

Inherently reciprocal verbs in Brazilian Sign Language

Guilherme Lourenço (Universidade Federal de Minas Gerais) &
Lorena Mariano Borges de Figueiredo (Universidade Federal de Minas Gerais)
guilhermelourenco@ufmg.br, lorenambf@ufmg.br

Abstract

Among various strategies employed by languages to encode reciprocity, there is the use of lexical reciprocals, which specify this relation inherently to the verb. In this paper, we analyze verbs that are inherently reciprocal in Brazilian Sign Language (Libras) and we show that they have an interesting pattern, regarding hand specification (with all inherently reciprocal verbs being two-handed) and also movement type (whether characterized by singular or repeated movement as opposed to alternating movement). We will argue in favor of a phonology-semantics interface, in such a way that two-handedness is related to participant mapping and the different types of movement mark the difference between symmetrical and non-symmetrical reciprocals.

Keywords: Reciprocity, lexical reciprocals, inherently reciprocal verbs, sign language, Libras

1 Introduction

A reciprocal construction, by definition, “denotes an eventuality that involves reciprocity between its participants” (Siloni 2008, 452) and is usually marked by a specific grammatical strategy - mostly morphology. Different languages encode reciprocity in different ways, and although reciprocal constructions are not very frequent, in general, they do exhibit a high cross-linguistic incidence (Evans et al. 2011, 13).

In this paper we focus on verbs in Libras (Brazilian Sign Language) that have an inherently reciprocal meaning. In other words, these verbs necessarily imply reciprocity, without the need of any additional morphology or syntactic configuration. Inherently reciprocal verbs, also called lexical reciprocals, have been considered to be idiosyncratic. However, we do find interesting semantic and phonological patterns. We show that inherently reciprocals in Libras: i) are two-handed, with a strong participant mapping between the two hands and the participants of the event; ii) have different types of movement, depending on the symmetrical vs. non-symmetrical distinction, in such a way that symmetrical reciprocal verbs have single (or repeated) movement whereas non-symmetrical reciprocal verbs have alternating movement; and iii) have meanings of general relations, spatial relations or relations between people, as also found in other natural human languages.

This paper is organized as follows. In Section 2, we discuss what reciprocity is and the different types of reciprocal marking in natural languages. We also provide some data on reciprocals in signed languages. In Section 3, our analysis of inherently reciprocal verbs in Libras is presented. Finally, Section 4 closes this paper showing how the reciprocal constructions in Libras contribute to broader discussions on sign language morphology and syntax.

2 Reciprocal Verbs

A reciprocal situation is an event in which “there are two participants, A and B, and the relation in which A stands to B is the same as that in which B stands to A.” (Lichtenberk 1985, 21). Reciprocity is encoded through different grammatical mechanisms across languages, including (but not limited to): bipartite NP constructions; reciprocal pronouns; reciprocal clitics; verbal affixes; compound verbs; lexical reciprocals. Examples are given below:

- (1) Sam and Pat saw **each other**. (Nordlinger 2023, 72)
- (2) *mun tsallàkē jūnan-mù.*
1PL.AUX jumped RECP-1PL
'We jumped over one another.' (Newman 2000, 530)
- (3) *Alag-bulu wurlu-ngg-a nyurrunyurru.*
child-DU(NOM) 3DU.SBJ-RECP-NFUT chase
'The two children are chasing each other.' (Nordlinger 1998, 142)
- (4) *Juma na Halima wa-li-tekeny-an-a.*
Juma and Halima 3PL.SBJ-PST-tickle-RECP-FV
'Juma and Halima tickled each other.' (Hurst 2012, 249)
- (5) *Tāmen dǎ-lái-dǎ-qù.*
3PL beat-come-beat-go
'They beat each other.' (König and Kokutani 2006, 275)
- (6) Sam and Pat **quarreled**. (Nordlinger 2023, 74)

In (1), the bipartite NP construction “each other” adds the reciprocal interpretation to the event. A different strategy is used to express the reciprocity in Hausa (2), the use of the pronoun ‘jūnan-mù’. In (3), a reciprocal clitic -ngg- is used in the language Wambaya. The verbal affix -àn- encodes the reciprocal event in Swahili (4). In (5), the Mandarin example has a compound verb that expresses reciprocity. Finally, in (6) the English sentence has an inherently reciprocal verb – ‘quarrel’.

An important distinction in these strategies lies in the fact that all of them, but the last one, are reciprocalization strategies. In other words, a traditionally non-reciprocal event receives a reciprocal interpretation by means of one of those strategies. On the other hand, lexical reciprocals, like ‘quarrel’ express reciprocity inherently, so the reciprocal meaning doesn’t need to be marked by additional morphology.

Rakósi (2008, 413–414) presents the following criteria to define an inherently reciprocal verb:

- i. The verb is unambiguously reciprocal;
- ii. The verb encodes a concept that belongs to a universally available naturally reciprocal conceptual domain (e.g. ‘meet’);
- iii. The verb does not require any special marking on its form or any modification of its arguments for the reciprocal relation to hold.

2.1 Reciprocals in signed languages

Fischer and Gough (1978, 43) describe two strategies used by ASL (American Sign Language) to encode reciprocity. The first one is the use of the sign EACH-OTHER, “with any verb for which is appropriate”. The second one “involves actually performing the verb twice, specially if it can reverse or can change direction”. Examples (7) and (8) demonstrate these mechanisms:

- (7) BOY GIRL PRAISE EACH-OTHER
‘The boy and the girl praised each other.’
- (8) I-FEED-YOU, YOU-FEED-ME
‘I feed you and you feed me’ or ‘we feed each other.’

Fischer and Gough (1978, 44) also present lexical verbs as a strategy to express reciprocity. In their terms, they divide ASL verbs that can have a reciprocal reading in two groups: the first one requires reciprocal interpretation (such as ARGUE, AGREE, CLASH, CORRESPOND, DIS-AGREE, EXCHANGE, GET-TOGETHER, MINGLE and CONVERSE) and the second group allows for but do not require a reciprocal interpretation. According to them, the second group can get a reciprocal interpretation using strategies like those presented in examples (7) and (8).¹

In their description on reciprocal constructions in DGS (German Sign Language), Pfau and Steinbach (2003) also identified different strategies to encode a reciprocal situation. The type of the verb – non-agreeing vs. agreeing verbs – will impact directly on the strategy used, because “the specific nature of reciprocal marking do not only depends on morphosyntactic properties of the underlying verb but also on its phonological form, i.e. on the phonological feature (\pm two-handed sign)” (10). The authors identified four ways of reciprocal marking: (i) conversion of movement and/or orientation (for two-handed agreeing verbs); (ii) conversion and feature copy onto the non-dominant hand (for one-handed agreeing verbs); (iii) zero marking (non-agreeing verbs) and (iv) insertion of an overt agreement marker (non-agreeing verbs). Just to illustrate one of these strategies, in (9 a), HELF (help) is an agreeing two-handed verb, that can be reciprocalized using the strategy of conversion of movement, as shown in (9 b).

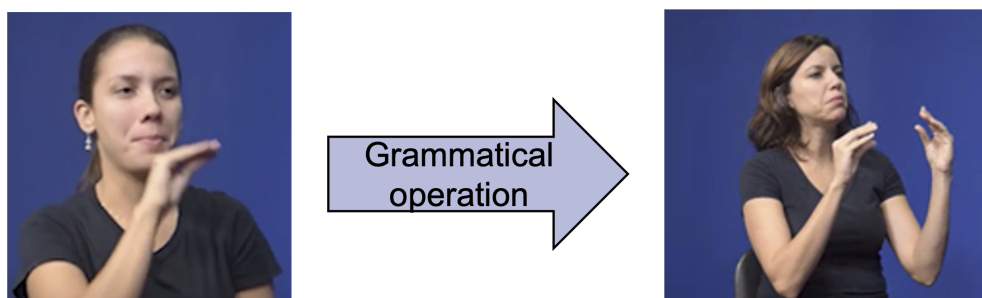
- (9) (a) ARZT IX_a MANN IX_b _aHELF_b
doctor INDEXICAL man INDEXICAL SUBJ.help.OBJ
‘The doctor is helping the man.’
- (b) ₁WIR-BEIDE₂ ₁HELF₂HELF₁
1ST.we-both.2ND 1ST.help.2ND.help.1ST
‘We are helping each other.’

Pfau and Steinbach (2003, 11, 19)

Zeshan and Panda (2011) also investigated reciprocal constructions in a signed language: IPSL (Indo-Pakistani Sign Language). They identified three types of constructions that encode implicational or inferential reciprocity: (i) sequence of agreeing verbs; ii) sequence of auxiliaries; and iii) classifier constructions. The first and the second constructions have a inflected movement, and it is similar to what has been observed for DGS (9 b). Zeshan and

1. Fischer and Gough (1978) present a short section on reciprocals, in their paper on ASL verbs. Although they make reference to it, they do not include a detailed description of lexical reciprocals.

Figure 1: TALK-SPOKEN in Libras - to the left one-handed and to the right two-handed with a reciprocal reading. Adapted from Pizzio et al. (2023, 222–223)



Panda (2011) also observe that reciprocalized verb constructions can be lexicalized and become inherently reciprocal signs, such as PUNCH that can be reciprocalized and lexicalized as FIGHT. These verbs can also undergo phonological (e.g. shortening or assimilation processes) and semantic (generalization of meaning) changes. They also notice that “all inherently reciprocal signs are two-handed, with either alternating movement or parallel movement of both hands towards each other”. Although Zeshan and Panda discuss inherently reciprocal verbs, they are more interested in the lexicalization process they underwent.

Similar to what has been proposed in previous analyses, it has been argued that Libras can also reciprocalize a non-reciprocal verb by means of grammatical operations (Pizzio et al. 2023; Ferreira 2021), as the example given in Fig. 1.

An interesting observation is that most of these descriptions are focused on reciprocalization strategies, that take non-reciprocal verbs and add a morphological marking bearing the reciprocal interpretation. In this paper, we focus specifically on inherently reciprocal verbs in Libras.

3 Inherently Reciprocal Verbs in Libras

For this study, we extracted all the inherently reciprocal verbs in Libras from the *VerboLibras* Project (Lourenço and Figueiredo 2023). This is an ongoing project, whose objective is to build a database of verbs in Libras, presenting different grammatical descriptions of verbs, such as: i) phonological specifications; ii) syntactic information; and iii) semantic categorizations.

In the *VerboLibras* Project, we have compiled a total of 589 verbs - an expansion from Lourenço (2018). These verbs were recorded by a deaf consultant, native signer. After that, a group of deaf and signing consultants analyzed the phonological specifications of these verbs, following the phonological features proposed by the Prosodic Model (Brentari 1998).

From the 589 verbs, we identified 19 inherently reciprocal verbs, assuming the criteria in Rakósi (2008). The verbs are presented in Fig. 2.

The fact that we could only identify 19 inherently reciprocal verbs in Libras from a total of 589 verbs was already expected. Evans et al. (2011) point out that although reciprocal verbs have high cross-linguistic incidence, they are infrequent. This low frequency of lexical reciprocals also matches the observation that there are some specific semantic meanings that are more frequently expressed by reciprocal verbs. Knjazev (2007, 122) claims that the meanings

Figure 2: Inherently reciprocal verbs in Libras.





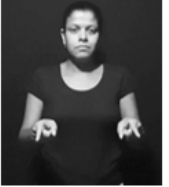
















of inherently reciprocal verbs can be classified into: i) general relations (e.g. identity or difference); ii) spatial relations (e.g. proximity or remoteness); and iii) relations between people (e.g. rivalry or collaboration).

The identification of these specific meaning classes helps us isolate the verbs that fulfill Rakósi’s second criterion, that stipulates inherently reciprocal verbs “encode a concept that belongs to a universally available naturally reciprocal conceptual domain”. Although Rakósi (2008) is not very specific about this “naturally reciprocal conceptual domain”, the semantic classes proposed by Knjazev (2007) suit the data we have for Libras, as illustrated in Fig. 3.

Thus far, we have identified the semantic meanings that are more common to be expressed by inherently reciprocal verbs in Libras. Let us now move to some additional interesting observations that can be made related to the phonological specifications of these verbs, such as number of hands and type of movement.

Figure 3: Inherently reciprocal verbs classified by their semantic reading.

General relations						
	RESEMBLE	MATCH				
Spatial relations						
	MEET	SEPARATE	SHACK-UP			
Relations between people						
	ARGUE	BREAK-UP	COMMUNICATE	COUPLE	DATE	
						
	DIALOGUE	DISCUSS	FIGHT	GET-IN-TOUCH	MARRY	
						
	NEGOTIATE	OPPOSE-IN-CHALLENGE	TALK	WAR		

3.1 Number of hands

A first observation is that all inherently reciprocal verbs in Libras are two-handed. We should remember that one of the reciprocal markings found in DGS (Pfau and Steinbach 2003) and also in Libras is the doubling of the hand specifications of one-handed signs, turning them into two-handed signs (Pizzio et al. 2023; Ferreira 2021). Additionally, Zeshan and Panda (2011) already noticed that all inherently reciprocal signs in IPSL are two-handed. At this point, one should ask why two-handedness is a common feature of reciprocal constructions.

Two-handedness in reciprocal verbs in Libras can be related to what Börstell, Lepic, and Belsitzman (2016) call *articulatory plurality*, which means “recruiting multiple articulators to represent (relationships among) multiple referents” (402). They claim that two-handedness is a feature related to lexically plural concepts. The authors also argue that articulatory plurality is indeed iconic, in such a way that the articulation of the two hands functions as

a visual representation of “relationships between individual entities (such as reciprocal or transitive situations), and between the component parts of single entities (such as dual-part artifacts)” (p. 394).²

Börstell, Lopic, and Belsitzman (2016, 399) also suggests that reciprocals tend to be produced with two-handed forms and that there is a tendency, across different sign languages, to use “each of the two hands to iconically represent one of the two sides of the reciprocal situation”. In this respect, we agree with their plurality analysis, but we make a more explicit statement that two-handedness in reciprocals is part of an iconic semantic mapping between each hand and one participant of the event. Furthermore, each hand seems to be mapped to one – and only one – participant.

Evidence for this strict mapping hypothesis comes from sentences with inherently reciprocal verbs that involve more than two participants. As noticed by Heim, Lasnik, and May (1991), Dalrymple et al. (1998), Nordlinger (2023), and many others, reciprocal constructions with more than two participants can have much more complex semantic readings. See, for instance, the example in (10):

(10) The five children saw each other.

A sentence like (10) is ambiguous, because at least two possible readings are available. The first reading is that every single child saw each of the other four children. This reading, also known as strong reciprocity, would result in 20 sub-events. The other possible reading is that each child participated at least once as the experiencer and as the theme of a seeing event. This second reading is called weak reciprocity.³

Interestingly, Libras does not allow sentences like (10), as the following examples show.

(11) TWO KIDS ARGUE .



TWO

KIDS

ARGUE

(12) *FIVE KIDS ARGUE .

Inherently reciprocal verb constructions with only two participants (11) are always grammatical in Libras. However (12) is not a grammatical sentence. In order to allow for more than two participants in a reciprocal construction, the reciprocal verb must be further inflected for event plurality, as in (13). Following Klima and Bellugi (1979)’s terminology, the reciprocal verb is inflected for numerosity, a type of distributional aspect, and, more specifically, it is marked for apportionative external inflection. According to the authors, this type of inflection marks that actions – (sub-)events, in our terms – are distributed around members of a closed group and it is realized as a repetition of the verb sign along a circular path on the horizontal plane of the signing space - see Fig. 4. An example of an inherently reciprocal verb construction with more than two participants is given in (13). Notice that now both strong and weak reciprocity readings are available in the construction.

2. See also Lopic et al. (2016).

3. For a discussion on strong and weak reciprocity, see Langendoen (1978).

Figure 4: Verb ARGUE+++ marked for apportionative external inflection. The verb is signed with different repetitions, distributed along a circular path on the horizontal plane of the signing space.



(13) FIVE KIDS ARGUE+++ .



The fact that (12) is not grammatical in Libras seems to corroborate with the claim that two-handedness in reciprocal constructions is the result of an iconic mapping (Börstell, Lopic, and Belsitzman 2016; Lopic et al. 2016). Meir (2010) proposes that iconic forms are more restricted in terms of what other semantic mappings they can undergo (e.g. metaphorical extensions), just because the structural correspondence in the iconic mapping must always be preserved. Similar observations have been made for iconicity and its interaction with morphological processes, such as agreement (Lourenço 2018; Oomen 2020). Considering iconicity to be a form-meaning mapping that must be structure-preserving gives us an explanation for why the hand-participant mapping found in reciprocal verbs blocks sentences like (12). Once there are only two hands, there can only be two participants. Reciprocal constructions with more than two participants must be further inflected as in (13). Notice also that in (13) the iconicity is actually constrained in a certain way to the entire hand, not to individual fingers, when it comes to participant mapping. Therefore, the five fingers in each hand cannot be mapped individually to different participants.

3.2 Type of movement

Another interesting observation concerns the movement specifications of reciprocal verbs. We identified two different types of movement: single (or repeated) movement and alternating movement. These two types of movement seem to code different types of reciprocal events, in respect to symmetry (Siloni 2012). See the following examples:

(14) IX_a SHACK-UP IX_b

A shacks up with B (B shacks up with A, also true).

(15) IX_a COMMUNICATE IX_b

A communicates with B (B communicates with A, also true).

Assuming the reasoning in Siloni (2012), we can say that there is symmetry in both (14) and (15), because both are reciprocal constructions. Therefore, in (14) A shacks up with B and also B shacks up with A. In the same way, in (15), A communicates with B and vice-versa. However, although both examples do have symmetry, there is a difference in the nature of their symmetric relation. In (14), the verb SHACK-UP denotes a single atomic event, in which A shacks up with B and B shacks up with A, and both A and B have identical participation in this single event. On the other hand, in (15), the symmetry is the result of the accumulation of sub-events of A communicating with B and others of B communicating with A. Events like the one in (14) have been called irreducibly symmetric predicates (Dimitriadis 2008), or just symmetric reciprocals (Siloni 2012).

Dimitriadis (2008) offers the following definition of irreducibly symmetric predicates:

A predicate is irreducibly symmetric if (a) it expresses a binary relationship, but (b) its two arguments have necessarily identical participation in any event described by the predicate (378).

Interestingly, all the symmetrical reciprocals in our data have a single or a repeated movement (see Figs. 5 and 6).

The observation that most of the symmetrical verbs have a single movement may correlate with the fact that they denote a single event in which both arguments have identical (symmetrical) participation. Additionally, some symmetrical verbs have repeated movement – but notice that repeated movement is not alternating movement. The distinction between single and repeated movement might be a matter of aspect. Assuming Wilbur's Event Visibility Hypothesis and her observations on telicity marking in sign languages (Wilbur 2003, 2008, 2010), telic predicates are marked with a single movement with a sharp deceleration. On the other hand, repeated (reduplicated) movement can be associated with atelic events.

The non-symmetrical reciprocal verbs show a different type of movement: they have alternating movement.

The fact that reciprocal verbs that are not symmetrical have an alternating movement might not be accidental. Kuhn (2015) notices that, in LSF (French Sign Language), some verbs can have their form changed in order to indicate pluractionality. He calls “/alt/” the morpheme that is pronounced as the “alternating motion of the two hands” (p. 124) and that “entails that a plurality of events vary with respect to their thematic arguments” (p. 126). This is exactly the case of non-symmetrical reciprocals. In these constructions, the reciprocal reading is the result of an accumulation of sub-events, and the thematic roles of the arguments do alternate. Remember that the reciprocal reading of the verb COMMUNICATE is made up of sub-events of A communicating and B and others of B communicating with A.

Figure 5: Symmetrical reciprocal verbs with single movement.



Figure 6: Symmetrical reciprocal verbs with repeated movement.

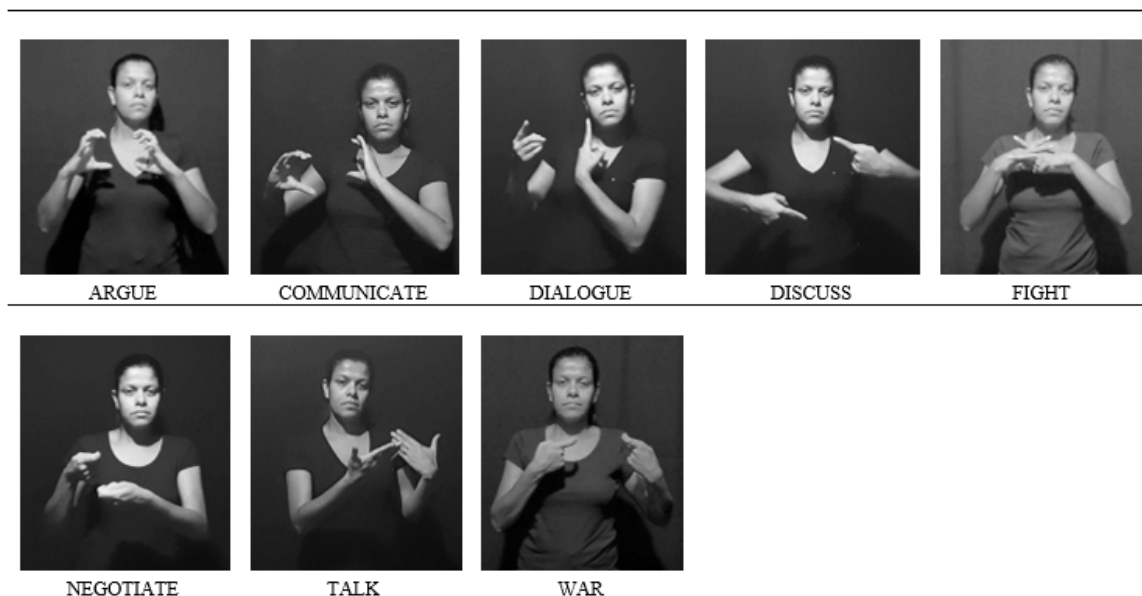


4 The bigger picture

The present analysis of inherently reciprocal verbs in Libras is not only relevant for the discussions on reciprocity – which are more than welcome since this is a theme not very much investigated in the sign language linguistics literature – but also because it adds up to the current debate on other relevant aspects of the grammar of Libras and of sign languages in general. One could easily connect the patterns we observed so far with some other aspect of the phonology-semantics interface.

First of all, the mapping between the participants of the reciprocal event and the and the hand specifications of the verb contributes to the description of pluractionality marking in sign languages. As we discussed before, Börstell, Lepic, and Belsitzman (2016) and Lepic et al. (2016) claim that two-handedness should not be analyzed only as a phonological feature of the signs, but they argue that the hands can encode different semantic concepts – lexical plurality, for instance. The data on inherently reciprocal verbs confirms their hypothesis and even show a stronger iconic mapping between two-handedness and participant coding, in such a way that each hand seems to be mapped to one – and only one – participant. This

Figure 7: Non-symmetrical reciprocal verbs with alternating movement.



also allows us to extrapolate the observation made by Benedicto and Brentari (2004) that hand specifications in classifier constructions are morpho-phonological and that they map the participants of the event and interact with the valency of the predicate. At the end, it seems that hand specifications are relevant not only for classifier constructions, but also for other type of verb constructions.

The second point of convergence comes from the distinction between symmetrical versus non-symmetrical reciprocals. As we have seen, these two types of reciprocal verbs exhibit different movement patterns – symmetrical reciprocals have a single or repeated movement, whereas non-symmetrical reciprocals have alternating movement. This interaction between the type of movement and the semantic interpretation is in line with the growing body of works that claim that signed languages can make visible some semantic properties that are not usually morphologically realized in spoken languages (Wilbur 2010; Schlenker 2018). Moreover, bringing data on Libras and showing that it has the same iconic biases that have been found in other signed languages (e.g. the alternating movement found in LSF (Kuhn 2015)) contributes to the discussion on how universal these form-meaning mappings really are.

We can also relate our discussion to some novel approaches like *The Bodily-Mapping Hypothesis* (Bross 2020, 275) which predicts that the syntactic structure is mapped onto the signer's body. For instance, inner aspect features (which are located below VoiceP, assuming a Cinquean structure) are expressed “by manipulating the movement path of the verb sign”. It has been proposed in the literature that inherently reciprocal verbs bear specific grammatical features that are merged very low in the derivation – e.g. the [symmetry] feature proposed by Hernández (2013) or features resulting of processes like bundling (Reinhart and Siloni 2005) or argument-unification (Rakósi 2008) – and that the distinction between symmetrical versus non-symmetrical reciprocals is actually a distinction between a single atomic event versus a collection of sub-events. Considering that argument structure and event properties are mapped very low in the syntactic structure, we would correctly expect

that these features would be expressed by different types of movement, as predicted by Bross (2020).

We have demonstrated that the properties of inherently reciprocal verbs in Libras are quite elucidative of the interface phonology-semantics in sign languages. However, for us to have a better understanding of the reciprocal constructions in Libras and in other sign languages, future research will require further formal analysis of other relevant aspects of their syntax, morphology and semantics.

Acknowledgments

This paper originated from a presentation delivered at FEAST 2023. We extend our gratitude to the conference audience for their valuable comments and questions. Special thanks go to Vadim Kimmelman and Andrew Nevins for their thoughtful revisions and comments on this paper. We also acknowledge the contributions of fellow researchers at the *VerboLibras Project*, including Crislaine B. Santos, Alícia Calderon-Verde, Jéssica da Silva, Natalia Najyme, Giselle Pontes, Edmar Coelho, and Sueli Pereira. Financial support for this study was provided in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) under Finance Code 001, as well as by the Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG). The second author acknowledges funding from grant # 5.18/2022, FAPEMIG. Any remaining errors or omissions are the sole responsibility of the authors.

References

- Benedicto, Elena, and Diane Brentari. 2004. "Where Did All the Arguments Go?: Argument-Changing Properties of Classifiers in ASL." *Natural Language & Linguistic Theory* 22 (4): 743–810.
- Börstell, Carl, Ryan Lopic, and Gal Belsitzman. 2016. "Articulatory plurality is a property of lexical plurals in sign language." *Linguisticae Investigationes* 39 (2): 391–407.
- Brentari, Diane. 1998. *A Prosodic Model of Sign Language Phonology*, 376. Cambridge: MIT Press.
- Bross, Fabian. 2020. *The clausal structure of German Sign Language: a Cartographic approach*. 349. Berlin: Language Science Press.
- Dalrymple, Mary, Makoto Kanazawa, Yookyung Kim, Sam Mchombo, and Stanley Peters. 1998. "Reciprocal Expressions and the Concept of Reciprocity." *Linguistics and Philosophy* 21 (2): 159–210.
- Dimitriadis, Alexis. 2008. "The event structure of irreducibly symmetric reciprocals." In *Event Structures in Linguistic Form and Interpretation*, edited by Johannes Dölling, Tatjana Heyde-Zybatow, and Martin Schäfer, 327–353. Berlin: De Gruyter Mouton. <https://doi.org/10.1515/9783110925449.327>.
- Evans, Nicholas, Stephen C. Levinson, Alice Gaby, and Asifa Majid. 2011. "Introduction: Reciprocals and semantic typology." In *Reciprocals and Semantic Typology*, edited by Nicholas Evans, Stephen C. Levinson, Alice Gaby, and Asifa Majid, 1–28. Amsterdam/Philadelphia: John Benjamins Publishing Company.

- Ferreira, Hely César. 2021. "A estrutura argumental e a voz reflexiva e reflexiva recíproca na Língua de Sinais Brasileira." PhD Dissertation, Universidade de Brasília.
- Fischer, Susan, and Bonnie Gough. 1978. "Verbs in American Sign Language." *Sign Language Studies* 1018 (1): 17–48. <https://doi.org/10.1353/sls.1978.0014>.
- Heim, Irene, Howard Lasnik, and Robert May. 1991. "Reciprocity and Plurality." *Linguistic Inquiry* 22 (1): 63–101.
- Hernández, Lucía Quintana. 2013. "Unaccusativity, Telicity and Inherent Reciprocals." In *Selected Proceedings of the 15th Hispanic Linguistics Symposium*, edited by Chad Howe, Sarah E. Blackwell, and Margaret Lubbers Quesada, 329–342. Somerville: Cascadilla Proceedings Project.
- Hurst, Peter. 2012. "Reciprocation strategies and the syntax of reciprocal constructions." PhD Dissertation, University of Melbourne.
- Klima, Edward S., and Ursula Bellugi. 1979. *The signs of language*. Cambridge: Harvard University Press.
- Knjazev, Jurij P. 2007. "Lexical reciprocals as a means of expressing reciprocal situations." In *Reciprocal constructions*, edited by Vladimir P Nedjalkov, Emma Š Geniušienė, and Zlatka Guentchéva, 115–146. Amsterdam/Philadelphia: John Benjamins Publishing Company.
- König, Ekkehard, and S. Kokutani. 2006. "Towards a typology of reciprocal constructions: focus on German and Japanese." *Linguistics* 44 (2): 271–302.
- Kuhn, Jeremy. 2015. "Cross-categorial singular and plural reference in sign language." PhD diss., New York University.
- Langendoen, D. Terence. 1978. "The Logic of Reciprocity." *Linguistic Inquiry* 9 (2): 177–197.
- Lepic, Ryan, Carl Börstell, Gal Belsitzman, and Wendy Sandler. 2016. "Taking meaning in hand." *Sign Language & Linguistics* 19 (1): 37–81. <https://doi.org/10.1075/sll.19.1.02lep>.
- Lichtenberk, F. 1985. "Multiple uses of reciprocal constructions." *Australian Journal of Linguistics* 5 (1): 19–41.
- Lourenço, Guilherme. 2018. "Verb agreement in Brazilian Sign Language: Morphophonology, Syntax & Semantics." PhD Dissertation, Universidade Federal de Minas Gerais.
- Lourenço, Guilherme, and Lorena Figueiredo. 2023. *VerboLibras Project*. <http://www.letas.ufmg.br/verbolibras>.
- Meir, Irit. 2010. "Iconicity and metaphor: constraints on metaphorical extension of iconic forms." *Language* 86 (4): 865–896.
- Newman, P. 2000. *The Hausa Language: An Encyclopedic Reference Grammar*. New Haven: Yale University Press.
- Nordlinger, Rachel. 1998. *A grammar of Wambaya, Northern Territory (Australia)*. 320. Canberra: Pacific Linguistics.
- . 2023. "The Typology of Reciprocal Constructions." *Annual Review of Linguistics* 9:71–91. <https://doi.org/10.1146/annurev-linguistics-022421-064006>.

- Oomen, Marloes. 2020. "Iconicity as a mediator between verb semantics and morphosyntactic structure: A corpus-based study on verbs in German Sign Language." PhD diss., Universiteit van Amsterdam. [https://dare.uva.nl/personal/pure/en/publications/iconicity-as-a-mediator-between-verb-semantics-and-morphosyntactic-structure\(08f79f08-f239-4e1d-a248-2fbac8186a35\).html](https://dare.uva.nl/personal/pure/en/publications/iconicity-as-a-mediator-between-verb-semantics-and-morphosyntactic-structure(08f79f08-f239-4e1d-a248-2fbac8186a35).html).
- Pfau, Roland, and Markus Steinbach. 2003. "Optimal reciprocals in German Sign Language." *Sign Language & Linguistics* 6 (1): 3–42. <https://doi.org/10.1075/sll.6.1.03pfa>.
- Pizzio, Aline, Ana Regina Campello, Carolina Pego, Guilherme Lourenço, Marcos Luchi, and Sandra Faria-Nascimento. 2023. "Morfologia da Libras." In *A gramática da Libras (Vol. 1)*, edited by Ronice Müller de Quadros, Jair Barbosa Silva, Miriam Royer, and Vinícius Rodrigues Silva, 175–378. Rio de Janeiro: INES.
- Rakósi, György. 2008. "The inherently reflexive and the inherently reciprocal predicate in Hungarian: Each to their own argument structure." In *Reciprocals and Reflexives: Theoretical and Typological Explorations*, edited by Ekkehard König and Volker Gast, 411–451. Berlin: Walter de Gruyter.
- Reinhart, Tanya, and Tal Siloni. 2005. "The Lexicon-Syntax Parameter: Reflexivization and Other Arity Operations." *Linguistic Inquiry* 36 (3): 389–436.
- Schlenker, Philippe. 2018. "Visible Meaning: Sign language and the foundations of semantics." *Theoretical Linguistics* 44 (3-4): 123–208. <https://doi.org/10.1515/tl-2018-0012>.
- Siloni, Tal. 2008. "The syntax of reciprocal verbs: An overview." In *Reciprocals and Reflexives: Theoretical and Typological Explorations*, edited by Ekkehard König and Volker Gast, 451–498. Berlin: Walter de Gruyter. <https://doi.org/10.1515/9783110199147.451>.
- . 2012. "Reciprocal verbs and symmetry." *Natural Language and Linguistic Theory* 30 (1): 261–320. <https://doi.org/10.1007/s11049-011-9144-2>.
- Wilbur, Ronnie B. 2003. "Representations of Telicity in ASL." *Proceedings from the Annual Meeting of the Chicago Linguistic Society* 39 (1): 354–368.
- . 2008. "Complex predicates involving events, time and aspect: Is this why sign languages look so similar?" In *Signs of the time: Selected papers from TISLR 2004*, edited by Josep Quer, 217–250. Hamburg: Signum-Verlag.
- . 2010. "The semantics-phonology interface." In *Sign Languages: A Cambridge language survey*, edited by Diane Brentari, 355–380. Cambridge: Cambridge University Press.
- Zeshan, Ulrike, and Sibaji Panda. 2011. "Reciprocal constructions in Indo-Pakistani Sign Language." In *Reciprocals and Semantic Typology*, edited by Nicholas Evans, Stephen C. Levinson, Alice Gaby, and Asifa Majid, 91–114. Amsterdam/Philadelphia: John Benjamins Publishing Company. <https://doi.org/10.1075/tsl.98.05zes>.