investigator and the participants was conducted in Libras, including addressing any potential questions they might have. This approach was adopted to ensure that the experiment took place in a sign language-friendly

environment. All sentences (with their respective questions) were randomly presented to prevent the participant from noticing the type of focus we intend to analyze. The order of sentences appearance was randomized through the website www.random.org/lists/ (Random, 1998-2024). Regarding the same purpose, a total of 30 distracting questions were added to the experiment (Appendix D). The participant read and signed the CSs, written in Brazilian Portuguese simplified glosses and accompanied by an image that helped them to understand the meaning of the CS (Figure 20), following the glosses order. Then, a brief video (of up to ten seconds) of the interpreter asking a question about the CS was presented, in Libras. After watching it, the participant answered the question, looking at the camera. This methodological approach (glosses related to an image) is similar to other studies such as Sandler (2010), Tyrone *et al.* (2010), Xavier (2013) and Dachkovsky and Sandler (2009). The experiment was presented to the participants with a visual stimulus on a notebook screen, through a Microsoft Power Point program, in which no statement was in bold, indicating the expected slot for the focus production. The equipment used for the data collection was a handcam video camera, JVC brand, model Everio GZ-HD300BU and tripod.

4.6 Videos edition

After the data was collected, the video editing process began. The videos of all participants were cut in the Movavi Video Editor program, first separating both the FNI and CF utterances from the distractors (broad, parallel, restricting, selecting, and expanding focus), and then separating the FNI from CF utterances. Finally, these videos were adjusted for brightness, contrast, and sharpness.

4.7 Data extraction

4.7.1 Annotating manual signs using ELAN

One of the main challenges faced by sign languages researchers is how to segment signs in an utterance. In our study, we identified the beginning of an utterance at the exact moment the hand left its initial position and the end at the exact moment the hand started to return to its initial position or stopped in the signing space, before returning to their first static position. The start of the sign was determined by its constitutive parameters (except for

NMMs), and the end when the hand left its configuration to perform the next sign or returned to its initial position. It is important to note that if these conditions were not satisfied, we considered it a transition (e.g. when the signer leaves the hand in the signing space for a few seconds to think). Figure 21 illustrates the beginning and the end of the utterance EU ABRAÇAR AMIG@ "I hug a friend", as well as the beginning and the end of the signs:

Figure 21 – The beginning and the end of the utterance in Libras

Source: Prepared by the author.

During the transcription of MSs in the ELAN Program (version 6.1), four tiers were created, as can be seen in Table 6:

Table 6 – ELAN tiers

Tier	Description	Example
Literal glosses reproduction (LGR)	Elicited answer that are identical to the CS, including the same sign variants and the exact order of glosses. These utterances were transcribed in Libras glosses.	CS and elicited answer: EU TER LIVRO MARROM (I HAVE BOOK BROWN)
Non-literal glosses reproduction (NLGR)	Elicited answer that differs from the CS, featuring a different sign order and, in some cases, different sign's variant. These utterances were transcribed in Libras glosses.	CS: TER COR MARROM (HAVE COLOR BROWN) Elicited answer: DIFERENTE ROXO, É COR MARROM (DIFFERENT PURPLE, IS COLOR BROWN).
Libras	Individual MSs that were transcribed in Libras glosses	EU (I); TER (HAVE); LIVRO (BOOK); MARROM (BROWN).
Extra movement	MSs that occurred simultaneously to another MS or NMM.	

Source: Prepared by the author.

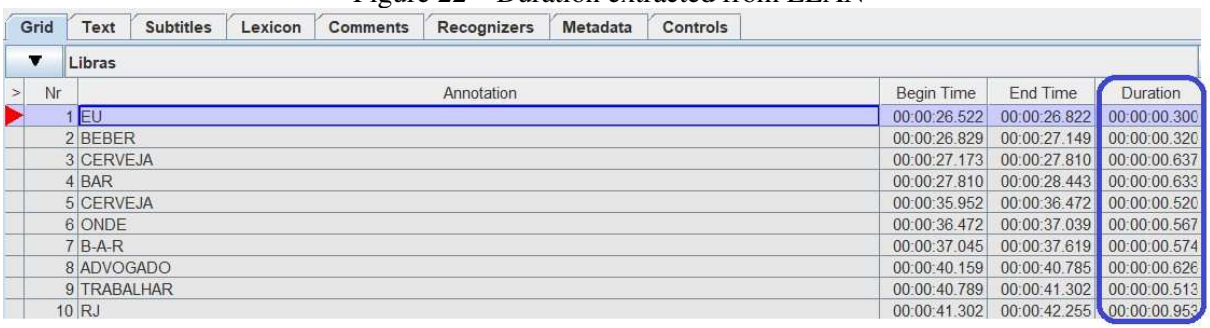
4.7.1.1 Duration

In speech, researchers analyze prominence and the effects of boundary marking by measuring duration (seconds), amplitude (dB), and frequency (Hz). In signing, we need to evaluate physical characteristics of sign movement, such as duration, displacement (in

centimeters), and velocity (in centimeters per second) (Wilbur, 1999). Although values of amplitude (displacement) and velocity of MSs are important for understanding stress, we did not include them in the analysis because we do not have access to equipment capable of measuring the MSs displacement in centimeters. The same apply for the analysis of torso movements. Thus, after segmenting and transcribing MSs, we tabulated the duration values.

The duration of signs and utterances (in milliseconds) was obtained from the ELAN Program, as depicted in Figure 22. Furthermore, the normalized duration, which is the raw duration of MSs divided by the utterance duration, expressed as a percentage, was also annotated. This normalization was done to account for individual differences in signing rate among participants.

Figure 22 – Duration extracted from ELAN



>	Nr	Annotation	Begin Time	End Time	Duration
	1	EU	00:00:26.522	00:00:26.822	00:00:00.300
	2	BEBER	00:00:26.829	00:00:27.149	00:00:00.320
	3	CERVEJA	00:00:27.173	00:00:27.810	00:00:00.637
	4	BAR	00:00:27.810	00:00:28.443	00:00:00.633
	5	CERVEJA	00:00:35.952	00:00:36.472	00:00:00.520
	6	ONDE	00:00:36.472	00:00:37.039	00:00:00.567
	7	B-A-R	00:00:37.045	00:00:37.619	00:00:00.574
	8	ADVOGADO	00:00:40.159	00:00:40.785	00:00:00.626
	9	TRABALHAR	00:00:40.789	00:00:41.302	00:00:00.513
	10	RJ	00:00:41.302	00:00:42.255	00:00:00.953

Source: Screenshot from ELAN (version 6.1).

4.7.1.2 Tabulation of manual signs

It is possible to observe the responses of each participant with elicited FNI and CF in Appendix E. This appendix is related to the statistical analysis, where the red color indicates answers (and their corresponding CS) that were excluded from the analysis. In the footnote accompanying each utterance, readers will find an explanation of the reason for exclusion. The main reasons were:

a) the participant did not understand the experimental task, either in the CS or during the answer production;
b) the answer is a literal reproduction of glosses (LGR), while the CS was produced non-literally;
c) the meaning of the CF question was ambiguous, leading the participant to interpret it differently;

d) target signs were produced using a different linguistic variant or were fingerspelled compared to the other participants.

We were unable to tabulate utterances like (b) in one of the categories of LG or NLGR, as we did with the other utterances. However, these utterances were not excluded from the qualitative analysis.

Regarding (c), upon the completion of the experiment, we recognized that two CS and their corresponding questions were ambiguous. We decided to select the intended meaning we had originally planned to elicit. As a result, participant answers that interpreted the sentences differently were excluded to ensure consistency in the meaning of the responses among all participants. The three ambiguous sentences were:

- CS: PEDAGOGO APRENDER LIBRAS (PEDAGOGUE LEARN LIBRAS) / Q: PROFESSOR APRENDER LIBRAS (TEACHER LEARN LIBRAS)?

  There was a potential for interpreting PEDAGOGUE and PROFESSOR as either synonyms or as two distinct careers with different functions. For our experiment, we chose the latter interpretation, aiming to contrast two different pieces of information.
- CS: EU ESPERAR ONIBUS EMPRESA (I WAIT BUS COMPANY) / Q: VOCÊ ESPERAR ÔNIBUS RODOVIÁRIA (YOU WAIT BUS BUS-STATION)?

  There was a potential for different interpretations regarding waiting for the bus from the company or waiting for the bus at the company. In this case, we selected the option of waiting for the bus at the company, as indicated by the FNI question: VOCÊ ESPERAR ÔNIBUS ONDE (YOU WAIT BUS **WHERE**)?
- CS: EU LER RECEITA (I READ RECIPE) / Q: VOCÊ ESCREVER RECEITA (YOU WRITE RECIPE)?

  This sentence could potentially be confused with Restricting Focus due to the association between the actions of writing and reading in relation to a recipe. Some may understand the question as: “Have you both written and read the recipe?”, while others may interpret as “Have you written the recipe, instead of reading it?”. In this case, we selected the second interpretation, as we are analyzing CF contexts. Answers that contained the particle SÓ (ONLY) were excluded since they presuppose the first interpretation. Despite the existence of two other responses with the particle SÓ (ONLY), we opted for maintaining them in the quantitative analysis, since they do not appear to be confused with the Restricting Focus. This is because their target signs are

not semantically related and do not presuppose each other (e.g. BUS and BREAD / GREY and LIGHT-PURPLE)[16].

To address the potential exclusion based on sign variation (d), we had initially planned for participants to review a list of signs. However, even after practicing, some participants chose to use specific sign forms to represent certain meanings that were not anticipated beforehand. Examples of such signs include CRIANÇA 'child', MARROM 'brown', LIVRO 'book', PÃO 'bread', and RECEITA 'recipe'.

When a target sign, such as MARROM 'brown', PÃO 'bread', and BAR 'bar', was produced with a variant that was not expected, it was excluded from both the LGR and NLGR categorization and analysis. But if a non-target sign, such as CRIANÇA 'child', LIVRO 'book', and RECEITA 'recipe', was produced with a different variant, it was only excluded from the LGR analysis. The variant selected for analysis was the one produced most frequently by most of the participants in the experiment data.

The yellow color in Appendix E represents LGR. As previously mentioned, LGR refers to instances where participants repeated the CS signs as elicited by the glosses to respond to the experimental question. This means that their answers contain the exact same signs, sign variants, and order, but may differ in terms of prosodic aspects. We divided the utterances into categories of LGR and NLGR, considering the coarticulation process and the possibility to investigate both prosodic and foregrounding structures. MSs in LGR are expected to have similar duration, amplitude and intensity levels across participants, due to normalization procedures. This is because participants are reproducing the signs exactly as they were elicited by the glosses. On the other hand, MSs in NLGR reproduction may exhibit more variability in these characteristics. For more detailed results and analysis, please refer to Chapter 5.

On the other hand, NLGR (blue in Appendix E) refers to instances where participants produced answers with different sign order or provided a different ordered response compared to the CS glosses. In both cases, it is possible to note that participants included additional information in their answers that were observed during the qualitative analysis, as discussed in section 5.1.3.2 (explanation of the target sign) or section 5.1.5 (CF

[16] However, after the analysis, we noticed that those signs can be syntactic related to the verb or to the object, as a mean of expressing "both", as follows: "HOMEM **VENDER** PÃO/ONIBUS (MAN SELL BREAD/BUS) 'The man sells both bread and bus'" and "MULHER COMPRAR **ROUPA** LILÁS/CINZA (WOMAN BUY SHIRT LIGHT-PURPLE/GREY) 'The woman bought both light-purple and grey shirts'". Therefore, it is important that future research investigate whether those utterances are indeed expressing Restricting or CF.

negation). However, for the quantitative analysis, only main utterances were included, which is indicated by bold formatting in Appendix E.

All the utterances in the Appendix E were transcribed in Libras glosses, following the "Transcription system for Brazilian sign language: the case of an avatar" (Paiva *et al.*, 2016). The colors used (red, blue and yellow) are only relevant to the quantitative and statistical analysis. Tabulation of the manual signs data was done using Excel, and the data was organized in separate columns:

Table 7 – Data tabulation

Columns	Description
Strategy	Literal gloss reproduction (LITERAL)
	(S)(V)(O)(A/L)
	Only the target sign (WH)
	Doubled construction (DUPLICATION)
	Topicalization (TOPIC)
	Cleft-like structure (CLEFT)
	Pseudocleft-like structure (PSEUDO)
	Explanation of the target sign (EXPLANATION)
	Lexical enhancement (ENHANCEMENT)
Focus	Control-statement, without Focus (CS)
	Focus of new information (FNI)
	Contrastive focus (CF)
Target sign[17]	Non-target sign (NK)
	Target sign (TARGET)
Sex	Female (FEMALE)
	Male (MALE)
Participant	Male-participant (MP1, MP2, MP3, MP4, MP5)
	Female-participant (FP1, FP2, FP3, FP4)
Signs classes	Subject (SUBJECT)
	Verb (VERB)
	Object (OBJECT)
	Color adjective (ADN.ADJ)
	Locative (LOC)
Manual signs	MSs produced in the participants' answers
Manual sign duration	MSs raw duration, in milliseconds
Final lengthening	Final sign (FINAL)
	Non-final sign (NF)
Utterance duration	Utterance raw duration, in milliseconds
Normalized duration:	MSs raw duration divided per utterance duration, in percentage
Number of	Number of movements

[17] When the target sign was duplicated in the sentence, we considered as target sign the sign that: 1) was topicalized (e.g. **MARROM** EU TER LIVRO MARROM meaning **BROWN** I HAVE BOOK BROWN); 2) appeared first in the sentence (e.g. **DOCE** GUARDANAPO DOCE meaning **CANDY** NAPKIN CANDY) or 3) appeared in the canonical position (in the CS) in the sentence (e.g. **PEDAGOGO** APRENDER LIBRAS PEDAGOGO meaning **PEDAGOGUE** LEARN LIBRAS PEDAGOGUE).

movements in manual target signs[18]	
Shrugged shoulders[19]	Citation movement (1)
	Slightly intensified (2)
	Very intensified (3)

Source: Prepared by the author.

4.7.2 Coding action units and head movements using FaceReader

We sought the assistance of Professors Sandra Madureira and Mario Fontes for analyzying of our video data using the FaceReader software. They possess expertise in utilizing the program and have access to its latest version (9.1) Professor Sandra Madureira[20] is from the Applied Linguistics and Language Studies Program, and Professor Mario Fontes[21] is from the Computer Science Department, both at the Pontifical Catholic University of Sao Paulo city (PUC SP). For further information about the use of FaceReader for NMMs analysis refer to Hanada (2023).

4.7.2.1 Calibrations

Prior to conducting the automatic coding, the professors performed a calibration/normalization process on each subject's face. This was done to correct any potential person-specific biases towards certain emotional expressions. For instance, if an individual had naturally lower outer eyebrows (as shown in the second eyebrow from Figure 23), the FaceReader program would automatically interpret this person as "sad", even if it was just the person's neutral expression. This could have impact on the analysis of Action Units. Similar situations could occur with other facial features such as mouth, nose, cheeks, and so

[18] Target and non-target signs in literal gloss reproduction sentences and only target sign in non-literal gloss reproduction. Besides, this tabulation did not include the target signs color adjectives LILÁS (light-purple) and MARROM (brown), since their movement is restricted to their location (see Appendix A).

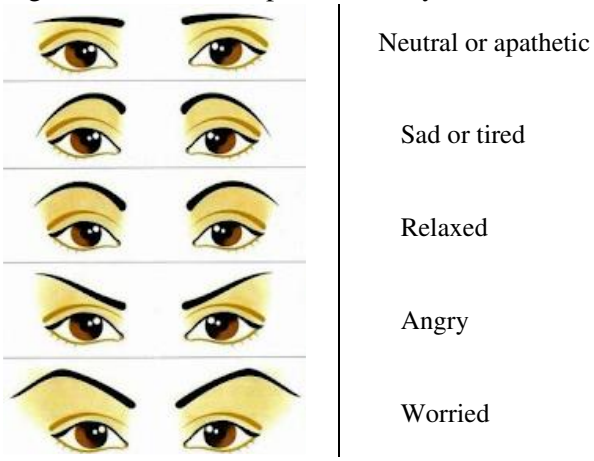
[19] The citation form of the signs HUG  (Dicionário, 2022) and RIO-DE-JANEIRO  (TIMÓTEO, 2019) are already produced with shrugged shoulders in Libras. In other words, shrugged shoulders seem to constitute the signs. Therefore, these signs were tabled as citation form of shrugged shoulders in the quantitative analysis.

[20] Sandra is the founder and leader of the Research Group on Speech Studies (GeFALA), researcher at the Research Group on Dynamic Analysis and Modeling of Speech Prosody, founder and coordinator of the Integrated Laboratory of Acoustic Analysis and Cognition (LIAAC) and member of Luso Brazilian Association of Speech Sciences (LBASS)(CV lattes: http://lattes.cnpq.br/8276302402805618).

[21] CV lattes: http://lattes.cnpq.br/6248409414144759.

on. Therefore, the purpose of the calibration process was to ensure accurate analysis for each participant.

Figure 23 – Natural aspects of the eyebrows



Source: Borboleta […] (2015).

FaceReader provides two different options for facial calibration:

a) participant calibration: used to analyze videos or images when the experimental setup allows the capture of a neutral face before the experiment;
b) continuous calibration: used in camera analysis when the experimental setup does not allow the capture of a neutral face before the experiment. Calibration is done continuously throughout the analysis process to account for any changes in facial expressions.

We selected the continuous calibration, as we were unable to capture a neutral face of the participants before the experiment. During the initial phase of the experiment, the participants interacted with the student investigator to understand the experiment instructions. Subsequently, they read the Libras glosses and answered the questions asked.

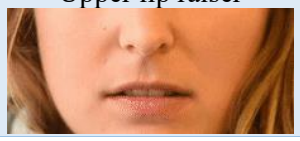
4.7.2.2 Action Units – Facial Action Coding System

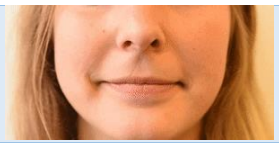
When we describe facial expressions, we refer to movements that are the result from the muscles contractions on the facial skin. Ekman, Friesen, and Hager (2002) developed a notation system titled Face Action Coding System (FACS). This notation system (used by FaceReader to categorize facial movements) can be described as a comprehensive system that anatomically describes facial movements and breaks them down into individual

components of muscle movement, known as 'Action Units' (AUs) (Ekman group, 2022). Table 8 provides an example of some AUs that are recognized by the program.

Table 8 – FACS Action Units

FACS action units

AU		AU	
01	Inner brow raiser 	**15**	Lip corner depressor 
02	Outer brow raiser 	**17**	Chin raiser 
04	Brow lowerer 	**18**	Lip pucker 
05	Upper lid raiser 	**20**	Lip stretcher 
06	Cheek raiser 	**23**	Lip tightener 
07	Lid tightener 	**24**	Lip pressor 
09	Nose wrinkle 	**25**	Lips part 
10	Upper lip raiser 	**26**	Jaw drop 
12	Lip corner puller 	**27**	Mouth stretch 
	Dimpler		Eyes closed

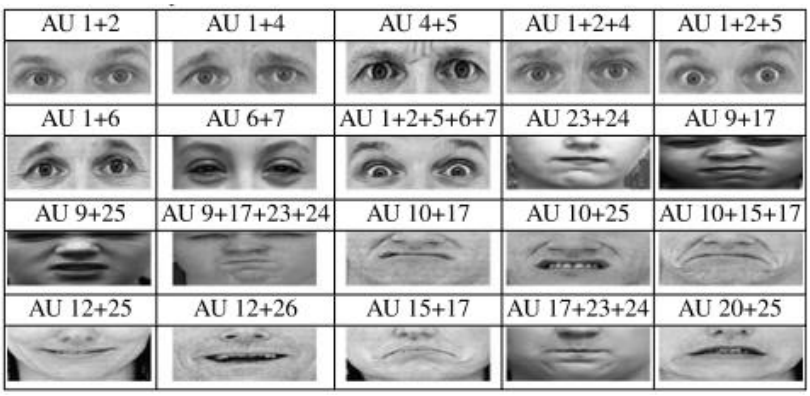
14		**43**	

Source: Farnsworth (2022).

The red color in this table signals AUs that were excluded from our analyses. Since the experimental task involved reading the glosses and signing them while looking at the camera. Despite the glosses being written in capital letters and researchers zooming the glosses, participants who wore glasses, in the attempt to read the sentences, slightly closed their eyes, resulting in the activation of the Brow lowerer (AU 04) and Lid Tightener (AU 07). Additionally, every participant mouthed almost every sign of the sentences, which led to the exclusion of Lip Pucker (18), Lip Pressor (24), Lips Part (25) and Jaw Drop (26).

In their research, the Paul Ekman Group identified approximately 40 AUs and examined the results of various combinations of them, ranging from two-way to six-way combinations. Figure 24 illustrates some of these combinations.

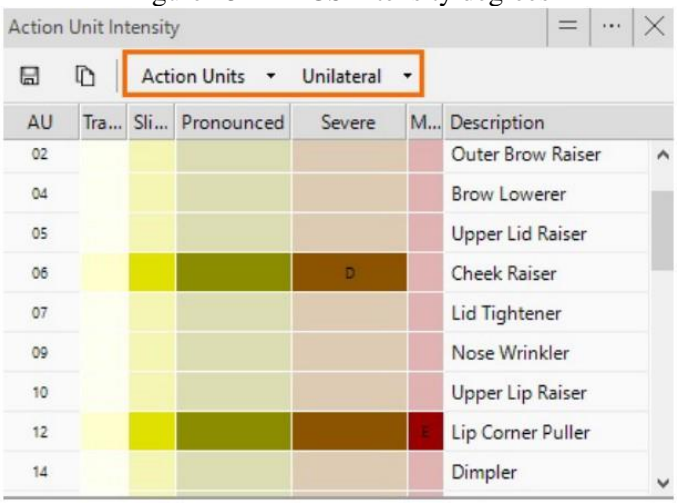
Figure 24 – Combinations of FACS action units



Source: Tian, Kanade; Cohn (2011, p.491).

In addition to annotating AUs and their combinations, the program also automatically categorizes AUs according to their intensity levels. Figure 25 provides an illustration of the intensity categories used in the program.

Figure 25 – FACS Intensity degrees



Source: FaceReader Reference Manual 9 (p. 262).

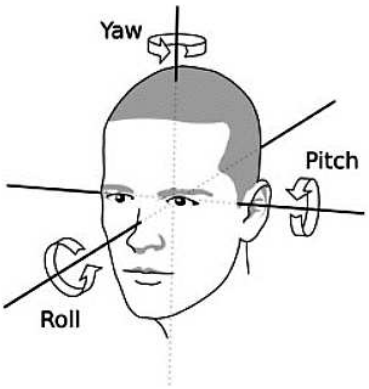
Since our research aims to investigate the differences in the production of MSs and NMMs between two focus conditions, it is important to examine whether the AUs, produced in these two contexts, differ in intensity. Our hypothesis is that AUs in CF sentences, as well as head movements, will be produced with more intensity than AUs in CS and FNI utterances.

AUs intensities: 0 to 1, in which Not active is from 0.00 to 0.100; Trace (A) is from 0.100 to 0.217; Slight (B) is from 0.217 to 0.334; Pronounced (C) is from 0.334 to 0.622; Severe (D) is from 0.622 to 0.910; and Max (E) is from 0.910 to 1.000 (Face Reader Reference Manual 9, p. 265) (see Figure 25).

4.7.2.3 Head movements

As mentioned, the program also recognizes and annotates head movements. This recognition is made through three different variables: yaw, pitch, and roll:

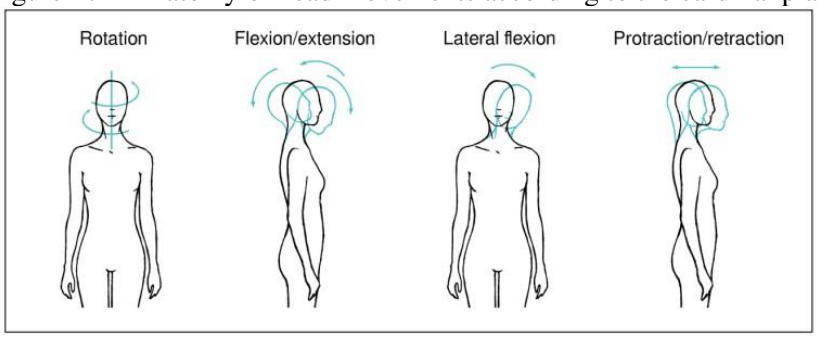
Figure 26 – Head movements



Source: FaceReader Reference Manual 9 (p.287).

By comparing these with the head movements anatomy described by Puupponen (2018) (Figure 27), it is possible to say that yaw is equivalent to head rotation, pitch to head flexion / extension, and roll to lateral flexion. In the program, the default range for pitch and yaw values is -30° to 30°, in both directions. Roll, however, is not factored for minimum or maximum allowed values.

Figure 27 – Anatomy of head movements according to the cardinal plan

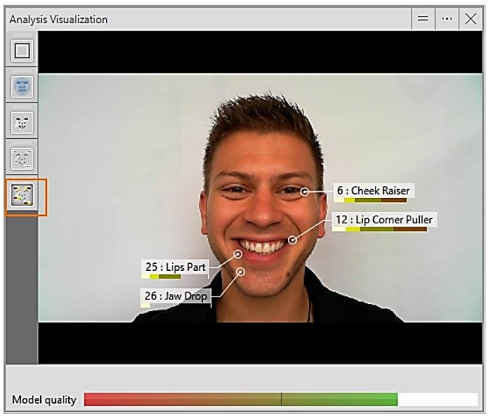


Source: Puupponen (2018, p.180).

From these head movements, protraction / retraction is the only one not coded by FaceReader. We transcribed this movement in the ELAN program using three levels of intensity. Pitch and yaw values also support the program to determine the image quality for modeling face and automatic coding, specifically how accurately the program can identify AUs, in which the video being analyzed is assessed for its quality, which is represented by the following colors: red for bad quality, orange for medium quality, and green for good quality. The video is considered to have sufficient image quality for facial coding when the green color crosses the dashed line. The dashed line indicates the minimum model quality required

for a model to be considered valid, representing the default value of 0.5. This is because 0 represents low quality, while 1 represents high quality.

Figure 28 – Model Quality



Source: FaceReader Reference Manual 9 (p. 96).

During the data extraction, professors Mario and Sandra observed that the FaceReader successfully detected facial expressions and head movements for participants who did not wear glasses, have a beard or any other facial features. However, the recognition of participants' face with beard or glasses was not as accurate as it was for individuals without these characteristics. Following this perspective, we calculated the average of the maximum values for Model Quality and presented them in the following tables (Table 9 for male participants and Table 10 for female participants). In these tables, when participants wear glasses or have beard, the model quality is lower than 0.699. However, it is worth noting that 0.699, as well as the lowest MP2 value (0.691), are still higher than the default value 0.5, representing enough quality for facial modeling. This indicates that the Model Quality for every participant falls within the medium-good to good range.

Table 9 – Male Participants Model Quality and features

	MP1	**MP2**	**MP3**	**MP4**	**MP5**
Model Quality	0.697	0.691	0.698	0.699	0.699
Glasses	X				
Beard		X	X		

Source: Prepared by the author.

Table 10 – Female Participants Model Quality and features

	FP1	FP2	FP3	FP4
Model Quality	0.714	0.699	0.698	0.702
Glasses			X	

Source: Prepared by the author.

It is important to note that FP4 was the only participant who was virtually recorded through Zoom meetings. Since FP4 was recorded virtually, she was positioned closer to the camera than the other participants. Despite this, her value remains among the highest Model Quality, suggesting that the difference between recording virtually or in person does not appear to have a significant impact on Model Quality, or that it might be compensated by the distance of the participant in relation to the camera.

Since the student investigator has already analyzed signed data in FaceReader in a previous study, we anticipate that the presence of certain facial characteristics, such glasses and beard, would affect the Model Quality of FaceReader. However, considering that beard can be an important part of individuals' identity and glasses are necessary for reading Libras glosses, we didn't request participants to remove them.

Moreover, we intended to collect data of 10 participants (5 men and 5 women). Despite our efforts, we were able to collect only 9 participants (5 men and 4 women). In other words, Sao Carlos Deaf Community (and typically other Deaf communities as well) doesn't comprise a large number of individuals. Therefore, selecting participants exclusively without facial features, such as glasses and beard, would make it even more challenging to collect data within the community.

It is important to mention that there are promising advancements in automatic annotation tools for signed prosody (Karppa *et al.*, 2012; Puupponen *et al.*, 2015) that offers the potential of conducting reliable large-scale analyses. In this study, we utilized the FaceReader program for the automatic coding of Actions Units and head movements in signed data (Hanada, 2023). However, the analyses using this program are still limited and more studies of this kind are necessary to assess the effectiveness of its automatic analysis in accurately capturing the structure and expression of signed languages.

Although we have analyzed manual signs, facial expressions, and head movements, we did not evaluate torso leaning movements and its amplitude nor manual signs amplitude and speed because we do not possess softwares that can extract such values. It is known in the literature that leans participate systematically in the CF marking in ASL (and in Catalan Sign Language: Barberà 2012; 201): leans backward reject and forward correct

information (Wilbur; Patschke, 1998; van der Kooij; Crasborn; Emmerik, 2006) According to Crasborn and van der Kooij (2013), the location that have been introduced determine the lean direction. The head/torso leaning can be understood as an intonational characteristic with the objective of emphasizing certain manual signs. Their hypothesis suggests is that body leans may also serve for highlighting information focus. In CF, for example, "in the response the constituent from the question that is to be replaced is repeated while leaning to one side, followed by the replacing constituent which is produced while leaning to the other side" (Crasborn; van der Kooij, 2013, p. 531). The analyses of torso would also serve other types of contrastive focus, such as the parallel focus [22](left-right or forward/backward locations) (Crasborn; van der Kooij, 2013) or selecting focus (forward) (Wilbur; Patschke, 1998).

4.7.2.4 Data tabulation: AUs

We received the data of AUs and head movements in *.txt* archives and converted them into editable *.xlsx* format. Prior to tabulation for quantitative analysis, the columns in Attachment E were excluded. We coded the AUs that were produced simultaneously with MSs. However, the majority of MSs filled out more than one line in the Excel table. For example, the sign ADVOGADO 'lawyer' was produced by MP1, starting at 00:37:758 and ending at 00:38:793. Based on the video time, we then extracted the maximum values of AUs, and head movement's values, as indicated by the blue line in Figure 29.

Figure 29 – Maximum values of AUs that accompany MSs

Video Time	AU 01	AU 02	AU 04	AU 05	AU 06	AU 07
00:37.8	0.059178	1.84E-07	0.096398	0.041458	0.300343	0.095589
00:38.0	0.054754	1.43E-07	0.125569	0.042214	0.272423	0.114161
00:38.2	0.051154	1.16E-07	0.141218	0.04292	0.251716	0.143791
00:38.4	0.050224	9.7E-08	0.1481	0.043057	0.230005	0.136541
00:38.6	0.050188	7.6E-08	0.131784	0.042769	0.212457	0.143114
ADVOGADO (LAWYER)	0.059178	1.84E-07	0.1481	0.043057	0.300343	0.143791

[22] Two examples of the contrastive body shift in DGS from Bross (2020):

Source: Prepared by the author.

Since the signs were typically produced very quickly (700 ms on average), we chose to capture the AUs and head movements with the default frame rate of 5 frames per second (FPS). We retained the columns described in Table 11 for the quantitative analysis.

Table 11 – Columns retained for the Quantitative analysis

Column	Functionality
Action Units	The FaceReader program recognizes the 20 most common AUs. It provides options to analyze the data using the 'General', 'EastAsian", and 'Baby' face models[23]. Since our participants are all adults of occidental descent, we opted to use the General Face Model for analysis.
Mouth / eyes / eyebrows	The program can detect whether the mouth and the eyes are open or closed, as well as determining the position of the eyebrow: raised, neutral or lowered. The original column extracted from FaceReader categorized mouth movements as either OPEN or CLOSED. To conduct statistical analysis and compare its distribution with independent variables, all instances of OPEN mouths were converted to the numerical value of 1, while CLOSE mouths were assigned the value of 0. We applied the same methodology to the EYES columns (OPEN = 1 and CLOSE = 0), as well as the EYEBROWS (LOWERED = 0, NEUTRAL = 1, and RAISED = 2) column. Every value from these columns was reviewed by the student investigator.
Pitch / yaw / roll	Head orientations in degrees, deviating from looking straight forward. The maximum allowed angles for yaw and pitch are -30° and 30°[24], respectively. If the angles exceed these limits, the face model will be rejected by the program.
Quality	The accuracy for automatic coding is indicated on a scale from 0 (low quality) to 1 (high quality).

Source: FaceReader Reference Manual 9.

After the exclusion of the columns presented in Attachment E, we were able to tabulate 3,993 data points of duration of MSs and intensity of movements of torso and shoulders. We tabulated 21,190 data of AUs and head movements.

4.8 Quantitative analysis

During the quantitative analysis, we compared the measures of AUs, head, and hands movements with the strategies adopted (LGR, (S)(V)(O)(A/L), only the target sign,

[23] The Children and Elderly Models have become obsolete.
[24] For Statistical purposes, we converted the negative numbers into positive ones.

cleft-like, pseudocleft-like, doubled constructions, topicalization, lexical enhancement, or explanation of the target sign); target signs (target or non-target sign); sign classes (subject, verb, object, color adjectives or locatives), sex (male or female), and participants[25]. For each analysis, we compared the production of movements in three different contexts: CS; FNI and CF.

The statistical analysis was performed in the R program (R Core Team, 2013) (Oushiro, 2017), where the 1-way Analysis of Variance (ANOVA) (Barbosa, in preparation) was applied. The objective of this analysis is to evaluate the presence of a significant difference between the means of values associated with different levels of focus, based on the p-value. In cases where the distribution deviated from normality and exhibited unequal variances among groups[26] (checked using by Shapiro and Fligner tests), the non-parametric Kruskal test was utilized. All the results considered significantly different ($p<0.05$) in this study were extracted from a non-parametric analysis[27]. After tabulating the results, we categorized the AUs results according to the FACS intensity degrees:

Table 12 – FACS intensity degrees

Not active	0.00 – 0.100
Trace (A)	0.100 – 0.217
Slight (B)	0.217 – 0.334
Pronounced (C)	0.334 – 0.622
Severe (D)	0.622 – 0.910
Max (E)	0.910 – 1.000

Source: Face Reader Reference Manual 9 (p. 265).

The same categories names from Table 12 were applied to the results table below. Results where the AUs were categorized as "Not Active" in all three contexts (CS, FNI, and CF) were excluded. In the following table, it is possible to visualize all the results that are significantly different ($p<0.05$) concerning the three focus contexts and the independent

[25] Results of sex and participants will be addressed in chapter 5.2 (Inter-individual variation), given that social information collected in the Participant form will be essential to understand some of the results related to each participant.

[26] The use of the ANOVA model requires meeting three conditions: 1) The residuals of the distribution should follow a normal distribution; 2) The measured values should be independent; and 3) The variances of the measurements at each level should satisfy the null hypothesis of equality. This condition is commonly referred to as homoscedasticity (Barbosa, in preparation, p. 3)

[27] Since all results were obtained through a non-parametric analysis, the values presented in Appendix G represent the median values.

variables. However, each result needs to be interpreted in the context of its respective occurrence. We intend to conduct these analyses in the following chapter.

Table 13 – Significantly different results

Dependent variable		Independent variable	P-value	contrast	Focus		
					CS	FNI	CF
Manual signs	Normalized duration (%)	General results	0.000611	CS-FNI CS-CF	21%	20%	24%
		Target	2.827e-12	CS-FNI CS-CF	26%	35.8%	35.9%
		Non-target	0.000334	CS-FNI FNI-CF	19%	15%	20%
		Only the target sign	1.727e-13	CS-FNI CS-CF	23%	47%	58%
		Explanation	0.01481	CS-FNI	20%	9%	11%
		Final signs	1.353e-06	CS-FNI CS-CF	27%	32%	33%
		Non-final signs	0.0007	CS-FNI FNI-CF	19%	15%	20%
		Female	0.000390	CS-CF	21%	21%	26%
Action Units	Inner brow raiser (AU 01)	LGR	1.941e-05	CS-FNI CS-CF		trace	trace
		Doubled construction	0.00769	FNI-CF	slight	trace	pronounced
		Only the target sign	0.002704	CS-FNI	pronounced	slight	pronounced
		Male	0.01385	CS-FNI	slight	pronounced	slight
	Outer brow raiser (AU 02)	General results	0.04562	CS-CF			trace
		Lexical enhancement	0.01296	FNI-CF		slight	
		Doubled constructions	6.946e-05	FNI-CF CS-CF			severe
		Only the target sign	0.004316	CS-FNI	trace		
	Upper lid raiser (AU 05)	Lexical enhancement	0.005981	CS-CF FNI-CF			slight
		Female	2.733e-09	CS-FNI CS-CF			trace
	Lip corner puller (AU 12)	Doubled construction	3.42e-05	CS-FNI	trace		
		Female	0.02516	CS-FNI	trace		trace
	Chin raiser (AU 17)		0.002896	CS-FNI CS-CF	trace		
		Explanation	0.00953	CS-CF		trace	slight
	Mouth stretch (AU 27)	LGR	0.007499	FNI-CF			trace
	Head nod (pitch/head flexion) (°)	Only the target sign	0.02817	CS-FNI	8.3°	11.7°	10.4°
		General results	0.00832	CS-CF	4.8°	5.2°	5.6°

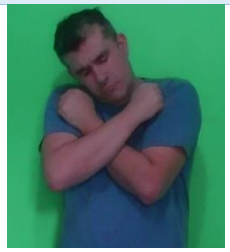
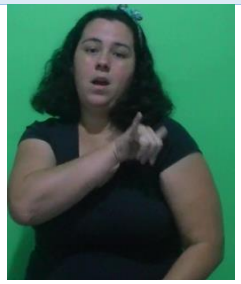
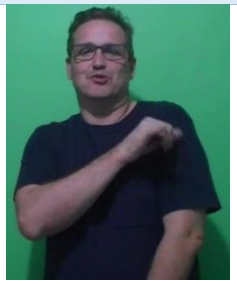
Head movements	Head shake (yaw/head rotation) (°)	Doubled construction	0.01105	CS-CF	5.8°	10°	14.6°
		Non-target	0.01711	CS-CF	4.4°	5.1°	5.5°
		Male	0.000211	CS-FNI CS-CF	3.9°	5°	6.3°
	Head tilt (roll/head lateral flexion) (°)	General results	2.922e-07	CS-FNI CS-CF	6.5°	9°	7.9°
		LGR	0.0002	CS-FNI CS-CF	5.3°	9.1°	8.9°
		(S)(V)(O)(A/L)	0.007092	CS-CF	5.9°	9.8°	9.4°
		Lexical enhancement	0.00883	CS-FNI FNI-CF	7.1°	13°	4.5°
		Target	8.708e-05	CS-FNI CS-CF	6.6°	9.6°	9.1°
		Non-target	0.001685	CS-FNI	6.3°	8.7°	7.7°
		Male	7.019e-09	CS-FNI CS-CF	6.4°	9.1°	8.4°

Source: Prepared by the author.

After obtaining the statistical results, we were able to better visualize which AUs and head movements were significantly different in marking FNI and CF within each independent variable. Subsequently, we analyzed each utterance produced by the participants and transcribed the onset and offset of the significantly different NMMs using the ELAN program (Appendix F). This NMM transcription was carried out only regarding the main clause that answers the experimental question (in bold in Appendix E), which means that additional clauses, like the negation of presuppositions or explanation of the main clause, were not considered. Furthermore, some utterances contained signs with a singular continuous and repetitive movement, which we considered as one sign. In other productions, we considered as two separate signs when there were separated movements with a pause between them or changes in the hand configuration. The NMMs transcribed were: brow raise (br), furrowed brow (fb), flexion of the torso (ft), head backward (hb), head downward (hd), head forward (hf), head nod (hn), head shake (hs), head upward (hu), lateral head (lh), lateral torso (lt), side facing (sf), shoulders raised (sr), and torso rotation (tr).

Finally, in this phase, certain NMMs were not considered, either because the participant was looking at the laptop, thinking, asking questions to the experimenter, or because a specific NM was a lexical NM sign. In the latter case, the exclusion is justified by the likelihood that signers produce them due to intricacies of the sign rather than focus marking. To illustrate this, view the example bellow:

Table 14 – Lexical NMMs

Non-manual expression	Sign	
Lateral head	 APRENDER ‘to learn’	 ESPERAR ‘to wait’
Closed eyes	 ABRAÇAR ‘to hug’	 ABRAÇAR ‘to hug’
Side face	 LER ‘to read’	 BAR
Shoulders raised	 RIO-DE-JANEIRO	 RIO-DE-JANEIRO

Source: Prepared by the author.

5 Focus marking

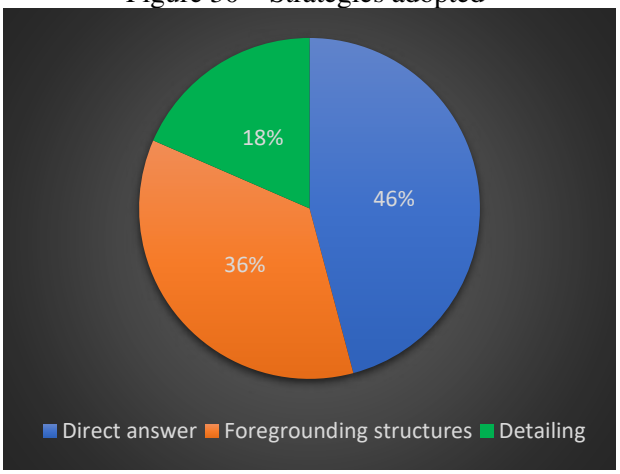
The following chapters will be dedicated to describing the strategies adopted by participants to express FNI and CF. Each description will be substantiated by quantitative analyses, including the frequency of occurrence and statistical results of AUs, head and hands movements.

5.1 Strategies

Earlier, we referred to answers that are identical to the CS, including the same sign variants and the exact order of glosses, as “Literal Glosses Reproduction” (LGR). In contrast, in this study, “Non-literal glosses reproduction” (NLGR) corresponds to answers that differ from the CS, featuring a different sign order and, in some cases, different sign’s variants. We can describe LGR as instances where participants adopted only prosodic changes to express focus, while NLGR refers to instances where participants adopted not only prosodic changes but also syntactic and/or semantic changes. For analytical purposes, this latter category was divided into two groups, where the participant’s purpose was to emphasize a constituent by: 1) using clause-external placement or syntactic structures (named as “Foregrounding structures”), as well as prosodic changes, and/or 2) using semantic/pragmatic strategies. In all answers, modification in the phonetic aspect of signs was found (section 5.1.4).

As mentioned in the methodology chapter, we instructed participants to choose how they preferred to answer the questions in our experiment. In our data collected, they opted for different strategies to express prominence in both FNI and CF signed utterances. These strategies were categorized into three main groups, as presented in the graphic bellow:

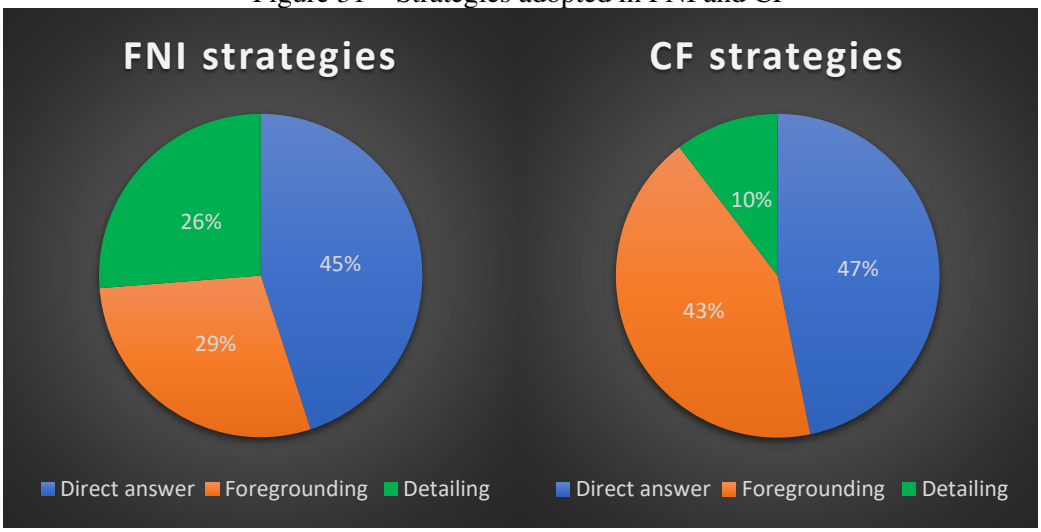
Figure 30 – Strategies adopted[1]



Source: Prepared by the author.

Observing this graphic, we can conclude that "Direct answers" and "Foregrounding structures" were the most common adopted strategies by participants to express both FNI and CF, while "Detailing" was less frequently used. When we differentiate FNI from the CF utterances, we observe that "Direct answer" appears to play an important role in focusing the target sign in both contexts, but in CF, "Foregrounding structures"[2] are similarly frequent as "Direct answers", while "Detailing" was the least used both in FNI and CF.

Figure 31 – Strategies adopted in FNI and CF



Source: Prepared by the author.

[1] If two or more strategies occurred in one singular utterance, all of them were included in the count.

[2] During the process of labeling strategies, if a foregrounding structure appeared in both CS and the focused answer, we did not categorize it as "Foregrounding structure". This decision was made due to the absence of observable comparisons. For example, we did not count an answer with the strategy of doubled construction if both the focused utterance and in its respective CS had their target signs doubled. However, these instances were relatively infrequent.

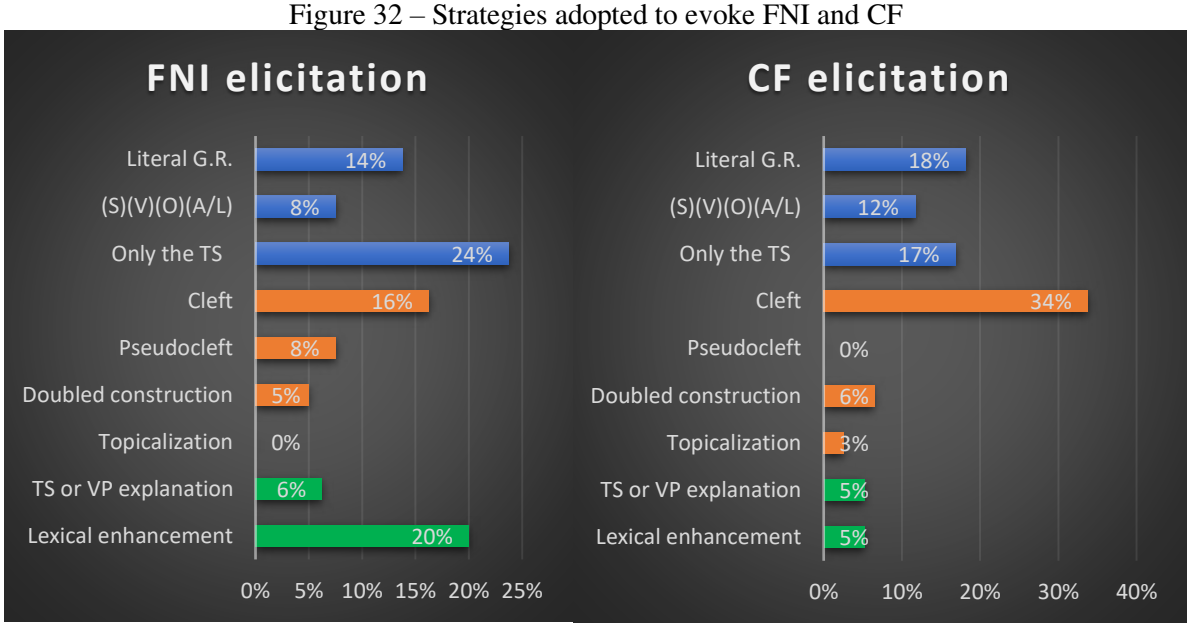
These results indicate that when the participants aim to provide the addressee with new information (FNI), they are more likely to directly answer the missing information (45%). However, they may also choose to emphasize the target sign by clause-external placement (29%) or provide additional details/information about the missing target sign (26%). In contrast, when the participants' intention was to contrast a previous piece of information with the target sign, they are more likely to directly answer (47%), or to stablish foregrounding structures (43%). Detailing the target sign was less frequently adopted in this type of focus (10%).

We chose *wh*-questions to elicit FNI data and Yes-No Questions to elicit CF. In Pragmatics studies, there exist three types of questions in a grammaticalization continuum: complete > semi rhetorical > rethorical questions (Araújo; Freitag, 2010). The categorization of the type of questions will depend on the topic of discourse. The questions adopted here are all complete questions since the question was constructed to be responded by the addressee. In other words, we expect an answer from the questions of our experiment. More specifically, we expected that the participants would respond to the question with the information requested.

This is what happened: in both type of focus, participants responded to the experiment, and in most answers, they simply provided the missing or the correct information by answering the question directly (FNI: 45%, CF: 47%). Foregrounding structures were utilized to answer questions in both type of focuses. However, since foregrounding structures involve emphasizing elements to draw attention to specific parts of an utterance, it was expected that they would be more frequent in CF contexts (43%) than in FNI contexts (29%), as signers need not only to provide an information but to contrast it with another. Lastly, the strategy of detailing the target sign (or the VP) was more frequently adopted in FNI contexts (26%) than CF contexts (10%). We believe that since our study is experimental and all our sentences are invented, the participants understood that if the addressee hasn't understood the missing information, it might be the case that contextualizing it or providing more details about it would solve the problem. On the other hand, in CF contexts, the signers know exactly what the problem is: the confusion between two phonetically similar signs. Therefore, they also know that contextualizing / detailing the target sign won't be as efficient (10%) as, for example, just giving the correct information (47%) or foregrounding the structure (43%) of the utterance.

Now let's delve into these graphics and examine which structure was produced within each of these three major groups and with what frequency. However, while describing each strategy, we will also discuss each category/strategy. In these two graphics, blue represents Direct answers, encompassing LGR, (S)(V)(O)(A/L) structures, and/or produced only the requested information (target sign). Orange represents Foregrounding structures and includes cleft-like and pseudocleft-like structures, doubled constructions, and topicalizing the target sign. Finally, green represents the group "Detailing" and encompasses strategies such as explaining the target sign or the Verbal Phrase (VP) or lexically enhancing the target sign.

Figure 32 – Strategies adopted to evoke FNI and CF



Source: Prepared by the author.

From these graphics, it is possible to understand that when the experiment question asked for specific information from the sentence, 24% of the FNI answers were produced with only the target sign. This means that the participant simply gave the addressee the exact requested information, nothing less or more. Other strategies used to express FNI were Lexical enhancement (20%), cleft-like structure (16%), and LGR (14%). Finally, less frequent, but still used, were structuring an utterance with the target sign and the sign before or after it – "(S)(V)(O)(A/L)" (e.g. VENDER PÃO 'sell bread', where PÃO is the target sign) (8%); pseudocleft-like structures (8%), Explaining the target sign or the VP (6%), and doubled constructions (5%). Topicalization wasn't used by participants in the FNI context.

On the other hand, to express CF, the same strategies were used, but with different frequencies: in order to negate and provide the correct information, participants mostly produced cleft-like structures (34%), but they also answered the experiment question by

signing LGR (18%), providing the missing target sign (17%) and with a (S)(V)(O)(A/L) structure (12%). Less frequently, they also used doubled constructions (6%) explained the Target sign or the VP (5%), enhanced the target sign lexically (5%), and topicalized the target sign (3%). Pseudocleft-like structures were not used as a mean for expressing CF.

Next, we will describe each strategy. We will begin by approaching the "Direct answers" strategies, since this was the group with a higher percentage of strategies adopted in both FNI and CF utterances (45% and 47% in Figure 31, respectively). Then we will describe "Foregrounding structures" as the second group with most strategies adopted in FNI and CF (29% and 53% in Figure 31, respectively) contexts. Finally, we will direct our analysis to "Detailing" strategies that were adopted in 26% of FNI utterances and 10% of CF utterances (26% and 10% in Figure 31, respectively).

It is crucial to emphasize that, in all the forthcoming strategies, CSs constituted a LGR. The task for creating CSs involved reading the glosses, comprehending them, and subsequently looking at the camera to sign them, maintaining the same order provided by the glosses and using the same sign variants of other participants, which was ensured through a sign list review before the beginning of the experiment. Thus, although we will go through the analysis of various strategies, CSs will consistently stand as complete utterances with the LGR. However, it is essential to draw a distinction between CSs and LGR, which is elaborated in the next section of Direct Answers. Unlike CSs, LGR comprises responses in which the participant opted to use as a strategy for providing the missing information requested by the experiment question, and this response was the same utterance signed in the CS. In other words, CSs are utterances with complete information signed specifically for comparative purposes, while LGR involves utterances produced to respond the experiment task (in the majority of the cases, with changes in NMMs).

5.1.1 Direct answers

5.1.1.1 Literal glosses reproduction (LGR)

The responses wherein participants reproduced the glosses literally are considered here as they utilized the same manual signs in the same order but in a different manner (with NMMs). Essentially, this involves modifying the NMMs or manual phonetic realization of a morpheme with the intention of providing new information or contrasting a sign with another.

In Appendix G, the reader can refer to the lengthening of NMMs in all the answers of the experiment, categorized based on the type of the focused target sign (subject, verb, object, color adjectives, or locatives).

The Quantitative tests in relation to LGR highlighted three NMMs important for the focus marking: 1) Inner brow raiser (AU 01), 2) Mouth strecth (AU 27), and 3) Head tilt (roll/ head lateral flexion). Here, we will discuss these findings and indicate other qualitative discoveries related to them.

In the analysis encompassing all strategies, male participants marked FNI (0.5004) context with inner brow raiser (AU 01)[3] more intensively (pronounced) than CS (0.2275) and CF (0.2721) contexts (slight). However, in the LGR analysis, a trace of the AU 01 was activated in both FNI and CF utterances by both male and female participants. Meanwhile, in CS utterances, this AU was not active.

It is crucial to investigate upper face NMMS and head movements, as they have been reported to convey information corresponding to prosody and intonation (ASL studies, such as Wilbur, 2000; Brentari; Crossley, 2002), since they have a larger scope domain than lower face NMMs[4]. In NGT and in several other signed languages, brow raises have been associated with grammatical structures, such as topic constituents and yes-no questions (Coerts, 1992), the emotion of surprise used alongside a linguistic expression (de Vos *et al.*, 2009), as well as counter-assertions[5] (in response to both positive – 95% – and negative – 71% – statements) (Crasborn; Van deer Koij, 2013). These authors also found that this particular AU was used with focused information in their study. Shorter brow raises can occur in cases of one or more signs being contrastively focused, although this seems to be less likely to occur on subjects than on objects or verbs[6]. Despite their impression that brow raise (and head nod) movements typically have larger amplitude in CF sentences, they expressed the need for additional quantitative research. Differently from their expectations, in our study, this marker was produced with the same intensity in both contexts.

Although our participants marked brow raise with a trace (milder) movement, they only used it in focused utterances, while CSs (non-focused utterances) were not marked with this AU. This could suggest that brow raise plays an important role for focus expression.

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[3] In ISL, it can also mark temporal adverbial phrases or signal that the IP is followed by another phrase (Dachkovsky; Sandler, 2009)

[4] Lower face components can occur layered inside them. (p.360) (Wilbur, 2003a).

[5] A counter-assertion is a response made in opposition to a preceding assertion. Example: A – Your mother didn't go to the grossery store, did she? B – Yes, she did go to the movies.

[6] The variable "sign classes" did not show significant differences in any of the quantitative analyses.

However, analyzing each production, we noticed that in the majority of the focused utterances, brow raise was accompanied by a head nod. Our interpretation is that brow raise served as a means for participants to increase the prominence of an already mentioned element. In focused LGR, brow raise was either produced in the first sign of the utterance (marking the 'theme'/topic) or throughout the whole utterance. According to Engberg-Pedersen (1990), this AU is used to accommodate the information in the addressee's mind[7]. In Libras studies, brow raise was described to mark topics (Quadros, 2019; Quadros; Karnopp, 2004), yes-no questions (Quadros; Karnopp, 2004), conditionals and relatives (Figueiredo; Lourenço, 2019).

Figure 33 – Topic marking in Libras

< >t
(<t> meaning topic marking: raised eyebrows)
Source: Quadros and Karnopp (2004, p. 133).

This topic marking was utilized to express given or shared information, and it was predominantly used in FNI and CF contexts, where participants had to reiterate part of the information[8] to provide the new (FNI) or the correct information (CF). This was reinforced when the participant produced a raised eyebrow over the whole shared information (present in the question of the experiment), but not in the sign containing the new information, as

[7] In ASL, however, raised brows are utilized in three types of topic marking: one marking given information, one marking thematic shift, and another marking new information (Aarons, 1994). This indicates that raised brows cannot be associated with a singular functional behavior (Coulter, 1978; Wilbur, 1996; Wilbur; Patschke, 1999).

[8] As mentioned, a signer can indicate that the information is not immediately accessible with the use of squint in ISL (Dachkovsky; Sandler, 2009). Only one participant used squint to answers the questions in our experiment. In light of this, we assume that the participant believed that the utterance was not a central given information in the addressee's mind, and the participant was using it to promote it from accessible to active.

illustrated in the following examples. It is important to highlight that this occurred not only in LGR but also in other strategies adopted, such as (S)(V)(O)(A/L) structures.

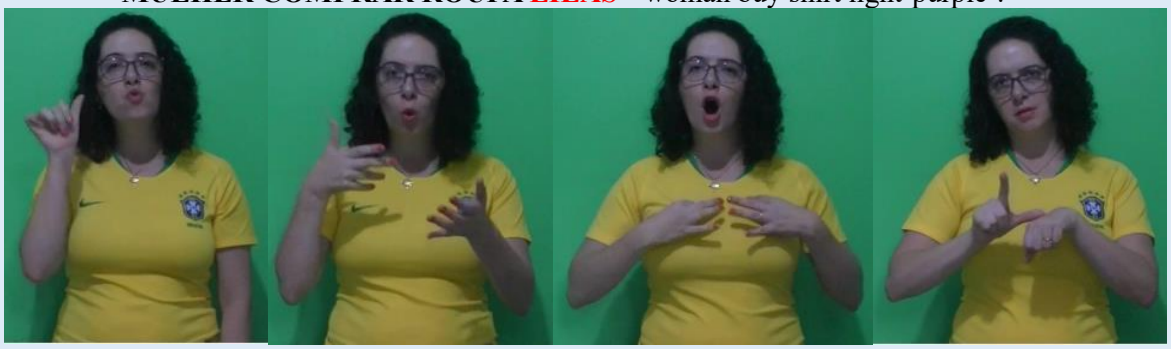
Table 15 – Brow raise marking old/shared information

Brow raise: _____

EU ESPERAR ONIBUS EMPRESA* 'I wait bus company'.

Brow raise: _____

MULHER COMPRAR ROUPA LILÁS[9] 'woman buy shirt light-purple'.



Source: Prepared by the author.

* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

Topic marking has been early explored in sign linguistics because it is quite common and salient. The first description was made for ASL (Friedman, 1976; Ingram, 1978) and later for other sign languages. It is important to highlight that we are adopting the term 'topic' regarding its pragmatic function: when it functions as old, shared or known information. It is important to make this observation since terminological ambiguity was previously found in the literature. This term occasionally denotated the pragmatic function (that can either indicate topic or focus – Chen Pichler (2010)) and in other situations was making reference to the syntactic operation of topicalization, involving the relocation of a constituent to the initial position of an utterance (Kimmelman; Pfau, 2021). Different sign languages were described to mark topics syntactically and prosodically in a similar manner:

[9] When there is an (adnominal/adverbial) adjunct, it tends to be new information in the utterance, since they are characterized to provide additional, descriptive, or circumstantial information about part or the rest of the sentence. Most, but not all, adjectives and locatives were not marked with a brow raise in our study.

sentence-initial position, a prosodic break that isolates the topic (which may involve change in NMMs, a manual pause-hold, and/or eye blink (Nespor; Sandler, 1999), as well as the topic marked by an eyebrow raise and a head movement.

We also found some cases in which the participant marked the FNI or CF target sign with a brow raise (example a). In other instances, they produced a raised eyebrow to enhance the prominence of a sign that was semantically related to the target sign (example b, where the participant increased the prominence of the VP: the verb COMPRAR ‘to buy’ and the object target sign DOCE ‘candy’).

Table 16 – Brow raise marking focused constituents

	CS	**FOCUSED**
(a)	 EU ESPERAR ÔNIBUS **EMPRESA*** ‘I wait bus company’ Target sign: EMPRESA ‘company’	 _____br EU ESPERAR ÔNIBUS **EMPRESA** ‘I wait bus company’ (FNI) Target sign: EMPRESA ‘company’
(b)	 CRIANÇA **COMPRAR DOCE** ‘child buy candy’ Target sign: DOCE ‘candy’	 _____br CRIANÇA **COMPRAR DOCE** ‘child buy candy’ (CF) Target sign: DOCE ‘candy’

Source: Prepared by the author.
* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

There is ample evidence indicating that speakers possess mechanisms to inform addresses when they are revisiting information present in the immediate linguistic context or introducing something entirely new (Krifka; Musan, 2012). Similar to a Danish Sign Language analysis, in Libras, raised eyebrows seem to mark signs that refer to thematically central information – specifically, information that is either new or that the signer assumes the

addressee can easily access or is familiar with (Engberg-Pedersen, 1990). Despite the seeming contradiction in using a NMM to signify both new and old information, we believe that the correct interpretation depends on the context and discourse in which the signer produces the brow raise. Similar to ASL (Coulter, 1978; Wilbur, 1996; Wilbur; Patschke, 1999), brow raise cannot be associated with a singular functional behavior; its meaning will vary according to the signer's intention and the context of the discourse.

Besides the inner brow raiser, participants marked CF utterances (0.1015) with a trace of Mouth stretch (AU 27), whereas CS (0.0887) and FNI (0.0627) utterances did not exhibit a significant activation of this AU. First, let us address the differences between mouthing and mouth gestures:

> Studies on sign languages have identified a distinction between two types of mouth movements in sign languages: (i) mouthings, understood as those mouth movements found in sign languages that are derived from the pronunciation of spoken languages, which are a type of visual word; and (ii) mouth gestures, defined as those mouth movements specific to sign languages, oral components present in sign languages that do not have a direct correspondence with the pronunciation of spoken languages, and which are a type of idiomatic gesture inherent to sign languages. (Rodrigues; Medeiros, 2016, p.7)

Pfau et al. (2010) refer to 'mouth gestures' as 'oral components' and 'mothings' as 'spoken components' or 'word pictures', in which only part of the word can be articulated (usually the first syllable). Thus, compared to other NMMs, the mouth exhibits the broadest range of simultaneous use with manual articulation, considering its numerous configurations and movements (Tomaszewski; Farris, 2010). Following this perspective, one strategy to focus a constituent is to put more effort in the production of a sign. Signers can achieve this by adding manual articulation or NMMs, which add phonetic weight to the sign and, consequently, increase the articulatory effort in its production. The concept of putting more effort is described by Gussenhoven (2004) as the "Effort Code"[10]. From an informational

[10] Crasborn and Van deer Koij (2013) states that those strategies by adding a focus interpretation also add phonetic weight to the sign since more phonetic prominence results in more semantic prominence. This is similar to spoken languages, where focus is widely linked to prosodic prominence (Zimmermann; Onea 2011). Several researchers, including Pfau and Steinbach (2006) and Sandler (2011) have argued that the Effort Code motivation also seems to apply in sign languages prosody. However, the study of Schlenker et al. (2016) regarding ASL and LSF (Langue de Signes Française – French Sign Language) note that head nods and forward learns are not directly related to greater effort code, as opposed to backward leans and head shakes, which could have been alternatives. Additionally, Herrmann (2015) argues that focused constituents were sometimes produced de-accented and without any NMM in DGS, while the rest of the utterance was accompanied by NMMs. Finally, Herrmann (2015) and Kimmelman (2019) has demonstrated that both contrastive and non-contrastive focus can be marked by manual and NMMs, differing from each other on the degree of emphasis.

perspective, when signers perceive a part of the message as important, they are willing to spend more energy in its production, to make the information more visible and clearer for the addressee. In German sign language, Crasborn and van der Kooij (2013) observed that signers exert more effort in mouthing in focused domains. They also noted that mouthings are consistently present in narrowly focused signs and are sometimes hyperarticulated, meaning that their number of syllables is never reduced.

In the responses collected in our experiment, each participant mouthed[11] signs to every context: CS, FNI and CF. This behavior could be attributed to the nature of our experiment, which involved reading glosses, reproducing the CSs, internalizing the question, and answering this question on camera. This process required participants to memorize gloss information. We believe that, since our task was purely experimental, mouthing assisted participants in memorizing the signs' order, as well as sentence information, but this needs to be further investigated.

Despite signs being mouthed in all contexts, it is noticeable that CF utterances in LGR were produced quantitively with a trace of mouth stretch (AU 27), whereas CS and FNI weren't. This suggests that participants likely exerted more effort in the production of signs within CF utterances. In Crasborn and van der Kooij (2013)'s data, contrastively focused verbs were accompanied by mouthing to enhance the contrast in the verb's meaning even more.

Pfau (2010) contributes to the discussion by stating that, even though mouthing does not add any meaning, it enables the disambiguation of manual signs meaning. This argument is relevant to our experiment, as mouthing can contrast two very phonetically similar signs (alternative *vs.* target sign) in CF utterances, thereby disambiguating them. Notably, this result was only significant for LGR, indicating that when exact manual signs were produced in the same order, participants needed to adopt a new strategy to contrast them for the addressee. In contrast, in NLGR, participants were able to employ foregrounding structures and detailing strategies to contrast the target and the alternative signs.

Kimmelman (2019) study of RSL (Russian Sign Language) and NGT, specifically, showed that focus can be marked by ellipsis and various manual prosodic markers, even though their frequency may differ.

[11] Six out of the nine participants underwent oralization therapy for more than 6 years, two of them for 2 to 5 years, and only one never underwent oralization therapy. The rhythmic parallel of mouthing is akin to 'echo phonology' (Woll, 2001) – the identity in movement properties between mouth and hands. Sign language linguistics researchers have reported significant variation both between and within signers in the utilization of mouthings. Due to this variability, researchers argue that many, if not most, mouthings should be viewed as a language contact phenomenon (Pfau, 2010).

Lastly, considering all strategies (direct answers, foregrounding structures, and detailing), participants showed a higher degree of head tilt in FNI utterances (9°), a lesser degree in CF utterances (7.9°), and an even lesser degree in CS utterances (6.5°). The same pattern was also found in the following analyses: Male participants, LGR, (S)(V)(O)(A/L) structure, and non-target signs analyses[12]. In LGR, participants exhibited a higher degree of head tilt in FNI (9.1°) and CF utterances (8.9°), and a lesser movement degree in CS utterances (5.3°).

In the literature, Pfau *et al.* (2010) suggest that head tilt in transitive sentences may be used as subject agreement, while eye gaze may indicate object agreement. However, although eye gaze might indicate object agreement, it is not a rule. By comparing gaze to the addressee with 'gaze to Non-addressed referent' during points in ASL, Lillo-Martin and Meier (2011) rejected the hypothesis that eye gaze differentiate second from third person. A similar result was found in the eye-tracking study conducted by Thompson (2006). It might also be the case that head tilt movements might also not strictly specified for agreement markings.

Upon analyzing each signed utterance, we observed that head tilt was mostly marked with the last sign (which may or may not be accompanied by a head nod and brow raise). From these productions, we interpreted that head tilt seems to represent a confirmation of the uttered information, expressing a meaning of "that is it". We arrived at this interpretation by observing that this NMM was consistently produced at the end of the utterance and with greater amplitude in answers (FNI and CF) compared to CSs, especially in FNI contexts where the addressee requested information, and the participant provided it. We hypothesize that in the case of a positive counter-assertion (for example: A – "your mother bought cake?" / Answer: "yes, she did"), the production of head tilt at the end of utterances (or throughout the entire utterance) would be higher than the FNI context, as it would serve to positively confirm the statement.

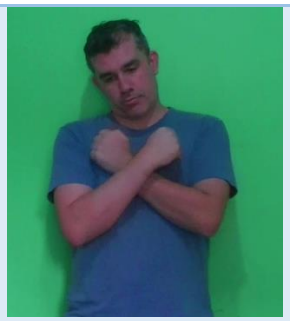
[12] In (S)(V)(O)(A/L) structures, the head tilt was 9.8° in FNI, 9.4° in CF, and 5.9° in CS.
In non-target signs, it was 8.7° in FNI, 7.7° in CF, and 6.3° in CS. Although target signs were not significantly different, participants demonstrated greater head tilt in focused constituents (FNI: 9.6° and CF: 9.1°) compared to the CS context (6.6°). The same pattern was observed in (S)(V)(O)(A/L) structures.

Figure 34 – Head tilt at the end of the utterance

Source: Prepared by the author.

In the case of the sign ABRAÇAR ‘to hug’, a head tilt (with an optional head nod) was employed to intensify the meaning of the target sign, thereby making it more visible to the addressee (see the discussion on increasing the visual acuity in section 5.1.4.2). We propose this interpretation based on the belief that producing head tilt movement may be an optional part of the phonological sign production, with an iconic meaning conveying the action of putting one’s cheek on the person being hugged. In this case, we believe that the sign ABRAÇAR ‘to hug’ might be a reported/constructed action[13], in which the head tilt might not be necessarily marking focus, but it does get intensified in focused contexts.

Table 17 – Lexical head tilt intensified in focused context

CS	**FNI**
	
EU **ABRAÇAR** AMIGO ‘I hug friend’	EU **ABRAÇAR** AMIGO ‘I hug friend’

Source: Prepared by the author.
* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

Thus, although the head tilt may not be directly responsible for marking focus, it appears to be a discourse NMM that is associated with it. Finally, another use of this NMM

[13] A constructed action is when a signer utilizes facial expressions, head, body, hand, and other non-manual cues to depict the actions, utterances, thoughts, emotions, and attitudes of a referent (Metzger, 1995).

was the contrast between old and new information with a change in the head tilt direction, as seen in the following example. However, only one of such occurrence was found.

_____ (lh-left) _____(lh-right)

(12) **EU ESPERAR ONIBUS** **EMPRESA**

Figure 35 – Change in the direction of head tilt movement

Source: Prepared by the author.
* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

Among the NMM changes previously described to evoke FNI and CF in LGR, we also qualitatively observed participants nodding their heads to place or increase prominence on certain signs. We consider this NMM as non-obligatory since there were no statistically significant differences in the quantitative analysis of "pitch" (head nod/flexion) in LGR.

We found a singular head nod (in the first sign – subject), produced in the CS, which was then spread or repeated in the verb and object of the FNI utterance. Most CSs were marked with a singular head nod or a brow raise in the first sign of the utterance. Although brow raise has been previously described to mark the topic of discourse (Quadros, 2019; Quadros; Karnopp, 2004), we believe that a singular head nod also plays an important role on it. This observation aligns with the study of NGT by Crasborn and van deer Koij (2013, p. 533), where "subject NPs in general are often immediately followed by a head nod, often very shallow". Additionally, in various signs languages worldwide (ASL: Todd, 2008; Hong Kong Sign Language (HKSL): Sze, 2008; RSL and NGT: Kimmelman, 2015; Italian Sign Language (LIS): Calderone, 2020), linguists have indicated that topics are not always marked with brow raise, although they might be. In the literature, head nods are described as marking existence, assertion or emphasis (Wilbur, 2003a). They are used to align with the boundaries of discourse, syntactic or prosodic sequencies (Sandler *et al.*, 2011; Wilbur, 2000; Puupponen *et al.*, 2016), and/or to increase the prominence of single signs (Wilbur, 2000; Puupponen *et al.*, 2015). We also found head nods after the end of the utterance, indicating confirmation.

In FNI utterances, we believe that the repetitive head nod (one head nod movement per sign) was produced to place focus on each sign within the utterance, to make sure that the addressee understood each information of the utterance. Wilbur (2003a) also note

that single head nods can mark focus and, in some cases, can be accompanied by a voluntary eyeblinks. Other uses of repetitive head nods include expressing a sense of 'sort of' or 'kind of' (Wilbur, 2003a) or serving as a domain marker of assertion (Wilbur, 1994a). It is important to highlight that our experimental questions consisted of simple and short passages in Libras, typically comprising only three or four signs (subject, verb, object, adjective/locative, respectively). Therefore, these repetitive single head nods (as well as brow raise spread throughout the whole utterance) may not occur in more extensive and complex sentences in Libras, as it would require a significant amount of energy.

When the entire CS sign was produced with a single head nod (likely marking assertion), the head nod movement in the focused target sign was amplified. However, further research is needed to identify whether the head nod amplitude was due to the increase in velocity, duration, and/or tension.

Table 18 – Head nod amplification in focused contexts

CS	**FNI**
	
HOMEM VENDER **PÃO** 'man sell bread'	HOMEM VENDER **PÃO** 'man sell bread'

Source: Prepared by the author.
* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

In CF utterances, single head nods or head down, accompanied by a torso flexed forward (according to Wilbur and Patschke (1998), lean forward in ASL can express pragmatic affirmation), were used to mark the focused target signs (example a) or to increase the prominence of a sign related to the target sign (example 'b', where the participant placed emphasis on the verb – action – related to the target subject sign):

Table 19 – Head nod and torso flexed forward in focused context

	CS	CF
(a)	 **ADVOGAD@** TRABALHAR RJ ‘lawyer work Rio-de-Janeiro’	 **ADVOGAD@** TRABALHAR RJ ‘lawyer work Rio-de-Janeiro’
(b)	 ADVOGAD@ **TRABALHAR** RJ ‘lawyer work Rio-de-Janeiro’	 ADVOGAD@ **TRABALHAR** RJ ‘lawyer work Rio-de-Janeiro’

Source: Prepared by the author.
* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

5.1.1.2 (S)(V)(O)(A/L)

In the present study, (S)(V)(O)(A/L) stands for “(subject)(verb)(object)(adjective/locative)” and makes reference to answers in which the participant produced only the target sign and a previous or subsequent syntactic category. For example, instead of producing an answer containing all the syntactic categories within the CS (e.g. EU LER RECEITA ‘I read recipe’ – in this case, the SVO), they omitted some of its categories (e.g. LER RECEITA ‘read recipe’), but still produced two or more signs. We considered this type of structure as a direct answer since it, as well as LGR and only the target sign (see next section), provides the information requested directly. We found only one statistical result where the difference between groups was significantly different: the degree of head tilt movement.

The same pattern found in the production of head tilt in LGR was also observed in (S)(V)(O)(A/L) structures: participants exhibited a higher degree of head tilt movement in FNI utterances (9.8°), and in CF utterances (9.4°) and a lesser degree of movement in CSs (5.9°). This finding reinforces our interpretation that head tilt (accompanied by raised

eyebrow) seems to confirm the conveyed information, expressing a sense of "that is it", which is crucial to be expressed primarily in FNI and CF utterances, rather than in CS contexts.

Table 20 – Head tilt movement in focused contexts

CS	FC
	
_____br EU TER LIVRO **MARROM** 'I have book brown'	_____lh+sf _____br LIVRO **MARROM** 'book brown'

Source: Prepared by the author.
* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

Similar to what was described in the previous section, participants marked the target sign with a brow raise. Some CF target signs were not only marked with a brow raise but also with a head down, as described in by Quadros (2019) (see Figure 18 – CF construction in Libras) or a head nod. However, head nod (pitch/ head flexion) did not yield significant results, and we haven't observed a consistently production of it in all CF utterances, leading us to believe that while it is possible to contrast information with it, it is not mandatory.

Table 21 – Brow raise and head down in CF utterances

CS	CF
	
___br **EU LER RECEITA** 'I read recipe'	____br _____hd **LER RECEITA** 'I read recipe'

Source: Prepared by the author.
* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

5.1.1.3 Only the target sign

This strategy was the most adopted in FNI utterances (23%). As mentioned earlier, direct answers, in general, constituted the most prevalent responses in our experiment, serving to supply the missing information in *wh*-questions. This observation aligns with the experimental task, wherein we formulated *wh*-questions to elicit FNI in target signs. Consequently, while we identified various means of conveying direct answers, this section focuses on comprehending the modifications in NMMs when participants solely provided the missing information. For example, when the experimental task asked the participant QUEM APRENDER LIBRAS? 'who learn Libras', the participant only answered with the target sign PEDAGOG@ 'pedagogue'.

From the statistical analysis, we observed that in the case of CS, each sign lasted 23% of the total duration of the utterances. However, FNI target sign lasted 47%, and CF lasted 58% of the utterance duration. The reason for FNI and CF signs lasting 47% and 58% respectively, even when they were the only sign produced in the utterance is due to the duration measurement method. We measured the beginning of the utterance when the hand left its initial position and the end when it returned to its initial position. In contrast, for all signs in our experiment, we considered the beginning as the moment when the hand formed its intrinsic handshape, and the end of the sign when it departed from its handshape. Returning to our analysis, it is evident that focused signs have a longer duration than non-focused signs. More specifically, CF target signs seems appear to be produced with longer duration than FNI target signs, indicating that not only does focus seem to play a role in duration, but also the type of focus. One possible reason for this increased duration in focused signs might be that they are being produced in a 'stressed manner', often associated with larger movements and more repetition (Crasborn; van deer Koij, 2013). We will observe forms of stressing signs in section 5.1.4, entitled "Phonetic changes".

Another quantitative result revealed that CS utterances were characterized by a pronounced inner brow raiser (AU 01) and a trace of outer brow raise (AU 02), while FNI target signs were marked with a slight AU 01, and CF target sign exhibited a pronounced AU 01. Initially, we were puzzled by the presence of raised eyebrow in CS, as it seemed inconsistent with the findings described in the section about LGR (section 5.1.1.1), where CS did not show markers like AU 01 or 02. However, upon scrutinizing each instance of raised eyebrows within respective CS, we discovered that our interpretation of shared knowledge being marked by raised eyebrows was partially accurate. In these CS instances, we believe

that shared knowledge was indeed being conveyed, but our initial interpretation that this marker would exclusively occur in focused answers (as they presuppose old information, unlike CS) proved to be incorrect.

This phenomenon can be attributed to the linguistic principle that every constituted produced in the language must either be introduced through a presentational construction (e.g. "**I have a cat**, and I had to bring my cat to the vet" from Krifka and Musan (2012, p. 01) or it must have been introduce before, with the signer presupposing it a shared knowledge, thus treating it as old information or topic. The signer then adds new information about it to the common ground, forming a focus or comment in the topic-comment structure. Despite our intention to formulate CS as neutral sentences representing information in the participant's mind or expressing the absence of focus, when participants were asked to reproduce these sentences to the camera without contextualization, it appears that they imagined or interpreted the most appropriate context as a topic-comment structure. This is because, in introducing a new topic to the conversation and begin an informational sentence with active verbs, the CS must inherently form a topic-comment structure. Therefore, in these cases, participants produced CS as if there was already a common ground about an imaginative topic, akin to FNI and CF utterances, where they added more information to an existing topic. As illustrated in the next example, the topic (marked by raised eyebrow) would be PEDAGOGO APRENDER 'pedagogue learn', and the comment would be LIBRAS:

Figure 36 – Brow raise in CS

_____br

PEDAGOGO APRENDER LIBRAS

'pedagogue learn Libras'

Source: Prepared by the author.

* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

Regarding the marking of AU 01 in both FNI (slight) and CF (pronounced), we posit that, in such cases, the raised eyebrow does not represent topic marking. This interpretation arises from the fact that the answers contained only the target sign, which indicate new information (CF also is a form of providing new information, but it is done by

contrasting it with another one) prompted by the experimental questions. From our perspective, the raised eyebrows here serve to emphasize the target signs, with CF utterances being more strongly emphasized than FNI utterances. Our prosodic findings regarding answers with only the target signs closely align with those found in LGR and (S)(V)(O)(A/L) structures.

The quantitative results also pointed for a higher degree of head nod in FNI (11.7°) and CF (10.4°) utterances compared to CS (8.3°). We believe that the discussion about raised eyebrows in LGR and (S)(V)(O)(A/L) structures also applies to the NMM of head nods here: they seem to function as topic marking in the CS (when accompanied by brow raises) or as topic or focus in FNI and CF contexts. In these cases, it seems that they are produced with a higher degree of dislocation in focused constituents.

5.1.2 Foregrounding structures

Beyond changes in prosody, information can also be focused through clause-external placement, referred to as 'foregrounding structures' (Wilbur, 1994b) or information structure-related functions (Kimmelman; Pfau, 2021). Foley and Van Valin (1985) identify five such structures in ASL, which include topicalization, cleft-like, pseudocleft-like, left and right dislocation. However, we will briefly address three of them here: 1) Cleft-like and 2) Pseudocleft-like structures, as they correspond to missing information in an open proposition (OP), while traditional dislocations (right and left dislocation) involve shared information with varying levels of prominence, (Foley; Van Valin, 1985), and 3) Topicalization, as it serves as a syntactic strategy to emphasize an element by integrating it into the comment structure.

> Different word orders reflect both syntactic and pragmatic functions, and word order changes are prosodically marked (Fischer, 1990; Lillo-Martin, 1990a,b; Aarons *et al.*, 1992; Wilbur, 1991; Petronio, 1991, 1993; Romano, 1991) (Wilbur, 1994b, p. 647-648).

The phrase order in Libras has been discussed by Felipe (1989) and Ferreira-Brito (1995). They observed that the order SVO (Subject-Verb-Object) order is more basic than the others, as every sentence constructed with this order is consistently considered grammatical (Quadros; Karnopp, 2004). Quadros's study (1999) provides evidence, from simple to complex sentences, to justify this intuition. Other possible sign orders (OSV, SOV e VOS)

appear to be linked to the interaction with other grammatical structures and result from the primary SVO order undergoing syntactic operations associated with certain markers (agreement, topicalization, focus, NMMs etc) (Quadros; Karnopp, 2004). The SVO order was chosen to construct the control-statements (CS) in our experiment.

As previously cited, 'foregrounding structures' correspond to clausal-external placement used to focus information (Wilbur, 1994b). In Libras, doubled constructions were identified by Quadros and Karnopp (2004) as a syntactic structure to mark focus. Thus, in this chapter, we will describe each foregrounding structure found in our study and how they were produced according to our study's purpose. It is important to highlight that when we mention clefts and pseudoclefts in the following analysis, we will be referring to structures in Libras (and other sign languages) that are similar or resemble cleft and pseudocleft constructions found in spoken languages, such as Brazilian Portuguese or English. Thus, it is important to note that while these structures share similarities, we cannot definitively categorize them as genuine clefts and pseudoclefts because there haven't been sufficient studies comparing these structures between spoken and signed languages. Therefore, in the context of signed languages, we will cite the terms "cleft-like" and "pseudocleft-like", to refer to ASL/Libras constructions that bear resemblance to these linguistic phenomena.

5.1.2.1 Cleft-like

Both clefts and pseudoclefts serve to increase the focus on a constituent or emphasize and stress it by constructing a biclausal structure (Kimmelman; Pfau, 2010), resembling a kind of relative clause (cleft sentence) or a 'what' clause (pseudocleft sentences) functioning as subject or complement and forming a sentence with 'to be' as the main verb. Additionally, the emphasized information typically corresponds to the missing information in the presupposed OP (Jackendoff, 1972; Carlson, 1984; Kadmon; Roberts, 1986), as demonstrated in the following examples. (12) is an English example, and (13) is an ASL example of a cleft sentence (derived from the verb "to cleave", meaning divided by two).

(12) A: Mitchell ate the hamburgers last night.
B: Who ate the hamburgers last night?
A: It was Mitchell who ate the hamburgers last night.

(13) A: I told Kay she should consider going into counseling.
B: You told WHO?
lean back

A: KAY THAT, TOLD FINISH.
Source: ASL example extracted from Wilbur and Patschke (1998, p. 293).

In the answer in 11A, "KAY THAT TOLD FINISH", the construction with THAT, containing the focus, is equivalent to the English 'it-cleft' (Wilbur, 1994c, 1995a, *apud* Wilbur; Patschke, 1998, p. 293). Collins (1991) suggests an 'implied exclusiveness' in clefts (and pseudocleft sentences), meaning KAY "[…] is the only information which satisfies the informational conditions" (Collins, 1991, *apud* Wilbur; Patschke, 1998, p. 289). In this example, THAT is accompanied by the signer leaning back, which reinforces the implied exclusiveness of the focus (Wilbur; Patschke, 1998).

Although we haven't found any statistical different results regarding cleft-like constructions, it is important to discuss the role of these structures as a strategy adopted by participants. It was the most used strategy in CF (33%) and the third most used in FNI (16%) contexts. Additionally, the majority of the syntactic categories in CF utterances were evoked using the cleft-like strategy (subjects: 46%, objects: 33%, adjectives: 42%, and locatives: 35%), while verbs were primarily evoked by LGR and (S)(V)(O)(A/L) structures (29%).

Cleft-like constructions are rearranged with the purpose of emphasizing a particular constituent, structured as follows: "It was X that/who/Ø Y" (this second part could be understood as a relative clause[14] in spoken languages), as observed in the English example (14):

(14) A: Mitchell ate the hamburgers last night.
B: Who ate the hamburgers last night?
A: It was Mitchell who ate the hamburgers last night.

In ASL, however, clefts seem to be marked with the sign-particle THAT, which contains the focus (Wilbur, 1994c, 1995a):

[14] According to Ludwig (2020), in different sign languages, there is a tendency to mark the relative clause with a lexical item (THAT in ASL, and PROR-H and PROR-NH in DGS, for human and non-human referents, respectively) or with NMMs (in ASL, this would involve using raised eyebrows, head tilt backward, or upper lip raised; in DGS, it would include leaning the torso to the side of the relative pronoun's location or narrowing the eyes; in LIS, it would be projecting lips (Tang; Lau, 2012); in Libras, it would involve narrowed gaze, body rotation, turned head, and facial expression of the mouth (Ludwig, 2020). In Libras, no lexical item seems to mark relative clause, but there appears to be a relative NMM that has scope over the restrictive relative sentence (Ludwige, 2020), as in the following example:

_____rel
MENINA CAIR BICICLETA FICAR HOSPITAL
(GIRL FALL BIBYBLE STAY HOSPITAL)
'The girl who fell from the bicycle is in the hospital' (our translation)
Source: Nunes and Quadros (2004, p. 2).

(15) A: I told Kay she should consider going into counseling.
B: You told WHO?
lean back[15]
A: KAY THAT, TOLD FINISH.

Source: ASL example extracted from Wilbur and Patschke (1998, p. 293).

As observed in (12), the ASL it-cleft clause KAY was marked by the manual sign THAT, followed by TOLD FINISH. In other words, one can say that THAT would be representing the ASL equivalent of the English 'it-cleft' (Wilbur, 1994c, 1995a). The use of cleft sentences for focus marking frequently suggests an exhaustive interpretation that is absent in in-situ focus.

Since we haven't found any similar study related to Libras, it will be difficult to affirm that the productions found in our corpora are the Libras equivalent of Brazilian Portuguese it-cleft. Also, the main object of our study is to investigate the possible differences between FNI and CF. Therefore, it is crucial to mention that the analysis we are about to present is supported by limited constructions that we believe are very similar to cleft constructions found in Brazilian Portuguese. Following this perspective, the following discussion will be conducted towards our purpose to understand how FNI and CF are produced in Libras. We suspect that the following utterances are constructions equivalent to cleft utterances in spoken languages since those utterances seem to express a meaning of exclusiveness. All in all, future research is needed to confirm or deny the discussion we are about to present.

Similar to what was described by Wilbur and Patschke (1998), there seems to be sign-particles responsible for marking the 'it-cleft' clauses in Libras. We recorded a total of 39 cleft-like occurrences (13 of FNI and 26 of CF), all marked with the focus-particle É 'to be' and/or CERT@ 'correct'. However, instead of appearing after the OP as in ASL, in Libras, it was produced before it. We believe that those signs have the same function within the cleft-equivalent construction, as they were used with similar prosodic marking, and, in some cases, participants produced one with the mouthing of the other one (as the CERT@ 'correct' in the example bellow, produced with the mouthing of É):

[15] "the lean back occurred phonetically as a return to neutral position from a lean forward position, followed by a head back on KAY which flowed smoothly into an assertion affirmation head nod on THAT. Thus at this time, it is not entirely clear whether the lean back is intended for the focus information (e.g., KAY), for the focuser THAT, or for the whole phrase." (Wilbur; Patschke, 1998, p. 293).

Table 22 – Cleft particles

	
É ‘to be’[16]	CERT@ ‘correct’

Source: Prepared by the author.

The following discussion presented here on copula[17] was based on the work of Quarezemin (2014). According to her, in predicative sentences, such as "Fernanda is excited," the subject can naturally be focused before the copula, which is an appropriate response to "Who is excited?". These utterances with subject focus resemble sentences with lexical/plein verbs (mostly transitive), since subject inversion hardly occurs. However, specificational copular utterances differ more from predicatives, as they seem to prefer post-copula position to express information focus, although they still accept pre-copula position. Thus, in Brazilian Languages, the preferred response to "Quem é seu amigo?” (Who is your friend?) would be "O meu amigo é o professor” (My friend is the teacher) rather than "O professor é o meu amigo” (The teacher is my friend).

Finally, in copular utterances (clefts that prefer to position the information focus post-copula), the reduced constituent (such as “Foi o professor” – “It was the teacher”) cannot precede the copula. Besides the reduced forms, the following possibilities exemplify copula: "quem ensinou foi o professor” (who taught was the teacher) and "foi o professor que ensinou” (it was the teacher who taught). All of them serve the function of focusing a constituent, unlike the predicative copula, which has the function of predication, and the equative, which has the function of specification or predication. Belletti (2008), and

[16] In É COR MARROM (BE COLOR BROWN) the cleft-like particle É was produced with two hands:

[17] In a copulative utterance, nominal, adjectival, adverbial, and prepositional phrases may occur to the right of the verb (Mateus *et al.*, 2006), as follows, respectively: "Tim is a wrestler," "Sophie looks pretty," "the car stayed in the underground parking lot," and "the restaurant is near by".

Frascarelli and Puglielli (2008) argue that the copula is a focus marker in several languages, suggesting that the copula is directly related to the process of focus marking in sentences[18].

Returning to our study, the prosodic marking of the particles É "to be" and CERT@ "correct" involved a head nod and /or a brow raise, and in some cases, a lateral head. It is important to mention that we are glossing them differently only for descriptive and discussion purposes, but they seem to have the same meaning ("this is the information requested or "that is it") and function (to mark the target sign as the focused information). The following signed utterances are examples that we believe represent a Libras construction that resembles cleft utterances in a spoken language:

Table 23 – Cleft-like occurrences according syntactical categories

Subject	br hn+lh _____hn _____hn É ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (BE LAWYER WORK RIO-DE-JANEIRO) 'It is the lawyer who/that works in Rio de Janeiro'.
Verb	br+hn _____hn CERT@ ABRAÇAR AMIG@ (CORRET HUG FRIEND) 'It is hugging that I did to my friend'.
Object	_____hn _____hn _____lh CRIANÇA COMPRAR CERT@ DOCE (CHILD BUY CORRECT CANDY 'It is candy that the child bought'.
Adjective	hn _____br MULHER COMPRAR É ROUPA LILÁS [19] (WOMAN BUY BE SHIRT LIGHT-PURPLE) 'It is a light-purple shirt that the woman bought'.
Locative	br _____hn _____lh EU ESPERAR ONIBUS É EMPRESA (PRO-1WAIT BUS BE COMPANY) 'It is in company that/where I wait for the bus'.

Source: Prepared by the author.
* The sign in red represents the target sign.

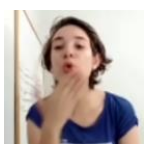
Observing these examples, as well as the other cleft-like constructions in our data, we noticed that the NMMs accompanying the target signs varied: some were marked with a head nod, brow raise (as reported as cleft marking in ASL by Wilbur and Patschke (1998)),

[18] I would like to thank my friend Douglas Alan da Silva for suggesting me some readings about the use of copula for focus marking.
[19] Five utterances in our corpora had their signs order changed: three of them were in cleft signed utterances; one in (S)(V)(O)(A/L) structure; and one in a doubled construction. Most of them seem to place the target sign closer to the verb, or in cleft structures, closer to the cleft particles É 'to be' or CERT@ 'correct'.

head up[20], and/or torso flexed forward[21]. In other it-cleft structures, only the particles and lateral head were produced in the VP or with the target sign (usually when it was in the final position of the utterance), indicating “that is it”. Although further data are necessary, as well as studies analyzing such specific constructions, we believe that these NMMs are responsible for increasing the prominence of the target sign. When produced with the it-cleft particles, they are responsible for marking it-cleft structures. The same marking was found in other occurrences where participants produced only the it-cleft clause, omitting the rest of the sentence. We considered these as cleft-like structures with ellipsis, with the elided part being the shared information:

Table 24 – Brow raises in cleft-like constructions

(a)	 _brow raise **É DOCE** (BE CANDY) ‘It was candy (that the kids bought)’.
(b)	 _____brow raise **CERT@ LILÁS** (CORRECT LIGHT-PURPLE) ‘It was light-purple (the shirt the that woman bought)’.

[20] CF: 

[21] FNI: 

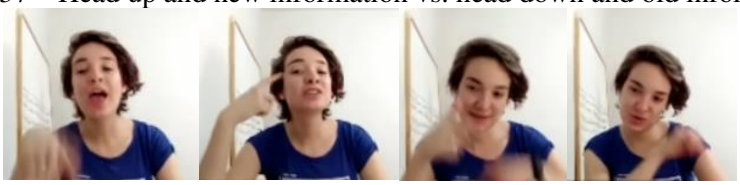
(c)	 _____brow raise **É CERT@ DOCE** (BE CORRECT CANDY) 'It was candy (that the kids bought)'.

Source: Prepared by the author.
* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

In our qualitative analysis, we haven't found any prosodic marking differences between those answers and the answers where the whole utterance was rearranged as a complete cleft construction. Additionally, in the ASL example (12), leaning back supports the focus' implied exclusiveness (Wilbur; Patschke, 1998). In Libras, however, we still do not know which NMM could be responsible for this implied exclusiveness.

Finally, we also found two curious occurrences that are worth to be mentioned here. The first one is what we believe to be a contrasting expression between new (head up – hu) and old (head down – hd) information, as in the following example:

Figure 37 – Head up and new information vs. head down and old information



Source: Prepared by the author.
* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

The second occurrence involves the duplication of a target sign produced at the same time of a cleft-like construction: $\overset{\text{hn}}{\text{É EMPRESA ESPERAR EMPRESA ÔNIBUS}}$. This indicates that participants can adopt more than one foregrounding structure simultaneously. However, it seems to be the more common when they produce a structure (which can be a foregrounding structure) and alter the prosodic NMMs of this utterance.

5.1.2.2 Pseudocleft-like

Traditional studies have considered the pseudocleft first clause as a 'rhetorical question' (because it contains a wh-question and NMMs are associated with yes/no questions), and the second one as an answer (Baker-Shenk, 1983). However, pseudocleft-like seem to be true focus structures and not rhetorical nor a questions structure. Wilbur (1994b) indicates this is because speakers ask rhetorical questions without the expectation that they will be answered, to repeat a question, or to talk to themselves. She also mentions other reasons: first, that rhetorical questions can be answered by the speaker, but they are usually marked by a furrowed eyebrow, not raised eyebrows (pseudocleft-like marker); second, because the *wh*-word cannot be doubled in the pseudocleft, as it can in real *wh*-questions; and finally, because, in pseudoclefts, the *wh*-word occurs at the end of the *wh*-clause, while in real *wh*-questions, it does not necessarily occur on the righthand position – it can appear on the left, right, or be doubled. In summary, Wilbur (1994b) presents strong arguments to defend that pseudoclefts are true focus structures, considering that they are produced with focused constituents and stress, and not simply a question-and-answer pair. As previously mentioned, in ASL, the pseudocleft seems to be the major focusing construction, since other structures, such as Topicalization, Left Dislocation, and possibly Right Dislocation, exist, but none of them participate in the process of focusing.

Similar to cleft constructions, pseudoclefts are produced to rearrange the structure to focus a constituent. In English, the pseudocleft structure adopted is "What Y is X". On the other hand, in ASL, the focused sign is usually marked by raised eyebrows and an animate (agents, patients, experiencers, recipients, benefactives), locative, or temporal *wh*-words (Wilbur, 1994b). In this manner, they differ from rhetorical and echo questions, as they are more complex than a question-and answer pair, and their emphasized information corresponds to the missing information in the presupposed OP. We will now revisit the English (16) and ASL (17) examples of pseudocleft provided earlier about how this structure is produced in those languages, respectively:

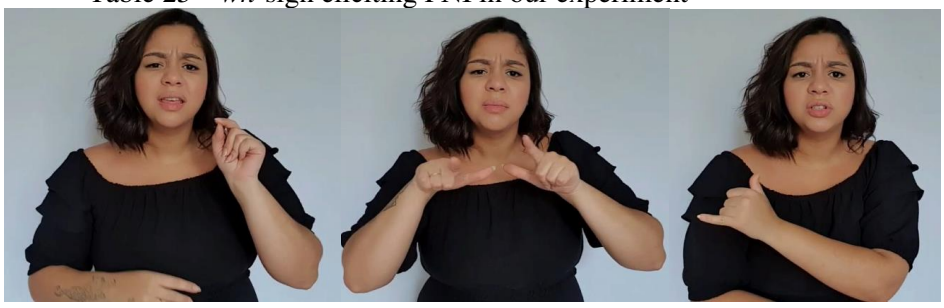
(16) A: We should tell Mary the truth
B: We should do what?
A: What we should do is tell Mary the truth

(17) A: JOHN SEE BILL TIRE FLAT 'John saw that Bill's tire was flat'
B: JOHN SEE WHAT? 'What did John see?'
A: JOHN SEE WHAT? BILL TIRE FLAT 'What John saw was that Bill's tire was flat'.

Source: ASL example extracted from Wilbur (1994b, p. 648).

In 14A, according to Wilbur (1994b), when A signs ‘JOHN SEE WHAT?’, they would blink, nod the head, or both. This is then followed by a brief pause before the focused constituent, which appears in the final position. In our study, we also observed each of those NMMs in the uttered expressions. However, they do not appear to be mandatory; some participants blinked and briefly paused before the focused constituent, while nodding their heads, whereas others did not exhibit these behaviors. In our data, we found only six occurrences of pseudoclefts, all of which elicited FNI: four evoked locatives, one evoked a subject and another evoked an object. We believe that pseudoclefts were exclusively used in FNI contexts, as they are formed by a *wh*-clause (who, where, what, etc.), and the OP is fulfilled by the FNI signs. This fulfillment is requested by a *wh*-sign in the experimental task, as observed in the following example extracted from our data. However, further investigation is needed to comprehend the reasons why pseudoclefts were not adopted in CF contexts.

Table 25 – *wh*-sign eliciting FNI in our experiment

Question			
	QUEM ‘who’	TRABALHAR ‘work’	RIO-DE-JANEIRO ‘Rio de Janeiro’
Answer			
	QUEM? ‘who’	ADVOGADO ‘lawyer’	

Source: Prepared by the author.

As described in ASL (Wilbur, 1994b), in our Libras data, pseudocleft occurrences focused animate entities (agents and patients) and locatives. Despite pseudoclefts being used

to evoke locatives in 4 out of 6 occurrences, we still possess limited data on this type of structure, preventing us from affirming the presence of a variable leading to this result, but we can hypothesize that this type of structure is most commonly used when expressing locations, as well as it would be frequent to focus temporal *wh*-words (this category, however, was not included in our experiment). Finally, the *wh*-constituent within the *wh*-clause was marked by either a furrowed eyebrow (already described as partial interrogative marking in Libras by Paiva et al. (2018), side-facing expression, a head shake, or a lateral head with a raised eyebrow.

While Wilbur (1994b) described pseudoclefts in ASL as being marked with raised eyebrows, our observations in Libras suggest that they are marked with a head nod in the emphasized information. However, it is crucial to investigate whether this head nod is an integral part of pseudocleft constructions or if it solely marks the FNI in the target sign. We propose further investigation with an expanded dataset of pseudocleft instances to compare and establish predictions regarding: 1) the validity of the hypothesis that pseudoclefts are unlikely to be used on CF utterances; 2) the likelihood of pseudoclefts being adopted to focus on locative signs (as well as on temporal adverbial adjuncts); and 3) whether head nods indeed serve as a marking for pseudoclefts or for FNI.

In ASL, focus is not indicated with stress; instead, stress consistently appears in the final position of the sentence, and signs shift to this final position when the signer aims to focus them. The approach to achieve this is through the use of pseudo-cleft constructions, as outlined by Wilbur (1990b, 1999) and Wilbur and Schick (1987). However, based on the observed distribution of strategies in our corpus, it appears that this is not the case in Libras, as pseudoclefts were one of the least used strategies in FNI (8%) and they were not employed at all in CF contexts.

It is important to highlight that in three out of the six pseudocleft occurrences, participants included the particle É ‘to be’ within their answer-clause. This indicates that while this particle can represent cleft utterances, it might also be employed in other structures to enhance the prominence of the target sign:

Figure 38 – Pseudocleft construction

EU ‘I’ ESPERAR ‘wait’ ONDE ‘where’ **É ‘be’** EMPRESA ‘company’

Source: Prepared by the author.

According to Wilbur (1994b), the sign that can be focused by a pseudocleft seems to be the same as the one that can be doubled. Next, we will analyze how doubled constructions were produced in our data.

5.1.2.3 Doubled construction

Although pseudoclefts and doubled construction types are found in spoken languages, their syntactic characteristics and pragmatic functions in sign languages seem to differ (Kimmelman; Pfau, 2021). In doubled constructions, to focus a constituent, the speaker can double the focused sign (Figure 39) or place the focused sign in the final position, constructing an utterance with a SOV order. In other words, one constituent appears in its originally generated position, while its copy appears at the end of the sentence, occupying a focus position (Petronio, 1993; Petronio; Lillo-Martin, 1997; Quadros, 1999; Wilbur 1997). It involves an emphatic interpretation of the reduplicated element (Nunes; Quadros, 2005). However, it is unclear in the literature whether this focused final position occurs in both FNI and CF contexts.

Figure 39 – Sentence with doubled constructions in Libras

EU ‘I’ LIVRO ‘BOOK’ <PERDER>mc ‘LOSE’

I **lost** the book

Source: Quadros and Karnopp (2004, p.153).

The VOS order in Libras usually occurs for Contrastive Focus marking (Arrotéia, 2003), as observed in Figure 40:

Figure 40 – Contrastive Focus in Libras

COMPRAR ‘’buy’ CARRO ‘car’ <JOHN>mc

John bought a car

Source: Quadros and Karnopp (2004, p.155).

Phrasal prominence can thus be achieved through phrase-final reduplication (Covington, 1973; Wilbur, 1990a; Wilbur; Nolen, 1986; Wilbur; Schick, 1987). This involves focusing a sign by either doubling it – producing it in both its original and at the right edge of the utterance –, or placing the focused sign in the final position, creating an SOV utterance. Petronio and Lillo-Martin (1997) note that a doubled construction can be identified when there is no significant pause before the duplicated element. In Libras, this construction serves to confirm or disconfirm a preceding statement within the discourse context (Quadros, 2004).

In Libras, Quadros (2019) mentioned that constructions with focus involve duplication that and that they are associated with emphatic NMMs. Despite this, this structure was one of the least employed in our study (FNI: 5% / CF: 6%). In doubled constructions, CF utterances were characterized by a pronounced AU 01 accompanied by a severe outer brow raise (AU 02), while CS and FNI were marked with only a trace of AU 01. The raised eyebrows analysis in the present section is similar to the one described in section 5.1.1.1 regarding LGR: this facial expression marked both the topic of the discourse and the focus placed in the target signs, with an increased level of intensity in CF contexts. However, it is important to mention that the doubled sign was consistently unmarked. Our interpretation is supported by the observation that raised eyebrows were not only produced in the target sign but also accompanied by other NMMs, such as head forward and/or head tilt indicating the production of a stressed sign, as observed in the following example:

Figure 41 – Topic marking with brow raise

_____brow raise

ADVOGAD@ TRABALHAR RIO-DE-JANEIRO ADVOGAD@

(LAWYER WORK RIO-DE-JANEIRO LAWYER)

"The **lawyer** works in Rio de Janeiro'.

Source: Prepared by the author.

* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

Furthermore, the doubled constituent consistently appears to be marked with a head nod in the final position of the utterance, corroborating the findings of Quadros and Karnopp (2004) and Quadros (2019). However, we observed that the head nod can be produced either concurrently with the manual sign duration or after the end of the utterance. It is crucial to note that while our data provides insights into how these structures are produced in Libras, further research is imperative. Our corpus comprises eight occurrences of doubled constructions, in which four of them were produced by a single participant. Investigating the reason behind this specific participant's more frequent adoption of doubled constructions compared to others is necessary (see more in section 5.2 – Inter-individual variation).

The exclusive activation of the outer brow raise (AU 02) in CF utterances, along with the simultaneous activation of AU 01, may indicate an intensification of the stress on constituents that are being contrasted. It is noteworthy, however, that although these AUs are addressed separately here for descriptive purposes, signers typically produce them simultaneously. This simultaneous activation occurs because the muscles responsible for these AUS are closely to situated[22]. Considering that most studies on sign languages analyze these AUs together, we conducted a Multivariate Analysis of Variance (MANOVA) statistical analysis with AU 01 and AU 02 as dependent variables, examining their relationship with CS, FNI and CF contexts. Although the result was found to be significantly different ($p<0.01$), the combination of AU 01 and 02 in all three contexts showed only a slight marking. MANOVA is an extension of Analysis of Variance (ANOVA), used to analyze the variance in multiple dependent variables simultaneously.

[22] A similar pattern appears to apply to other AUs, including those related to the mouth and the cheeks, lids and eyebrows, and so on.

Figure 42 – Combination of AU 01+02

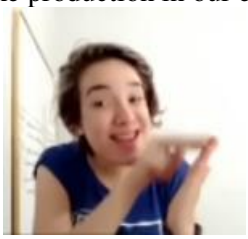
Source: De vos, van der Kooij and Crasborn (2009, p.318).

Although CF utterances showed only a trace of AU 02 movement in the general analysis[23], we attribute this result to the pronounced marking of these utterances with severe AU 02 in doubled constructions.

Another significantly different result was that focused contexts (FNI: 5.2° and CF: 5.6°), in the general analysis, were produced with a wider range of head shake (yaw/head rotation) compared to signs in CS (4.8°). Focused non-target signs exhibited higher head shake (FNI: 5.1° and CF: 5.5°) compared to non-focused non-target signs (CS: 4.4°). There was no significant difference in the activation of this AU between focused and non-focused target signs. However, upon closer examination in the doubled constructions statistical results, it was evident that CF utterances were produced with a significantly higher head shake of 14.6°, followed by FNI signs at 10°, and then CS signs at 5.8°. The same pattern was found for male participants: (6.4° in CF, 5° in FNI, and 3.9° in CS in the analysis considering all the strategies). In our data, participants rotated their heads (referred to as 'side facing' in Appendix F) mainly for three reasons: a) when it constituted the phonology of the target sign, as in the case of LER 'read', where signers needed to direct their gaze at the manual sign representing the act of reading; b) when the manual sign was located in the facial region, and participants rotated their heads more for the production of doubled signs to make the manual sign more visible to the addressee (see more about increasing visual acuity in section 5.1.4.2); or c) when they rotated their heads, slightly tilted forward, and simultaneously raised their eyebrows, it could indicate that the information being signed is noteworthy or important, as observed next. However, the head rotation by itself does not seem to mark focus.

[23] This analysis included all the obtained data with the exception of the excluded utterances. It was not categorized according to specific independent variables, such as strategies, target signs, sign classes, sex, or participants.

Table 26 – Head shake production in our experiment

(a)	 **LER ‘to read’**
(b)	 ADVOGAD@ ‘lawyer’
(c)	 LILÁS ‘light-purple’

Source: Prepared by the author.

One interesting occurrence of our corpus involved doubling the target sign with a different sign. One example is illustrated in the following table, where the participant produced the sign MASSA ‘(bread) dough’ to refer to the sign PÃO ‘bread’. In this case, the we believe that the participant had a purpose similar to the one described in the previous paragraph: to enhance the visibility of the sign when duplicated. We categorized this utterance as a doubled construction since both manual signs (in the original and final positions) refer to the same object target sign and it follows the same prosodic pattern observed in other doubled constructions:

Table 27 – Duplication of the sign PÃO ‘bread’ in a doubled construction

Original position	**Final position (doubled)**
	

Source: Prepared by the author.
* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

Fischer and Janis (1990) early research on ASL stated that verbs are syntactically and morphologically restricted, implying that they cannot simultaneously mark aspect and license an object. Following this perspective, doubling can be employed to rescue derivation when an aspectual modification is required by a transitive verb with overt object. In this scenario, the initial copy of the verb will license the object and the final one will express the aspectual marking (Fischer; Janis, 1990) (see also Kegl, 1985; Liddell, 2003). Since our experiment CS sentence was HOMEM VENDER PÃO 'the man sells bread', accompanied by a supporting image of a baker (Figure 20), the participant might have interpreted it as a relative clause, such as 'The man who prepares (the bread) sells it', when producing the CF utterance HOMEM VENDER PÃO MASSA 'man sell bread dough'. However, in this case, the signer would be duplicating the subject HOMEM 'man' rather than the object PÃO 'bread'. Therefore, it is unclear to which sign the duplicated sign (we are glossing this doubled sign with claw-5 handshape[24] here as MASSA 'dough', according to Capovilla et al (2017)) is referring to. We believe that the participant might be focusing both of them, as the sentence allows the use of a duplicated transitive verb that represents both the agent (the body part – the hands – of the HOMEM 'man' or PADEIRO 'baker') and the theme PÃO 'bread'. In other words, we believe that this participant has emphasized the information by using a handling handshape that encompasses the manner in which objects or instruments are manipulated (Benedicto; Brentari, 2004).

It has been attested that not only transitive verbs with aspectual marking can be doubled but also modal verbs, negators, quantifiers, nouns, *wh*-words (Nunes; Quadros, 2008), as well as tense signs and *wh*-elements (Petronio, 1993; Quadros, 1999). Additionally, the doubling of transitive verbs is noted even when there is no aspectual marking. In such cases, the information structure of doubling is associated to focus (Petronio, 1993) or emphatic focus (Lillo-Martin; Quadros, 2008; Nunes; Quadros 2008), marked by a head nod on the doubled element.

[24] One of the semantic labor for the Claw-5 handshape is gaps between fingers representing "Non-compact matter […] solid, loosely assembled, or fluffy matter or not wholly contained matter." Occhino (2017, p.83).

Another noteworthy production is the following example, where the participant employed the verb PRECISAR ‘to need’ to duplicate the target sign in a direct answer[25]. In this case, the head nod had scope over the modal verb, and not the doubled sign. It is essential to mention that only uninflected verbs can be duplicated, meaning that verbs inflected for agreement morphology cannot (Nunes, 2003, 2004; Nunes; Quadros, 2004, 2006).

(18)
___br _____hn
EU LER PRECISAR LER
(PRO-1READ NEED READ)
‘I need to **read**’

The latest quantitative result suggests that a trace of lip corner puller (AU 12) was activated in CS, while FNI and CF utterances did not show such activation. However, AU 12 exhibited a significant difference for female participants in the analysis considering all the strategies. In this case, they displayed trace activation of AU 12 in both CS and CF utterances, but not in FNI utterances. Upon reviewing each participant’s video, it became apparent that the activation of this NMM is not related to focusing constituents. Instead, it was produced immediately after the end of the signs production but still before the end of the utterance (before the hand returns to its initial position or comes to a stop in the signing space). Figure 43 provides an example of when a question was posed about having a purple book, and the response was “No, (it) is brown”. Immediately after the production of the last sign, the participant activated AU 12 (indicated by the red line). It is highly plausible that this activation was prompted by conversational factors that extend beyond the scope of this research or to indicate the end of the signing turn.

[25] This is similar to the following occurrence where the sign COR ‘color’ was added to duplicate the color adjective LILÁS ‘light-purple’:
_____hn _____hn _____hn_____br+hn ____hn
MULHER COMPRAR ROUPA LILÁS COR LILÁS
(WOMAN BUY SHIRT LIGHT-PURPLE COLOR LIGHT-PURPLE)

Figure 43 – Lip corner puller (AU 12)

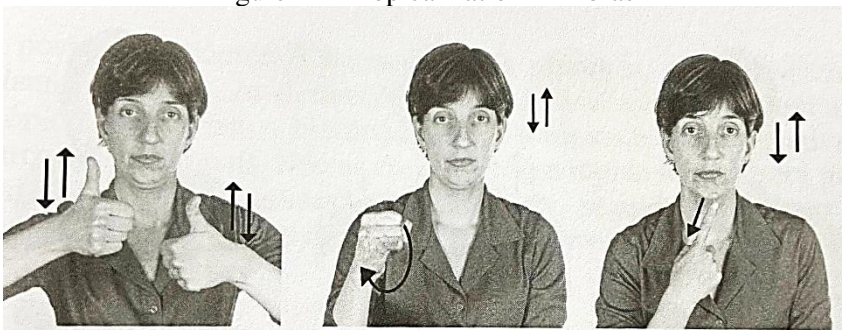
Source: Prepared by the author.

It is important to mention, however, that Neidle *et al.* (2000) suggest that the doubling constructions are not connected to focusing strategies. They argue that it originated from a tag or a simple repetition of a reduced version of the material of the main clause.

5.1.2.4 Topicalization

Topicalization, a common syntactic raising strategy found in various (sign) languages, involves placing a sign in a pre-verbal position at the beginning of a sentence to establish it the topic of discussion. In ASL, topicalization is responsible for altering the basic SVO order (Fischer, 1973; Liddell, 1980; Aarons, 1994), resulting in an OSV order with a complex predicate. A similar phenomenon is observed in Libras, where sign order flexibility is linked to topic marking (Felipe, 1989; Ferreira-Brito, 1995). Topicalization in Libras is characterized by raised eyebrows, a slightly tilted back head, and a subsequent head nod (Quadros, 1999, p. 5) and signifies that the NP entity has either been previously evoked or holds an important information inferable from the ongoing discourse (Prince, 1983). Figure 44 provides an example of a Libras topicalization utterance with an OSV order.

Figure 44 – Topicalization in Libras



<FUTEBOL>t ‘soccer’ <JOHN GOSTAR>hm ‘John likes’
<>t = raised eyebrows / <>hm = head movement
Soccer**,** John likes it.

Source: Quadros and Karnopp (2004, p. 147).

The NMM of raised eyebrows that commence slightly before the onset sets the boundaries for topicalization in Libras (Quadros; Karnopp, 2004), as it cannot extend throughout the entire sentence. In other words, if a sign is not the topic of the sentence, it cannot be associated with the raised eyebrows marker. Additionally, a brief pause typically occurs between the topicalized constituent and the rest of the utterance, and the topicalized sign is usually linked to an argument position, whether it be the subject or object. According to Aarons (1996), in ASL, there are alternative other ways to mark a topic, such as body shifting, widening the eyes, and possibly succeed by rapid head nods.

It is important to emphasize that, in section 3.2.4, we delineated the concept of “topic” (the outcome of the topicalization process) to underscore the pragmatic distinctions between topic and focus. Here, we delve into topicalization as a syntactic strategy employed to raise the argument to the initial position of the utterance, thereby altering its order and establishing thematic prominence.

In our corpus, we encountered only two instances of topicalization, both used to evoke CF. In one occurrence where the target sign was a verb, the topicalized sign was the object (AMIG@ ‘friend’) that received the action of the verb (ABRAÇAR ‘to hug’), resulting in AMIG@ ABRAÇAR (FRIEND HUG) ‘my friend, I hug’. In this utterance, the topic (object) was marked with a head tilt and a slight head nod, while the verb was produced with more amplitude, involving greater more movement dislocation and tension, to emphasize the action of the verb. According to Liddell (1977a, 1980), topic position allows only phrasal

constituents. Consequently, a verb is not permitted in the topic position[26]. Therefore, despite the verb target sign not being selected as a topic due to grammatical constraints, the signer was able to emphasize it prosodically.

In the second occurrence, the target sign was an adjective and it was topicalized in the production of the answers, resulting in MARROM TER LIVRO MARROM (BROWN HAVE BOOK BROWN) 'brown, I have a brown book'. As observed, the target sign MARROM was produced both in its original position and as a topic, suggesting that the signer placed more emphasis on it than on other signs in the utterance. This topicalized sign was also produced with head tilt and head nodding, but also with wide eyes, raised brows, and torso flexed forward – NMMs that collectively support the emphasis on the topic. The other signs in the comment were all produced with head nods, which reinforces the idea that the signer, by topicalizing the adjective target sign, not only answered the question with the requested target sign but also used the comment structure to summarize the entire utterance information.

In both answers, the topics were marked with a head tilt and a head nodding, and the subject was omitted. Among all the NMMs observed in these two topicalized utterances, raised eyebrows have been previously cited in the literature on Libras (Quadros; Karnopp, 2004) and ASL (with chin, by Baker-Shenk, 1983; Coulter, 1979; Liddell, 1978, 1980) and rapid head nodding and widened eyes have been described in ASL literature as topic marking (Aarons, 1996). Although head tilt movement and head/torso flexed forward have not been previously cited in the literature, it is important to note that we only have two utterances that are representative of topicalization used to evoke CF. Further investigations are needed to understand whether head tilt movement and head/torso flexed forward were used as topic marking or only as prosodic changes to increase the prominence of the topic.

5.1.3 Detailing

When detailing is employed as a focus strategy, the signer aims to clarify the information in the utterance, either throughout lexical enhancement or by providing additional details about the target sign, VP or IP. This involves elaborating the target sign with

[26] A VP is allowed to occupy this position. In these cases, it is obligatory to sign the subject (within the main clause) with a head nod. The next ASL example was extracted from Aarons (1996), where tm2 means "large movement of head back & to the side; eyes" (Aarons, 1996, p. 74): $\overline{\text{LOVE MARY}}^{\text{tm2}}$ $\overline{\text{JOHN}}^{\text{hn}}$

examples, contexts, functions, or other aspects that can support the addressee's understanding. Thus, we believe that the detailing strategy serves as a means of focusing information while providing relevant information for understanding a sentence, thereby ensuring that the then addressee does not misunderstand it. Despite detailing being the least strategy used in both focuses, it was more commonly used in FNI (26%) than in CF (10%) contexts.

5.1.3.1 Lexical enhancement

A remarkable finding was that focused signs were often repeated using a synonym or a related lexical item to enhance semantic attention to the focused sign. This repetition could occur at the end of the sentence, as discussed in 5.1.2.3 section – Doubled Constructions –, but, much like Crasborn and van deer Kooij (2013), we observed several instances where the focused target sign was immediately followed by synonyms (example a) or lexical items semantically close to the sign[27]. In some cases, these near synonyms served to narrow down the information, making the target sign and the message clearer. This was achieved by producing the category's target sign followed by the target sign itself (example b)[28].

Table 28 – Lexical enhancement

(a)	_____hu ___hn _____hn+ft HOMEM EL@ ADVOGAD@ (MAN PRO-3 LAWYER) "The lawyer"
(b)	_____hn _____br PESSOA ADVOGAD@ (PERSON LAWYER)

Source: Prepared by the author.
* The sign in red represents the target sign.

It was mostly adopted in FNI contexts (20%) than in CF (5%). As previously cited, our hypothesis is that participants guest the cause of the problem that generated the question of the experiment: while lexically enhancing the target sign could support the resolution of the problem in utterances responsible for evoking FNI, it would not be sufficient

[27] It might also be the case that participants are utilizing the strategy of "lexical enhancement", where they produce the sign-name of the group and then the target sign. (e.g. COMIDA PÃO 'food bread').
[28] In Cognitive Grammar, a symbol is formed by the association of a semantic and a phonological pole, representing the symbolic structure (Wilcox et al., 2022). Wilcox et al. (2022) refer to conceptual overlap when there are multiple symbolizations of the same entity in grammatical constructions.

in CF, since in CF they were more certain about the problem's origin: the misunderstanding of an information due to the similarity of the phonetic aspect of signs (target *vs*. alternative).

In FNI contexts, 47% of the lexical enhancement occurrences were produced to elicit color-adjectives. In both lexicalist and connectionist models of psycholinguistics, memory plays a crucial role, considering that the brain stores not only items independently and all their possible variations but also all the situations in which they were used in conjunction with other words. In essence, a network of items is established, with some being more or less reinforced by their frequency and the frequency of their combinations, enabling direct access in any context (Butterworth, 1983; Hay, Baayen, 2005; Jackendoff, 1983). For instance, the world "classroom" can involuntarily evoke words such as teacher, dictionary, test, vocabulary, table, etc (For database of lexical and phonological properties of ASL, access ASL-LEX (2021)). In light of this, two possible hypotheses can be established:

- the target signs LILÁS (LIGHT-PURPLE) and MARROM (BROWN) would directly trigger the sign COR (COLOR) more readily than other target signs would elicit their equivalent or the name of the group in which the sign is included. This hypothesis is because participants also specified the target sign in other syntactic categories but not as frequently as in adjectives, or
- COR LILÁS 'color light-purple' or COR MARROM 'color brown' are linguistic variants (in this case, compounds) of the signs LILÁS 'light-purple' and MARROM 'brown'. This is because, in Capovilla *et al.* (2017) dictionary of Libras signs, both possibilities (the signs alone and COR+sign) are listed as entries.

To elicit target signs, participants evoked different signs. The strategy "target sign explanation" also involved evoking signs. However, in lexical enhancement strategy, participants only produced a sign related to the target sign to make it clearer, whereas in the explanation, participants contextualized, exemplified, or explain the function of the target sign or the VP. The target signs DOCE (CANDY), LER (TO READ), and PEDAGOGO (PEDAGOGUE) haven't been lexically enhanced. The following sequences of signs[29] represent the lexical enhancement found in our corpus:

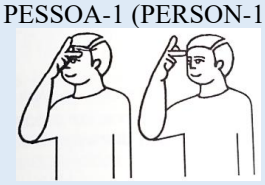
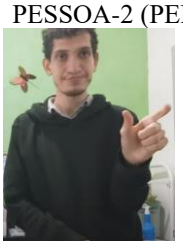
---

[29] The sequences found in Crasborn and van deer Koij (2013, p.543) was:
STUDY WRITE;
LEARN STUDY;
LEARN TAKE-IN;
STUDY TAKE-IN;
TO-BE-DISGUSTED DISLIKE;
CINEMA-THEATER FILM;

- ✓ ADVOGAD@ PESSOA PESSOA-CL (LAWYER PERSON-1 PERSON-2);
- ✓ PESSOA ADVOGAD@ (PERSON-2 LAWYER);
- ✓ HOMEM ADVOGAD@ (MAN LAWYER);
- ✓ HOMEM EL@ ADVOGAD@ (MAN PRO-3 LAWYER);
- ✓ FAZER ABRAÇAR (DO HUG);
- ✓ COMIDA PAO (FOOD BREAD);
- ✓ PÃO MASSA (BREAD DOUGH)
- ✓ COR LILÁS (COLOR LIGHT-PURPLE);
- ✓ LILÁS L-I-L-A-S [30](LIGHT-PURPLE L-I-L-A-S).
- ✓ COR MARROM (COLOR BROWN);
- ✓ LÁ BAR (THERE BAR);
- ✓ LÁ EMPRESA (THERE COMPANY);
- ✓ LÁ EMPRESA DENTRO EMPRESA (THERE COMPANY INSIDE COMPANY).

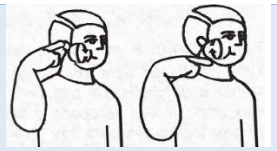
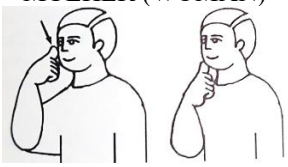
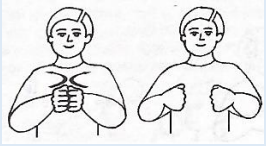
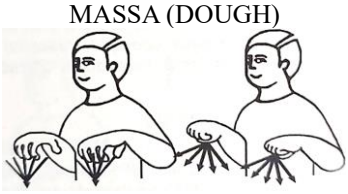
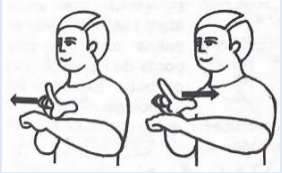
The following signs were used in the sequencies just presented:

Table 29 – Lexical enhancement evoked signs

Category	Target sign	Signs evoked
	ADVOGAD@ (LAWYER)	PESSOA-1 (PERSON-1)  Capovilla et al (2017, p. 2171)
		PESSOA-2 (PERSON-2)   Source: Sinais […] (2021b)
		HOMEM (MAN)

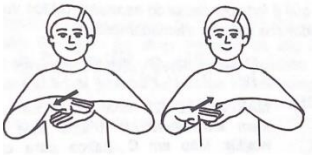
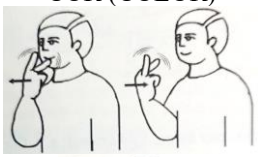
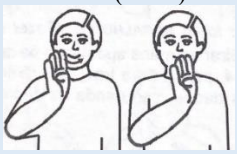
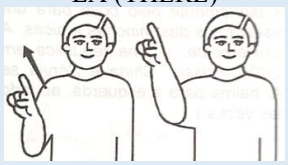
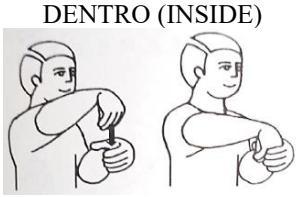
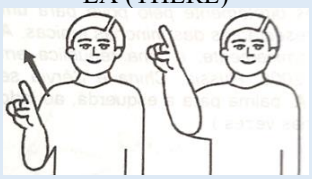
SOLD GONE;
GO DISAPPEAR;
ASSEMBLE REPAIR.

[30] In Crasborn and van deer Koij's CF on the object (2013), the fingerspelled word was realized higher in the signing space than in non-focused conditions. We had only one occurrence of fingerspelling as a strategy to emphasize the target sign. In this example, the fingerspelled word in the CF utterance was produced higher and more centrally to the camera when compared to the target sign in the CS, but not when compared to the target sign present in the same CF utterance: CERT@ LILÁS L-I-L-A-S (CORRECT LIGHT-PURPLE L-I-L-A-S) 'It is **light-purple**'.

Subject	 Capovilla et al (2017, p. 111)	 Capovilla et al (2017, p. 1467) MULHER (WOMAN)  Capovilla et al (2017, p. 1907) EL@ (pronominal reference)  Capovilla et al (2017, p. 1052)
Verb	ABRAÇAR (TO HUG)  Capovilla et al (2017, p. 64)	FAZER (TO DO)  Capovilla et al (2017, p. 1269)
Object	PÃO[31] (BREAD)  Capovilla et al (2017, p. 2083)	COMIDA (FOOD)  Capovilla et al (2017, p. 717) MASSA (DOUGH)  Capovilla et al (2017, p. 1784)
	LILÁS (LIGHT-PURPLE)  Capovilla et al (2017, p. 1677)	L-I-L-A-S (LIGHT-PURPLE)  Capovilla et al (2017, p. 17)

[31] In the following production, the target sign is PÃO (BREAD), but the participant opted to lexically enhance the subject instead while emphasizing the target sign with the particle SÓ (ONLY).

_hd _____hn _____lh
_____br
_____lt ____hd
HOMEM É RAPAZ VENDER SÓ PÃO
(MAN BE GUY SELL JUST BREAD)

<table>
<tr><td rowspan="2">Adjectives</td><td>MARROM (BROWN)
 
Capovilla et al (2017, p. 1782)</td><td>COR (COLOR)
 
 
Capovilla et al (2017, p. 785-786)</td></tr>
<tr><td rowspan="3">Locatives</td><td>BAR (BAR)
 
Capovilla et al (2017, p. 375)</td><td>LÁ (THERE)
 
Capovilla et al (2017, p. 1626)</td></tr>
<tr><td>EMPRESA (COMPANY)
 
Capovilla et al (2017, p. 1071)</td><td>DENTRO (INSIDE)
 
Capovilla et al (2017, p. 889)</td></tr>
<tr><td>LÁ (THERE)
 
Capovilla et al (2017, p. 1626)</td></tr>
</table>

Source: Prepared by the author. Images extracted from Capovilla et al (2017, p. 1071).

The evoked signs EL@ (PRO-3), PESSOA-1 (‘PERSON-1), and PESSOA-2 (PERSON-2) from the table above appear to exhibit similarities with the signs PERSON and INDEX in NGT (van der Kooij; Crasborn, 2008) and in ISL (Sandler, 1999a). These signs form a prosodic word by occurring in cliticized form with a focused lexical sign. For instance, Craborn and van der Kooij (2013) noted that focused NP is often followed by a clitic or a combination of clitics (PERSON+PT[32]). We posit that this may not only apply to clitics and PERSON signs, but also to the evoked locative pointing sign LÁ (THERE).

> As we propose in Crasborn *et al.* (2012), the addition of clitics may be closely linked to prosodic weight in NGT. When in a certain context a full prosodic word is required, an indexical sign may be added to fill rhythmic

[32] ‘PT’ represents an indexical (pointing) sign, with ‘PT:1’ specifically denoting first person pointing (Craborn and van der Kooij, 2013).

> requirements even though it is not needed from a syntactic point of view. (Craborn and van der Kooij, 2013, p. 545)

Only productions in which the participant produced at least one distinct sign related to the target sign were categorized as lexical enhancement strategy. Consequently, the following structures were not considered in the present analysis:

- utterances comprising only one target sign, either with a different linguistic variant or the same sign produced with phonetic changes (see section 5.1.4);
- utterances containing the target sign and another sign related to it, specifically the signs PÃO 'bread' and fingerspelled B-A-R 'bar'. This exclusion was implemented due to the ambiguity of whether the participant produced the additional sign to enhance the target sign or because the sign variant was the participant's preferred choice. As outlined in Chapter 3, participants were instructed to use a specific linguistic variant from the revised signs list before the experiment. However, some participants still opted for their preferred variant, resulting in the production of both the preferred variant and the respective variant on the sign list.

The statistical analysis indicates that FNI was characterized by a slight Outer brow raise (AU 02) and a greater degree of head tilt (13°, compared to 7.1° in CS and 4.5° in CF utterances). Upon examining utterance by utterance, we observed that AU 02 marked old or shared information, particularly in adjectives and locatives, in some instances, or accompanied a cleft particle in others[33]. Head tilt served different purposes: (a) being produced at the end or throughout the entire utterance, often with an optional head nod, to confirm the information presented; or (b) emphasizing information when produced in conjunction with a brow raise.

Table 30 – AU 02, head tilt, and FNI

(a)	hn hn lh+hb HOMEM VENDER COMIDA PÃO (MAN SELL FOOD BREAD) 'Man sells bread'.
(b)	br+hn+lh hn COR LILÁS (COLOR LIGHT-PURPLE) 'It is light-purple'.

Source: Prepared by the author.

[33] Example:

_hn
_____br+lh
COR É LILÁS ROUPA(COLOR BE LIGHT-PURPLE SHIRT) 'Is is **light-puple**'

Another statistical result revealed that CF in lexical enhancement was characterized by a slight upper lid raiser (AU 05). In the analysis of all strategies, female participants exhibited a trace activation of AU 05 (0.1254) in CF utterances, whereas in CS and FNI utterances, this AU remained inactive. We identified only three instances of CF utterances where the lexical enhancement strategy was employed. In all three occurrences, AU 05 was activated in signs containing old, given or shared information. This marking was occasionally accompanied by a brow raise.

5.1.3.2 Explanation of the target sign

Another way of providing additional information about the target sign involved explaining or contextualizing it. This strategy was the least utilized in both focuses, accounting 6% of FNI and 5% of CF within the Detailing group. Notably, the majority of instances in which this strategy was employed focused on verbs. While "subjects and objects" serve as grammatical constituents offering supplementary details about entities involved in an action, and "adjectives and locatives" are responsible for modifying elements, verbs hold a central role in the structure of an utterance. They determine the arrangement of the elements and are instrumental in expressing actions and occurrences.

In line with this perspective, when the target sign was a verb, participants seemed to interpret that the addressee might face challenges in understanding not only the verb itself but also the element(s) required by the verb. In such cases, our interpretation is that contextualizing the information would facilitate comprehending the VP or the entire IP. To illustrate, we can consider the two types of verbs selected as target signs in our experiment. While the verb LER 'to read' was associated with a direct object that is non-active (RECEITA 'recipe'), the verb ABRAÇAR 'to hug' was linked to a direct object that is an agentive or experiential (AMIGO 'friend'). The experimental questions about these two target signs elicited the adoption of the "detailing" strategy, albeit in different manners: participants provided answers that detailed the VP (example a bellow) or the object (example b bellow) related to the verb LER 'read', as there was only one active entity. In contrast, for the verb ABRAÇAR 'to hug', participants detailed or contextualized the IP, considering two active entities – the subject and the object (experiencer) (example c bellow).

Table 31 – Explanation of the target sign

(a)	__hb _____lh _____lh _____br _____br _____sr EU LER PARA FAZER COMIDA (PRO-1 READ TO DO FOOD) 'I read (the recipe) to make food'.
(b)[34]	_____fb _____hu _____sf _____lt ____ft _____fb+ft EU LER RECEITA COMO É COMIDA BOLO OU VÁRI@S (PRO-1 READ RECIPE HOW BE EAT CAKE OR VARIOUS) 'I read the recipe to (understand) how (to prepare food), such as cake or other food".
(c)	_____hn ENCONTRAR EU AMIG@ ABRAÇAR (MEET PRO-1 FRIEND HUG) 'Me and my friend we meet each other and hug'.

Source: Prepared by the author.
* The sign in red represents the target sign.

The main clause EU LER 'I read' was marked with a brow raise in example 'a'. The same VP however, was marked with furrowed brow in example 'b', probably marking the exemplification of a theme/topic. Finally, in example 'c', the target sign was marked with a head nod. Both brow raise and head nod, as discussed, seems to have scope over the constituents the participants intend to focus.

There was only one production of detailing within the adjectives and locatives groups: in both cases it seems that the signer detailed the meaning information of the target sign as the addressee was not familiar with it. To answer the question, the participant explained what is the color LILÁS 'light-purple' by signing COR SIGNIFICAR TEMA ROX@ CLAR@ LILÁS 'the color LILÁS means purple light'; and the meaning of BAR, where the signer explained ONDE EU IR CERVEJA BEBER ONDE B-A-R 'The place I go to drink beer, this place is named B-A-R'.

The statistical results show that the duration of CS signs within the category of "Target sign explanation" (20%) last more than in FNI (9%) and CF (11%) answers where the participants explained the information. But when we analyze the gross duration, we notice that FNI (4.693s) and CF (3.690s) utterances were produced with a longer duration than CS (2.687s). Our hypothesis is that, although utterances were longer in FNI and CF contexts, signs within those utterances could have been produced faster than signs in CS. This is because, in order to explain/contextualize the target sign, more signs were incorporated into their answers. This is in accordance with the Menzerath-Altmann Law that states that larger

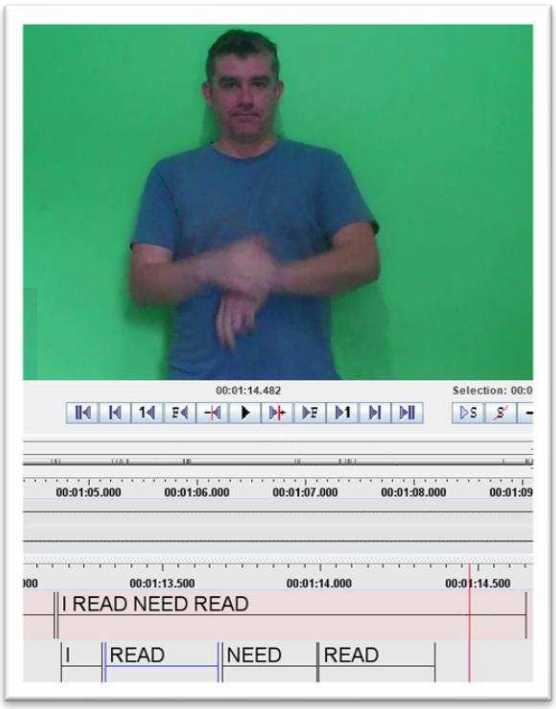
[34] In this utterance, the torso flexed forward (ft) appears to be employed to highlight a contrast between "cake" and other possibilities.

linguistic constructs tend to have smaller constituents, and smaller constructs tends to have larger constituents (Menzerath, 1928; Altmann, 1980).

It is important to cite that in CS, we asked participants to read, memorize and sign the glosses in the same order presented looking at the camera. Therefore, the task of memorizing the glosses, signing it in the same order, and understand the information of the sentence might have affect the normalized duration of signs within CS, while in FNI and CF utterances, participants also had to memorize information to answer the questions, but they were freer to answers them in the order of their choice, with the signs and strategy they would prefer. Therefore, we can say that the experimental character of our study may have affected the duration of signs within CS, while had less effect on FNI and CF utterances.

Although in the general analysis, female participants exhibited a trace of chin raiser (AU 17) muscle in CS, this was not observed in FNI and CF contexts. Specifically, in the explanation strategy, participants incorporated a slight AU 17 in CF contexts, while its production was observed to a lesser extent in FNI utterances (trace). In ASL, the AU 17 has been associated with imperative marking (Ichida, 2010), and lower face movements have been found to serve various semantic functions (Bross, 2018, 2020; Bross; Hole, 2017; Nikolai; Wilbur, 2019; Karabüklü; Wilbur, 2019; Wilbur; Nikolai, 2019; Pentecost; Wilbur; Crabtree, 2019). However, in our study the production of AU 17 was primarily observed at the end of the utterance, just before the hands returned to their initial position (as indicated by the red line in the following example).

Figure 45 – AU 17 in focused utterances



Source: Prepared by the author.

Given that this marking does not have scope over any manual sign, our interpretation is that AU 17 indicates "meta-textual awareness of being in a discourse situation by addressing the interlocutor" (Cohen-koka; Nir; Meir, 2023, p. 210). In the examples of Cohen-koka, Nir and Meir's (2023) study, signers produced the AU 17 along with dimpler (AU 14), lip stretcher (AU 20), lip pressor (AU 24), accompanied by PALM-UP[35]. While the explanation utterances in our corpus were not marked with PALM-UP, these occurrences are similar to how those authors interpreted theirs – as expressing rhetorical confirmation, akin to saying "like, isn't it so?"[36]. In other utterances outside the Explanation group, participants produced the PALM-UP gesture and the AU 17 at the end of the utterance, just before the hands returned to its initial position.

[35]  Source: extracted from Cohen-koka, Nir, and Meir (2023, p.210).

[36] We also observed a singular production of AU 17 in explanation utterances, where the participant utilized AU 17 to provide an exemple of the object related to the verb target sign.

Table 32 – PALM-UP expressing rhetorical confirmation

__**PU**+AU17
HOMEM ADVOGAD@ VIAJAR RIO-DE-JANEIRO
(MAN LAWYER TRAVEL RIO-DE-JANEIRO)
'The lawyer (man) traveled to Rio-de-Janeiro'.

__**PU**+AU17
ADVOGAD@ PESSOA TER RIO-DE-JANEIRO
(LAWYER PERSON HAVE RIO-DE-JANEIRO)
'There is a lawyer in Rio de Janeiro'.

Source: Prepared by the author.
* The gloss in bold represents the signs in the image and the sign in red represents the target sign.

In light of this, this rhetorical confirmation appears to be more necessary in CF contexts, which aligns with the quantitative analysis in which it was produced with more intensification in CF than in FNI contexts, as the necessity of checking if the information was properly transmitted is more evident in CF contexts, particularly when the addressee confused one alternative with a mistaken one. However, there is also the possibility that the participant was merely ensuring that their answer was aligned with the experimental task.

5.1.4 Phonetic changes

We also found modifications in the production of stressed signs units (Phonetics) instead of changes with scope over the entire answer (Prosody). This indicates that it was not categorized in any of the previously described strategies. The following alterations were observed across in the majority of the answers within our corpora.

According to Wilbur and Schick (1987), increased intensity in sign language can be achieved through modifications in NM expressions, the use of sharp boundary markers, signing higher in the signing space, and/or increasing the tension of the sign. (p. 19-20)

Wilbur and Schick (1987) also outlined additional modifications to convey stress in sign language. This include as movement along a stressed sign's trajectory (for signs

without movement), other movements before or after the lexical movement, changes in rhythmic pattern, and increased tension in articulation, such as hand configuration. Some of these modifications align with the concept that the face is the area with greatest visual acuity, while the signing space (area in front of the chest) is the least, as it is only targeted by peripheral vision[37] (Siple, 1978).

5.1.4.1 Manual sign duration

We conducted a statistical analysis to examine potential differences in the production of both manual and NMMs based on FNI and CF utterances. This analysis encompassed all data, excluding the previously mentioned excluded utterances. Consequently, it was not categorized based on specific independent variables. While we have discussed certain manual changes, like increasing visual acuity or potentially enhancing amplitude and tenseness, it is important to approach those changes regarding prosodic characteristics. To extend duration (and consequently enhance sign prominence/stress the articulation), signers can increase the size of the movement, decelerate it, repeat it, or incorporate extra movements before or after the lexical movement (Wilbur; Schick, 1987), or add hold at the end of the movement, and produce sharper onsets and offsets (Wilbur, 1990a, 1999).

It is important to assess the physical characteristics of manual signs, including duration, displacement (in centimeters), and velocity (in centimeters per second) (Wilbur, 1999). Although we conducted the duration analysis, we did not measure displacement and velocity values due to a lack of access to equipment. Nevertheless, it is essential that future research explores these values, if they have the necessary resources. Here, we refer to "normalized duration" as the raw duration of MSs divided by the utterance duration, expressed as a percentage.

Our experiment includes CS consisting of three signs, each representing the subject, verb, and object functions[38], and CS comprising four signs, specifically designed to elicit color adjectives or locatives (SVOA/L). Therefore, the interpretation of the results, especially LGR, needs to be interpreted in light of this information. In our methodology, we chose short CS and utilized simplified glosses. Given that one gloss can evoke more than only

[37] In comparison to the trunk region, the facial region displays a considerable variety of distinct locations and complex (marked) hand configurations (Battison, 1978).
[38] Except for ADVOGADO TRABALHAR RIO-DE-JANEIRO 'The lawyer works in Rio de Janeiro' that stands for subject, verb, and locative.

one sign, creating extensive CS written in simplified glosses could hinder participant's comprehension of CS meanings.

Our statistical results indicated a significant difference in the distribution of sign durations between focused and not-focused utterances. Specifically, CF manual signs were produced longer in duration, equivalent to 24% of the utterance duration, compared to CS signs (21%) and FNI signs (20%). As the focus of our research is to explore how focused target signs are produced in different contexts, we conducted a target sign analysis[39]. In this analysis, we found that focused target signs had significantly longer durations (35%) compared to CS (26%).

From these two results, three observations emerge: 1) target signs (CS: 26%, FNI: 35%, and CF: 35%) exhibit longer durations than non-target signs[40] (CS: 19%, FNI: 15%, and CF: 20%); 2) focused target signs (FNI and CF utterances: 35%) have longer durations than CS signs (26%); and 3) signs in the general analysis show slightly higher durations in CF utterances (24%) than in CS and FNI utterances (20% and 21%, respectively). This suggests that interpreting manual signs duration requires consideration the following factors: the role of the sign as a target sign, whether it was focused, and whether this was a contrastive or non-contrastive focus. Specifically, when the focus intention is to contrast with an alternative, signers tend to produce signs with longer durations compared to FNI and CS. The experimental study by Gökgöz *et al.* (2016) revealed that children in the age range of 4-8 years old, acquiring ASL, produced contrastively focused signs with longer duration, higher articulation speed, more repetitions, and proximalization in comparison to the non-contrastive focus signs.

Another significant prosodic result of duration was phrase-final lengthening, a prosodic phenomenon that is quite prevalent and has been previously observed in various spoken and signed languages. It refers to the phenomenon where the duration of the last sign is extended/lengthened. In ISL, for focus purposes, the last sign is usually duplicated or hold in its location (Nespor; Sandler, 1999). In ASL, systematic lengthening consistently takes place at the end, serving as a cue for the final boundary of the phrase (Wilbur, 1999; Brentari; Crossley, 2002). In Hong Kong Sign Language, the last signs are approximately one and a half times longer than non-final forms (Tang; Brentari; González; Sze, 2010). While we were

[39] Non-target signs were produced with longer durations in CF (20%) and CS (19%) utterances compared to FNI (15%) utterances.

[40] In verbal focus, the sign form may undergo alterations that closely resemble the articulation of the durative or continuative aspect (see more about telic and atelic verbs in Kuhn, 2017; Malaia; Wilbur, 2012; Wilbur, 2003b; Malaia et al., 2008).

unable to investigate the duration of holds (as we annotated the utterances until the moment when the hands stop in the signing space), we analyzed the duration of the final sign to observe whether its lengthening was influenced by focus purposes. In accordance with these studies, our results show that when signs were in the final position, they were produced longer than non-final signs, regardless of the context (non-final signs: 19% in CS, 15% in FNI, and 20% in CF / final signs: 27% in CS, 32% in FNI, and 33% in CF). Another interesting finding was that focus contexts also seem to play a role in the duration of final lenghtening: in FNI and CF, signs in the final position were produced significantly longer than CS final signs (CS: 27%, FNI: 32%, CF: 33%). Similar to spoken languages, the phenomenon of phrase-final lengthening has been observed in various studies conducted on sign languages as well. (Coulter, 1990; Grosjean, 1979; Liddell, 1980; Perlmutter, 1992, 1993; Wilbur; Nolen, 1986).

Finally, although the distribution of MSs duration based on the independent variable of sex did not show significant difference in utterances produced by male participants (21% in CS, 18% in FNI, and 23% in CF contexts), a notable distinction emerged for female participants. Females produced signs in CS and FNI with a 21% of the duration of the whole utterance, while CF signs were produced with 26% of the utterance duration. Despite CF signs being longer than CS and FNI signs, women appear to extend these signs more than men.

In the literature, various factors unrelated to linguistic stress can impact the overall duration of a sign (Liddell, 1978; Wilbur, 1985, 1987), including sentence or phrase position (Liddell, 1978; Wilbur; Nolen, 1986), as well as the semantic and syntactic functions of the signs (Coulter, 1979; Liddell, 1978). This is why we chose an experimental study, allowing us to control semantic and syntactic functions and positions of the signs. However, Wilbur and Nolen's (1986) study did not confirm that stressed situations result in longer sign durations or significantly faster movements. Instead, stressed signs contained a greater number of syllables than unstressed signs, often due to the addition of extra movements. Thus, more syllables per sign led to a greater length of signs in stressed contexts.

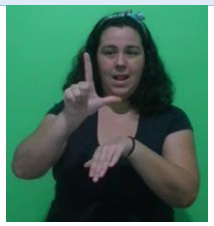
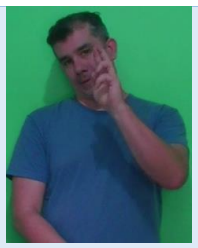
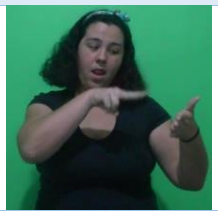
5.1.4.2 Area of greatest visual acuity

According to Johnston and Schembri (1999), signs can undergo internal or external modifications. They describe two internal sign modifications: one involving space and movement, which may also include changes in orientation and handshape, and the other involving the number of hands selected, ranging from one-handed to doubled-handed or vice

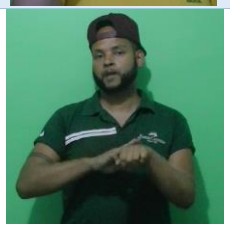
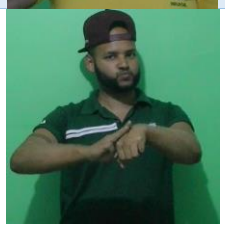
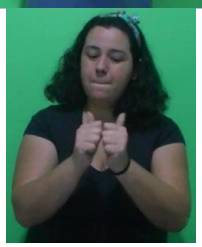
versa (Johnston, 1989). Furthermore, these authors identify external modification as the addition of minimal meaningful units into a stem, through affixing and compounding.

In light of this, given that the face is the region with greatest visual acuity (Siple, 1978)[41] – making it easier to discern small differences in hand configuration, location, or movement –, stress can be expressed through additional signing modifications. If a signer wishes to emphasize a sign, they will extend its duration, incorporate wider and more repetitive movements, or add NMMs to enhance visibility and clarity, ensuring effective understanding by the recipient. All these techniques are considered prosodic changes. Although we have previously described some of these stressing techniques, the following phonetic alterations have been found across various strategies in both FNI and CF contexts. Before addressing them, we considered phonological aspects of the signs, such as movement, location, and hand configuration.

Table 33 – Phonetic changes in focused contexts

Articulator	Alteration	Example		
		Sign	CS	Focused
Hand configuration	In CF, the source of confusion steemed from the hand configuration itself. The participant clarified the hand configuration at the onset of the sign production in the focused context.	LILÁS ‘light-purple’		
Manual sign position	To emphasize the sign, the participant positioned it in a more central location in the signing space, resulting in a change in head position – either tilting backward or facing to the side.	BAR (fingerspelled)		
Movement repetition	The participant executed a single movement in the CS target sign, whereas she performed two movements in the focused context.	LER ‘read’		

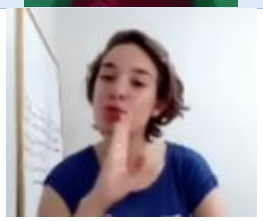
41  Source: extracted from Quadros and Karnopp (2004, p. 78, based on Battison, 1978, p. 44)

Selected fingers[42]	The participant doubled the selected fingers to emphasize the target sign.	ADVOGAD@ 'lawyer'		
Non-dominant hand position	As the camera represented the addressee position in front of the participant, they adjusted the non-dominant hand make the sign more visible to the addressee (see more in Wilcox *et al.*, 2022).	MARROM 'brown'		
Non-dominant arm position	The participant elevated both the non-dominant hand and its arm to bring them closer to the area of greatest visual acuity.	PEDAGOG@ 'pedagogue'		
Eyes	The eyes, along with pointing, serve to direct attention to specific information that the participant wants the addressee to focus on. Therefore, directing the eye gaze toward the manual sign is a way of emphasizing it.	PÃO[43] 'bread'		
Mouthing movements	The manual sign ADVOGADO 'lawyer' was produced with a singular repetitive movement, while the participant mouthed it three times.	ADVOGAD@ 'lawyer'	"ADVOGADO" while prodcing the manual sign.	"ADVOGADO ADVOGADO ADVOGADO" wile producing the manual sign.
Head[44]	The participant allocated the manual sign closer to the area of greatest visual acuity and positioned the head backward, accompanied by a brow raise, to the emphasize the	LILÁS 'light-purple'		

[42] Since Xavier (2013) reported doubled hands as a means of intensifying meaning, we initially hypothesized that doubling could be a strategy adopted by our participants for stressing signs. However, we did not find any of its occurrence.

[43] Although we haven't analyzed precision between two-handed symmetrical signs, Waleschkowski (2009) found that those signs in German Sign Language were articulate more precisely when focused, with sharper transition boundaries. In contrast, the articulation of other signs, whose form is not specified, occurs at a higher position in space.

[44] While in the study by Crasborn and Van der Kooij (2013) with NGT, focused objects were articulated with an upward and backward head movement in both informational and contrastive focus, the examples in our corpora were predominantly from CF contexts. Although head nod (Pitch) did not show significant differences in our statistical results, our corpora included several instances of head upward in the first sign of the utterance

	stressed sign.			
	The participant tilted her head upward, changed the non-dominant hand position, and inclined the torso laterally to emphasize the target sign.	MARROM 'brown'		
	Some target signs were marked with head up or side facing. However, in our study, such instances occurred exclusively in utterances where the phonological location of the target sign was in the face region[45].	BAR 'bar'		
Torso	The participant adjusted the torso position to enhance the visibility of the sign for the addressee.	PEDAGOG@ 'pedagogue'		

Source: Prepared by the author.

Thus, despite the variation between the citation and the focused sign production, these signs should not be treated as different signs[46]. This is because the same meaning is associated with them (Johnston; Schembri, 1999). Finally, we observed another form of stressing CF signs: phonetic contrast, which was produced two times by only one of our participants. In this signed utterance, the participant explicitly contrasted the phonetics of the target and alternative sign, illustrating to the addressee the difference in movement between the alternative and the target/correct sign.

Table 34 – Phonetic contrast between the target and the alternative signs

(a)	**PÃO ÔNIBUS** **(BREAD BUS)**	**br+hu**
	'This is the sign for bread and this is the sign for bus'.	

(possibly indicating the topic) or in the focused target sign, with a backward head movement indicating object marking.

[45] Additional research is needed to determine whether this NMM can be considered a distinctive marking for CF or if it simply serves as a form of emphasis for signs produced in the face region.

[46] The challenges in determining whether sign modification linked to morphological processes are lexical or grammatical can be attributed, in part, to glossing practices that seem to inaccurately categorize certain lexemes as fundamentally nominal, verbal, or adjectival. In reality, a significant portion of lexemes appears to belong to more than on sign class (Johnston; Schembri, 1999).

(b)	br+hd br+sf DOCE GUARDANAPO DOCE (CANDY NAPKIN CANDY) 'This is the sign for candy and this is the sign for napkin'.

Source: prepared by the author.

In 'a', the production of the target sign was marked with the repetition of movement and eyes directed to the manual sign, while the target sign was stressed with a brow raise and a head upward. On the other hand, in 'b', the same participant appears to have chosen to place the stress on the target/correct sign, instead of the alternative one. Although we only have these two occurrences of sign contrast, we believe that the participant is capable of placing the stress on both the correct and incorrect information.

Finally, the sign RESPONDER 'answer' was found in only four focused utterances: one FNI and three CF answers[47]. Although its production might have been influenced by our experimental methodology (participants answering questions), we believe it was used to emphasize the information that follows, similar to the meaning found in the main clause of the following ASL example.

(19) English: 'I didn't say 'DEATH', I said 'BET'!'
lean back lean forward
ASL: PRO. 1 NOT SAY **'DEATH'**, PRO. 1 SAID **'BET'**

Source: Wilbur; Patschke (1998, p. 296).

According to Crasborn and Van deer Koij (2013), the manual location and movement of focused signs are altered depending on their phonological specifications. Signs without movement, specially fingerspelled signs, are likely to be raised in the signing space, but not all signs can be raised[48], similar to the considerations for lengthening and reduplication. In other words, phonological form appears to determine how prosody is altered. In our experiment, we did not consider the phonological form of sign when selecting them, focusing only on their grammatical function. However, in the analysis of our results, we considered the possibility that the phonological form of the sign may limit the extent to which its prosody is modified.

[47] FNI: EU RESPONDER BAR (PRO-1 ANSWER BAR);
CF: RESPONDER PEDAGOG@ (ANSWER PEDAGOGUE) / EU FALAR PODER RESPONDER MARROM (PRO-1 SAY CAN ANSWER BROWN) / RESPONDER ÔNIBUS É EMPRESA (ANSWER BUS BE COMPANY).

[48] Tyrone and Mauk (2010) discovered that the height of a lexical sign in ASL is also influenced by coarticulatory factors.

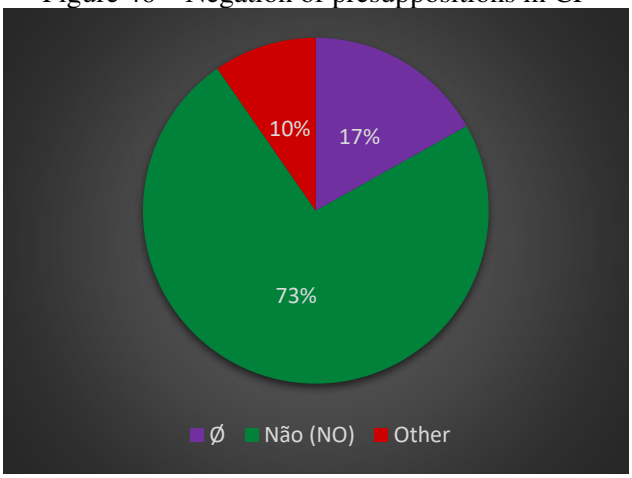
5.1.5 CF negation

As described by Wilbur and Patschke (1998), replacing focus (referred to here as CF) is employed when the signer's intention is to correct mistaken information. This form of focus rejects a specific element of the previous discourse and replaces it with another, which also occurs in Libras (Quadros, 2019). Therefore, CF answers are expected to encompass both the negation of the contextual information and the assertion of new information, as in the following example:

(20) A: Phillip is wearing a green shirt.
B: No, Phillip is wearing a blue shirt.

Following Zubizarreta (1998), in (20), we can assert that there exists an x such that Phillip is wearing x AND it is not the case that the x (representing what Phillip is wearing) = a green shirt, but that x = a blue shirt. Therefore, despite the CF literature citing the negation as part of the CF construction, in our corpora, this negation appears to be a tendency rather than a rule. About 83% of the answers had the discourse presupposition (the incorrect information) negated, but 17% only presented the correct information without negating it. In other words, the denial of the presupposition is highly likely to be produced in a focused answer, but it is not mandatory. To observe all the negations of presuppositions, please refer to Appendix E – "Experiment answers".

Figure 46 – Negation of presuppositions in CF



Source: Prepared by the author.

When observing these 17% of Ø occurrences, we noticed that, in fact, all of them were answered with no negation before it. Only just a few had other gestures responsible for

drawing the attention of the addressee to the new or correct information. The gesture found on CF contexts was PALM-DOWN produced with two hands (glossed as "ESPERAR 'to wait'), as in the CF example ESPERAR. FALAR ROXO? NÃO. CERT@ MARROM (WAIT. SPEAK PURPLE? NO. CORRECT BROWN) 'wait, did you say 'purple'? No, it is brown'. This gesture was produced by only one participant, suggesting a preference for a discourse particle, expressing the meaning of "wait a minute". Additionally, this example was the only utterance where the participant posed a rhetorical question to contrast two pieces of information. Another gesture found was PALM-UP [49](glossed as "ENTÃO 'so'), produced in our corpus with one or two hands and found in both FNI and CF contexts, as in the following FNI example: ENTÃO. COR ROUPA LILÁS (SO. COLOR SHIRT LIGHT-PURPLE) 'So, the shirt is light-purple'. It appears to be used for clarification purposes and, therefore, can be adopted in both contexts, since both of them require clarification.

To construct the Figure 46, we categorized all negations containing at least one NÃO 'no' sign in the category named "NÃO (NO)". The type of answers were: (a) only the sign NÃO; b) the NÃO sign before the target sign (e.g. NÃO ESCREVER meaning NO WRITE); c) the target sign followed by the NÃO sign (e.g. PEDAGOG@ NÃO meaning PEDAGOGUE NO); and d) the sign NÃO before and after the target sign (e.g. NÃO PROFESSOR@ NÃO meaning NO TEACHER NO). In addition to the utterances classified within NÃO constructions, we also found NMMs and facial expressions that reject or indicate that the previous information is not quite accurate. These facial expressions were sometimes produced with or without the negative manual sign and include head shake[50] (known as the negative sentence marking[51] – Arrotéia, 2005), furrowed brows (marking doubt), and Lip corner depressor (AU 15) (indicating "not exactly").

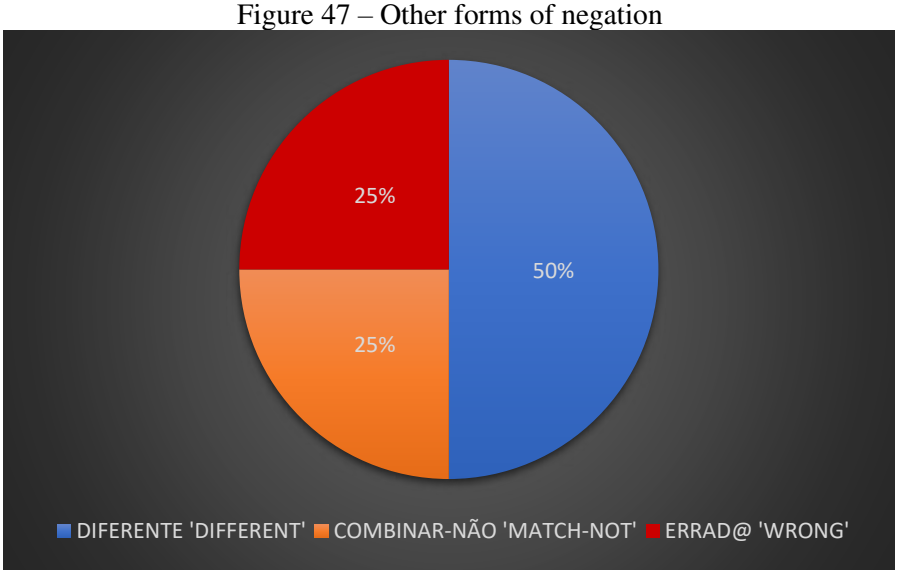
[49] In section 4.3.1.2, we discussed PALM-UP accompanied by the chin raiser (AU 17) produced at the end of the utterance. Here, we are citing PALM-UP before the beginning of the CF utterance, which seems to serve different functions.

[50] When the head shake was accompanied by a smile, it appears that the participant's intention was to negate the presupposition information in a polite way:

[51] Besides Libras, according to Zeshan (2004), the negative head is employed in Irish Sign Language, Greek Sign Language, Quebec Sign Language, British Sign Language, Chinese Sign Language, Flemish Sign Language, and Russian Sign Language.

The “Other” category included the signs DIFERENTE ‘different’, COMBINAR-NÃO ‘it doesn’t match’, and ERRAD@ ‘wrong’. Unlike the NÃO particle, those signs were only produced either before or after the alternative sign.

Figure 47 – Other forms of negation

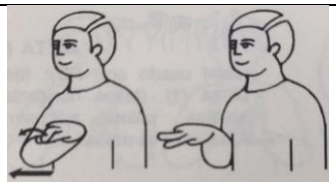


Source: Prepared by the author.

Although NÃO ‘no’ constructions were the prevalent form of denying the presupposition, two participants also used other sign constructions. To negate, MP2 only used the signs DIFERENTE ‘different’ and COMBINAR-NÃO ‘it doesn’t match’ (50% and 25% within the “Other” category, respectively). MP4 used NÃO ‘no’ constructions but also used ERRAD@ ‘wrong’ (25% within the “Other” category). Since only two participants used other forms of negating the presupposition, it is not possible here to establish patterns to predict in which contexts those signs are or are not used. This is also beyond the scope of our research. However, we can affirm that all those signs seem to have the same function of denying the mistaken presupposition. Hence, it is likely that those different forms of negating the presupposition represent a preference choice, reflecting linguistic variation in expressing the same information.

Table 35 – Signs used for negating the presupposition

Gloss	Sign
COMBINAR-NÃO ‘it doesn’t match’	 Source: (Sinais […], 2021a)

DIFFERENTE 'different'	 Source: Capovilla et al (2017, p. 964) dictionary.
ERRAD@ 'wrong'	 Source: Capovilla et al (2017, p. 1.113) dictionary.

Source: Prepared by the author.

It is important to highlight that CERT@ (CORRECT) can be used to mark cleft utterances (section 5.1.2.1), but it is also possible that it is being used in opposition to ERRAD@ 'wrong', as in the following two examples: 1) ERRAD@ ÔNIBUS. CERT@ PÃO (WRONG BUS. CORRECT BREAD) 'Bus is wrong. Bread is correct', and 2) ERRAD@ CINZA. CERT@ LILÁS ROUPA (WRONG GREY. CORRECT LIGHT-PURPLE SHIRT) 'grey is wrong. Light-purple is correct'. However, considering the sign ERRAD@ as a language variation or participant preference, it seems that these two productions are isolated occurrences of this possibility, since only two utterances were produced with this structure. Our strongest interpretation leans toward affirming that the contrast is not in lexical signs, but in two clauses of the CF answers, as described by Zubizarreta (1998): 1) a rejection of an element of clause in the previous discourse, and 2) a replacing of it with the correct information, and this can be done through the use of lexical signs such as CERT@ and ERRAD@.

Moreover, in the majority of the answers, the negation clause was produced before the clause with the correct information. However, we also found two occurrences where (a) the negation clause was produced after it, and in (b) it was negated with the sign NÃO, the correct information was provided, and then the wrong information was again denied:

Table 36 – Position of the negative clause

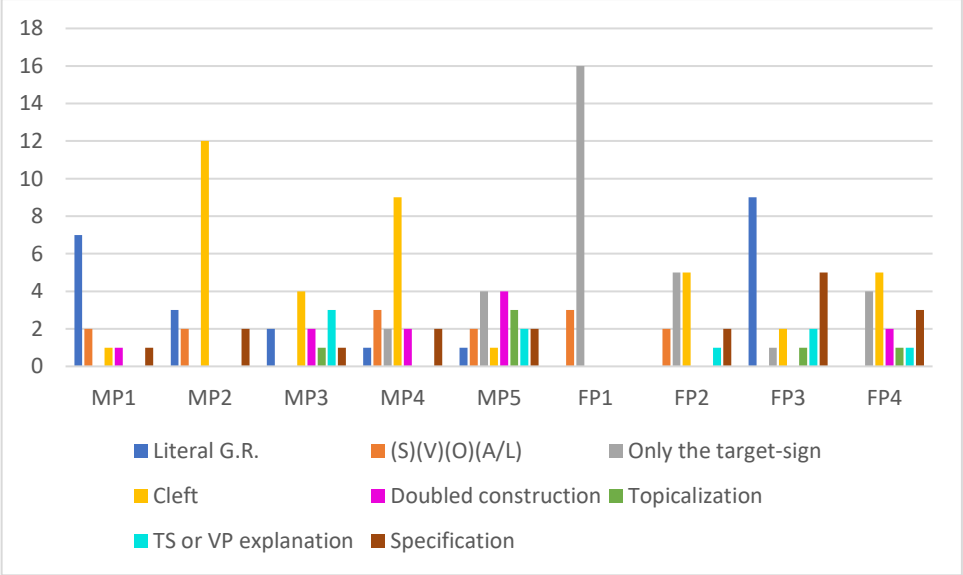
(a)	MARROM TER LIVRO MARROM**.** EU FALAR PODER RESPONDER MARROM. **ROX@ NÃO** (BROWN HAVE BOOK BROWN. PRO-1 SPEAK CAN ANSWER BROWN. PURPLE NO) 'I have a brown book. I can say that it is brown, not purple'.
(b)	NÃO. **CERT@ LILÁS L-I-L-A-S**. COR SIGNIFICAR TEMA ROX@ CLAR@ LILÁS. NÃO É CINZA NÃO (NO. CORRECT LIGHT-PURPLE L-I-L-A-S. COLOR MEANS TOPIC PURPLE LIGHT LIGHT-PURPLE. NO BE GREY NO) 'No. It is *lilás*. This color means that it is a light purple. It is not grey'.

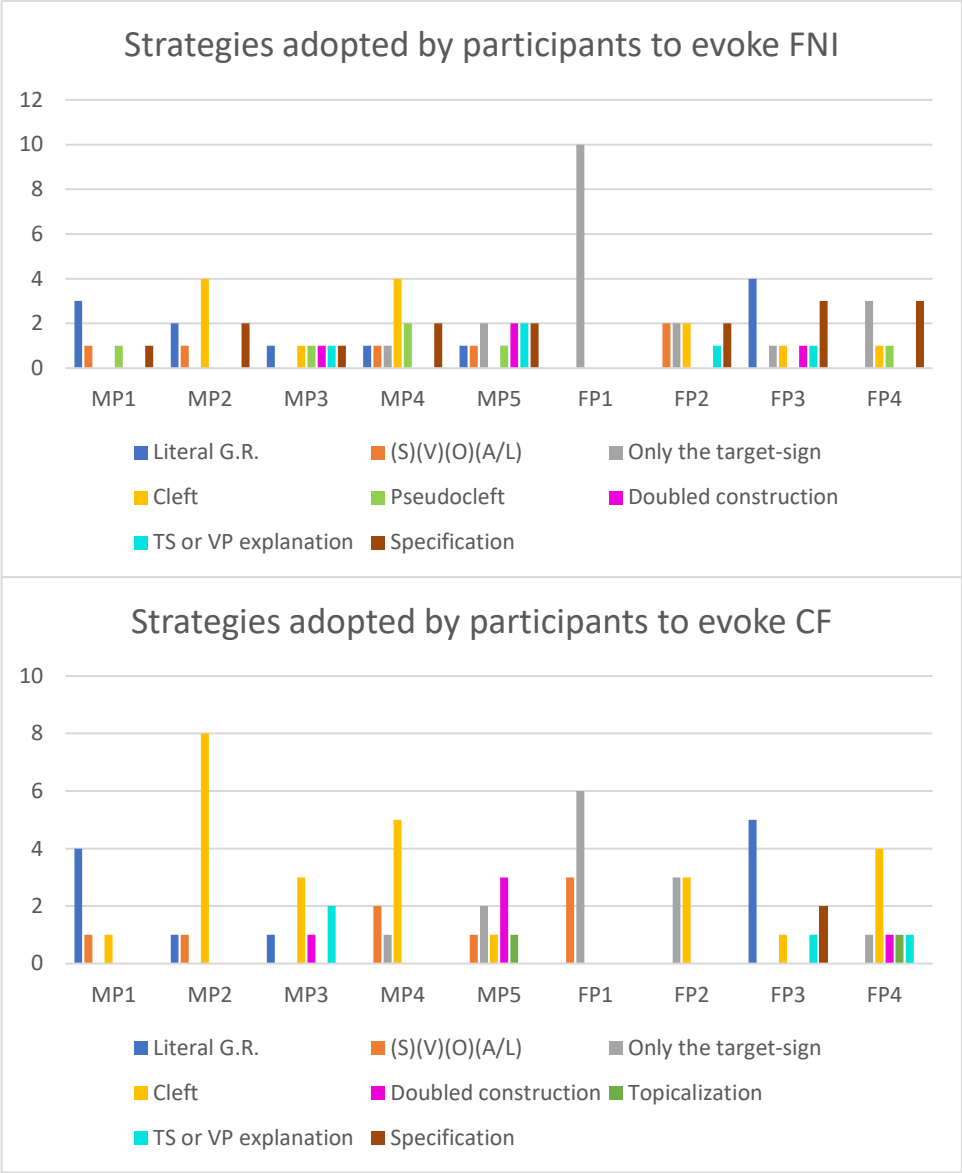
Source: Prepared by the author.

5.2 Inter-individual variation

In this section, we will delve into demographic and social analysis, presenting insights that take into account the diversity and heterogeneity inherent in the Sao Carlos Deaf Community, as with any other Deaf Community. However, it will not be possible to make generalizations, as our corpus consisted of only 9 deaf individuals (5 men and 4 women) from the city of Sao Carlos, Sao Paulo, Brazil. Attachment F includes important social information about participants, and Appendix G presents all the dependent variables according to participants. The following graphics depict the distribution of strategies adopted by each participant, where MP stands for 'male participant' and FP for 'female participant'. To construct these graphics, we used the gross number of occurrences per utterance, as calculating the percentage would not clearly demonstrate how they were employed. For example, FP3 signed two utterances within the CF lexical enhancement group, while none of the other participants produced lexical enhancement in CF, making her production 100% of the production in the group.

Figure 48 – Strategies adopted by participants to focus signs





Source: Prepared by the author.

MP1 and FP3 tend to answer the question with LGR more frequently than other participants. They use this strategy more often to contrastively focus signs than to provide new information. From their demographic data, we observe that both participants are the oldest within our corpus (MP1 with 46 and FP3 at 40 years old). They studied in regular schools without Libras, learned Libras only after the age of 12, self-declared a high degree of lip-reading (MP1 self-declare 4/5 and FP3 self-declare 5/5[52]), and underwent oralization therapy for more than 6 years[53]. It might be the case that older deaf individuals who did not

[52] FP3 was the only participant who evaluated her Libras fluency as 4/5.
[53] MP1 still uses hearing aid, while FP3 has never used before.

have earlier access to Libras would rely more on written Portuguese (and therefore on glosses) in our experiment. This could be due to factors such as low exposure to Libras during the critical period for language acquisition[54], inadequate educational resources (lack of interpreters at school), or lack of public policies regarding deaf education during that period. Despite the National Institute for Deaf Education (INES – Instituto Nacional de Educação de Surdos) being founded in 1856, Libras was only legally recognized in 2002 through Law 10,436[55]:

> Art. 1 The Brazilian Sign Language – Libras (and other expression resources associated to it)is recognized as a legal mean of communication and expression.
> Single paragraph. Brazilian Sign Language - Libras is understood as the form of communication and expression, in which the linguistic system of a visual-motor nature, with its own grammatical structure, constitutes a linguistic system for the transmission of ideas and facts, coming from communities of Brazilian deaf people (Brasil, 2002) (our translation).

Despite this, FP1 with similar demographic data did not present the same pattern. At the time of data collection, she was 37 years old, attended a regular school without Libras, and learned Libras after 12 years old. However, she did not answer the experiment questions with LGR. Instead, she differentiated herself by responding only the target sign in all the questions of the experiment responsible for eliciting FNI. In questions evoking CF, she used only the target sign but also employed (S)(V)(O)(A/L) answers. Additionally, further investigation is needed to understand why this participant has a strong preference for answering questions with only the requested information. Overall, the higher mean duration of signs and target signs for FP1 is likely due to her shorter answers compared to other participants.

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[54] The critical period for language has been debated for a long time. While Skinner (1957) proposed that learning comes from environmental stimulus-response reinforcement, Chomsky (1959) argues that its origins can be better explained within the linguistic human faculty, rather than linguistic behavior (Chomsky, 1965). The most current proposal believes that initial language acquisition is governed by both behavioral and neural perspectives. Sign languages, however, are acquired in unique environmental circumstances, as most deaf children are born to hearing parents (Fernandes; Moreira, 2014; Freeman; Carbin; Boese, 1999; Quadros, 2005; Silva; Pereira; Zanoli, 2007).

[55] The same law established that Libras could not replace written Portuguese. Three years later, in 2005, Decree 5,626 was enacted:

> Art. 2 For the purposes of this Decree, a deaf person is considered to be one who, due to having a hearing loss, understands and interacts with the world through visual experiences, expressing their culture mainly through the use of the Brazilian Sign Language – Libras (Brasil, 2005) (our translation).

According to Skliar (1999), recognizing the written Portuguese as the second language and Libras as the first language results in a political recognition of deafness as a difference, a flag constantly raised by the deaf community.

FP2 answered CF questions with only the target sign more frequently than FNI questions. FP2 shares some similarities with FP1, since both of them are adult women (37 and 33 years old, respectively), born deaf with profound hearing loss, born and lived mostly in the city of Sao Paulo, from the C social class, have completed higher education, and have lived in Sao Carlos for a period of 4 years or more (FP1 for 6 years, FP2 for 4 years). However, they also have some differences: FP1 attended regular school without Libras, learned Libras after 12 years old, underwent oralization therapy for more than 6 years, but never used hearing aid; FP2, on the other hand, attended bilingual school for the deaf, learned Libras before the age of 2, underwent oralization therapy for 2 to 5 years, and has used a hearing aid before. FP1 has used only strategies within the "Direct answer" group, while FP2 employed strategies both from "Direct answer" and "Foregrounding structures". Specifically, she increased the frequency of "only the target sign" production and produced cleft-like structures in CF.

MP2 and MP4 employed cleft-like structures more frequently in FNI contexts compared to other participants. Nevertheless, in CF, these participants used cleft-like structures even more frequently than in FNI[56]. MP2 was the participant that most employed more cleft-like structures. He learned Libras between 2 and 5 years, and currently do not use, but has used hearing aid before, and underwent oralization therapy for 2 to 5 years. Differently from other participants, he is also a Libras instructor. The participant MP4 that also frequently used cleft-like structures attended bilingual schools for the deaf, learned Libras between 6 and 9 years old, and underwent oralization therapy for more than 6 years.

MP5 was the only participant who used doubled constructions in both FNI and CF. The frequency with which he adopted this strategy increased in CF compared to the frequency he employed doubled constructions in FNI utterances. Despite this, in focused contexts, he varied in the strategies adopted. This participant has completed higher education, attended regular school without Libras, learned Libras between 6 and 9 years old, never used a hearing aid, and underwent oralization therapy for more than 6 years.

[56] This pattern was also observed in MP3, FP2 and FP4, who used less cleft-like structures in FNI than other participants, but used more frequently in contrasting contexts.
It is worth noting that MP3 is the only participant who has never undergone oralization therapy, and FP4 is the youngest participant in our corpus. She is an undergraduate student who attended inclusive regular school, uses a hearing aid, learned Libras after the age of 12, and underwent oralization therapy for more than six years.

All in all, it seems that older signers[57] who learned Libras later and attended regular schools without an interpreter might answer the questions directly, with LGR, (S)(V)(O)(A/L) structures, or by producing only the target sign. In contrast, individuals who learned Libras earlier or had earlier exposure to Libras in school might use more foregrounding structures[58]. Hearing aid use, oralization therapy, education level, and social class do not seem to have interfered with the type of strategy adopted. However, as mentioned, we are only pointing to intuitions based on the production of a corpus with a small number of deaf participants. For generalizations, it is necessary to conduct greater research involving a larger number of representative deaf individuals.

Regarding the previous findings on sex differences, male participants exhibited significant variations in head movements (head shake and tilt) and the inner brow raiser (AU 01). They indeed intensified AU 01 production more than women. In terms of head movements, they intensified head shake more than women in CF (but not in CS and FNI contexts) and intensified head tilt more than women in FNI and CF (but not in CS). In contrast, the results for female participants included variations in manual sign durations and facial expressions (AU 05, 12, 17). AU 05 and 12 were activated only for women, while AU 17 was activated for both sexes (activated only by woman in FNI and by men in all three contexts).

In the literature, there has been a described tendency for women to exhibit more nonverbal backchannel cues, including emotive (Forni-Santos; Osório, 2015) and reactive (Dimberg; Lundquist, 1990) facial expressions. Additionally, women are reported to nod their heads more frequently (Duncan; Fiske, 1977; Roger; Nesshoever, 1987) and with greater intensity (Ashenfelter *et al.*, 2009) than men. Therefore, while our results suggests that women may intensify facial expressions more than men, it would be premature to draw conclusions in this regard, as our results are very limited. Moreover, there were no observed differences in head nodding distribution between the sexes.

Despite the literature indicating that women intensify facial expressions and head nodding more, we haven't found any study indicating the tendency of other head movements

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[57] MP4 and MP5 were also in the same age range (39 and 38 years old, respectively), but they adopted other strategies, mainly in the foreground structure group. However, it is worth mentioning that they acquired Libras earlier, between the age of 6 and 9.

[58] Lillo-Martin and de Quadros (2005) conducted a study on the acquisition of focus marking in ASL and Libras. They examined longitudinal data from two ASL-acquiring and two Libras-acquiring children between 1;1 and 3;0. The findings revealed that all children acquired contrastive focus fronting significantly earlier than emphatic focus doubling and focus-final realization. This supported their hypothesis that focus doubling and focus-final realizations stem from the same underlying operation, which is distinct from fronting.

(head shake and head tilt) between men and women in different contexts. Thus, these results need further investigation.

It is important to note that the identity of the conversation partner also plays a role: people tend to employ more backchannel cues when they are talking to women (Dixon; Foster, 1998) and nod more when talking to a man (Ashenfelter *et al.*, 2009). The person asking the questions in our experiment, as well as the interviewer applying the experiment are women. Therefore, we cannot ignore the possibility that this could lead to different intensities of facial expressions and head movements, influencing participants to make themselves more expressive.

Another variable that could influence the form of how the utterances were answered is the personality of each participant, as well as the fact that they participate in the same community (São Carlos Deaf Community) and know each other (a "social net" as described by Milroy and Milroy, 1992). These two aspects were not controlled in the present study, as the São Carlos Deaf community, as most other Deaf communities, has a limited number of individuals. Thus, selecting those that has a personality more/less expressive or who do not know each other would hinder our data collection.

5.3 Summary of the findings

Following this perspective, addressing the research question "Are there are differences in the production of Focus of New Information (FNI) and Contrastive Focus (CF) in Brazilian Sign Language (Libras)? What are these differences?", in this chapter, we observed certain trends that co-occur with focused constituents and are summarized in the following table:

Table 37 – Summary of the findings

Strategy	Articulator	Analysis	Focused contexts
-LGR -(S)(V)(O)(A/L) -Only the TS -TS explanation	Inner brow raiser (AU 01)	Qt*	- Topic marking (in CS, FNI, and CF); - Focus (FNI&CF>CS).
-Only the TS			- Focus (CF>FNI).
-Only the TS -Lexical enhancement	Outer brow raiser (AU 02)	Qt	-Topic marking; - Focus: CF>FNI;
-Lexical enhancement	Upper lid raiser (AU 05)	Qt	- Topic marking.
-Doubled	Lip corner		- After the end of the utterance: it was used due to conversation

constructions	puller (AU 12)	Qt	factors or as a way to signal the conclusion of the signing turn.
-TS explanation	Chin raiser (AU 17)	Qt	- At the end of the utterance (CF>FNI): it was used to express rhetorical confirmation.
-LGR	Mouth strecht (AU 27)	Qt	- In CF only: Mouthing was used to disambiguate phonetically similar signs.
-Only the TS	Head nod (pitch/head flexion)	Qt	- Topic marking (when accompanied by brow raise); - Focus marking (FNI&CF>CS).
Cleft		Ql*	- Cleft particle: É 'be' / CERT@ 'correct'.
-LGR **-(S)(V)(O)(A/L)** **-TS explanation**		Ql	- Singular head nod at the beginning of the utterance: topic marking - Focus marking (CF signs with more movement amplitude than FNI) or increasing the prominence of a sign.
Doubled construction			- Head nod during the production of the duplicated sign or after it.
-Pseudocleft			- Only in FNI: focus.
-(S)(V)(O)(A/L) **-Only the TS**			- Only in CF (optional): single head nods or head down, accompanied by a torso flexed forward: focus in the target sign or in a sign related to it.
-General analysis **-Doubled construction**	Head shake (yaw/head rotation)	Qt	-When accompanied by a head nod: focus marking (CF>FNI).
-LGR **-(S)(V)(O)(A/L)** **-Cleft** **-Lexical enhancement**	Head tilt (roll/head lateral flexion)	Qt	- Confirmation of the signed utterance (FNI>CF>CS); - When accompanied by a brow raise: emphasis placed on information.
-General analysis	Manual sign duration	Qt	- More duration in CF (24%) than in signs from the CS (21%) and FNI signs (20%).
-Target sign			- More duration in target signs (35%) compared to CS (26%).
-Only the TS			- More duration in CF than in FNI signs.

* Qt = Quantitative / Ql = Qualitative.
Source: Prepared by the author.

As mentioned, participants utilized different strategies to emphasize signs and clauses, categorized into three main groups: 1) Direct answers, encompassing LGR, (S)(V)(O)(A/L) structure, and producing only the target sign; 2) Foregrounding structures, covering cleft-like and pseudocleft-like structures, doubled constructions, and topicalization; and 3) Detailing, involving lexical enhancement and explanation of the target sign.

In both focus types, participants provided the missing or correct information directly addressing the question (FNI: 45%, CF: 47%), foregrounding structures (FNI: 29%, CF: 43%), as well as "detailing" (FNI: 26%, CF: 10%), were employed to respond to questions. In FNI contexts, participants used more direct answers (where producing only the target sign or lexically enhancing it were the most adopted strategies), but also answers within the groups of "foregrounding structures" and "detailing". In CF contexts, on the other hand, we found more foregrounding structures were found (where cleft-like structures were the

most adopted strategy), along with direct answers (LGR and producing only the targe-sign were the most adopted strategies within this group), and less detailing. The tactic of detailing the target sign (or the VP) was more commonly utilized in FNI contexts (26%) than in CF contexts (10%). We suggest that furnishing additional context/ providing more details about it or lexically enhancing the target sign might be adequate to address the issue. In contrast, in CF contexts, signers recognized that employing this strategy would not be as effective (10%) as, for example, simply providing the correct information (45%) or foregrounding the structure (45%) of the utterance. It is important to highlight that most of the NMMs from CF contexts were slightly more intensified than FNI in the majority of the analyses. Within the strategy analyses, the following aspects were observed.

- ✓ In LGR answers within CF contexts, mouthing played a crucial role in disambiguating similar phonetic signs;
- ✓ In (S)(V)(O)(A/L) structures, certain CF utterances were distinguished by a head down, as previously outlined by Quadros (2019), sometimes coupled with a torso flexed forward that, according to Wilbur and Patschke (1998) in ASL, might express pragmatic affirmation;
- ✓ Cleft-like particles, such as É 'be' and CERT@ 'correct', were identified, often marked by a head nod or brow raise, and, in occasionally by a head tilt. However, the accompanying NMMs with the target signs exhibited variability;
- ✓ Pseudocleft-like structures were exclusively produced in FNI contexts, where participants emphasized the information with head nod;
- ✓ In doubled constructions, the target sign in its original position was marked by a brow raise, which could indicate either both topic or focus, while the duplicated sign was accompanied by a head nod, as previously outlined by Quadros (2004). This head nod occurred either concurrently with the sign production or after it. Furthermore, the activation of lip corner puller (AU 12) was observed in this group, likely for conversational factors or signaling the end of the signing turn. Additionally, Head shake (when accompanied by ae brow raise) was employed for emphasis, with head shake being produced with more emphatic in CF than in FNI contexts;
- ✓ In our corpus, we annotated only two instances of topicalization structures, both used to express CF. In these cases, the topic was indicated by a head nodding (Quadros; Karnopp, 2004) and brow raise, and in ASL's literature (with chin, by Baker-Shenk, 1983; Coulter, 1979; Liddell, 1978, 1980, Aarons, 1996). However, we also observed topics being marked with a head tilt and head/torso flexed forward. It is important to

note that further investigation is needed, given the limited number of occurrences (only two utterances), which is insufficient for establishing generalizations;

- ✓ Participants also lexically enhanced or explained the target sign or the clause associated with the target sign to mark both focuses. In terms of the explanation strategy, the chin raiser (AU 17) was utilized, conveying rhetorical confirmation, and the signs within CS were produced for a longer duration compared to FNI and CF. Our hypothesis is that, in order to explain or contextualize the target signs, participants incorporated additional signs within their responses and produced them more rapidly in FNI and CF answers.

Another form of highlighting prominence and distinguishing parts of an utterance involved altering the prosody of the information (Wilcox; Wilcox, 2005) in which NMMs play an important role. Based on our results, it appears that both focuses (FNI and CF) were indicated by a brow raise (as observed in ASL by Wilbur and Patschke, 1999) and head nod (quantitatively more intensified in CF contexts in different analyses). However, brow raises (potentially encompassing movements of inner brow raiser (AU 01), outer brow raiser (AU 02), upper lid raiser (AU 05), and singular head nods seem not only to serve as markers for focus but also topics, representing shared, old, or known information. As discussed by Kimmelman and Pfau (2021), there is an overlap between NNMs used for focus and topic, where brow raises are used in both markings in ASL (Wilbur; Patschke, 1999) and in NGT (Crasborn; van der Kooij, 2013). Sandler and Lillo-Martin (2006) states that it is challenging to address only one function to the eyebrows since it serves multiple functions, such as marking topics, yes-no questions, and various competing syntactic analyses of the sentences in question. Nevertheless, some markers are specifically employed to indicate foci rather than topics. An example is the use of forward and backward body leans, identified as markers for focus in these respective signed languages (Wilbur; Patschke, 1998; van der Kooij *et al.*, 2006).

In addition to brow raises and head nods, we have identified other prosodic aspects related to the production of FNI and CF, such as head movements and the duration of manual signs:

- ✓ Head tilt movement (head tilt/lateral head flexion) was observed in focused contexts., primarily representing confirmation of the signed utterance. Head tilt was also used to enhance emphasis on a specific sign or clause.
- ✓ In terms of duration, target signs exhibited longer durations than non-target signs, focused target signs had longer durations than CS signs, and CF signs showed slightly

higher durations than in CS and FNI signs. Based on these results, we believe that longer durations may reflect signs being articulated in a stressed manner.

This stressed manner if often associated with larger movements and more repetition (Crasborn; van deer Koij, 2013). Besides these aspects, our study also observed phonetic modifications in hand configuration, manual sign position, phonetic contrast, the number of selected fingers, non-dominant hand/arm position, as well as NMMs such as eyes direction, mouthing movements, and head positions.

In CF contexts, to negate the presupposed information, participants produced the sign NÃO 'no' either by itself or on structures containing this sign. This negation was executed before the production of the main clause (answer). Other signs used for denying the presupposed utterance included DIFERENTE 'different', COMBINAR-NÃO 'match-not', and ERRADO 'wrong'.

Finally, concerning inter-individual variations, it appears that older signers, who acquired Libras later and attended regular schools without an interpreter, tend to respond to questions directly using LGR, (S)(V)(O)(A/L) structures, or by producing only the target sign. Conversely, individuals who learned Libras earlier or had earlier exposure to it in school may employ more foregrounding structures. Factors such as hearing aid use, oralization therapy, education level, and social class do not seem to influence the type of strategy adopted. However, it's crucial to acknowledge that these observations are based on intuitions derived from a corpus with a limited number of deaf participants. For more comprehensive generalizations, further research involving a larger and more representative sample of deaf individuals is necessary.

It is important to mention that a strategy asserted to be associated with information structure in sign languages is buoys[59] (or more broadly, weak hand holds) (Kimmelman; Pfau, 2021). Although we haven't found this type of strategy in our corpus, we recognize its potential importance for the marking of FNI and CF. According to Liddell (2003, p. 223), buoys "help guide the discourse by serving as conceptual landmarks as discourse continues". According to him, there are several types of buoys: 1) the list buoy involves holding a numeral handshape on the non-dominant hand, where different referents are linked to distinct fingers; 2) the theme buoy is characterized by a raised index finger, representing a significant referent; 3) The pointer buoy directed at a referent that is important; 4) The fragment buoy

[59] In buoys, one hand remains stationary in the location and configuration of a previously executed sign, while the other hand is utilized to produce one or more additional signs (Kimmelman; Pfau, 2021).

where a part of a two-handed sign that is maintained in the signing space refers to an important concept. The shared purpose of 2, 3, and 4 is to emphasize an important referent.

We can also cite as a limitation the fact that we collected isolated utterances (a limitation from our elicitation method). In ASL (Brentari; Crossley, 2002), as well as in RSL and NGT (Kimmelman *et al.*, 2016) forward-referencing holds were observed when final signs from an utterance are held while the signer started producing the next phrase, indicating the emphasized semantic relation between the two utterances.

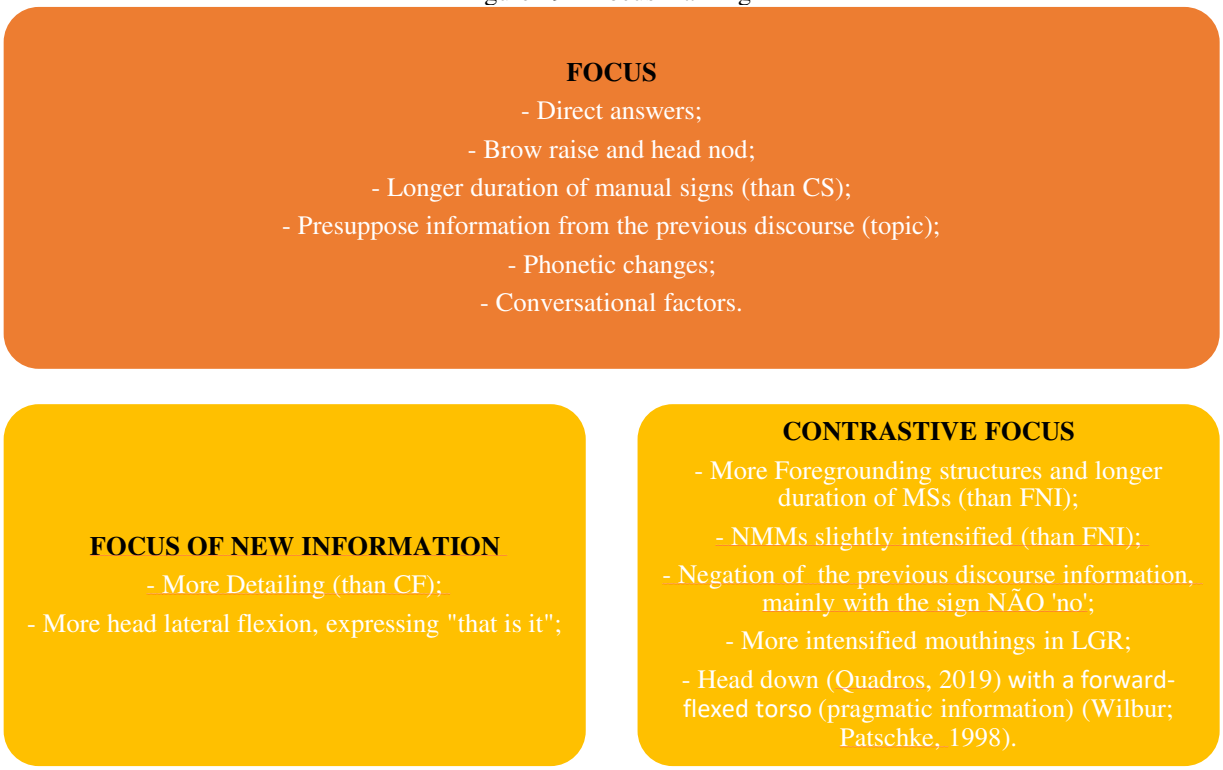
6 Final considerations

Despite the growing number of signed linguistic studies (cf. Ann, 2005; Eccarius; Brentari, 2010; Healy, 2011; Liddell, 1989; Nyst; Baker, 2003; Russell; Wilkinson; Janzen, 2011), research on the focusing phenomenon on sign languages remains limited. In this M.A. thesis, we sought to discuss and compare the process of expressing Focus of New Information (FNI) and Contrastive Focus (CF) in the Brazilian Sign Language (Libras), based on data analysis from the Deaf Community of Sao Carlos (Sao Paulo, Brazil). We used experimental phonetics analysis, opting to elicit and record video data of focused utterances. Given the diverse and multifaceted nature of our object of study "Focus", encompassing phonology, syntax, semantics, pragmatics, discourse, or computation (Büring, 2007; Jackendoff, 1972; de Swart; de Hoop, 1995; Vallduví; Engdahl, 1996; Zubizarreta, 1998), we assumed a specific definition introduced by Rooth (1985, 1992), where focus denotates the existence of alternatives relevant for interpretating a linguistic expression.

As discussed in 2.3.1, despite the various types of focus documented in the literature, this study exclusively analyzed, compared and described FNI and CF. This decision was made as a single CS allowed us to evoke both, optimizing our methodology and the quantity of signed utterances collected. FNI, as implied by its name, is employed to furnish the requested information, essentially asserting a proposition (Mioto, 2004). This type of focus is crucial for assessing the accuracy of an expression (Crasborn; van der Kooij, 2013). On the other hand, CF is used when the signer aims to rectify inaccurate information, rejecting a specific element from the previous discourse and substituting it with another (Wilbur; Patschke, 1998).

The encoding of information structure across various languages perspectives appears to align: like spoken languages, sign languages can mark foci and topic. Nevertheless, this marking is seldom unambiguous and achieved through an intricate combination of syntactic and prosodic markers, which encompass both manual and non-manual signs (Kimmelman; Pfau, 2021). The following figure presents the main characteristics found in each group (FNI and CF), as well as those found in both of them:

Figure 49 – Focus marking



Source: Prepared by the author.

From the results obtained, since both FNI and CF are focuses, their marking exhibits some similarities: both were predominantly marked with a brow raise and a head nod, primarily occurring in direct answers; their signs are generally produced with longer durations than CS, and they both presuppose previous discourse information and undergo a process of phonetic changes.

In FNI contexts, the strategy of “detailing” was more frequently adopted compared to CF. This suggests that explaining or contextualizing the target sign or enhancing it lexically might be an effective approach for supporting the transmission of information, mainly in FNI. In CF of the present study, the problem is more specific, involving an inferred confusion between two phonetically similar signs. Consequently, the use of “detailing” in CF contexts may not be as useful as observed in FNI contexts. Notably, FNI signs were often accompanied by broader head tilt movements at the end of the utterance than CF, signaling a sense of conclusion or “that is it”, after providing the requested information.

In the majority of cases, CF signs exhibited longer durations, NMMs slightly more intensified, and a higher prevalence of foregrounding structures, especially cleft-like constructions, compared to FNI context. Additionally, as expected, in CF contexts, there was the negation of previous discourse information, often signaled by the sign NÃO ‘no’ or clauses containing it. Distinctive features exclusive to CF contexts included, in the

quantitative analyses, the broadest range of mouthing simultaneous to manual articulation for disambiguating similar phonetic signs in LGR. In the qualitative analyses, characteristics specific to CF were a head down, occasionally combined with a forward-flexed torso. According to Wilbur and Patschke (1998) in ASL, this torso movement might express pragmatic affirmation. Despite the fact that Quadros (2019) associated CF marking with a head down, this NMM was observed in some of our CF utterances, but not all of them.

Our findings suggest a tendency in the production of these two types of focus. It is important to note, though, that these aspects cannot be exclusively associated with the expression of FNI or CF, as none of them appear to be mandatory. The expression of focus is diverse, and participants have various options for highlighting information. Thay can:

- ✓ Repeat the structure produced in the initial utterance, answering the question in a very similar way to the first production; and/or
- ✓ Maintain the structure from the initial utterance but add new information, either by lexically enhancing or explaining it; and/or
- ✓ Maintain the structure from the initial utterance but introduce modifications in NMMs or in the duration of manual signs; and/or
- ✓ Formulate a clause external placement; and/or
- ✓ Combine a clause external placement and to alter the layering of NMMs.

Regardless of the chosen option, the signer can also modify the form of individual signs within the clause; signal conversational functions, such as checking if the addressee is following the train of thoughts, indicating conversational turns, or providing rhetorical confirmation of the uttered information. The exposed indicate the difficulty encountered in research involving NMMs analyses arises from the frequent correspondence of prosodic structure with syntactic elements. However, this partial isomorphism implies that they possess grammatical autonomy (Nespor; Vogel, 1986). Despite this, the inclination for prosodic constituents to coincide with syntactic ones implies that a single NMM might fulfill both syntactic and/or prosodic roles (Pfau *et al.*, 2010). There are opposing perspectives to whether NMMs domain should be considered as a prosodic or syntactic structure. According to the syntactical view, NMMs articulate morpho-syntactic features in specific position within the sentence (Wilbur; Patschke, 1999; Neidle *et al.* 2000), while the prosodic perspective claim that NMMs are best understood as intonational tunes (Sandler; Lillo-Martin, 2006).

Differently from generative grammar, Martin' study of French (1987) argues that prosodic structure of sentences doesn't necessarily align with their syntactic structure, since this study demonstrates that acceptable prosodic structures can also emerge independently

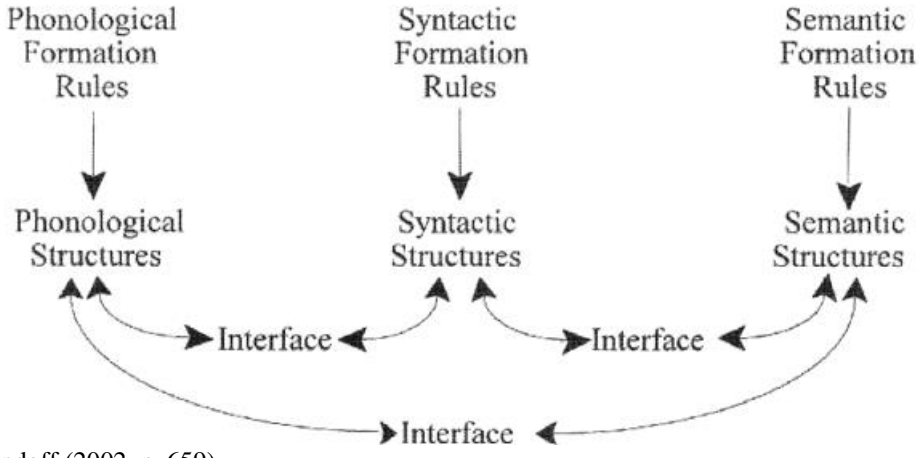
from the syntactic structure. Studies such as Dell (1984), Hayes (1984), and Wenk and Wioland (1982) have shown that rhythmic rules are necessary to anticipate accurate stress patterns in specific instances. Then, when prosody and syntax intersect, a strong prosodic boundary would represent a strong syntactic boundary at a deeper level of the tree.

A way to address this lack of correspondence is by proposing a phonological category known as the Intonational Phrase (IP). This category influences the assignment of intonation contours and the distribution of stress (Beckman; Pierrehumbert, 1986; Ladd, 1996). Although IPs are somewhat linked to syntax and their boundaries typically align with the beginning of significant syntactic constituents, their endings do not always coincide with the endings of the corresponding syntactic constituents, and they are governed by their own independent constraints (Jackendoff, 2002).

Following this perspective, considering that the phonological structure cannot be derived from syntax, conventional arguments for combinatoriality inevitably lead to the inference that phonological structure is generative. However, to better articulate these structures, it is necessary to refer to the principle proposed by Jackendoff (2002) called "interface rules". These rules govern the interface between independent structures.

> An important property of interface rules is that they don't "see" every aspect of the structures they are connecting. For example, the rules that connect syllabic content to metrical grids are totally insensitive to syllable onset. Universally, stress rules care only about what happens in the rhyme. Similarly, although the connection between syntax and phonology "sees" certain syntactic boundaries, it is insensitive to the depth of syntactic embedding, Moreover, syntactic structure is totally insensitive to the segmental content of the words it is arranging. Thus, interface rules implement not isomorphisms between the structures they relate, but rather only partial homomorphisms. (Jackendoff, 2002, p. 656)

Figure 50 – The parallel architecture



Source: Jackendoff (2002, p. 659).

From the results obtained in the present study, we tend to believe that the *Parallel architecture* (Jackendoff, 2002) would explain our focus data as it includes the interaction between autonomous generative systems, such as Phonology (Bbodly structure in sign language), Syntax, and Conceptual Structure (CS in Figure 50). In these interactions, the lexical items permeate the interfaces, manifesting as elements with features shared across each component. This notion applies to all modalities (Cohn, 2013), whether they are stored in memory (signed words, constructions, gestural emblems, or conventionalized images) or not (novel words, gesticulations, images, etc) (Cohn, 2016). We support this interpretation, since the characteristics of the focus marking described here appear to represent the direct interaction between Phonology/Modality as "a channel by which something can be expressed", Syntax/Grammar as "a system for combining elements", and Conceptual structure/Meaning as "the ideas being expressed" (Cohn, 2024). The Phonology/Modality of focus marking Libras would be the body with its phonetic changes, the Syntax/Grammar would be the strategies adopted, and the Conceptual structure/Meaning would be to call the addressee's attention for a specific part of information (focus). This approach aligns naturally with the brain's architecture and allows a comprehensive mentalistic theory of semantics (Jackendoff, 2002).

From it, we can suggest that human languages (mainly their semantic, discourse, and interactive functions) are multimodal, since, despite different cultural and linguistic backgrounds, they encompass not only the linguistic system, but also other forms of expression across different modalities, such as co-speech gestures (audiovisual prosody). The relationships found between language, gesture, and communication have been recently investigated based on the patterns found in L2 speakers (Brown, 2015; Gregersen *et al.*, 2009; Gullberg, 2006; So *et al.*, 2013; Stam; McCafferty, 2008; Tutton, 2011). Kendon (2000, 2004) and Zhao (2006) have studied these speakers and demonstrated that the main functions of their gestures were to express assistive roles, including clarification, emphasis, avoidance of redundancy, replacement of speech, and seeking help. These gestures can be produced through different channels, such as head movements (McClave, 2000) and eyebrow movements (Fontes; Madureira, 2019; Madureira; Fontes, 2023), as well as the manipulation of hands (McNeil, 2000) and pointing, highlighting the need for more multimodal and cross-cultural studies.

The answers collected in our experiment also indicate a close relationship between focus and topic-comment structures. According to Crasborn and van der Kooij (2013), most

of the discussions on focus prosody in sign languages indicate that the comment contains the focused element. In our study, most utterances were produced with a topic-comment structure, where the topic was marked by brow raise (Quadros, 2019; Quadros; Karnopp, 2004) and head nod, signifying old, shared, or known information from the previous discourse. The comment portion represented new information, often highlighted with focus or prominence. Caponigro and Davidson (2011, p. 324) suggest that "[p]ragmatically, a QAC instantiates a topic/comment structure, with the Q-constituent expressing the topic as picking out a sub-question under discussion and the A-constituent expressing the comment as the answer to that sub-question". Thus, we embrace the perspective (widely accepted but not universally held) that concepts related to information structure, such as givenness, play a role in delineating focus and its associated counterpart, topic.

Another discussion we can briefly arise is that Quadros (2019) and Nunes and Quadros (2006) described focus constructions involving duplication. However, this structure was one of the least employed in our study (FNI: 5% / CF: 6%). This suggests that, contrary to findings in these previous studies, duplication might not be the primary structure utilized for marking emphatic focus.

As previously cited, our inter-individual variation analysis indicates that older signers who learned Libras later might answer the questions directly, while those who learned Libras earlier or had earlier exposure to Libras in school might use more foregrounding structures. According to Lenneberg (1967), the language acquisition occurs during a specific developmental period until the beginning of puberty. Thus, acquiring a language after the critical/sensitive period makes it more difficult to achieve full competence in the grammatical system of the respective language (Lenneberg, 1967; Lieberman, 1984). Souza's study on Libras (2016) suggests that the age of exposure to Libras is a crucial factor for the acquisition and fixation of the mother language. Therefore, the present study contributes to the understanding that both early and late Libras learners are capable of marking focus. However, the different forms of marking focus, according to the age of Libras exposure – where early learners would utilize more foregrounding structures and late learners would employ more direct answers – might indicate sensitivity of focus structures to the critical period and support the idea that some structures "close" with aging, while others remain not completely closed (Dekeyser, 2000; Harley; Wang, 1997; Long, 1990; Martohardjono; Flynn, 1995; Schwartz, 2004).

All in all, the hypothesis tested here is that CF utterances would show greater intensification compared to FNI. This assumption is based on the notion that CF serves not

only to provide the requested new information but also to contrast and negate incorrect information. Thus, our hypothesis was partially confirmed, as the majority of CF utterances, though not all, were produced with more intensification than FNI. However, both FNI and CF were consistently demonstrated higher prominence than CS.

This study contributes to the field of Linguistics by asserting that sign languages not only contribute to the understanding of prominence and focus but also offer intricate insights into the information structure in the visual-gestural modality. Languages of this modality underscore research challenges that experimental linguists must confront. This focus marking, as described, can be expressed through MSs duration and NMMs changes, reinforcing the importance of teaching NMMs to Libras learners, as they are essential linguistic features for fluency in Libras. At the same time, these NMMs appear to not be very specialized, since the same NMM can be activated for the expression of more than one function (at least not as other grammatical structures, such as relative sentences in Libras). In other words, there does not to be a one-to-one correlation between a specific combination of NMMs and one function. To illustrate this, we can refer to the result found that suggests the activation of brow raise and head nods for the marking of both topic and focus.

We conclude the present work by stating that navigating a theme as intricate and expansive as the one explored in this M.A. thesis carries the risk of overlooking crucial aspects. Despite this inherent challenge, we aim to have fulfilled the specified objectives by presenting a work grounded in both theoretical and methodological texts, as well as the outcomes of our experimental procedures. We conclude this thesis by resonating with the feelings of Eco (1997), understanding the challenges faced in scientific research as an ongoing endeavor, with much work yet to be undertaken:

> "[...] I decided to proceed cautiously from the architecture of gardens to gardening, and instead of designing Versailles, I contented myself with clearing some poorly connected flower beds along paths of beaten earth – suspecting that everything around might still stretch out like a romantic English park. Where did I choose to place my flower beds? Deciding (instead of debating with a thousand others) debating with myself (...) because ideas change like a leopard's spots, never entirely, never overnight." (Eco, 1997, p. 13, our translation).

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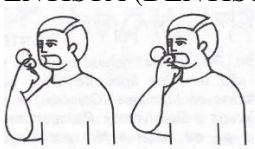
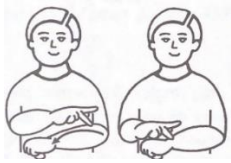
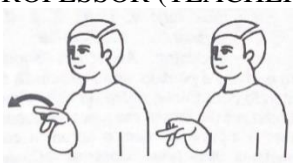
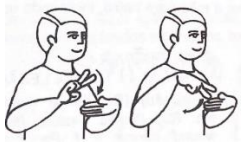
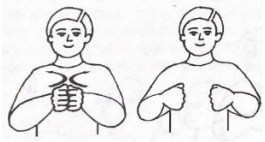
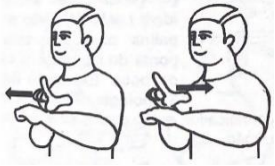
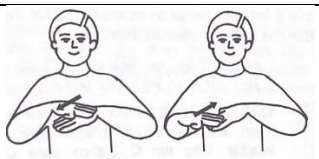
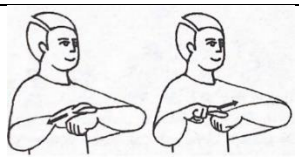
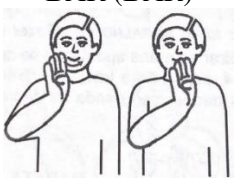
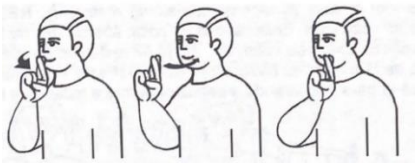
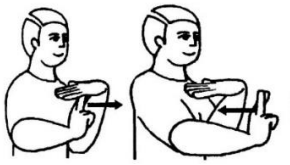
APPENDICES

Appendix A – Target and alternative signs and to elicitate the CF

FNI / CF target signs			Alternative signs to elicitate CF
Subject	01	ADVOGAD@ (LAWYER)  Capovilla et al (2017, p. 111)	DENTISTA (DENTIST)  Capovilla et al (2017, p. 888)
	02	PEDAGOGO (PEDAGOGUE)  Capovilla et al (2017, p. 2130)	PROFESSOR (TEACHER)  Capovilla et al (2017, p. 2310)
Verb	03	ABRAÇAR (TO HUG)  Capovilla et al (2017, p. 64)	ESPERAR (TO WAIT)  Capovilla et al (2017, p. 1147)
	04	LER (TO READ)  Capovilla et al (2017, p. 1663)	ESCREVER (TO WRITE)  Capovilla et al (2017, p. 1131)
Direct object	05	PÃO (BREAD)  Capovilla et al (2017, p. 2083)	ÔNIBUS (BUS)  Capovilla et al (2017, p. 2013)
	06	DOCE (CANDY)  Capovilla et al (2017, p. 992)	GUARDANAPO (NAPKIN)  Capovilla et al (2017, p. 1432)
Color adjective	07	LILÁS (LIGHT-PURPLE)  Capovilla et al (2017, p. 1677)	CINZA (GREY)  Capovilla et al (2017, p. 673)
	08	MARROM (BROWN)	ROXO (PURPLE)

		 Capovilla et al (2017, p. 1782)	 Capovilla et al (2017, p. 2482)
Locatives	09	BAR (BAR)  Capovilla et al (2017, p. 375)	RESTAURANTE (RESTAURANT)  Capovilla et al (2017, p. 2445)
	10	EMPRESA (COMPANY)  Capovilla et al (2017, p. 1071)	RODOVIÁRIA (BUS-STATION)  Capovilla et al (2017, p. 2469)

Source: Capovilla *et al.* (2017) dictionary.

Appendix B – Focus of New Information elicitation

Focus of New Information			
		English	**Libras (glosses)**
Subject	01	CS: The **lawyer** works in Rio de Janeiro (RJ). Q: Who works in RJ?	CS: ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (**LAWYER** WORK RIO-DE-JANEIRO). Q: QUEM TRABALHAR RIO-DE-JANEIRO? (WHO WORK RIO-DE-JANEIRO?)
	02	CS: The **pedagogue** learn Libras. Q: Who is learn Libras?	CS: **PEDAGOG@** APRENDER LIBRAS (**PEDAGOGUE** LEARN LIBRAS). Q: QUEM APRENDER LIBRAS? (WHO LEARN LIBRAS?)
Verb	03	CS: I **hug** my friend. Q: What do you do with your friend?	CS: EU **ABRAÇAR** AMIG@ (PRO-1 **HUG** FRIEND). Q: VOCÊ AMIG@ FAZER O-QUE? (PRO-2 FRIEND DO WHAT?)
	04	CS: I **read** the recipe. Q: What do you do with the recipe?	CS: EU **LER** RECEITA (PRO-1 **READ** RECIPE). Q: VOCÊ RECEITA FAZER O-QUE? (PRO-2 RECIPE DO WHAT?)
Direct object	05	CS: The man sells **bread**. Q: What does the man sell?	CS: HOMEM VENDER **PÃO** (MAN SELL **BREAD**). Q: HOMEM VENDER O-QUE? (MAN SELL WHAT?)
	06	CS: The child buy **candy**. Q: What does the child buy?	CS: CRIANÇA COMPRAR **DOCE** (CHILD BUY **CANDY**). Q: CRIANÇA COMPRAR O-QUE? (CHILD BUY WHAT?)
Color adjectives	07	CS: The woman buys a **light-purple** shirt. Q: Which shirt does the woman buy?	CS: MULHER COMPRAR ROUPA **LILÁS** (WOMAN BUY SHIRT **LIGHT-PURPLE**). Q: MULHER COMPRAR ROUPA QUAL? (WOMAN BUY SHIRT WHAT?)
	08	CS: I have **brown** book Q: Which book do you have?	CS: EU TER LIVRO **MARROM** (PRO-1 HAVE BOOK **BROWN**). Q: VOCÊ TER LIVRO QUAL? (PRO-2 HAVE BOOK WHAT?)
Locatives	09	CS: I drink beer at the **bar**. Q: Where do you drink beer?	CS: EU BEBER CERVEJA **BAR** (PRO-1 DRINK BEER **BAR**). Q: VOCÊ BEBER CERVEJA ONDE? (PRO-2 DRINK BEER WHERE?)
	10	CS: I wait for a bus at the **company**. Q: Where do you wait for the bus?	CS: EU ESPERAR ÔNIBUS EMPRESA (PRO-1 WAIT BUS **COMPANY**). Q: VOCÊ ESPERAR ÔNIBUS ONDE? (PRO-2 WAIT BUS WHERE?)

Appendix C – Contrastive Focus elicitation

Contrastive Focus elicitation			
		English	**Libras (glosses)**
Subject	11	CS: The **lawyer** works in Rio de Janeiro. Q: Does the **dentist** works in Rio de Janeiro?	CS:**ADVOGAD@** TRABALHAR RIO-DE-JANEIRO (**LAWYER** WORK RIO-DE-JANEIRO). Q: **DENTIST@** TRABALHAR RIO-DE-JANEIRO? (**DENTIST** WORK RIO-DE-JANEIRO?)
	12	CS: The **pedagogue** learn Libras Q: Does the **teacher** learn Libras?	CS: **PEDAGOG@** APRENDER LIBRAS (**PEDAGOGUE** LEARN LIBRAS). Q: **PROFESSOR@** APRENDER LIBRAS? (**TEACHER** LEARN LIBRAS?)
Verb	13	CS: I **hug** my friend. Q: Do you **wait** your friend?	CS: EU **ABRAÇAR** AMIG@ (PRO-1 **HUG** FRIEND). Q: VOCÊ **ESPERAR** AMIG@? (PRO-2 **WAIT** FRIEND?)
	14	CS: I **read** the recipe. Q: Do you **write** the recipe?	CS: EU **LER** RECEITA (PRO-1 **READ** RECIPE). Q: VOCÊ **ESCREVER** RECEITA? (PRO-2 **WRITE** RECIPE?)
Direct object	15	CS: The man sells **bread**. Q: Does the man sells **buses**?	CS: HOMEM VENDER **PÃO** (MAN SELL **BREAD**). Q: HOMEM VENDER Ô**NIBUS**? (MAN SELL **BUS**?)
	16	CS: The child buy **candy**. Q: Does the child buy **napkins**?	CS: CRIANÇA COMPRAR **DOCE** (CHILD BUY **CANDY**). Q:CRIANÇA COMPRAR **GUARDANAPO**? (CHILD BUY **NAPKIN**?)
Color adjectives	17	CS: The woman buys a **light-purple** shirt. Q: Does the woman buys a **grey** shirt.?	CS: MULHER COMPRAR ROUPA **LILÁS** **(**WOMAN BUY SHIRT **LIGHT-PURPLE**). Q: MULHER COMPRAR ROUPA **CINZA**? (WOMAN BUY SHIRT **GREY**?)
	18	CS: I have **brown** book. Q: Do you have a **purple** book?	CS: EU TER LIVRO **MARROM** (PRO-1 HAVE BOOK **BROWN**). Q: VOCÊ TER LIVRO **ROX@**? (PRO-2 HAVE BOOK **PURPLE**?)
Locatives	19	CS: I drink beer at the **bar**. Q: Do you drink beer at the **restaurant**?	CS: EU BEBER CERVEJA **BAR** (PRO-1 DRINK BEER **BAR**). Q: VOCÊ BEBER CERVEJA **RESTAURANTE**? (PRO-2 DRINK BEER **RESTAURANT**?)
	20	CS: I wait for a bus at the **company**. Q: Do you wait for a bus at the **bus-station**?	CS: EU ESPERAR ÔNIBUS **EMPRESA** (PRO-1 WAIT BUS **COMPANY**). Q: VOCÊ ESPEARAR ÔNIBUS **RODOVIÁRIA?** (PRO-2 WAIT BUS **BUS-STATION?**)

Appendix D – Distractors

Distractors				
		s/o/v	**English**	**Libras (glosses)**
Broad focus (FNI)	01		CS: The vet took care of the dog. Q: What happened?	CS: VETERINARI@ CUIDAR CACHORRO (VET TAKE-CARE DOG). Q: O-QUE ACONTECER? (WHAT HAPPEN?)
	02		CS: The child woke up at noon. Q: What happened?	CS: CRIANÇA ACORDAR MEIO-DIA (CHILD WAKE-UP NOON). Q: O-QUE ACONTECER? (WHAT HAPPEN?)
	03		CS: My brother died of Covid. Q: What happened?	CS: IRMÃ@ COVID MORRER (BROTHER COVID DIE). Q: O-QUE ACONTECER? (WHAT HAPPEN?)
	04		CS: My family played soccer. Q: What happened?	CS: FAMÍLIA JOGAR FUTEBOL (FAMILY PLAY SOCCER). Q: O-QUE ACONTECER? (WHAT HAPPEN?)
	05		CS: I started the medicine course. Q: What happened?	CS: EU COMEÇAR CURSO MEDICINA (PRO-1 START COURSE MEDICINE) Q: O-QUE ACONTECER? (WHAT HAPPEN?)
	06		CS: The interpreter helped the student. Q: What happened?	CS: INTÉRPRETE AJUDAR ALUN@ (INTERPRET HELP STUDENT). Q: O-QUE ACONTECER? (WHAT HAPPEN?)
Parallel focus	07	S-O	CS: My neighbor studies biology and my cousin studies chemistry. Q: Who studies biology and who studies chemistry?	CS: VIZINH@ ESTUDAR BIOLOGIA. PRIM@ ESTUDAR QUÍMICA (NEIGHBOR STUDY BIOLOGY. COUSIN STUDY CHEMISTRY) Q: QUEM ESTUDAR BIOLOGIA? QUEM ESTUDAR QUIMICA? (WHO STUDY BIOLOGY? WHO STUDY CHEMISTRY?)
	08	S-O	CS: My daughter-in-law ate cake and my son-in-law ate a sandwich. Q: Who ate cake and who ate a sandwich?	CS: NORA COMER BOLO. GENRO COMER LANCHE (DAUGHTER-IN-LAW EAT CAKE. SON-IN-LAW EAT SANDWICH). Q: QUEM COMER BOLO? QUEM COMER LANCHE? (WHO EAT CAKE? WHO EAT SANDWICH?)
	09	V-O	CS: The student goes to the library and studies Portuguese. Q: What does the student do?	CS: ALUN@ IR BIBLIOTECA DEPOIS ESTUDAR PORTUGUÊS (STUDENT GO LIBRARY THEN STUDY PORTUGUESE). Q: O-QUE ALUN@ FAZER? (WHAT STUDENT DO?)

	10	V-O	CS: The guy goes to the beach and drinks juice. Q: What does the guy do?	CS: RAPAZ IR PRAIA DEPOIS BEBER ÁGUA (GUY GO BEACH THEN DRINK WATER). Q: O-QUE RAPAZ FAZER? (WHAT GUY DO?)
	11	S-V	CS: The student asked the subject and the teacher explained. Q: Who asked and who explained the matter?	CS: ALUN@ PERGUNTAR MATÉRIA. PROFESSOR EXPLICAR MATÉRIA (STUDENT ASK SUBJECT. TEACHER EXPLAIN SUBJECT) Q: QUEM PERGUNTAR MATÉRIA? QUEM EXPLICAR MATÉRIA? (WHO ASK SUBJECT? WHO EXPLAIN SUBJECT?)
	12	S-V	CS: the man sings music and the woman dances to the music. Q: Who sings and who dances to the music?	CS: HOMEM CANTAR MÚSICA. MULHER DANÇAR MÚSICA (MAN SING MUSIC. WOMAN DANCE MUSIC). Q: QUEM CANTAR MÚSICA? QUEM DANÇAR MÚSICA? (WHO SING MUSIC? WHO DANCE MUSIC?).
Restricting focus	13	S	CS: my son traveled to Japan. Q: Did your son and his cousin travel to Japan?	CS: FILH@ VIAJAR JAPÃO (SON TRAVEL JAPAN). Q: FILH@ TAMBÉM PRIM@ VIAJAR JAPÃO? (SON ALSO COUSIN TRAVEL JAPAN?)
	14	S	CS: I watched a movie. Q: Did you and your spouse watch a movie?	CS: EU ASSISTIR FILME (PRO-1 WATCH MOVIE). Q: VOCÊ TAMBÉM ESPOS@ ASSISTIR FILME? (PRO-2 ALSO SPOUSE WATCH MOVIE?)
	15	O	CS: Young people love Carnival. Q: Does young people love Easter and Carnival?	CS: JOVEM AMAR CARNAVAL (YOUNG LOVE CARNIVAL). Q: JOVEM AMAR CARNAVAL TAMBÉM PÁSCOA? (YOUNG LOVE CARNIVAL ALSO EASTER?)
	16	O	CS: The woman eats an egg. Q: Does the woman eat eggs and meat?	CS: MULHER COMER OVO (WOMAN EAT EGG). Q: MULHER COMER OVO TAMBÉM CARNE? (WOMAN EAT EGG ALSO MEAT?)
	17	V	CS: I smoke. Q: Do you smoke and drink?	CS: EU FUMAR (PRO-1 SMOKE). Q: VOCÊ FUMAR TAMBÉM BEBER? (PRO-2 SMOKE ALSO DRINK?)
	18	V	CS: My son study. Q: Your son study and work?	CS: FILH@ ESTUDAR (SON STUDY). Q: FILH@ ESTUDAR TAMBÉM TRABALHAR ?

				(SON STUDY ALSO WORK?)
Selecting focus	19	S	CS: My boyfriend cooks and I eat. Q: Do you or your boyfriend cook?	CS: NAMORAD@ COZINHAR. EU COMER (BOYFRIEND COOK. PRO-1 EAT). Q: VOCÊ OU NAMORAD@ COZINHAR? QUAL? (PRO-2 OR BOYFRIEND COOK? WHICH?).
	20	S	CS: My brother was born in April and I was born in December. Q: Were you or your brother born earlier?	CS: EU NASCER ABRIL. IRMÃ@ NASCER DEZEMBRO (PRO-1 BORN APRIL. BROTHER BORN DECEMBER). Q: VOCÊ OU IRMÃ@ NASCER ABRIL? QUAL? (PRO-2 OR BROTHER BORN APRIL? WHICH?).
	21	O	CS: I bought chocolate and my fiance bought cake. Q: Did you buy chocolate or cake?	CS: EU COMPRAR CHOCOLATE. NOIV@ COMPRAR BOLO (PRO-1 BUY CHOLOCHATE. FIANCE BUY CAKE). Q: VOCÊ COMPRAR CHOCOLATE OU BOLO? QUAL? (PRO-2 BUY CHOCOLATE OR CAKE? WHICH?).
	22	O	CS: My brother sold his motorcycle and his friend bought a car. Q: Did your brother sell a motorcycle or a car?	CS: IRMÃ@ VENDER MOTO. AMIG@ DELE COMPRAR CARRO (BROTHER SELL MOTORCYCLE. FRIEND HIS BUY CAR). Q: IRMÃ@ VENDER MOTO OU CARRO? QUAL? (BROTHER SELL MOTORCYCLE OR CAR? WHICH?).
	23	V	CS: My cousin teaches English. I learn English. Q: Does your cousin teach or learn English?	CS: EU APRENDER INGLÊS. PRIM@ ENSINAR INGLÊS (PRO-1 LEARN ENGLISH. COUSIN TEACH ENGLISH). Q: PRIM@ APRENDER OU ENSINAR INGLÊS? QUAL? (COUSIN LEARN OR TEACH ENGLISH? WHICH?).
	24	V	CS: Teacher wrote on the blackboard and I erase it. Q: Did you write or erase the blackboard?	CS: PROFESSOR ESCREVER LOUSA. EU APAGAR LOUSA (TEACHER WRITE BLACKBOARD. PRO-1 ERASE BLACKBOARD). Q: VOCÊ ESCREVER OU APAGAR LOUSA? (PRO-2 WRITE OR ERASE BLACKBOARD?)
	25	S	CS: My friend and I traveled to France. Q: Did you travel alone to France?	CS: EU JUNTO AMIG@ VIAJAR FRANÇA (PRO-1 TOGETHER FRIEND TRAVEL FRANCE). Q: VOCÊ SOZINHO VIAJAR FRANÇA? (PRO-2 ALONE TRAVEL FRANCE?)
	26	S	CS: The man and his	CS: HOMEM JUNTO ESPOS@ IR

Expanding focus			wife went to the supermarket. Q: Did the man go alone to the supermarket?	SUPERMERCADO (MAN TOGETHER WIFE GO SUPERMARKET). Q: HOMEM SOZINH@ IR SUPERMERCADO? (MAN ALONE GO SUPERMARKET?)
	27	O	CS: I have a cat and a dog. Q: Do you only have a cat?	CS: EU TER GAT@ TAMBÉM CACHORR@ (PRO-1 HAVE CAT ALSO DOG). Q: VOCÊ TER GAT@ SÓ? (PRO-2 HAVE CAT ONLY?)
	28	O	CS: I am learning dancing and singing. Q: Are you learning only dance?	CS: EU APRENDER DANÇAR TAMBÉM CANTAR (PRO-1 LEARN DANCE ALSO SING). Q: VOCÊ APRENDER DANÇA SÓ? (PRO-2 LEARN DANCE ONLY?)
	29	V	CS: The woman loves chocolate and flowers. Q: Does the woman love only chocolate?	CS: MULHER AMAR CHOCOLATE TAMBÉM FLOR (WOMAN LOVE CHOCOLATE ALSO FLOWER). Q: MULHER AMAR CHOCOLATE SÓ? (WOMAN LOVE CHOCOLATE ONLY?)
	30	V	CS: The man sells pencil and pen. Q: Does the man sell only pencils?	CS: HOMEM VENDER LAPIS TAMBÉM CANETA (MAN SELL PENCIL ALSO PEN). Q: HOMEM VENDER LAPIS SÓ? (MAN SELL PENCIL ONLY?)

Appendix E – Experiment answers in the Quantitative Analysis

Red: excluded from the quantitative analysis.
Yellow: considered as "literal glosses reproduction", including identic control-statements and answers, produced in the same sign-order.
Blue: considered as "non-literal glosses reproduction", including control-statements and answers that are not identical or where produced with different variants and signs-order.

Answers		
Participant	**FNI**	**CF**
MP1	NÃO. EU ABRAÇAR AMIGO[1] (NO. PRO-1 HUG FRIEND)	NÃO. **EU ABRAÇAR AMIGO** (NO. PRO-1 HUG FRIEND)
	EU BEBER CERVEJA BAR (PRO-1 DRINK BEER BAR)	NÃO. **EU BEBER CERVEJA BAR** (NO. PRO-1 DRINK BEER BAR)
	QUEM? **ADVOGAD@** (WHO? LAWYER)	NÃO. **É ADVOGAD@ TRABALHAR RIO-DE-JANEIRO** (NO. BE LAWYER WORK RIO-DE-JANEIRO)
	VENDER PÃO (SELL BREAD)	NÃO. **HOMEM VENDER PÃO** (NO. MAN SELL BREAD)

[1] The participant did not understand the experimental task during the answer production.

	EU LER RECEITA^COMIDA[2] (PRO-1 READ RECIPE^FOOD)	NÃO. EU LER RECEITA^COMIDA[3] (NO. PRO-1 READ RECIPE^FOOD)
	MULHER COMPRAR COR LILÁS (WOMAN MONEY COLOR LIGHT-PURPLE)	NÃO. MULHER COMPRAR ROUPA LILÁS[4] (NO. WOMAN BUY SHIRT LIGHT-PURPLE)
	EU TER LIVRO MARROM[5] (PRO-1 HAVE BOOK BROWN)	NÃO. EU TER LIVRO MARROM[6] (NO. PRO-1 HAVE BOOK BROWN)
	EU ESPERAR ÔNIBUS EMPRESA (PRO-1 WAIT BUS COMPANY)	NÃO. **EU ESPERAR ÔNIBUS EMPRESA** (NO. PRO-1 WAIT BUS COMPANY)
	CRIANÇA COMPRAR DOCE[7] (CHILD BUY CANDY)	NÃO. **COMPRAR DOCE** (NO. BUY CANDY)
	PEDAGOG@ APRENDER LIBRAS (PEDAGOGUE LEARN LIBRAS)	NÃO PROFESSOR@ NÃO. PEDAGOG@ APRENDER LIBRAS[8] (NO, TEACHER NO PEDAGOGUE LEARN LIBRAS)
MP2	FAZER O-QUE? COMBINAR-NÃO É ABRAÇAR[9] (DO WHAT? MATCH-NOT BE HUG)	**EU ABRAÇAR AMIG@** (PRO-1 HUG FRIEND)
	É B-A-R[10] (BE B-A-R)	RESTAURANTE DIFERENTE. **É BAR** (RESTAURANT DIFFERENT. BE BAR)
	ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (LAWYER WORK RIO-DE-JANEIRO)	DENTISTA DIFERENTE. **É ADVOGAD@ IR RIO-DE-JANEIRO TRABALHAR** (DENTIST DIFFERENT. BE LAWYER GO RIO-DE-JANEIRO WORK)
	É PÃO[11] (BE BREAD)	NÃO-COMBINAR ONIBUS. CERT@ PÃO OU PÃO PÃO[12] (MATCH-NOT BUS. CORRECT BREAD OR BREAD BREAD)
	LER RECEITA (READ RECIPE)	**LER RECEITA** (READ RECIPE)
	COR É LILÁS ROUPA (COLOR BE LIGHT-PURPLE SHIRT)	COR DIFERENTE. **CERT@ LILÁS** (COLOR DIFFERENT. CORRECT LIGHT-PURPLE)
	TER COR MARROM (HAVE COLOR BROWN)	DIFERENTE ROX@. **É COR MARROM** (DIFFERENT PURPLE. BE COLOR BROWN)
	IR EMPRESA[13] (GO COMPANY)	**É EMPRESA** (BE COMPANY)
	É DOCE (BE CANDY)	**É CERT@ DOCE** (BE CORRECT CANDY)
	PEDAGOG@ APRENDER LIBRAS (PEDAGOGUE LEARN LIBRAS)	PROFESSOR@ NÃO-COMBINAR. **É CERT@ PEDAGOGO APRENDER LIBRAS CERT@** (TEACHER MATCH-NOT. BE CORRECT PEDAGOGUE

[2] The answer is a literal reproduction of glosses, while the CS was produced non-literally.
[3] The answer is a literal reproduction of glosses, while the CS was produced non-literally.
[4] The answer is a literal reproduction of glosses, while the CS was produced non-literally.
[5] BROWN was produced with a different linguistic variant.
[6] BROWN was produced with a different linguistic variant.
[7] CHILD was produced with a different linguistic variant in a literal reproduction of glosses.
[8] The answer is a literal reproduction of glosses, while the CS was produced non-literally.
[9] The participant did not understand the experimental task in the answer production.
[10] B-A-R was fingerspelled.
[11] BREAD was produced with a different linguistic variant.
[12] BREAD was produced with a different linguistic variant.
[13] The CS and CF question were ambiguous, leading the participant to interpret it differently.

		LEARN LIBRAS CORRECT)
MP3	EU ABRAÇAR AMIG@ VOCÊ[14] (PRO-1 HUG FRIEND YOU)	**ENCONTRAR EU AMIG@ ABRAÇAR** (MEET PRO-1 FRIEND HUG)
	CERVEJA ONDE? B-A-R[15] (BEER WHERE? B-A-R)	NÃO. EU BEBER CERVEJA B-A-R[16] (NO. PRO-1 DRINK BEER B-A-R)
	ADVOGAD@ PESSOA PESSOA-CL TER RIO-DE-JANEIRO (LAWYER PERSON PERSON-CL[17] THERE-IS RIO-DE-JANEIRO)	**ADVOGAD@ TRABALHAR RIO-DE-JANEIRO** (LAWYER WORK RIO-DE-JANEIRO)
	HOMEM VENDER PÃO PÃO-CL[18] (MAN SELL BREAD BREAD-CL)	ESPERAR. HOMEM VENDER PÃO PÃO[19] (WAIT. MAN SELL BREAD BREAD)
	ENTÃO. **EU LER RECEITA COMO É COMER BOLO OU VÁRI@S** (SO. PRO-1 READ RECIPE HOW BE EAT CAKE OR VARIOUS	**EU LER RECEITA É COMIDA VARI@S** (PRO-1 READ RECIPE BE FOOD VARIOUS)
	ENTÃO. **MULHER COMPRAR ROUPA LILÁS** (SO. WOMAN BUY SHIRT LIGHT-PURPLE)	**MULHER COMPRAR É ROUPA LILÁS** (WOMAN BUY BE SHIRT LIGHT-PURPLE)
	EU TER LIVRO MARROM[20] (PRO-1 HAVE BOOK BROWN)	ESPERAR. FALAR ROXO? NÃO. **CERT@ MARROM** (WAIT. SPEAK PURPLE? NO. CORRECT BROWN)
	EU ESPERAR ÔNIBUS É EMPRESA (PRO-1 WAIT BUS BE COMPANY)	ENTÃO. EU ESPERAR ÔNIBUS PORQUE EMPRESA MEIO-DE-TRANSPORTE[21] (SO. PRO-1 WAIT BUS BECAUSE COMPANY TRANSPORTATION)
	CRIANÇA COMPRAR DOCE[22] (CHILD BUY CANDY)	**CRIANÇA COMPRAR CERT@ DOCE** (CHILD BUY CORRECT CANDY)
	PEDAGOG@ APRENDER LIBRAS [23](PEDAGOGUE LEARN LIBRAS)	PEDAGOG@ NÃO. PEDAGOG@ ENSINAR APRENDER LIBRAS[24] (PEDAGOGUE NO. PEDAGOGUE TEACH LEARN LIBRAS)
	ABRAÇAR (HUG)	NÃO. **CERT@ ABRAÇAR AMIG@** (NO. CORRET HUG FRIEND)
	ONDE? É BAR B-A-R[25] (WHERE? BE BAR B-A-R)	NÃO RESTAURANTE. B-A-R OR BAR[26] (NO RESTAURANT. B-A-R OU BAR)
	PESSOA ADVOGAD@ (PERSON LAWYER)	NÃO DENTISTA NÃO. **É ADVOGAD@ TRABALHAR RIO-DE-JANEIRO** (NO DENTIST NO. BE LAWYER WORK RIO-DE-JANEIRO)

[14] The participant did not understand the experimental task in the answer production.
[15] B-A-R was fingerspelled.
[16] B-A-R was fingerspelled.
[17] CL means classifier.
[18] BREAD was produced with a different linguistic variant.
[19] BREAD was produced with a different linguistic variant.
[20] The answer is a literal reproduction of glosses, while the CS was produced non-literally.
[21] The CS and CF question were ambiguous, leading the participant to interpret it differently.
[22] CHILD was produced with a different linguistic variant in a literal reproduction of glosses.
[23] The answer is a literal reproduction of glosses, while the CS was produced non-literally.
[24] The participant did not understand the experimental task in the answer production.
[25] B-A-R was fingerspelled in the CS.
[26] B-A-R was fingerspelled.

MP4	**HOMEM VENDER PÃO** (MAN SELL BREAD)	ERRAD@ ÔNIBUS. **CERT@ PÃO** (WRONG BUS. CORRECT BREAD)
	PALAVRA NÃO. **SÓ LER RECEITA^COMIDA**[27] (WORD NO. JUST READ RECIPE^FOOD)	NÃO ESCREVER. **LER RECEITA^COMIDA** (NO WRITE. READ RECIPE^FOOD)
	COR LILÁS (COLOR LIGHT-PURPLE)	ERRAD@ CINZA. **CERT@ LILÁS ROUPA** (WRONG GREY. CORRECT LIGHT-PURPLE SHIRT)
	TER LIVRO MARROM (HAVE BOOK BROWN)	NÃO. **TER MARROM LIVRO** (NO. HAVE BROWN BOOK)
	EU ESPERAR ONDE? **É EMPRESA** (PRO-1 WAIT WHERE? BE COMPANY)	NÃO RODOVIÁRIA. **É EMPRESA ÔNIBUS** (NO BUS-STATION. BE COMPANY BUS)
	CRIANÇA COMPRAR É DOCE (CHILD BUY BE CANDY)	NÃO. **COMPRAR DOCE** (NO. BUY CANDY)
	É PEDAGOG@ (BE PEDAGOGUE)	É PROFESSOR@. **CERT@ PEDAGOG@**[28] (BE TEACHER. CORRECT PEDAGOGUE)
MP5	ABRAÇAR AMIG@ ABRAÇAR. AMIG@ PORQUE JÁ LIBRAS. NÃO PRECISAR PORTUGUÊS JUNTO. JÁ ABRAÇAR AMIG@ ABRAÇAR[29] (HUG FRIEND HUG. FRIEND BECAUSE ALREADY LIBRAS. NO NEED PORTUGUESE TOGETHER. ALREADY HUG FRIEND HUG)	NÃO. **AMIG@ ABRAÇAR** (NO. FRIEND HUG)
	ONDE? B-A-R. ONDE EU IR CERVEJA BEBER ONDE B-A-R[30] (WHERE? B-A-R. WHERE PRO-1 GO BEER DRINK WHERE B-A-R)	B-A-R[31]
	HOMEM ADVOGAD@ VIAJAR ADVOGAD@. OU HOMEM MULHER TANTO-FAZ (MAN LAWYER TRAVEL LAWYER. OR MAN WOMAN WHATEVER)	NÃO DENTISTA NÃO. **ADVOGAD@ RIO-DE-JANEIRO TRABALHAR ADVOGAD@** (NO DENTIST NO. LAWYER RIO-DE-JANEIRO WORK LAWYER)
	VENDER PÃO (SELL BREAD)	PÃO ÔNIBUS CONFUNDIR. **PÃO ÔNIBUS** (BREAD BUS CONFUSE. BREAD BUS)
	PRECISAR LER COMO COLOCAR COMIDA RECEITA COMIDA COLOCAR OVO FARINHA VÁRI@S. EU LER PRECISA LER (NEED READ HOW PUT FOOD RECIPE FOOD PUT EGG FLOUR VARIOUS. READ NEED READ)	EU LER EU ESCREVER BOLO COMIDA VÁRI@S RECEITA COZINHAR[32] (PRO-1 READ PRO-1 WRITE CAKE FOOD VARIOUS RECIPE COOK)
	ENTÃO. **COR ROUPA LILÁS** (SO. COLOR SHIRT LIGHT-PURPLE)	**LILÁS** (LIGHT-PURPLE)

[27] The CS and CF question were ambiguous, leading the participant to interpret it differently.
[28] The CS and CF question were ambiguous, leading the participant to interpret it differently.
[29] The participant did not understand the experimental task in the answer production.
[30] B-A-R was fingerspelled.
[31] B-A-R was fingerspelled.
[32] The participant did not understand the experimental task in the answer production.

	MARROM (BROWN)	NÃO. **LIVRO MARROM** (NO. BOOK BROWN)
	DOCE (CANDY)	NÃO. **DOCE GUARDANAPO DOCE** (NO. CANDY NAPKIN CANDY)
	EU ESPERAR ÔNIBUS EMPRESA (PRO-1 WAIT BUS COMPANY)	NÃO. **É EMPRESA ESPERAR EMPRESA ÔNIBUS** (NO. BE COMPANY WAIT COMPANY BUS)
	ENTÃO. ENSINAR APRENDER LIBRAS ENSINAR PEDAGOG@[33] (SO. TEACH LEARN LIBRAS TEACH PEDAGOGUE)	**PEDAGOG@ APRENDER LÍNGUA-DE-SINAL PEDAGOG@** (PEDAGOGUE LEARN SIGN-LANGUAGE PEDAGOGUE)
FP1	**ABRAÇAR** (HUG)	NÃO. **ABRAÇAR AMIG@** (NO. HUG FRIEND)
	BAR	NÃO. **BAR** (NO. BAR)
	ADVOGAD@ (LAWYER)	NÃO. **ADVOGAD@** (NO. LAWYER)
	PÃO PÃO (BREAD BREAD)	NÃO. **VENDER PÃO** (NO. SELL BREAD)
	LER (READ)	NÃO. **LER RECEITA** (NO. READ RECIPE)
	LILÁS (LIGHT-PURPLE)	CINZA NÃO. **LILÁS** (GREY NO. LIGHT-PURPLE)
	MARROM (BROWN)	ROXO NÃO. **MARROM** (PURPLE NO. BROWN)
	DOCE (CANDY)	DOCE (CANDY)
	EMPRESA (COMPANY)	RODOVIÁRIA NÃO. **EMPRESA** (BUS-STATION NO. COMPANY)
	PEDAGOG@ (PEDAGOGUE)	PROFESSOR@ SÓ CARREIRA TRABALHAR SÓ. PEDAGOG@ AINDA CONTINUAR FUTURO PROFESSOR@[34] (TEACHER JUST CAREER WORK JUST. PEDAGOGUE STILL CONTINUE FUTURE TEACHER)
FP2	**FAZER ABRAÇAR** (DO HUG)	**NÃO. EU ABRAÇAR AMIG@** (NO. PRO-1 HUG FRIEND)
	EU RESPONDER BAR (PRO-1 ANSWER BAR)	NÃO. **BAR** (NO. BAR)
	É ADVOGAD@ (BE LAWYER)	**NÃO. ADVOGAD@ TRABALHAR RIO-DE-JANEIRO** (NO. LAWYER WORK RIO-DE-JANEIRO)
	HOMEM VENDER COMIDA PAO (MAN SELL FOOD BREAD)	ÔNIBUS NÃO. **PÃO** (BUS NO. BREAD)
	EU LER PARA FAZER COMIDA (PRO-1 READ TO DO FOOD)	NÃO. **SÓ EU LER RECEITA^COMIDA**[35] (NO. JUST PRO-1 READ RECIPE^FOOD)
	É LILAS (BE LIGHT-PURPLE)	NÃO. **CERT@ LILÁS** (NO. CORRECT LIGHT-PURPLE)
	LIVRO MARROM (BOOK BROWN)	NÃO. **É MARROM** (NO. BE BROWN)
	IR EMPRESA[36] (GO COMPANY)	**RESPONDER ÔNIBUS É EMPRESA** (ANSWER. BUS BE COMPANY)

[33] The CS and CF question were ambiguous, leading the participant to interpret it differently.
[34] The CS and CF question were ambiguous, leading the participant to interpret it differently.
[35] The CS and CF question were ambiguous, leading the participant to interpret it differently.
[36] The CS and CF question were ambiguous, leading the participant to interpret it differently.

	EL@ COMPRAR DOCE (PRO-3 BUY CANDY)	**NÃO. CRIANÇA COMPRAR DOCE** (NO. CHILD BUY CANDY)
	PEDAGOGO (PEDAGOGUE)	**RESPONDER PEDAGOG@** (ANSWER. PEDAGOGUE)
FP3	**EU ABRAÇAR EU AMIG@** (PRO-1 HUG PRO-1 FRIEND)	NÃO. **EU ABRAÇAR AMIG@** EU EL@ AMIGO ABRAÇAR (NO. PRO-1 HUG FRIEND PRO-1 PRO-3 FRIEND HUG)
	EU NÃO GOSTAR BEBER CERVEJA. CERVEJA LÁ BAR[37] (PRO-1 NO LIKE DRINK BEER. BEER THERE BAR)	NÃO. **EU BEBER CERVEJA LÁ BAR** (NO. PRO-1 DRINK BEER THERE BAR)
	ADVOGAD@ (LAWYER)	NÃO. **É ADVOGAD@ TRABALHAR RIO-DE-JANEIRO** (NO. BE LAWYER WORK RIO-DE-JANEIRO)
	HOMEM EL@ É VENDER SÓ PÃO[38] (MAN BE GUY SELL JUST BREAD)	**NÃO. HOMEM VENDER PÃO** (NO. MAN SELL BREAD)
	EU LER RECEITA (PRO-1 READ RECIPE)	NÃO. EU LER RECEITA[39] (NO. PRO-1 READ RECIPE)
	MULHER COMPRAR ROUPA LILÁS COR LILÁS (WOMAN BUY SHIRT LIGHT-PURPLE COLOR LIGHT-PURPLE)	**NÃO. MULHER COMPRAR ROUPA LILÁS** (NO. WOMAN BUY SHIRT LIGHT-PURPLE)
	EU TER LIVRO MARROM COR (PRO-1 HAVE BOOK BROWN COLOR)	**NÃO. EU TER LIVRO MARROM** (NO. PRO-1 HAVE BOOK BROWN)
	EU ESPERAR ÔNIBUS LÁ EMPRESA DENTRO EMPRESA (PRO-1 WAIT BUS THERE COMPANY INSIDE COMPANY)	NÃO. **EU ESPERAR ÔNIBUS LÁ EMPRESA** (NO. PRO-1 WAIT BUS THERE COMPANY)
	CRIANÇA COMPRAR DOCE (CHILD BUY CANDY)	NÃO. **CRIANÇA COMPRAR DOCE DOCE** (NO. CHILD BUY CANDY CANDY)
	PEDAGOG@ APRENDER LIBRAS (PEDAGOGUE LEARN LIBRAS)	SIM. PROFESSOR@ OU PEDAGOG@ APRENDER LIBRAS[40] (YES. TEACHER OR PEDAGOGUE LEARN LIBRAS)
FP4	**ABRAÇAR** (HUG)	EU ESPERAR NÃO. EU ABRAÇAR AMIG@[41] (PRO-1 WAIT NO. PRO-1 HUG FRIEND)
	BAR B-A-R 2 (BAR B-A-R TWO)	NÃO RESTAURANTE NÃO. **É BAR B-A-R** (NO RESTAURANT NO. BE BAR B-A-R)
	HOMEM EL@ ADVOGAD@[42] (MAN PRO-3 LAWYER)	NÃO DENTISTA NÃO. **É ADVOGAD@ TRABALHAR RIO-DE-JANEIRO** (NO DENTIST NO. BE LAWYER WORK RIO-DE-JANEIRO)
	PÃO PÃO (BREAD BREAD)	NÃO. **PÃO** (NO. BREAD)

[37] The participant did not understand the experimental task in the answer production.
[38] The CS and CF question were ambiguous, leading the participant to interpret it differently.
[39] The participant did not understand the experimental task in the CS production.
[40] The CS and CF question were ambiguous, leading the participant to interpret it differently.
[41] The answer is a literal reproduction of glosses, while the CS was produced non-literally;
[42] The participant did not understand the experimental task in the CS production.

	EU LER VÁRI@S. NÃO. EU LER COZINHAR RECEITA. EU LER SÓ LER ASSISTIR LER SÓ[43] (PRO-1 READ VARIOUS. NO. PRO-1 READ COOK RECIPE. PRO-1 READ JUST READ WATCH READ JUST)	NÃO EU ESCREVER NÃO. **EU LER RECEITA LER** (NO PRO-1 WRITE NO. PRO-1 READ RECIPE READ)
	COMPRAR ROUPA SÓ COR LILÁS. SÓ COR LILÁS (BUY SHIRT JUST COLOR LIGHT-PURPLE. JUST COLOR LIGHT-PURPLE)	NÃO. **CERT@ LILÁS L-I-L-A-S**. COR SIGNIFICAR TEMA ROX@ CLAR@ LILÁS. NÃO É CINZA NÃO (NO. CORRECT LIGHT-PURPLE L-I-L-A-S. COLOR MEANS TOPIC PURPLE LIGHT LIGHT-PURPLE. NO BE GREY NO)
	TER LIVRO COR MARROM (HAVE BOOK COLOR BROWN)	**MARROM TER LIVRO MARROM.** EU FALAR PODER RESPONDER MARROM. ROX@ NÃO (BROWN HAVE BOOK BROWN. PRO-1 SPEAK CAN ANSWER BROWN. PURPLE NO)
	EMPRESA[44] (COMPANY)	NÃO ÔNIBUS RODOVIÁRIA NÃO. É EU ESPERAR ÔNIBUS PRÓPRI@ EMPRESA[45] (NO BUS BUS-STATION NO. BE PRO-1 WAIT BUS ITSELF COMPANY)
	CRIANÇA COMPRAR O-QUE? **É DOCE** (CHILD BUY WHAT? BE CANDY)	GUARDANAPO NÃO. **É DOCE** (NAPKIN NO. BE CANDY)
	PROFESSOR@ EL@ PROFESSOR@ PEDAGOG@ PROFESSOR@ EL@[46] (TEACHER PRO-3 TEACHER PEDAGOGUE TEACHER PRO-3)	RESPONDER. PEDAGOG@ APRENDER LIBRAS SIM[47] (ANSWER. PEDAGOGUE LEARN LIBRAS YES)

[43] The CS and CF question were ambiguous, leading the participant to interpret it differently.
[44] The CS and CF question were ambiguous, leading the participant to interpret it differently.
[45] The CS and CF question were ambiguous, leading the participant to interpret it differently.
[46] The CS and CF question were ambiguous, leading the participant to interpret it differently.
[47] The CS and CF question were ambiguous, leading the participant to interpret it differently.

Appendix F – Focusing marking

S V O	Part.	CS	FNI's answer	CF's answer
SUBJECT	MP1	_____hn ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (LAWYER WORK RIO-DE-JANEIRO)	_____hs_____hn QUEM? ADVOGAD@ (WHO? LAWYER)	__br _hn+lh_____hn_____hn É ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (BE LAWYER WORK RIO-DE-JANEIRO)
		_____hn PEDAGOG@ APRENDER LIBRAS (PEDAGOGUE LEARN LIBRAS)	_____hn_____hn_____hn PEDAGOG@ APRENDER LIBRAS (PEDAGOGUE LEARN LIBRAS)	
	MP2	_____hn_____lh _____br ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (LAWYER WORKRIO-DE-JANEIRO)	_____hn+br _____br+hn+lh ADVOGAD@ TRABALHAR RIO- DE-JANEIRO (LAWYER WORK RIO-DE-JANEIRO)	_hn+lh br lh_____lh É ADVOGAD@ IR RIO-DE-JANEIRO TRABALHAR (BE LAWYER GO RIO-DE-JANEIRO WORK)
		_____br+hn PEDAGOG@ APRENDER LIBRAS (PEDAGOGUE LEARN LIBRAS)	_____hn br PEDAGOG@ APRENDER LIBRAS (PEDAGOGUE LEARN LIBRAS)	_br+hn_____hn_____hn _____lh É CERT@ PEDAGOG@ APRENDER LIBRAS CERT@ (BE CORRECT PEDAGOGUE LEARN LIBRAS CORRECT)
	MP3	_____hu_____br_____sf ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (LAWYER WORK RIO-DE-JANEIRO)	_____ ADVOGAD@ PESSOA PESSOA-CL TER RIO-DE- br JANEIRO (LAWYER PERSON PERSON-CL THERE-IS RIO-DE-JANEIRO)	_____hn+tf_____hn ADVOGAD@ TRABALHAR RIO- DE-JANEIRO (LAWYER WORK RIO-DE-JANEIRO)
	MP4	_____br+hn_____hn_____hu ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (LAWYER WORK RIO-DE-JANEIRO)	_____hn br PESSOA ADVOGAD@ (PERSON LAWYER)	_br+hn_____hn_____hn É ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (BE LAWYER WORK RIO-DE-JANEIRO)
		_____hn _____hn PEDAGOG@ APRENDER LIBRAS (PEDAGOGUE LEARN LIBRAS)	_br_____hn+tr É PEDAGOG@ (BE PEDAGOGUE)	
		_____br _____lh ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (LAWYER WORK RIO-DE-JANEIRO)	_____sf fb_____hn HOMEM ADVOGAD@ VIAJAR ADVOGAD@ ADVOGAD@ (MAN LAWYER TRAVEL LAWYER)	_____br+hf _____sf ADVOGAD@ RIO-DE-JANEIRO TRABALHAR ADVOGAD@ (LAWYER RIO-DE-JANEIRO WORK LAWYER)

	MP5		OU HOMEM MULHER TANTO-FAZ (OR MAN WOMAN WHATEVER)	
		_____hd _____br PEDAGOG@ APRENDER LIBRAS (PEDAGOGUE LEARN LIBRAS)		_____sr _____lh_____sf _____br PEDAGOG@ APRENDER LÍNGUA-DE-SINAL PEDAGOG@ (PEDAGOGUE LEARN SIGN-LANGUAGE PEDAGOGUE)
	FP1	_____hn _____br ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (LAWYER WORK RIO-DE-JANEIRO)	_____br+hu ADVOGAD@ (LAWYER)	_____br+sf+hf ADVOGAD@ (LAWYER)
		_____br_____sf PEDAGOG@ APRENDER LIBRAS (PEDAGOGUE LEARN LIBRAS)	_____sf+hb PEDAGOG@ (PEDAGOGUE)	
	FP2	_____lh _____br ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (LAWYER WORK RIO-DE-JANEIRO)	_hn _____ft É ADVOGAD@ (BE LAWYER)	_____br+hn+tf ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (LAWYER WORK RIO-DE-JANEIRO)
		_____hn PEDAGOG@ APRENDER LÍNGUA-DE-SINAL LIBRAS (PEDAGOGUE LEARN SIGN-LANGUAGE LIBRAS)	_____hn PEDAGOG@ (PEDAGOGUE)	_____hn_____hn RESPONDER PEDAGOG@ (ANSWER. PEDAGOGUE)
	FP3	_____br+hn ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (LAWYER WORK RIO-DE-JANEIRO)	_____br+sf ADVOGAD@ (LAWYER)	_hn_____ft _____br_____lh É ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (BE LAWYER WORK RIO-DE-JANEIRO)
		_____br+hn+ft PEDAGOG@ APRENDER LIBRAS (PEDAGOGUE LEARN LIBRAS)	_____br+hn _____lh PEDAGOG@ APRENDER LIBRAS (PEDAGOGUE LEARN LIBRAS)	
	FP4	_____sf+hn _____ _____br _____ ADVOGAD@ IR TRABALHAR RIO-DE- _____lh+hn _____fb JANEIRO (LAWYER GO WORK RIO-DE-JANEIRO)	_____hu____hn_____hn+ft HOMEM EL@ ADVOGAD@ (MAN PRO-3 LAWYER)	_____br+ft _____hn hu_____hd É ADVOGAD@ TRABALHAR RIO-DE-JANEIRO (BE LAWYER WORK RIO-DE-JANEIRO)
	MP1	hn_____hn EU ABRAÇAR AMIG@ (PRO-1HUG FRIEND)		___hn_____hn+lh EU ABRAÇAR AMIG@ (PRO-1HUG FRIEND)
		_____br __hn	___br_____br LER RECEITA	__br _____hd

VERB	MP2	EU LER RECEITA (PRO-1READ RECIPE)	(READ RECIPE)	LER RECEITA (READ RECIPE)
		___br+hn _____lh EU ABRAÇAR AMIG@ (PRO-1HUG FRIEND)		_____br+lh EU ABRAÇAR AMIG@ (PRO-1HUG FRIEND)
	MP3	EU LER RECEITA (PRO-1READ RECIPE)	_____fb_____hu _____lt_____ft EU LER RECEITA COMO É COMER BOLO _____sf _____fb+ft OU VÁRI@S (PRO-1 READ RECIPE HOW BE EAT CAKE OR VARIOUS	___hn_____hn_____fb+lh EU LER RECEITA É COMIDA VARI@S (PRO-1 READ RECIPE BE FOOD VARIOUS)
		_____br+hn_____hn EU ABRAÇAR AMIG@ (PRO-1HUG FRIEND)		ENCONTRAR EU AMIG@ ABRAÇAR (MEET PRO-1 FRIEND HUG)
	MP4	___hn___hn_____hn EU LER RECEITA^COMIDA VARI@S COMIDA (PRO-1 READ RECIPE VARIOUS FOOD)		___br+hn_____hn LER RECEITA^COMIDA (READ RECIPE^FOOD)
		hn_____hn EU ABRAÇAR AMIG@ (PRO-1HUG FRIEND)	_____hn ABRAÇAR (HUG)	_____br+hn_____hn CERT@ ABRAÇAR AMIG@ (CORRET HUG FRIEND)
	MP5	___hn _____hn EU LER RECEITA^COMIDA (PRO-1 READ RECIPE^FOOD)	PRECISAR LER COMO COLOCAR COMIDA RECEITA COMIDA COLOCAR OVO FARINHA VÁRI@S (NEED READ HOW PUT FOOD RECIPE FOOD PUT EGG FLOUR VARIOUS) br_____hn EU LER PRECISAR LER (PRO-1READ NEED READ)	
		_____tr_____lh _____sr ABRAÇAR AMIG@ ABRAÇAR (HUG FRIEND HUG)		_____hn_____fb+tr+sr _____lh+hf AMIG@ ABRAÇAR (FRIEND HUG)
	FP1	___br EU LER RECEITA (PRO-1READ RECIPE)	LER (READ)	___br+ft LER RECEITA (READ RECIPE)
		_____fb ABRAÇAR AMIG@ (HUG FRIEND)	_____hd+sf ABRAÇAR (HUG)	_____lh+lt ABRAÇAR AMIG@ (HUG FRIEND)

	FP2	__hu _____hf EU LER RECEITA^COMIDA (PRO-1READ RECIPE^FOOD)	__hb _____lh_____lh _____br_____br _____sr EU LER PARA FAZER COMIDA (PRO-1 READ TO DO FOOD)	
		_____hu EU ABRAÇAR AMIG@ (PRO-1HUG FRIEND)	_____hn_____lh+ft FAZER ABRAÇAR (DO HUG)	___br ___hn_____hn EU ABRAÇAR AMIG@ (PRO-1HUG FRIEND)
	FP3	_____fb EU ABRAÇAR AMIG@ (PRO-1HUG FRIEND)	_____fb___lh_____hs+lt EU ABRAÇAR EU AMIG@ (PRO-1 HUG PRO-1 FRIEND)	_____lh EU ABRAÇAR AMIG@ (PRO-1 HUG FRIEND) EU EL@ AMIGO ABRAÇAR (PRO-1 PRO-3 FRIEND HUG)
		_____fb EU LER RECEITA (PRO-1 READ RECIPE)	_____lh EU LER RECEITA (PRO-1 READ RECIPE)	
	FP4	_____lh_____br _____ EU LER RECEITA COZINHA ____lh _____lt RECEITA EU LER (PRO-1 READ RECIPE KITCHEN RECIPE I READ)		_____br ____br ___hn_____hd___hn EU LER RECEITA LER (PRO-1 READ RECIPE READ)
		_____fb_____hb EU ABRAÇAR AMIG@ _____lh ABRAÇAR (I HUG FRIEND HUG)	_____hd ABRAÇAR (HUG)	
	MP1	_____hn_____hn HOMEM VENDER PAO (MAN SELL BREAD)	_____hn_____lh VENDER PAO (SELL BREAD)	_____br _____hn_____hn_____hn HOMEM VENDER PÃO (MAN SELL BREAD)
		_____hn_____lh_____lh CRIANÇA COMPRAR DOCE (CHILD BUY CANDY)		_____hn COMPRAR DOCE (BUY CANDY)
	MP2	_____br HOMEM VENDER PÃO (MAN SELL BREAD)	_br____hn É PÃO (BE BREAD)	_____lh___br+sf___lh CERT@ PÃO OU PÃO PÃO (CORRECT BREAD OR BREAD BREAD)
		_____hn	_br+hn	_____br+lh

OBJECT		_____br lt CRIANÇA COMPRAR DOCE (CHILD BUY CANDY)	É DOCE (BE CANDY)	É CERT@ DOCE (BE CORRECT CANDY)
	MP3	_____hn ___br HOMEM VENDER PÃO (MAN SELL BREAD)	___hn HOMEM VENDER PÃO MASSA (MAN SELL BREAD DOUGH)	_____br+sf _____br hn+hf____hn HOMEM VENDER PÃO PÃO (MAN SELL BREAD BREAD)
		_____ft _____sf+hn _____fb CRIANÇA COMPRAR DOCE (CHILD BUY CANDY)		_____hn_____hn_____lh CRIANÇA COMPRAR CERT@ DOCE (CHILD BUY CORRECT CANDY)
	MP4	_____br_____hn HOMEM VENDER PAO (MAN SELL BREAD)	_____br _____hn_____hn_____hn HOMEM VENDER PÃO (MAN SELL BREAD)	___hn CERT@ PÃO (CORRECT BREAD)
		_____hn_____hn CRIANÇA COMPRAR DOCE (CHILD BUY CANDY)	_____br _____hn_____hn_____hu CRIANÇA COMPRAR É DOCE (CHILD BUY BE CANDY)	_____hn_____hu COMPRAR DOCE (BUY CANDY)
	MP5	_____br+lh HOMEM VENDER PAO (MAN SELL BREAD)	_____hn____hn br VENDER PÃO (SELL BREAD)	_____br+hu PÃO ÔNIBUS (BREAD BUS)
		_____br_____lh CRIANÇA COMPRAR DOCE (CHILD BUY CANDY)	_____br+hd DOCE (CANDY)	_____br+hd _____br+sf DOCE GUARDANAPO DOCE (CANDY NAPKIN CANDY)
	FP1	_____hu HOMEM VENDER PÃO PÃO (MAN SELL BREAD BREAD)	PÃO PÃO (BREAD BREAD)	_____hn____br+hb VENDER PÃO (SELL BREAD)
		_____hn _____br CRIANÇA COMPRAR DOCE (CHILD BUY CANDY)	_____br+ft DOCE (CANDY)	_____hu DOCE (CANDY)
	FP2	_____br+hn_____br+hn____hd HOMEM VENDER PÃO (MAN SELL BREAD)	_____hn_____hn lh+hb HOMEM VENDER COMIDA PAO (MAN SELL FOOD BREAD)	___br+ft PÃO (BREAD)
		_____lh CRIANÇA COMPRAR DOCE (CHILD BUY CANDY)	___hn_____hn_____hn+lh EL@ COMPRAR DOCE (PRO-3 BUY CANDY)	_____lh_____hn+hf _____br CRIANÇA COMPRAR DOCE (CHILD BUY CANDY)
		_____hn____hn	__hd_____hn_____hn br	_____br hn hn hb

	FP3	HOMEM VENDER PÃO (MAN SELL BREAD)	_____lt____hd HOMEM É RAPAZ VENDER SÓ PÃO (MAN BE GUY SELL JUST BREAD)	HOMEM VENDER PÃO (MAN SELL BREAD)
		_____br _____hn _____lt_____fb CRIANÇA CRIANÇA COMPRAR DOCE DOCE (CHILD CHILD BUY CANDY CANDY)	_____hn+lt_____hn_____hn _____br CRIANÇA COMPRAR DOCE (CHILD BUY CANDY)	_____br+lh_____hn_____hn CRIANÇA COMPRAR DOCE DOCE (CHILD BUY CANDY CANDY)
	FP4	br+lh+lt____lt HOMEM VENDER PÃO (MAN SELL BREAD)	____hn____hn PÃO PÃO (BREAD BREAD)	____hn+sf PÃO (BREAD)
		_____hn _____lh _____br CRIANÇA COMPRAR DOCE (CHILD BUY CANDY)	_____sf _____br+lh_____hd CRIANÇA COMPRAR O-QUE? (CHILD BUY WHAT?) _br_____ft É DOCE (BE CANDY)	_____hu É DOCE (BE CANDY)
COLOR ADJECTIVES	MP1	_____hn_____hn_____hn MULHER COMPRAR ROUPA LILÁS (WOMAN COMPRAR SHIRT LIGHT-PURPLE)	_____hn_____hn____hn MULHER COMPRAR COR LILÁS (WOMAN BUY COLOR LIGHT-PURPLE)	
	MP2	_____br_____hn MULHER COMPRAR ROUPA LILAS (WOMAN BUY SHIRT LIGHT-PURPLE)	_hn br+lh COR É LILÁS ROUPA (COLOR BE LIGHT-PURPLE SHIRT)	_____br+hn CERT@ LILÁS (CORRECT LIGHT-PURPLE)
		_____br __hn___hn EU TER LIVRO MARROM (PRO-1HAVE BOOK BROWN)	__hn _____br lh TER COR MARROM (HAVE COLOR BROWN)	_br+hn_____br+sf É COR MARROM (BE COLOR BROWN)
	MP3	_____br MULHER COMPRAR LILAS ROUPA (WOMAN BUY LIGHT-PURPLE SHIRT)	_____hn MULHER COMPRAR ROUPA LILÁS (WOMAN BUY SHIRT LIGHT-PURPLE)	_____hn br MULHER COMPRAR É ROUPA LILÁS (WOMAN BUY BE SHIRT LIGHT-PURPLE)
		EU TER LIVRO MARROM (PRO-1HAVE BOOK BROWN)		_____br+hn _____sf CERT@ MARROM (CORRECT BROWN)
	MP4	_____hn_____hn_____hn_____hu MULHER COMPRAR ROUPA LILÁS (WOMAN BUY SHIRT LIGHT-PURPLE)	___br+hn+lh_____hn COR LILÁS (COLOR LIGHT-PURPLE)	_____hn_____hu CERT@ LILÁS ROUPA (CORRECT LIGHT-PURPLE SHIRT)
		hn hn hn	br	br+hn hn

		EU TER LIVRO MARROM (PRO-1HAVE BOOK BROWN)	___hn_____hn_____hn TER LIVRO MARROM (HAVE BOOK BROWN)	TER MARROM LIVRO (HAVE BROWN BOOK)
	MP5	_____br MULHER COMPRAR ROUPA LILAS (WOMAN BUY SHIRT LIGHT-PURPLE)	ENTÃO (SO) _____hn _____br+sf COR ROUPA LILÁS (COLOR SHIRT LIGHT-PURPLE)	_____br+hd+sf LILÁS (LIGHT-PURPLE)
		___hn _____br EU TER LIVRO MARROM (PRO-1HAVE BOOK BROWN)	_____hn+hd MARROM (BROWN)	_____hn_____lh+sf br LIVRO MARROM (BOOK BROWN)
	FP1	_____sf _____hd _____br MULHER COMPRAR ROUPA ROUPA-cl LILÁS (WOMAN BUY SHIRT LIGHT-PURPLE)	_____hd+sf+lt LILÁS (LIGHT-PURPLE)	_____hn+hd LILÁS (LIGHT-PURPLE)
		_____hn _____br EU TER LIVRO MARROM (PRO-1HAVE BOOK BROWN)	_____hn+lh MARROM (BROWN)	_____hn MARROM (BROWN)
	FP2	_____ft _____lh MULHER COMPRAR ROUPA LILÁS (WOMAN BUY SHIRT LIGHT-PURPLE)	_hn É LILAS (BE LIGHT-PURPLE)	_____br+hn_____lh+ft CERT@ LILÁS (CORRECT LIGHT-PURPLE)
		___hn _____lh+sr EU TER LIVRO MARROM (PRO-1HAVE BOOK BROWN)	_____lh LIVRO MARROM (BOOK BROWN)	_br+hn_____hu+lt É MARROM (BE BROWN)
	FP3	_____br+hn_____hn_____sf+hd_____br+lt_____hb MULHER COMPRAR COMPRAR ROUPA LILÁS (WOMAN BUY BUY SHIRT LIGHT-PURPLE)	_____hn_____hn_____hn_____br+hn____hn MULHER COMPRAR ROUPA LILÁS COR LILÁS (WOMAN BUY SHIRT LIGHT-PURPLE COLOR LIGHT-PURPLE)	_____br hn_____hn_____hn_____lh MULHER COMPRAR ROUPA LILÁS (WOMAN BUY SHIRT LIGHT-PURPLE)
		__hn___hn _____hu EU TER LIVRO MARROM (PRO-1 HAVE BOOK BROWN)	____hn _____hu EU TER LIVRO MARROM COR (PRO-1 HAVE BOOK BROWN COLOR)	_____br ___hn____hn_____hn_____lh EU TER LIVRO MARROM (PRO-1HAVE BOOK BROWN)
	FP4	_____sf_____hu _____br_____hn MULHER COMPRAR ROUPA LILÁS (WOMAN BUY SHIRT LIGHT-PURPLE)	____ft _____br_____fb lh COMPRAR ROUPA SÓ COR LILÁS. (BUY SHIRT JUST COLOR LIGHT-PURPLE)	_____hn _____hn_____hu CERT@ LILÁS L-I-L-A-S (CORRECT LIGHT-PURPLE L-I-L-A-S). COR SIGNIFICAR TEMA ROX@ CLAR@ LILÁS.

			SÓ COR LILÁS (JUST COLOR LIGHT-PURPLE)	(COLOR MEANS TOPIC PURPLE LIGHT LIGHT-PURPLE)
		__hu _____hn+hu_____lh _____br EU TER LIVRO MARROM (PRO-1 HAVE BOOK BROWN)	___hn_____hn____ft _____hu lh TER LIVRO COR MARROM (HAVE BOOK COLOR BROWN)	_____br+hn___hn_____hn_____hn _____lh+hd _____ft MARROM TER LIVRO MARROM (BROWN HAVE BOOK BROWN) EU FALAR PODER RESPONDER MARROM. (PRO-1 SPEAK CAN ANSWER BROWN)
L O C A T I V E S	MP1	___hn_____hn_____hn_____hu EU ESPERAR ONIBUS EMPRESA (PRO-1WAIT BUS COMPANY)	_____br _hn+lh_____hn_____hn+lh_____hn+lh _____lt_____lt EU ESPERAR ONIBUS EMPRESA (PRO-1WAIT BUS COMPANY)	_____br _hn+lh_____hn+lh_____hn+lh_____hn+lh EU ESPERAR ONIBUS EMPRESA (PRO-1WAIT BUS COMPANY)
		___hn_____hn_____hn EU BEBER CERVEJA BAR (PRO-1DRINK BEER BAR)	___br ___hn_____hn_____hn_____hn+lh EU BEBER CERVEJA BAR (PRO-1DRINK BEER BAR)	___hn_____hn _____hu EU BEBER CERVEJA BAR (PRO-1DRINK BEER BAR)
	MP2	__hn_____hd br EU BEBER CERVEJA BAR (PRO-1DRINK BEER BAR)	_br+hn_____hn É B-A-R (BE B-A-R)	_br+hn É BAR (BE BAR)
		___hn _____lt_____lh _____br EU ESPERAR ONIBUS EMPRESA		_br+hn_____hn+lh É EMPRESA (BE COMPANY)
	MP3	_____br EU BEBER CERVEJA BAR (PRO-1 DRINK BEER BAR)	_____br_____fb_____hn CERVEJA ONDE? B-A-R (BEER WHERE? B-A-R)	
		_____hn _____hn EU ESPERAR ONIBUS EMPRESA (PRO-1WAIT BUS COMPANY)	__br_____hn _____lh EU ESPERAR ONIBUS É EMPRESA (PRO-1WAIT BUS BE COMPANY)	
	MP4	_____hn_____hn ___hn EU BEBER CERVEJA B-A-R BAR (PRO-1 DRINK BEER B-A-R OR BAR)	_____br+hn _lh____hu_____lh ONDE? É BAR B-A-R (WHERE? BE BAR B-A-R)	NÃO RESTAURANTE NÃO (NO RESTAURANT NO) _____br+hn B-A-R BAR
		__hn_____hn_____hn_____hn EU ESPERAR ONIBUS EMPRESA (PRO-1WAIT BUS COMPANY)	_____br+hn+lh_____hn+hb EU ESPERAR ONDE? É EMPRESA (PRO-1 WAIT WHERE? BE COMPANY)	_br+hn É EMPRESA ÔNIBUS (BE COMPANY BUS)
		br	hd lh	lh+hn

	MP5	EU BEBER CERVEJA B-A-R (PRO-1 DRINK BEER BAR)	ONDE? B-A-R (WHERE? B-A-R) ONDE EU IR CERVEJA BEBER ONDE B-A-R (WHERE PRO-1 GO BEER DRINK WHERE B-A-R)	B-A-R
		_____br+lh EU ESPERAR ONIBUS EMPRESA (PRO-1WAIT BUS COMPANY)	_____hn _____br_____lh EU ESPERAR ONIBUS EMPRESA (PRO-1WAIT BUS COMPANY)	_____hn É EMPRESA ESPERAR EMPRESA ÔNIBUS (BE COMPANY WAIT COMPANY BUS)
	FP1	____hu _____tr _____br EU BEBER CERVEJA BAR (PRO-1DRINK BEER BAR)	____hf BAR	____hf+ft BAR
		__br _____hn_____tr EU ESPERAR ONIBUS EMPRESA (PRO-1WAIT BUS COMPANY)	_____hn+tr EMPRESA (COMPANY)	_____tr EMPRESA (COMPANY)
	FP2	__hn_____hn_____hn____br+hn EU BEBER CERVEJA BAR (PRO-1DRINK BEER BAR)	_____hn____hn+ft EU RESPONDER BAR (PRO-1 ANSWER BAR)	____br+hn+ft BAR (BAR)
		_____hn EU ESPERAR EU ESPERAR ONIBUS EMPRESA (PRO-1WAIT PRO-1WAIT BUS COMPANY)		_____hn _br+hn_____lt RESPONDER ÔNIBUS É EMPRESA (ANSWER BUS BE COMPANY)
	FP3	_____lt ____hn fb EU BEBER CERVEJA BAR (PRO-1 DRINK BEER BAR)		__hn_____hn _____br____hn EU BEBER CERVEJA LÁ BAR (PRO-1 DRINK BEER THERE BAR)
		_____br _____lh EU ESPERAR ÔNIBUS LÁ EMPRESA (PRO-1 WAIT BUS THERE COMPANY)	_____lh_____br+hn___hn_____lh EU ESPERAR ÔNIBUS LÁ EMPRESA DENTRO _____hn EMPRESA (PRO-1 WAIT BUS THERE COMPANY INSIDE COMPANY)	_____sf_____hn _hn EU ESPERAR ÔNIBUS LÁ EMPRESA (PRO-1 WAIT BUS THERE COMPANY)
	FP4	____hn EU BEBER CERVEJA BAR (PRO-1 DRINK BEER BAR)	_____lh hn_____hn hn+lh BAR B-A-R 2 (BAR B-A-R TWO)	_____hu É BAR B-A-R (BE BAR B-A-R)

Appendix G – Results according participant

Dependent Variable	Focus	p-value	Participants								
			Female				Male				
			FP1	FP2	FP3	FP4	MP1	MP2	MP3	MP4	MP5
Normalized duration (%)	CS	0.2319	23.37	22.26	21.40	18.95	21.79	22.48	19.87	20.06	20.72
	FNI	6.646e-07	58.67	21.43	15.61	22.24	18.10	23.17	13.50	20.38	22.86
	CF	1.082e-06	58.09	25.95	21.03	27.80	26.01	21.40	15.61	29.77	23.66
Normalized duration of target signs	CS	X	26.22	28.59	29.17	23.35	26.07	26.88	26.23	30.51	24.83
	FNI	0.0001552	62.07	33.67	32.89	43.36	39.39	34.01	17.78	43.38	31.79
	CF	2.33e-06	64.44	39.68	31.59	39.78	34.71	35.94	28.33	40.05	35.70
Head nod (pitch/head flexion) (°)	CS	2.2e-16	8.12	8.12	5.47	14.90	4.95	9.38	7.09	9.65	5.26
	FNI	1.758e-13	8.06	12.39	6.61	15.66	6.23	8.90	9.13	12.77	6.05
	CF	4.1e-05	5.80	9.43	7.91	14.08	8.42	7.48	7.45	8.10	6.64
Head shake (yaw/head rotation) (°)	CS	4.195e-16	6.05	2.85	6.12	8.11	2.22	3.71	8.86	5.95	2.53
	FNI	1.561e-07	5.84	2.32	7.45	6.43	3.26	4.49	7.19	5.77	7.79
	CF	3.483e-10	6.53	3.90	6.15	5.64	3.04	3.15	6.05	8.68	10.85
Head tilt (roll/head lateral flexion) (°)	CS	2.2e-16	5.21	5.80	5.37	15.54	2.95	7.71	5.87	6.18	8.79
	FNI	2.338e-10	6.17	6.84	7.29	18.74	8.81	12.15	6.52	13.70	10.36
	CF	5.375e-05	8.04	6.64	5.41	8.65	5.79	12.91	5.08	8.48	10.27
Inner brow raiser (AU 01)	CS	2.2e-16	0.57	0.06	0.07	0.59	0.06	0.72	0.16	0.09	0.74
	FNI	2.2e-16	0.43	0.07	0.08	0.49	0.08	0.76	0.26	0.60	0.49
	CF	1.556e-15	0.58	0.17	0.12	0.12	0.10	0.61	0.16	0.44	0.36
Outer brow raiser (AU 02)	CS	2.2e-16	0.15	0.00	0.00	0.51	0.00	0.31	0.12	0.02	0.54
	FNI	2.2e-16	0.01	0.00	0.00	0.38	0.00	0.47	0.15	0.56	0.34
	CF	2.2e-16	0.04	0.07	0.01	0.11	0.01	0.19	0.13	0.36	0.43
Upper lid raiser (AU 05)	CS	2.2e-16	0.05	0.05	0.16	0.06	0.04	0.05	0.04	0.05	0.06
	FNI	2.2e-16	0.04	0.05	0.23	0.05	0.04	0.06	0.04	0.16	0.08
	CF	2.2e-16	0.11	0.10	0.23	0.05	0.05	0.09	0.04	0.11	0.09
Lip corner puller (AU 12)	CS	2.2e-16	0.06	0.19	0.07	0.17	0.89	0.04	0.04	0.09	0.05
	FNI	2.2e-16	0.04	0.21	0.05	0.24	0.70	0.03	0.03	0.06	0.04
	CF	2.2e-16	0.04	0.49	0.05	0.22	0.77	0.04	0.04	0.41	0.05
Chin raiser (AU 17)	CS	2.2e-16	0.15	0.11	0.08	0.09	0.09	0.49	0.15	0.24	0.07
	FNI	2.2e-16	0.18	0.08	0.09	0.06	0.12	0.58	0.18	0.40	0.13
	CF	2.2e-16	0.11	0.14	0.06	0.06	0.14	0.42	0.15	0.25	0.06
Mouth Stretch (AU 27)[1]	CS	2.2e-16	0.06	0.06	0.12	0.08	0.12	0.06	0.05	0.06	0.06
	FNI	1.41e-14	0.05	0.06	0.16	0.09	0.09	0.06	0.05	0.08	0.05
	CF	2.2e-16	0.06	0.07	0.22	0.08	0.11	0.06	0.05	0.13	0.06

[1] The colors Applied to the AUs follows the FACS intensity degrees (Face Reader Reference Manual 9, p. 265):

Not active	0.00 – 0.100
Trace (A)	0.100 – 0.217
Slight (B)	0.217 – 0.334
Pronounced (C)	0.334 – 0.622
Severe (D)	0.622 – 0.910
Max (E)	0.910 – 1.000

SUPLEMENTED MATERIALS
Attachment A – Image use authorization term

UNICAMP

Termo de Autorização de Uso de Imagem

Eu,_____ , nascido(a) no dia _____/_____/_____, de nacionalidade _____, residente e domiciliado(a) à _____, Cidade de _____, Estado _____, profissão _____, portador(a) da Cédula de Identidade RG/RNE nº _____, e inscrito(a) no CPF/MF sob o nº _____, Telefone: _____, doravante denominado simplesmente **Autorizador**, na melhor forma do direito, de maneira livre, espontânea, sem qualquer vício de consentimento ou de vontade:

AUTORIZO

Letícia Kaori Hanada, CPF 354.186.408-79, mestranda em Linguística da Universidade Estadual de Campinas (UNICAMP) doravante denominado simplesmente **Autorizada**, a fazer uso de minha imagem mediante a observação das seguintes condições:

1. A utilização da imagem, doravante em conjunto denominados simplesmente de **Conteúdo Autorizado**, será permitido para fins acadêmicos, educacionais ou institucionais, de forma inteiramente gratuita, a título universal, em caráter total, definitivo, irrevogável e irretratável, em especial para os usos de divulgação científica relativos ao projeto de pesquisa "Prosódia Visual na Língua Brasileira de Sinais" de Letícia Kaori Hanada orientado pelo Prof. Dr. Plínio Almeida Barbosa, Matrícula Unicamp: 27396-1, e em qualquer outro projeto de pesquisa deste derivado, realizado no Instituto de Estudos da Linguagem da UNICAMP.

2. A **autorizada** poderá praticar os seguintes atos relacionados com o Conteúdo Autorizado: editar, reeditar, mudar o formato, armazenar, transferir, publicar, reproduzir ou divulgar o Conteúdo Autorizado para fins estritamente acadêmicos. O principal intuito é divulgar o conteúdo em artigos, para divulgação científica.

3. Reconhece expressamente o **Autorizador** que a **Autorizada**, na qualidade de detentor dos direitos patrimoniais de autor de quaisquer obras em que o Conteúdo Autorizado possa ser inserido, e tendo em vista a autorização efetuada neste termo, poderá o Autorizado, a seu exclusivo critério, utilizar o Conteúdo Autorizado livremente, bem como seus extratos trechos ou partes, da forma que achar mais conveniente.

4. Declara a **Autorizada** que estão ressalvados os direitos do **Autorizador** sobre a integridade da sua honra, boa fama ou a respeitabilidade, sendo vedada a utilização do Conteúdo Autorizado para fins estritamente acadêmicos sem a sua prévia autorização.

5. Poderá a **Autorizada**, a qualquer tempo, inclusive após iniciada ou concluída a gravação audiovisual, interromper a sua produção, ou optar por não exibí-los. Nesta hipótese, não será devido ao **Autorizador** qualquer tipo de reparação ou indenização.

6. O **Autorizador** declara que exime a **Autorizada** de qualquer responsabilidade pelo uso indevido do Conteúdo Autorizado por terceiros.

7. O presente instrumento é firmado em caráter irrevogável e irretratável obrigando-se as partes por si, seus herdeiros e sucessores a qualquer título, a respeitarem integralmente os termos e condições estipuladas no presente instrumento.

8. Fica estabelecido o foro da Comarca de Campinas, Estado de São Paulo, com expressa renúncia a qualquer outro, por mais privilegiado que possa ser, para dirimir quaisquer questões oriundas do que dispõe o presente termo.

_____, ___ de _____ de 20___

_____

AUTORIZADOR

Attachment B – Free and Informed Consent Term

UNICAMP

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

Projeto: Prosódia Visual na Língua Brasileira de Sinais

Letícia Kaori Hanada (orientanda) e Prof. Dr. Plínio Almeida Barbosa (orientador)
Projeto de dissertação de Mestrado
Número do CAAE: 47780021.4.0000.8142

Você está sendo convidado a participar como voluntário de um estudo. Este documento, chamado Termo de Consentimento Livre e Esclarecido, visa assegurar seus direitos e deveres como participante e é elaborado em duas vias, uma que deverá ficar com você e outra com o pesquisador.
Por favor, leia com atenção e calma, aproveitando para esclarecer suas dúvidas. Se houverem perguntas antes ou mesmo depois de assiná-lo, você poderá esclarecê-las com o pesquisador. Se preferir, pode levar para casa e consultar seus familiares ou outras pessoas antes de decidir participar. Se você não quiser participar ou retirar sua autorização, a qualquer momento, não haverá nenhum tipo de penalização ou prejuízo.

Justificativa e objetivos:
O presente estudo visa analisar, observar e compreender o funcionamento linguístico e prosódico da Língua Brasileira de Sinais.

Procedimentos:
Participando do estudo você está sendo convidado a:

- Preencher a "ficha de informações do participante" com seus dados cadastrais e responder perguntas pessoais que caracterizam o seu contato com a Libras e com a Comunidade Surda;
- Assinar o Termo de Autorização de Uso de Imagem, autorizando a pesquisadora responsável por este projeto (Letícia Kaori Hanada) a fazer uso de sua imagem para fins acadêmicos, educacionais ou institucionais;
- Ler e sinalizar os enunciados escritos em glosas, mentalizá-los e, então, responder emLibras a pergunta que se faz sobre esses enunciados. Essa sinalização deverá ser gravada em vídeo, conforme as orientações enviadas;
- As tarefas descritas são passíveis de serem realizadas em um mesmo dia, devendo duraraproximadamente 50 minutos.

Desconfortos e riscos:
Por mais que em toda pesquisa seja considerada a possibilidade de riscos ou desconforto, coloca-se aqui como desconforto o tempo de aproximadamente 50 minutos para ajuste dos equipamentos durante e entre a execução das tarefas que compõem o estudo e a realização do experimento. Outro possível desconforto está na divulgação dos resultados desse estudo, uma vez que a divulgação das expressões faciais depende do uso de sua imagem, para isso, será disponibilizado um Termo de Autorização de Uso de Imagem, explicitando que a imagem será utilizada apenas quando necessário, para fins acadêmicos, educacionais ou institucionais. Seu nome, ou outras informações pessoais, não serão citados. Não há riscos previsíveis nessa pesquisa.

Benefícios:
O estudo não apresenta nenhum benefício individual ao participante, mas sim um benefício coletivo por contribuir para a área de experimentação em Fonética Experimental, em relação ao fenômeno pesquisado.

Acompanhamento e assistência:
Será realizado acompanhamento dos sujeitos dessa pesquisa pelo pesquisador responsável, sendo promovida qualquer assistência necessária durante e após o encerramento da pesquisa. É direito de qualquer participante se retirar da pesquisa em qualquer momento, sem nenhum prejuízo a ele. Dúvidas também serão esclarecidas pelos pesquisadores em qualquer momento.

Rubrica do pesquisador:_____ Rubrica do participante:_____

Sigilo e privacidade:
Você tem a garantia de que sua identidade e dados serão mantidos em sigilo e nenhuma informação será dada a outras pessoas que não façam parte da equipe de pesquisadores, assim como as filmagens realizadas. Na divulgação dos resultados desse estudo, seu nome não será citado.

Ressarcimento:
Não há necessidade de nenhum ressarcimento, uma vez que as atividades serão realizadas em locais e horários previamente agendados com os pesquisadores.

Indenização:
O participante de pesquisa tem direito a indenização em caso de danos decorrentes do estudo.

Armazenamento de dados
O material obtido nas gravações desse estudo será armazenado no banco de gravações do Grupo de Estudos de Prosódia da Fala, do Instituto de Estudos da Linguagem (IEL) da Universidade Estadual de Campinas (UNICAMP) por pelo menos 5 (cinco) anos e estarão sob a responsabilidade da pesquisadora responsável (Letícia Kaori Hanada). É direito do participante permitir ou não o uso do material coletado em estudos futuro – nesse caso, o material só será utilizado mediante nova aprovação do CEP. Indicando o seu consentimento ao assinalar as opções a seguir:
[ ] Autorizo o armazenamento do material coletado nesta pesquisa no banco de dados do Grupo de Estudos de Prosódia da Fala, do Instituto de Estudos da Linguagem da UNICAMP
[ ] Autorizo o uso do material coletado nesta pesquisa em projetos futuros apenas mediante a aprovação de um novo projeto pelo Comitê de Ética em Pesquisa (CEP) da UNICAMP.

Contato:
Em caso de dúvidas sobre o estudo, você poderá entrar em contato com Letícia Kaori Hanada, End: Rua Doutor Fernando Costa, 340 – 13720-000 – São José do Rio Pardo, SP. Tel: 19-992868701. E-mail: leticiahanada@hotmail.com ou com o Plinio Almeida Barbosa, Rua Sérgio Buarque de Holanda, 571, CEP 13083-859 Campinas-SP, Tel.: 19-35211555.
Em caso de denúncias ou reclamações sobre sua participação e sobre questões éticas do estudo, você poderá entrar em contato com a secretaria do Comitê de Ética em Pesquisa em Ciências Humanas e Sociais (CEP-CHS) da UNICAMP das 08h30 às 11h30 e das 13h00 às 17h00 naRua Bertrand Russell, 801, Bloco C, 2º piso, sala 05, CEP 13083-865, Campinas – SP; telefone
(19) 3521-6836; e-mail: cepchs@unicamp.br.

Brasil, 2016. Resolução nº 510, de 07 de abril de 2016. Dispõe sobre as normas aplicáveis a pesquisas em Ciências Humanas e Sociais. Diário Oficial [da] República Federativa do Brasil, Brasília, DF, 24 maio 2016.

Consentimento livre e esclarecido

Após ter sido esclarecimento sobre a natureza da pesquisa, seus objetivos, métodos, benefícios previstos, potenciais riscos e o incômodo que esta possa acarretar, aceito participar:

Nome do(a) participante: _____ Data:___/___/___.
(Assinatura do participante ou nome e assinatura do responsável)

Responsabilidade do Pesquisador:
Asseguro ter cumprido as exigências da resolução 466/2012 CNS/MS e complementares na elaboração do protocolo e na obtenção deste Termo de Consentimento Livre e Esclarecido. Asseguro, também, ter explicado e fornecido uma cópia deste documento ao participante. Informo que o estudo foi aprovado pelo CEP perante o qual o projeto foi apresentado. Comprometo-me a utilizar o material e os dados obtidos nesta pesquisa exclusivamente para as finalidades previstas neste documento ou conforme o consentimento dado pelo participante.

Rubrica do pesquisador:_____ Rubrica do participante:_____ Data:___/___/___.
(Assinatura do pesquisador)

Attachment C – Participant Form[1]

FICHA DO PARTICIPANTE

Nome: _____

E-mail: _____

Data de nascimento: _____

Ocupação: _____

Cidade / Estado em que nasceu: _____

Cidade / Estado em que passou a maior parte da vida: _____

Quanto tempo mora em São Carlos / região?_____

Sexo:

☐ Feminino ☐ Masculino ☐ Prefiro não dizer

Classe social:

☐ Classe A ou B ☐ Classe C ☐ Classe D ou E

Escolaridade:

☐ Ensino Fundamental Incompleto

☐ Ensino Fundamental Completo

☐ Ensino Médio Incompleto

☐ Ensino Médio Completo

☐ Ensino Superior Incompleto

☐ Ensino Superior Completo

[1] Any doubts about the written Portuguese were answered in Libras for the participants.

Qual o tipo de escola que você estudou a maior parte da vida?

☐ Escola bilíngue para surdos (aulas em Libras)

☐ Escola inclusiva regular (aulas em português, com intérprete de Libras)

☐ Escola regular sem Libras (aulas em português, sem intérprete de Libras)

Você nasceu surdo?

☐ Sim ☐ Não

Qual o seu grau de perda auditiva?

☐ Leve ☐ Moderada ☐ Severa ☐ Profunda ☐ Não sei

Você utiliza aparelho coclear?

☐ Sim ☐ Não ☐ Não, mas já usei no passado.

Com quantos anos começou a aprender Libras?

☐ Antes dos 2 anos ☐ De 2 a 5 anos ☐ De 6 a 9 anos

☐ De 10 a 12 anos ☐ Após 12 anos

Em que contextos você utiliza a Libras? (É possível marcar mais de 1 opção)

☐ Em casa, com minha família ☐ Em meu trabalho / escola ou faculdade

☐ Com meus amigos surdos ☐ Com meus amigos ouvintes

☐ Apenas com a presença de um intérprete ☐ Não uso a Libras

Com qual frequência você utiliza a Libras durante a semana?

☐ Todos os dias ☐ Quase todos os dias ☐ Razoavelmente

☐ Quase nunca ☐ Nunca

Com qual frequência você participa de eventos relacionados à Comunidade Surda? (Como teatros, discussões, assiste vídeos de youtuber surdos)

☐Nunca ☐Quase nunca ☐Razoavelmente ☐Quase sempre ☐Sempre

Fez terapia de oralização?

☐Não, nunca

☐Sim, por até 1 ano ☐Sim, por 2 a 5 anos ☐Sim, por mais de 6 anos.

Em uma escala de 0 a 5, qual você acha que é seu grau de leitura labial?

☐0 ☐1 ☐2 ☐3 ☐4 ☐5

Em uma escala de 0 a 5, qual você acha que é seu grau de fluência em Libras?

☐0 ☐1 ☐2 ☐3 ☐4 ☐5

Attachment D –Research ethics committee's approval term

CHS/UNICAMP - UNIVERSIDADE ESTADUAL DE CAMPINAS

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Prosódia Visual na Língua Brasileira de Sinais: A diferença do uso de Expressões Não-Manuais em contexto de Foco de Informação Nova e Foco Contrastivo

Pesquisador: LETICIA KAORI HANADA

Área Temática:

Versão: 2

CAAE: 47780021.4.0000.8142

Instituição Proponente: Instituto de Estudos da Linguagem

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 4.891.782

Apresentação do Projeto:

"O presente estudo tem como objetivo analisar e descrever o uso das Expressões Não-Manuais (ENMs), ou seja, movimentos de corpo e expressão facial (Baker-Shenk e Cokely, 1980), exercendo a expressão sintática / prosódica de Foco de Informação Nova e Foco Contrastivo em alguns sinais da Língua Brasileira de Sinais (Libras). Para tanto, será construído um corpus com enunciados e perguntas referentes a esses enunciados a fim de elicitar a produção enfática de sinais-chave, essa produção deverá ser caracterizada pelo uso das ENMs. Serão selecionados como sinais-chave, sinais que ocupem as categorias de sujeito, ação e objeto. Além desses enunciados e perguntas, a fim de que o participante não perceba a variável a ser analisada, também serão elaborados enunciados distratores que apresentarão outras formas de foco. Pretende-se gravar um total de dez participantes surdos, cinco homens e cinco mulheres na faixa etária adulta, fluentes em Libras e que tenham nascido e crescido na mesma região. Espera-se que os resultados deste trabalho contribuam, principalmente, em quatro frentes: a) nas pesquisas que envolvem línguas de sinais, b) no entendimento de como as ENMs são utilizadas na Libras como recurso para expressar Foco de Informação Nova e Foco Contrastivo, c) Na importância do ensino da prosódia para aprendizes de Libras e d) Na relevância da metodologia da Fonética Experimental para os estudos deaquisição da prosódia da Libras.

A hipótese que aqui se projeta é a de que existe uma diferença significativa entre essas produções, uma vez que a intenção expressa por esses dois tipos de foco não é a mesma: enquanto no foco

Endereço: Av. Betrand Russell, 801, 2º Piso, Bloco C, Sala 5, Campinas-SP, Brasil.
Bairro: Cidade Universitária "Zeferino Vaz" **CEP:** 13.083-865
UF: SP **Município:** CAMPINAS
Telefone: (19)3521-6836 **E-mail:** cepchs@unicamp.br

de informação nova o locutor tem a intenção de informar algo, no foco contrastivo a intenção é de corrigir uma informação incorreta. Portanto, existe a possibilidade de que a produção do foco contrastivo seja produzida com mais ênfase do que a de foco de informação nova.

Para que testar a hipótese acima mencionada, será construído um corpus com 20 enunciados e 20 perguntas sobre esses enunciados a fim de eliciar a produção do fenômeno de Foco de Informação Nova e Foco Contrastivo em 10 sinais-chave (10 perguntas a fim de elicitar o Foco de Informação Nova e 10 a fim de eliciar o Foco Contrastivo). Os participantes apenas sinalizarão os enunciados (que serão gravados como enunciado controle, já que não deverão possuir foco) e suas determinadas respostas, já os enunciados-pergunta deverão apenas serem lidos a fim de eliciarem as respostas. O critério para seleção desses sinais-chave será sinais que configurem como parte das categorias de substantivo, adjetivo, verbo e advérbio, uma vez que as perguntas a serem feitas sobre os enunciados está exclusivamente relacionada às funções dessas categorias, retomando questões como quem fez a ação? (sujeito), qual ação foi feita? (verbo), quem recebeu a ação? (objeto), qual a característica de quem fez ou de quem recebeu a ação? (adjunto adnominal) e qual a circunstância da ação? (adjunto adverbial), essas perguntas serão feitas no sentido de informação nova ou de correção pragmática, possuindo um conjunto limitado de possibilidades. Além dos enunciados e perguntas a serem analisados, a fim de que o participante não perceba a variável a ser analisada, serão acrescentados ao experimento um total de 30 enunciados e 30 perguntas distratores, ou seja, enunciados e perguntas que não estejam relacionadas a análise central. Todos os enunciados experimentais quanto os distratores serão escritos em glosas, notação convencional que tem a função de representar sinais de uma língua de sinais, com o principal objetivo de não influenciar, com instrução em Libras, a produção do enunciado. Após a construção do material, será realizada a coleta de dados, em que um estímulo visual será apresentado aos participantes em uma tela de notebook através de um arquivo do programa Microsoft Power Point.

Em um primeiro momento, será apresentado o enunciado principal a ser sinalizado pelo participante, após essa sinalização, o aplicador do experimento apresentará a pergunta escrita em glosa e, logo em seguida, o participante deverá sinalizar sua resposta. Em nenhum enunciado a glosa apresentará o recurso de destaque / negrito para indicar onde se deve produzir o fenômeno do foco. Pretende-se gravar em vídeo um total de dez participantes, cinco homens e cinco mulheres na faixa etária adulta, todos fluentes em Libras, nascidos e crescidos na mesma cidade. Após a coleta de dados, a transcrição dos dados será feita através do programa de análise de vídeos ELAN (versão 5.4). Nesse momento, serão delimitados o início e o fim dos sinais e dos

enunciados, levando em conta a duração total de ambos, de acordo com os critérios apontados na seção 8. Após essa determinação, será feita a transcrição dos dados que estarão estratificados em 9 trilhas, baseada em Ferreira-Brito e Langevin (1995) e no trabalho de monografia da aluna responsável por este projeto. Pretende-se gravar em vídeo um total de dez participantes, cinco homens e cinco mulheres na faixa etária adulta, todos fluentes em Libras, nascidos e crescidos na mesma cidade. Para que essas características sejam garantidas, será elaborado uma ficha que objetiva coletar características individuais dos participantes, como idade, local de nascimento, local em que passou a maior parte do tempo, e também questionamentos referentes à identidade com a cultura surda, os contextos de uso da Libras, uma auto-avaliação sobre sua fluência em Libras, cursos e certificados de proficiência em Libras, quanto tempo utiliza a Libras, com quantos anos adquiriu a Libras como primeira ou segunda língua, frequência de contato com surdos ou com a comunidade surda, domínio de leitura de glosa etc. Esse questionário pode incluir novos questionamentos posteriormente quando for formulado e ele terá como principal função a otimização da seleção dos participantes. Além disso, na tentativa de atenuar as influências sociais sob o experimento, serão selecionados participantes que não participem da mesma "rede social" (Milroy e Milroy, 1992)."

Objetivo da Pesquisa:

"O presente estudo tem como principal objetivo comparar o uso de Expressões Não-Manuais quando desempenham diferentes focos relacionados ao mesmo enunciado e averiguar a existência de diferenças significativas na produção dessas Expressões Não-Manuais."

Avaliação dos Riscos e Benefícios:

No que se refere aos riscos, a equipe de pesquisa expressa que a pesquisa não apresenta riscos previsíveis aos participantes, mas que o tempo para a realização do procedimento de pesquisa, em torno de 50 minutos de duração, pode ser um motivo gerador de desconforto para os participantes. Sobre os benefícios, a equipe declara que: "O estudo não apresenta nenhum benefício individual ao participante, mas sim um benefício coletivo por contribuir para a área de Fonética Experimental, em relação ao fenômeno pesquisado. Em relação ao benefício coletivo, o presente estudo se faz importante e necessário, na medida em que a descrição do uso dessas ENMs, como construtores de sentido na Libras, contribuirá, para além do conhecimento de como as ENMs são utilizadas na Libras como recurso para expressar foco, também para ressaltar a importância do ensino de prosódia da Libras."

Comentários e Considerações sobre a Pesquisa:

Este protocolo se refere ao Projeto de Pesquisa intitulado "Prosódia Visual na Língua Brasileira de Sinais: A diferença do uso de Expressões Não-Manuais em contexto de Foco de Informação Nova e Foco Contrastivo", de Leticia Kaori Hanada, com o auxílio do pesquisador orientador Plinio Almeida Barbosa. Trata-se de pesquisa de mestrado, inserida na área temática de Fonética Experimental, na Grande área de Linguística, Letras e Artes, que será desenvolvida no Instituto de Estudos da Linguagem (IEL) da Unicamp. Segundo as informações preenchidas na Plataforma Brasil, a pesquisa tem orçamento estimado em R$ 400,00, com utilização de recursos próprios. O cronograma apresentado contempla a coleta de dados, com gravação de vídeo, no período de 16 de novembro de 2021 a 30 de março de 2022. Serão abordados, ao todo 10 participantes, sendo 5 homens e 5 mulheres, atendendo aos critérios de seleção.

Considerações sobre os Termos de apresentação obrigatória:

ver "Conclusões ou Pendências e Lista de Inadequações"

Conclusões ou Pendências e Lista de Inadequações:

Esclarecimentos feitos e pendências sanadas.

O protocolo foi considerado aprovado neste CEP e, caso não tenha autorizações institucionais pendentes ou centros co-participantes, pode ser iniciado.

Não estão sob o escopo deste parecer

- Eventuais alterações documentais realizadas sem aviso prévio e/ou não solicitadas pelo CEP em forma de pendência ou de recomendação;
- Dados coletados sem as adequações descritas acima;
- Dados coletados em data anterior a este parecer;
- Caso, eventualmente, os dados sejam coletados com autorizações institucionais pendentes;
- Caso, eventualmente, os dados sejam coletados sem a aprovação/autorização do centro co-participante (se necessário).

* Conforme a Resolução 510/16, art.28 inciso V, ao término do estudo deve ser apresentado ao CEP um relatório final da pesquisa via NOTIFICAÇÃO.

** Relatório parcial deve ser apresentado em caso de qualquer intercorrência.

*** Potenciais alterações no protocolo podem ser solicitadas via EMENDA. Em caso de submissão de emenda, a coleta de dados fica suspensa até que a emenda seja aprovada.

**** Documentação pendente pode ser submetida via NOTIFICAÇÃO, não sendo necessário aguardar novo parecer para a continuidade da pesquisa.

Considerações Finais a critério do CEP:

1. Vale lembrar que a interação com os participantes de pesquisa só pode ser iniciada a partir da aprovação desse protocolo no CEP. Os cronogramas de geração/coleta de dados deve acompanhar o relatório final de pesquisa

2. Cabe enfatizar que, segundo a Resolução CNS 510/16, Art.28 Inciso IV, o pesquisador é responsável por "(...) manter os dados da pesquisa em arquivo, físico ou digital, sob sua guarda e responsabilidade, por um período mínimo de 5 (cinco) anos após o término da pesquisa".

3. O participante da pesquisa tem a liberdade de recusar-se a participar ou de retirar seu consentimento em qualquer fase da pesquisa, sem penalização alguma e sem prejuízo ao seu cuidado. (Res.510/16, Cap.III, Art.9, inciso II)

4. A responsabilidade de obtenção de registro de consentimento, bem como o de sua guarda adequada, é de inteira responsabilidade da equipe de pesquisa. Tais documentos podem ser solicitados a qualquer momento pelo sistema CEP-CONEP para fins de auditoria, bem como servem de proteção para os próprios pesquisadores em caso de eventuais reclamações ou denúncias por parte dos participantes.

5. A responsabilidade pelo planejamento e boa gestão de dados é de inteira responsabilidade da equipe de pesquisa. Sugerimos fortemente a utilização de repositórios especializados. A comunidade interna à Unicamp têm, à sua disposição, o REDU (para dados anônimos/anonimizados) e os repositórios das unidades.
- Guia para depósito no Repositório de Dados/Unicamp-REDU
http://www.sbu.unicamp.br/sbu/wp-content/uploads/2021/05/REDU_Dataverse-2.0.pdf

6. Eventuais modificações ou emendas ao protocolo devem ser apresentadas ao CEP de forma clara

e sucinta, identificando a parte do protocolo a ser modificada e suas justificativas e aguardando a aprovação do CEP para continuidade da pesquisa.

7. Conforme a Resolução 510/16, art.28 inciso V, ao término do estudo deve ser apresentado ao CEP um relatório final da pesquisa via NOTIFICAÇÃO.

8. Caso a pesquisa seja realizada ou dependa de dados a serem observados/coletados em uma instituição (ex. empresas, escolas, ONGs, entre outros), essa aprovação não dispensa a autorização dos responsáveis. Caso não conste no protocolo no momento desta aprovação, estas autorizações devem ser submetidas ao CEP em forma de notificação antes do início da pesquisa.

9. Vale também ressaltar o Art. 3o, inciso VIII da Resolução 510/16:
"São princípios éticos das pesquisas em Ciências Humanas e Sociais:
VIII - garantia da não utilização, por parte do pesquisador, das informações obtidas em pesquisa em prejuízo dos seus participantes;"

10. O papel do CEP é proteger e garantir os direitos do participante de pesquisa. Está além das funções e das capacidades técnicas do CEP a validação jurídica de documentos como termos de licenciamento de uso/reprodução de imagem e voz e demais tipos de autorizações.

11. As declarações preenchidas na Plataforma Brasil são feitas sob pena da incidência nos artigos 297-299 do Código Penal Brasileiro sobre a falsificação de documento público e falsidade ideológica, respectivamente.

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_1765148.pdf	14/07/2021 00:33:07		Aceito
Outros	Uso_de_Imagem_versao2.pdf	14/07/2021 00:31:21	LETICIA KAORI HANADA	Aceito
TCLE / Termos de Assentimento / Justificativa de	TCLE_versao2.pdf	14/07/2021 00:31:03	LETICIA KAORI HANADA	Aceito

Ausência	TCLE_versao2.pdf	14/07/2021 00:31:03	LETICIA KAORI HANADA	Aceito
Outros	CARTARESPOSTA.pdf	14/07/2021 00:30:15	LETICIA KAORI HANADA	Aceito
Projeto Detalhado / Brochura Investigador	Projeto_CEP_versao2.pdf	14/07/2021 00:29:24	LETICIA KAORI HANADA	Aceito
Outros	AtestadoMatricula.pdf	31/05/2021 13:42:37	LETICIA KAORI HANADA	Aceito
Outros	RA.pdf	31/05/2021 13:41:56	LETICIA KAORI HANADA	Aceito
Outros	FuncionalPlinioBarbosa.pdf	31/05/2021 13:41:19	LETICIA KAORI HANADA	Aceito
Folha de Rosto	folha_de_rosto.pdf	31/05/2021 13:38:14	LETICIA KAORI HANADA	Aceito

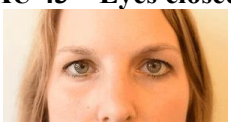
Situação do Parecer:
Aprovado

Necessita Apreciação da CONEP:
Não

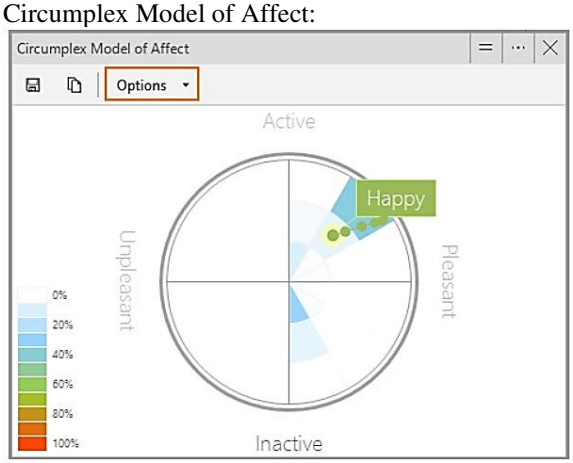
CAMPINAS, 07 de Agosto de 2021

Assinado por:
Thiago Motta Sampaio
(Coordenador(a))

Attachment E – Columns excluded from the quantitative analysis

Column names	Reason
Neutral; happy; sad; angry; surprised; scared; disgusted; contempt.	the six basic facial expressions (Figure *6*), along with other affective/emotional facial expressions, were not considered in our study. We focused solely on grammatical AUs related to linguistic structures of focus.
AU 43 – Eyes closed 	We excluded the results of the Action Unit 43 "Eyes closed", considering that results related to it seem to be evoked due to non-linguistic factors. When we analyzed the independent variable "EYES" (not significantly different), we noticed that the program was automatically categorizing most of eyes movements as closed. Checking video by video, we noticed that although we oriented the participants to look at the camera when signing the answer of the experiment, they did not look straight forward to the camera, mainly in the beginning and end of the utterances, instead, in those briefly moments, they were looking at the computer slide presentation, in order to read the glosses sentences.
Valence	It indicates the person's emotional status, whether it is positive, negative, or neutral. In other words, how (un)pleasant the person is. As mentioned, facial emotional analysis was not conducted in this study.
Arousal[1]	It indicates the level of activity or alertness of a person. It is commonly used for commercial purposes. However, in our experiment, which involves a simple task of reading Libras glosses and responding to related questions, we did not need to verify or consider arousal.
Participant name; Sex; Age; Glasses	Participant names, Sex and Age information were collected through the Participant Form. The presence of glasses does not need to be included in the Quantitative analysis.
Landmarks; 3rd Landmarks	"FaceReader uses a facial modeling technique based on deep neural networks. It synthesizes an artificial face model, which describes the location of 468 target points in the face. It is a single-pass quick method to directly estimate the full collection of landmarks in the face. […] (It is used for) describing the state of the face." (FaceReader Reference Manual 9, p.7). We do not plan to investigate the face state of the participants, our focus is solely on the analysis of AUs.

[1] Arousal (Vertical Axis) and Valence (Horizontal axis) support the FaceReader program in establishing the Circumplex Model of Affect:



Source: Extracted from Face Reader Reference Manual 9 (p.142)

Gaze Direction	Since we instructed the participants to answer the questions while looking at the camera, their gaze direction was mostly facing straight forward. If any eye movements to the left or right occurred due to the expression of focus, it was described in the qualitative analysis, rather than the quantitative analysis.
Unilateral Action Units	This functionality is commonly used in experiments involving participants who are semi-paralyzed, have had a stroke, or suffer from Parkinson's disease. None of our participants fall into any of those categories.
Heart rate, variability, warnings, and confidence	FaceReader is capable of detecting variations in blood volume caused by the pressure pulse, given that the face is appropriately illuminated. However, it is important to note that our study does not aim to investigate heart rate variables or blood pressure. Our main objective is to understand the production of AUs.
Stimulus	This functionality is typically utilized for testing commercial products and understanding how different stimuli elicit responses. However, in our experiment, every stimulus followed the same pattern: a sentence related to an image (Control-statement) was presented and then a video of the interpreter asking a question about the preceding sentence (Question).
Event marker	Event markers would be utilized in this analysis to differentiate the CS and Q analyzed here from the distractors. However, the researchers had already carried out this separation before running the videos in the FaceReader.
Analysis Index	This functionality is typically employed when a study includes multiple videos, allowing researchers to group them into analysis indexes. However, in our case, we manually merged all the sentence-videos based on participant and focus before running them in the FaceReader program. For example: MP1-FNI; MP1-CF; FP1-FNI; FP2-CF.
Intake event; Intake count; Chewing; Chew motion; Chew motion count	This funcionality is used for analyzing Consumption Behavior Module. It allows researcher to determine whether the participants chew or bite when tasting food, or taking a sip when testing a drink.
Horizontal; Vertical; and Depth Position	Head positions angles in millimeters relative to the camera.

Source: All the information about the extracted columns can be found in the FaceReader Reference Manual 9.

Attachment F – Participants information

Participant:	MP1	MP2	MP3	MP4	MP5	FP1	FP2	FP3	FP4
Age	46	30	30	39	38	37	33	40	20
Profession	Analyst	Instructor	Faber Castell company	Information Technology Analyst	Information Technology (IT) Analyst	Information Technology (IT) Analyst; Sao Carlos Deaf Community (ASSC)President	Sports and leisure promoter	Information Technology (IT) Analyst	Student
City of birth	Sao Paulo	Sao Carlos	Sao Paulo	Sao Paulo	Sao Paulo	Sao Paulo	Sao Paulo	Curitiba	Ibate
City of lifelong residence	Sao Paulo	Sao Carlos	Sao Carlos	Sao Paulo	Sao Paulo	Sao Paulo	Sao Paulo	Sao Paulo	Sao Carlos
How long have you been living in São Carlos? (in years)	5	30	28	6	6	6	4	6	I still live in Ibaté (city neighboring São Carlos)
Sex	Male	Male	Male	Male	Male	Female	Female	Female	Female
Social class[1]	C	D or E	C	A or B	C	C	C	A or B	C
Educational level	Completed higher education	Completed high school	Completed high school	Completed higher education	Completed higher education	Completed higher education	Completed higher education	Completed postgraduate studies	Incompleted higher education

[1] Class A includes individuals with higher incomes, advanced education, and greater access to luxury goods and services (more than 15 minimum wages – Brazilian Institute of Geography and Statistics (IBGE)). Class B includes individuals with moderate to good incomes, reasonably high education levels, and access to a variety of goods and services (from 5 to 15 minimum wages – IBGE). Class C (middle class) includes individuals with average incomes and education levels (from 3 to 5 minimum wages – IBGE). Class D includes individuals with lower incomes and limited access to some goods and services (from 1 to 3 minimum wages – IBGE). Class E includes individuals with lower incomes, less education, and limited access to many goods and services (up to 1 minimum wage – IBGE). In our interview, we provided only a basic explanation without mentioning the number of minimum wages each social class represents.

Type of school attended	Regular school without Libras	Regular school without Libras	Regular school without Libras	Bilingual school for the deaf	Regular school without Libras	Regular school without Libras	Bilingual school for the deaf	Regular school without Libras	Inclusive regular school
Born deaf?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Degree of hearing loss	Profound	Severe	Profound	Profound	Profound	Profound	Profound	Profound	Profound
Have you ever used a hearing aid? If so, for how long?	Yes	No, but I have used it in the past.	No	No	No	No	No, but I have used it in the past.	No	Yes
Age at which you learned Libras (in years)	After 12	Between 2 and 5	Between 2 and 5	Between 6 a 9	Between 6 a 9	After 12	Before 2	After 12	After 12
Context of Libras usage	- With deaf friends; - With the presence of an interpreter	- At home, with my family; - At work/ university; - With hearing friends.	- At home, with my family; - With deaf friends; - At work/ university.	- With deaf friends; - At work/ university.	- At home, with my family; - With deaf friends;	- At home, with my family; - With deaf friends;	- With deaf friends.	- At home, with my family; - With deaf friends; - At work/ university.	- With deaf friends;
How often do you use Libras during the week?	Everyday	Everyday	Everyday	Everyday	Everyday	Everyday	Everyday	Everyday	Everyday
How often do you participate in events within the Deaf community?	Always	Almost always	Almost always	Often	Almost always	Always	Often	Often	Almost always
Did you undergo Oralization Therapy?	Yes, for more than 6 years	Yes, for 2 to 5 years	No, never	Yes, for more than 6 years	Yes, for more than 6 years	Yes, for more than 6 years	Yes, for 2 to 5 years	Yes, for more than 6 years	Yes, for more than 6 years
How do you evaluate your degree of lip-reading? (0 =nothing and 5=fluent)	4	2	1	3	0	4	2	5	5
How do you evaluate your fluency in Libras? (0 =nothing and 5=fluent)	5	5	5	5	5	5	5	4	5