

LÍNGUA GESTUAL PORTUGUESA E OUTRAS LÍNGUAS DE SINAIS ESTUDOS LINGUÍSTICOS

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Apoios



Argument structure in the emerging sign language of Guinea-Bissau¹

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Abstract

The current study attempts to understand how argument structure is established in a new language currently emerging in the west African country of Guinea-Bissau, Guinea-Bissau Sign Language (LGG). We focus on two main questions: (1) How are the components of verb agreement assembled? and (2) How consistent is word order? Data was obtained through elicited responses to video clips of transitive events from 12 deaf signers. Findings show that arguments are indexed in space, but verb directionality does not always take into account the location of arguments. While the verb is strongly anchored on the Z-axis, coreference with at least one of the arguments suggests an agreement system in the making. Word order is consistently verb-final. Furthermore, distinct word orders appear to be somewhat predictable on the basis of the animacy of the object: SOV with a non-human object and OSV with two human arguments.

Keywords: Guinea-Bissau Sign Language, argument structure, word order, verb agreement, spatial coreference, emerging sign language.

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Introduction

With the time-depth of most languages stretching back to some unknown point of origin, it is an unusual opportunity to be able to look at the organization of an emerging linguistic system in real time. One of the ways to better understand how grammar is pieced together is by looking at the argument structure of events. In these constructions, the verb(s) and the other elements involved are arranged through morphosyntactic mechanisms like verb agreement and word order.

Guinea-Bissau is currently witnessing the development of a new school-based sign language (SL) still in its first generation. For that reason, we sought to investigate the organizational consistency that this emerging SL has attained in only 15 years. Moreover, we hope to shed light on the type of argument structure already established in this new language, and to compare it to other sign languages (SLs) with different time-depths. To do so, we will focus on two main questions about argument structure in **Guinea-Bissau SL** (*Língua Gestual Guineense*– **LGG**) (Martini & Morgado, 2008, Martins & Morgado, 2016, 2017):

- (1) How and to what extent are verb agreement elements put together?
In particular,
 - (i) Which devices do LGG signers recruit for argument spatial indexation? and
 - (ii) To what extent does verb directionality agree with R-loci for spatial coreference?
- (2) Is word order consistent?
To check syntactic consistency, we have to ask:
 - (i) How consistent are word order patterns across verb types? and
 - (ii) Which elements seem to be influencing word order variations?

This article is organised by the following sections: background (§1); methodology (§2); results (§3); discussion (§4); and conclusions (§5).

1. Background

Verbal morphosyntax often encodes certain relations between the verb and its arguments to make explicit the role of participants in events, such as verb agreement (§1.1) and word order (§1.2). This initial overview is relevant to understand how argument structure is characterised in young SLs (§1.3). In the last part (§1.4) we describe the context of emergence in Guinea-Bissau sign language (LGG).

1.1 Verb agreement

In SLs, the verb relies greatly on space to indicate who does what to whom, depending on whether the verb is moving between subject and direct object (simple

transitives) or subject and indirect object (ditransitives). Semantically, a transitive construction with two arguments usually assigns to the subject the thematic role of *agent* and to the object the thematic role of *patient*. This requires a combination of pre-established locations associated with arguments (“loci”) (§1.1.1) and corresponding verb directionality to agree with those locations (§1.1.2), in order to obtain “spatial coreference” (§1.1.3).

1.1.1 Localising devices

The signer commonly assumes the perspective of one of the arguments (usually the subject) while carrying out the action. To do so, the signer uses her/his body to represent that argument. Taking on the “body as subject” (Meir et al. 2007, Fenlon et al. 2018) can set up a two-part structure of referent location – on the body and anywhere in the signing space (Lillo-Martin & Meier, 2011).

When arguments are not assigned to the signer’s body or to physically present referents, they may be placed in abstract locations in front or on the sides of the signer, establishing a referential locus, henceforth *R-locus*. The indexing of nominal referents to specific locations can be done with different devices (Flaherty, 2014, Morgan, 2020), including:

- (1) *Altering the place of articulation of the nominal element*. Particular nominal signs that are not articulated on the body, as in the case of CHILD (cf. Schembri et al. 2018 for BSL/ Australian SL [Auslan], but also in many other SLs), allow a spatial displacement to mark the referent location.
- (2) *Pointing*. Pointing or indexing in SL has many functions, but as determiners, points constitute a noun phrase and/or assign location to referents (Cormier et al., 2013).
- (3) *Producing a classifier in the locus*. Classifiers are morphemic handshapes that represent different classes of nominal referents, such as human entities.
- (4) *Indicating with eye gaze*. The direction of eye gaze can also show the location of arguments, and may or may not be accompanied by a point to a location or placement of a nominal element.

1.1.2 Agreement verbs

In SLs, space is often used to illustrate who is involved in an event. To do so, referents may be assigned to abstract locations in the signing space, which enables the verb to refer back to the arguments, establishing coreference (Coppola & So, 2006). Transitive verbs, inflecting in this way, i.e. changing their directionality according to the locus or loci previously established, are called agreement verbs (Zeshan & Palfreyman, 2017). Such verbs will then move between body and locus or between different loci. When this occurs, it is traditionally referred to as spatial agreement of the verb with one or more of its arguments (Lillo-Martin & Meier, 2011).

To illustrate this mechanism, Figure 1 shows how GIVE moves away from the body (from a first person [1P] to a second person [2P] or vice versa), within a sagittal axis, that is also referred to as the Z-axis (Figure 1a). Alternatively, GIVE can move

horizontally, from side to side, between two third parties (3P); this is referred to as the X-axis (Figure 1b). This example from Portuguese Sign Language is very similar to constructions found in other SLs.

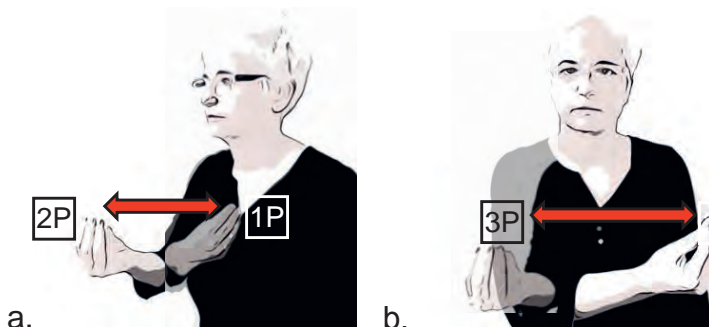


Figure 1: Example of different directionalities of GIVE.

The BSL corpus shows that some formal features of potential agreement verbs, like PUSH, exhibit less directional modifications (Fenlon et al., 2018). Moreover, there are verbs oriented to the object and moving away from the signer, known as regular agreement verbs, and verbs moving towards the signer, the so-called backward agreement verbs (e.g. Padden, 1983; Meir, 1998, Schembri et al., 2018).

In this way, agreement verbs are syntactically and semantically distinguished by the fact that they may modify their path and/or orientation according to the arguments involved and their respective referential loci (R-loci).

1.1.3 Spatial coreference

Canonical verb agreement involves marking locations for arguments in the signing space, altering the directionality of the verb, and synchronizing these two independent mechanisms with each other to enable coreference (Meir, 2010). Traditionally, scholars have assumed that the inflection of the verb encodes both semantic and syntactic relations between R-loci (Meir, 2010, Lillo-Martin & Meir, 2011).

In what concerns syntactic agreement, subject is frequently represented by the signer's body and thus omitted by default, making it optional. In contrast, verb agreement with the object seems to be obligatory (Lillo-Martin & Meir, 2011). In the presence of two human arguments, the role of the subject can be ambiguous. Events with two human arguments, whether simple transitive like PULL or WAVE, or ditransitive like GIVE or TAKE, are called *reversible* (Meir et al., 2017). For languages to avoid ambiguity, efficient coreference of some type is crucial.

Having described how a verb agreement system is set up and which mechanisms are involved, we will now look at another way of encoding syntactic functions: word order.

1.2 Word order

Word order is usually expressed by the basic syntactic functions in transitive constructions: subject (S), object (O) and verb (V). Regardless of modality, languages are found to favour SOV and SVO over other orders (Dryer & Haspelmath, 2013, for spoken languages, Napoli & Sutton-Spence, 2014, for signed languages).

In spite of a striking distinction between two basic word orders in SLs – SVO (e.g. American SL, Libras, Russian SL and Swedish SL) and SOV (e.g. Dutch SL, Indopakistani SL, Italian SL) – SLs tend to have flexibility in sequencing (cf. Sandler & Lillo-Martin 2006 and Baker et al., 2016). To explain this variation, it has been argued that word order may be governed by the semantics of human animacy. As such, the basic cognitive principle of ‘human first’ justifies an SOV order when an inanimate object is involved (Meir et al., 2017). Yet, when the object is human, it is more likely to precede the subject, introducing the passive participant prior to the active one and, thus, expressing an OSV order (Padden et al., 2010).

The devices for argument structure, concerning verb agreement and word order, show some systematicity in established SLs. We will now look at how these regularities emerge in young SLs.

1.3 Argument structure in young sign languages

Again, to understand the way argument structure is organised in young SLs, studies will be referred to separately in relation to verb agreement (§1.3.1) and word order (§1.3.2.).

1.3.1 Verb agreement

In young SLs, agreement between arguments seems to take time to develop. In various young SLs, signers use their own bodies to represent the subject of the action, moving the verb from or towards the body. Also, the use of the pointing to assign abstract referents to locations in the signing space is quite common. Both phenomena have been observed in the school-based SLs of Nicaragua (NSL; Senghas et al., 1997, Flaherty, 2014), Kenya (KSL; Morgan, 2014, 2020) and Israel (ISL; Sandler et al., 2005), as well as in the village SLs of Al-Sayyid Bedouin SL (ABSL) in Israel and Central Taurus SL in Turkey (CTSL; Ergin et al., 2017). The use of human classifiers as localising devices is also reported in ISL, ABSL and CTSL. In addition, KSL and NSL report the displacement of nominal signs in space for R-loci as well.

Nevertheless, this abstract use of syntactic space does not always arise, as in the case of the village SL of Kata Kolok (KK) in Bali (de Vos & Zeshan, 2012), where signers point to present referents only. Similarly, where agreement verbs are concerned, signers of ABSL rarely localise referents and orient the verb in relation to their body (Meir, 2010). Diachronic studies show that verb inflection, i.e. spatial modifications of the verb to enable coreference, can develop over time. In NSL, the verb begins to

manifest different directions by the second generation, whereas in ISL and CTSL the verb starts inflecting later on, by the third generation.

Overall, spatial agreement in these young SLs may show different patterns across generations. The verb may leave the body and move between R-loci. When the end-points of a verb's path match the locations of the arguments previously set up in space, then *coreference* occurs. To reflect the patterns of coreference over different generations in ISL and ABSL, Meir (2016) observes the number of established R-loci and the kind of directionality traced by the verb, as the expression of verb agreement. To do so, Meir considers the existence of R-loci, whether there is a) none, b) one in distal position, or c) two of them in the signing space. She also defines verb directionality in terms of axes, according to the initial and final loci of the verb movement, and reduces it to three possibilities:

- (1) sagittal (Z)– moving from body/proximal to a distal position directly in front of the body, or in the opposite direction (default axis when the verb assumes the body as subject),
- (2) diagonal (X+Z) –moving from the body/proximal to a distal location out in space to the signer's left or right, or in the opposite direction,
- (3) horizontal (X) – linking an initial locus on one side of the body to the opposite side, moving from right to left or the other way around.

According to this classification, verb agreement in the first generation of ISL signers is body-anchored with not more than one R-locus, moving along the Z-axis. In the second generation two arguments may be assigned to locations in space and in the third the verb may leave the body and move between R-loci (Meir 2010, pp. 19-20). Thus, over time, the agreement system of ISL changes and becomes increasingly space oriented.

Morgan (2020) also uses this approach for KSL (for ditransitive events), on the basis of three variables: (i) the subject has an R-locus, (ii) the indirect object has an R-locus, and (iii) the axis of the verb. She demonstrates that verb agreement in this new language is largely body-anchored, at least one argument is set in space, in front of the signer, and the verb moves mostly along a sagittal Z-axis to that locus.

In brief, spatial agreement systems across young SLs are more body-centered and tend to become more space-oriented over time, but do not seem to be fully efficient. We now turn to the alternative mechanism of word order for the encoding of syntactic functions.

1.3.2 Word order

Studies with home signers and hearing non-signers by Goldin-Meadow et al. (2008) show that SOV is the default order in visual communication. They argue that the natural cognitive sequencing of words in an event will introduce the arguments before the action, wherethe patient (or theme) will tendencially be more closely binded to the action.

In young SLs, either village or school-based, word order is somewhat more consistent than the agreement system (Sandler et al., 2014). Yet, the sequencing of arguments still exhibits wide variation between signers, and in complex ditransitive semantic events, there is a tendency to produce multiple single argument phrases rather than one phrase containing all arguments (cf. de Vos & Zeshan, 2012 for KK; Sandler et al., 2005, for ABSL and ISL; Ergin et al., 2017, for CTSL; Senghas et al., 1997, and Flaherty, 2014, for NSL; and Morgan, 2020, for KSL). Regardless of methodological differences between these studies, SOV appears to be consistent with inanimate objects, where there is less ambiguity about semantic roles. In these non-reversible events, both village SLs (CTSL, ABSL, and another village SL in Israel – KafrQasem SL, KQSL) and school-based SLs (NSL, KSL and ISL) show a strong preference for SOV. In contrast, clauses with two human arguments tend to pattern in a different way. They usually have OSV order, whereby patient precedes agent (Meir et al., 2017). This is the case in NSL and CTSL. In these reversible events, ABSL varies between SOV and OSV orders, KQSL maintains the SOV pattern, and ISL, KSL and even KK prefer to avoid ambiguities with SVO orders. Diachronic studies show that such consistency may take time to develop. For instance in ABSL, the SOV preference appeared in the second generation, whereas in CTSL and ISL it showed up in the third generation (Meir, 2010).

Thus, word order seems to emerge as an alternative way of encoding argument structure while a verb agreement system builds up (Meir, 2010).

1.4 Sign Language emergence in Guinea-Bissau

The emerging SL of Guinea-Bissau benefits from a diverse ethno-linguistic environment (§1.4.1), where deaf people are coming together as a group (§1.4.2), developing an autochthonous communication system (§1.4.3).

1.4.1 Multilingualism in Guinea-Bissau

Guinea-Bissau is located in west Africa, between Senegal and Guinea-Conakry. Though it is a small country (36.125km²) with just under two million inhabitants, it has a great variety of coexisting languages and cultures (Eberhard et al., 2020). There are estimated to be around twenty ethno-linguistic groups, with the five most spoken languages being: Balanta, Fula, Manjaku, Mandinka and Papel (Intumbo, 2007). The only official language is Portuguese, which is accessed mainly by schooled people. Because about half of the population are illiterate according to the last census (2009), many people do not speak the official language. Combined with the use of many different mother tongues, this results in 60% of Guineans using the Portuguese-based creole at nation wide level, including in social media and education.

It would be then expected that this multilingualism favours the use of gestures, including conventionalised ones, in ordinary social interactions (Kusters, 2017). A predisposition for a more gestural communication would presumably facilitate the

integration of local deaf people and possibly serve as a basis for their own SL (de Vos & Zeshan, 2012, pp. 6-7 and 17).

1.4.2 Deaf Community in Guinea-Bissau

Until recently, deaf people were largely ignored by the government of Guinea-Bissau. They had no access to language, education, or even identity documents. It was only in 2003 that deaf people began to come together in one school (*Escola Nacional de Surdos*– National School for the Deaf) in Bissau, the capital, in numbers that have increased to more than 400 at present.

Deaf people have built up strong connections between each other, supported by frequent meetings outside the educational context to socialise. In these gatherings, they communicate about everyday life, share new information with each other, promote awareness on sensitive issues like health or women’s status and discuss more general subjects, such as political opinions and human rights. In 2011, a group of deaf adults rose against the hearing leadership of both the school and the association and set apart a new school for the deaf (called *Mariposa*), also in Bissau. In spite of this major conflict, deaf people kept gathering in the city townships, and because of this, their deaf pride strengthened. One result is that they currently meet in places where they and their language are fully visible to hearing people in the community, increasing social awareness.

The present study began by working with deaf adults from this new school, who are leading most community-driven initiatives outside school, consequently motivating sign language pride amongst deaf people.

1.4.3 Guinea-Bissau Sign Language (*Língua Gestual Guineense* - LGG)

The conditions for the development of a SL were also improved by the regular contact between different age groups and by weekly activities among students and deaf adults of the Deaf Association, founded in 2006. Teachers were encouraged to learn the students’ signs and to use them in their classes. Given that deaf students had no means to access hearing aids or speech therapy whatsoever, signs were easily accepted by the teachers as the most practical communication form.

One deaf adult (a university student at the time) was trained as a sign language instructor, between 2005 and 2009, at the Portuguese Deaf Association. While in Portugal, he realized that LGG was a unique emerging SL of Guinea-Bissau and that influences of Portuguese SL should be avoided. When he returned to Bissau after his professional training, he taught LGG as a school discipline to all deaf classes along with around ten LGG ‘monitors’ (older deaf students proficient in LGG).

LGG signs have been compiled twice in dictionaries (Martini & Morgado, 2008, and Martins & Morgado, 2017). Over the years, we have observed a huge growth and conventionalization of the lexicon, as well as what appears to be the ongoing grammaticalization of its structure, which helped to motivate the current study.

2. Methodology

2.1 Participants

In order to have a first meaningful sample of the language, we collected data in the school founded by the deaf adults considered as leaders of the deaf community in Bissau. Here, we asked for the best signers, as perceived by their peers, to participate in the present task. The selection resulted in a group of 9 male and 3 female young adults, between the ages of 18 and 27, attending between the 5th and the 8th grade at the time of the recordings. Although skewed by gender, we believe they provide a good linguistic representations of current LGG.

The 12 signers in this study are all deaf since childhood, with the age of onset of deafness varying between birth and 8 years of age. Moreover, 10 out of the 12 participants had spent more than 6 years in a deaf school and had regular contact with other deaf people outside school. As young adults, 8 out of the 12 deaf subjects also worked during their studies. All were living in Bissau, though two were not originally from the city capital. Overall, the present group is a faithful portrait of the country diversity, in representing six different ethno-linguistic backgrounds (Papel, Balanta, Mankanya, Fula, Manjaku and Mandinka).

Crucially, all subjects used LGG with ease and did their best to perform the task described next as unflinchingly as possible.

2.2 Elicitation task

The research design took into consideration a cross-linguistic approach by using similar materials to elicit single sentences. With the purpose of observing the way transitive verbs encode their arguments, we used short videoclip events. This is a method widely employed with other SLs (Sandler et al., 2005, Senghas et al., 1997, Flaherty, 2014, Ergin et al., 2017).

The elicitation task was adapted specifically to the African context of KSL by Morgan (2014, 2020) from the so-called Haifa clips (Sandler et al., 2005). The stimuli are comprised of 21 video clips showing a variety of transitive events involving one or two people with or without inanimate objects. For this study, 14 stimuli out of 21 were analysed, according to their arguments, as shown in Table 1.

Table 1: Verbs in elicitation videoclips

SIMPLE TRANSITIVES		DITRANSITIVES
A1.1 human, 1 inanimate object	A2. 2 humans (reversible)	B. 2 humans, 1 inanimate object
CARRY (hoe on shoulder) CARRY (basket in hand) DROP (shirt)	WAVE (at man) WAVE (at girl) PUSH (boy) PULL (boy by the arm)	GIVE (cup) GIVE (shirt) THROW (ball) THROW (shirt) TAKE (cup)
LOOK (cup on ground) POINT (hoe on ground)		

One participant at a time watched each clip on a computer screen and described it to a deaf interlocutor. The interlocutor then had to identify the scene just described from three screenshots on a digital tablet. When finished, they changed roles and the second signer (formerly the interlocutor) viewed the videoclips in a different order. Each pair of participants went through the same procedure, as shown in Figure 2. Participants were filmed with one camera located in front of them in the centre.

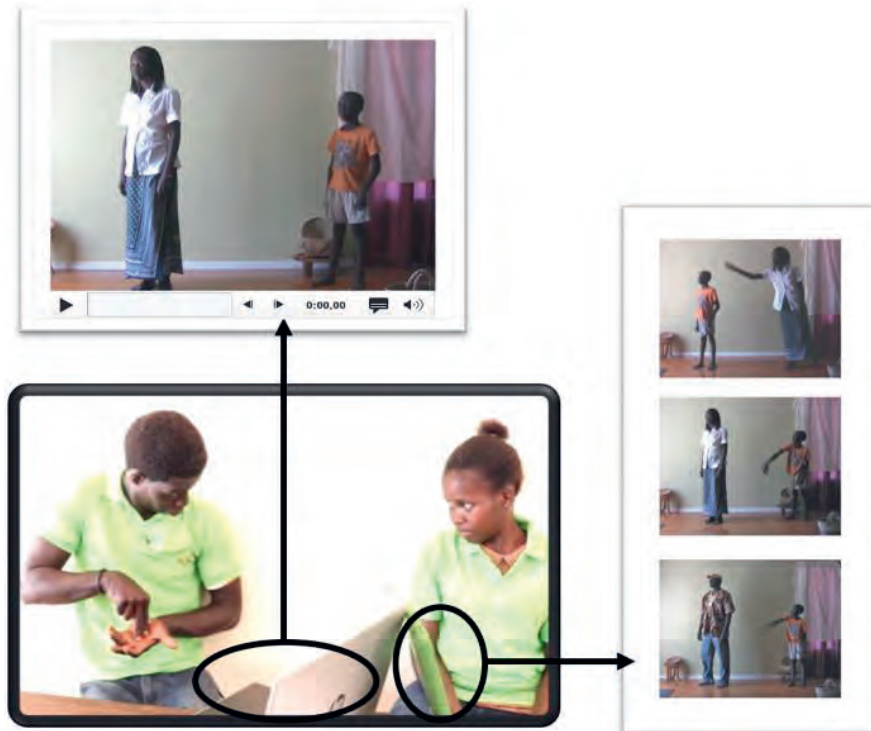


Figure 2: Procedure for the elicitation task.

In total, 181 sentences were obtained (121 simple transitive and 60 ditransitive-constructions). The responses were coded in ELAN² for argument structure.

2.3 Coding verb agreement

In order to analyse the syntactic organization within individual sentences, primary grammatical classes of constituents were established. These were: nouns, locatives and verbs. The first two classes were relevant to determine R-loci (in §2.3.1) and verbs, in their turn, were annotated according to the mechanisms involved in spatial agreement (§2.3.2).

² ELAN (Version 5.9) [Computer software]. (2020). Nijmegen: Max Planck Institute for Psycholinguistics, The Language Archive. Retrieved from <https://archive.mpi.nl/tla/elan>.

2.3.1 Localising devices

R-loci in the signing space can be established by different devices (§1.1.1): displaced nominal signs, pointing signs, classifiers, and eye gaze. The first three were coded in this project.

For displaced nominal signs, the neutral location for one-handed signs was set in front of the body slightly to the right, as considered to be the least-effort position for the arm (Brentari 2019). Any deviation from this expected location with a nominal (e.g., child) was classified as displacement (following Schembri et al., 2018).

Pointing, executed with the index finger towards a location in space, was also coded as a locative, i.e. a nominal modifier attributing location (following Johnston, 2016).

For classifiers, one particular sign, stand, was coded as a human entity classifier in the data. This two-legged classifier can be articulated in certain loci to indicate a human argument. Yet, in their study of ISL and ABSL, Meir et al. (2017, p. 195) acknowledge that stand can have either a predicative status or an attributive/modifier status. Sometimes the status can be distinguished by prosodic cues in marking (or not) boundaries with the main verbal clause (cf. Meir et al., 2017 and Volterra et al., 1984, cited in Johnston et al., 2007). The stand sign is interpreted as predicative in a construction like ‘girl stand, man push.’ Stand with this function was excluded from the present analysis as a localising device because it is more readily considered as a split sentence with two intransitive events, i.e. two SV clauses (cf. Leeson, 2001, for Irish SL, cited in Johnston et al., 2007).

Johnston et al. (2007), however, find that stand in Auslan is used as a post-nominal modifier attributing location (i.e., a classifier). Here it functions as an adjective modifying a noun; e.g., in a phrase like ‘the standing girl’ or as an embedded relative clause, as in ‘the girl who is standing’. In this case, the structure would be ‘(girl stand) man push’ to indicate that a girl who was standing was pushed by a man. This approach was followed in Vermeerbergen et al.’s (2007) crosslinguistic comparison of constituent order in Flemish SL (*Vlaamse Gebarentaal* – VGT) and South African SL (SASL). The authors suggest that analysing STAND is not straightforward, since it seems to willingly function as a localising device, but still has predicative qualities. In the LGG data, prosodic cues were not clear and consistent enough to support the status of STAND as a separate predicate. Furthermore, its frequency and significant role in setting up the location of arguments led us to classify the STAND sign as a post-nominal modifier that also functions as a localising device.

The fourth localising device, *eye gaze*, was not considered for this particular analysis, due to inconsistency of the camera angle on the signer’s face.

2.3.2 Spatial coreference

Constituents themselves were annotated according to their syntactic function and location in space, and verbs according to the initial and final locus of their movement, which is described in terms of axis directionality. Verbs analysed in this way were the so-called agreement verbs. For the current study we will look at which agreement de-

vices are used for both transitive and ditransitive events. However, in SLs, agreement usually happens only in events with two human arguments (Padden, 1983). These are listed in Table 1 and will be classified as (1) regular verbs (WAVE, PUSH, GIVE, THROW) and (2) backward verbs (PULL, TAKE) (see §1.1.2).

To measure the extent of coreference in ditransitive constructions we considered, in Table 2, the number of arguments (loci) indexed in space – R-loci (column A), the verb axis (column B), as proposed by Meir (2010) and the degree of overlap between argument locations and verb endpoints– coreference (column C) (see §1.1.3).

Table 2: Coreference with arguments, according to the arguments set up in space (R-loci) and the verb axis

A.Arguments in space (R-loci)	B.Verb axis	C. Overlap with argument location(s) (coreference)
0	Z	0
1	X+Z	
2	X	
1	Z	1
2	X+Z	
	X	2

In order to check coreference of verb endpoints with R-loci, both phenomena in marking abstract locations in space were annotated in the same way, using one of five locations. Locations for loci and endpoints were first distinguished between the *body* (1) and the signing space; and then positions in space were coded in relation to the body: *proximal* (2), *distal* (3), on the *right* (4), and on the *left* (5). Thus, coreference was determined; e.g., a verb that ended in a “distal” position matching an R-locus for an indirect object also in a “distal” position.

2.4 Coding word order

To code word order, it was important to decide on which constituents should be taken into account (§2.4.1) and which verbs to select for analysis, considering that a large number of verbs were used to express the events (§2.4.2).

2.4.1 Clause units

Word order was coded by looking at the arguments preceding the verb, as the verb was found to be consistently sentence-final. In our data, the participants in the events were typically assigned to specific locations in the signing space at the beginning of the sentence. This could be either followed immediately by the verb and, thus, present a complete sentence, or appear a second time before the verb. In the following

example, translated as ‘man looks at the cup’, the first reference to the MAN would not be considered (shown as crossed out) and the analysis would be $[\cancel{MAN\ STAND}]_s [CUP]_o [MAN]_s [LOOK]_v$.

The lack of consistency of prosodic boundaries (not described here) suggests that these may be cases of *doubling*. Doubling is a common phenomenon in SLs and implies producing different constituents twice within a clause, or entire clauses (see Kimmelman, 2011).

2.4.2 Multiple verb constructions

We also had to develop criteria for analysing multiple verb constructions. The main verb in the event is reported here as V_x and any additional verb as V_y . This additional verb is used to complement the meaning of the main verb, clarifying the event, either by adding extra information to the action, or by representing the reverse action of the main event. We found three overall types of multiple verb constructions.

First, multiple verbs can refer to the same action, they can occur one immediately after the other, or they can be interleaved by constituents. An example of a predicate phrase that depicts two distinct actions or states is $CARRY$ using a handling classifier combined with $WALK$ using an entity classifier. Around half of signers produced these verbs sequentially, but the other half were produced simultaneously, as shown in Figure 3. In our study, a sentence like $SOV_x V_y$ (with either sequential or simultaneous verbs) will be considered as a case of SOV word order.



Figure 3: Example of simultaneous production of $CARRY-BY-HAND+WALK$ and $CARRY-ON-SHOULDER+WALK$.

Second, verbs can add information to the main verb in short phrases, generally comprised of a noun and a verb, coming immediately after the main sentence to clarify its meaning. In this manner, an event translated as ‘boy grabs the girl’s arm and pulls it’ is analysed here as $[BOY\ STAND]_s [GIRL\ STAND]_o [GRAB-ARM]_v [BOY\ STAND]_s [PULL-ARM]_v$. When all arguments are included in the first clause, the second clause is disregarded (shown here as crossed out) for the purpose of establishing word order patterns.

Third, an isolated verb or a short phrase can indicate the reverse action of the main event after the main sentence. Figure 4 exemplifies a multiple verb construction with $GIVE$ and $RECEIVE$, referring to the event ‘man gives cup to woman’. Again, only the first clause is considered for analysis. Thus, the response in Figure 4 was coded as $SIOV$.



Figure 4: Example of a multiple verb construction with GIVE and RECEIVE.

This section described the task and stimuli, the participants, and how the data was coded. We now turn to the findings related to our main research questions regarding the components of verb agreement and the consistency of word order in LGG.

3. Results

3.1 Verb agreement

The present section shows how verb agreement is built up, by presenting the strategies used by LGG signers to mark referents through localising devices (§3.1.1), and by checking if verb directionality is agreeing with R-loci to establish coreference (§3.1.2).

3.1.1 Localising devices

We found that in LGG there is a strong tendency to use localising devices. This is done with three different types of signs: (1) *displaced nouns* (e.g., CHILD in Figure 5), (2) *pointing* and (3) the classifier sign for *STAND* (Figure 6).

In the sentences analysed, three signs were displaced in space as arguments of the verb. These displaced nouns are: CHILD (sometimes as part of a compound for BOY and for GIRL), CUP and BALL. In Figure 5, two different loci are shown for CHILD (both as part of the compound for BOY), produced with a fist handshape showing the height of a (short) person's head in *distal* (Fig. 5a) and *right* (Fig. 5b) positions.

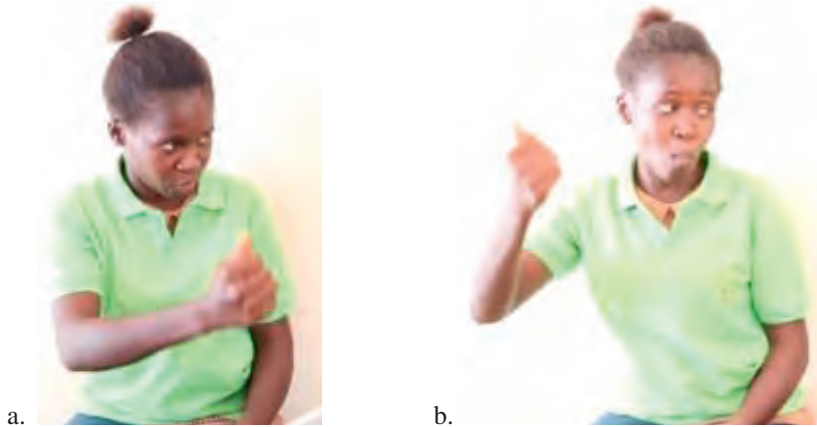


Figure 5: Examples of localised articulations of CHILD in compound BOY: *distal* (5a) and *right* (5b) positions.

SLs often use pointing signs to locate referents (see §1.1.1). Yet, in the LGG data, there were notably only 12 occurrences within the total of the 181 sentences. In contrast, the sign STAND is used frequently and in various spatial positions by 11 out of the 12 LGG signers to index human arguments in the signing space, as illustrated in Figure 6.



Figure 6: Example of localised articulations of the sign for STAND, in proximal (a.) and left (b.) positions.

Comparing the use of localising devices quantitatively, Figure 7 shows the different proportions of these devices in sentences with transitive and ditransitive verbs. The sign STAND is by far the most frequent, followed by displaced nouns and pointing signs.

Localisation is especially common for human objects. It happens when the person is the object (O) of simple transitive verbs, as in the event [MAN STAND]_O [BOY]_S [WAVE]_V, translated as ‘a boy waves at a man’. It also occurs when s/he is the indirect object (I) of ditransitive verbs, as in the example [WOMAN STAND]_I [BALL]_O [BOY]_S [THROW]_V, translated as ‘a boy throws a ball to a girl’. Though in smaller numbers, localisation also occurs with human subjects, in both transitive and ditransitive sentences.

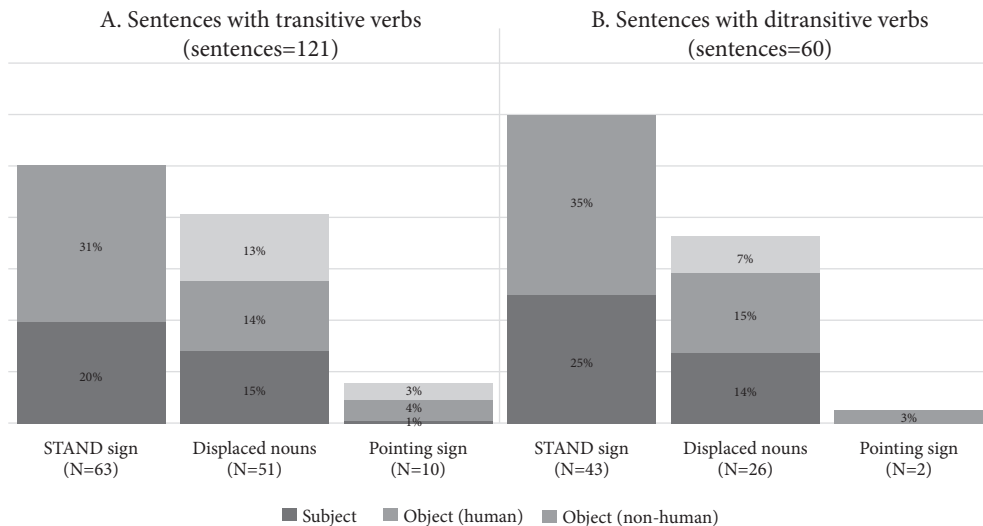


Figure 7: Percent of signs marking locations per argument type (subject, human objects, and non-human objects), in both transitives (A) and ditransitives (B).

Most sentences in the LGG responses have at least one argument located in space. One R-locus is present in almost half of all sentences. Two R-loci are observed in 19% and 25% of the sentences, with transitive and ditransitive verbs, respectively. Finally, 3% of sentences with ditransitives have all three arguments represented by R-loci.

Thus far, we observe that LGG signers do assign locations to (usually human) arguments, both subjects and objects of transitive and ditransitive verbs. To do so, they mostly use signs that can be localized in space, in particular *STAND* (in Figure 6) and *CHILD* as part of a compound meaning *BOY* (in Figure 5).

3.1.2 R-loci in simple transitive constructions

Having identified the devices that LGG signers use to mark R-loci, we will now look at which locations they use for that in transitive constructions (current section) and in ditransitive ones (next section). This analysis only takes into account the locations, not the devices used for assigning those locations. Table 3 shows the number of arguments established in the four spatial locations in sentences with simple transitive verbs (see A1 and A2 in Table 1). In sentences with non-human objects (A1), these are placed in space as much as their subjects. Human objects (A2), in turn, are almost twice as likely to be assigned to a location in space compared to subjects (see also Figure 7). R-loci for both non-human (A1) and human objects are preferably placed in a distal position (n=42), and subjects in a proximal position (n=25). Responses for transitive events with different types of objects show that there is a notable R-loci pattern of subject-proximal + object-distal, especially in constructions with two humans.

Table 3: R-loci for subjects and objects in sentences with simple transitive verbs (in Table 1), with 1 human and 1 object (A1) and with 2 humans (A2)

A1. 1 human, 1 object Total: sentences =66 / R-loci=34			A2. 2 humans Total: sentences =55 / R-loci=73	
R-LOCI	subject	object	subject	object
Proximal	12	2	12	12
Right	-	3	6	5
Left	2	3	1	7
Distal	3	9	4	26
TOTAL	17	17	23	50

CARRY: sentences =28 / R-loci=6 WAVE: sentences =31 / R-loci=39
 DROP : sentences =12 / R-loci=2 PUSH: sentences =12 / R-loci=17
 LOOK : sentences =14 / R-loci=14 PULL: sentences =12 / R-loci=17
 POINT : sentences =12 / R-loci=12

Thus, we may conclude that a consistent pattern for subject and object R-loci appears more prominently in the presence of two human arguments, though sentences with LOOK and POINT also assign locations to arguments with some frequency.

3.1.3 R-loci in ditransitive constructions

Ditransitive verbs in transfer events can also potentially be modified for agreement. This entails the movement of the hand from the location of the subject to the location of the indirect object.

In Table 4, the pattern for subjects located in space is similar to the simple transitive constructions, with the majority in a proximal position. However, the human objects (i.e., indirect objects in these events) are more evenly distributed between distal and proximal positions in relation to the body, with a slight preference for a distal one.

Table 4: R-loci of human arguments in sentences with ditransitive verbs (B in Table 1)

B. Ditransitives Total: sentences =60 / R-loci=57		
R-LOCI	subject	indirect object
Proximal	10	11
Right	1	4
Left	5	5
Distal	6	15
TOTAL	22	35

GIVE: sentences =26 / R-loci=25
 THROW: sentences =25 / R-loci=24
 TAKE: sentences =9 / R-loci=7

To summarize, we identify a general tendency in LGG to place subjects in a proximal position and objects distally in both transitive and ditransitive constructions, especially with reversible verbs. Also, a location in space is more often assigned to human objects than to (human) subjects or inanimate objects.

Now we turn to how verbs are modified with respect to arguments in space in ditransitive constructions. We will look at coreference only in these constructions because these verbs are more likely to incorporate both R-loci.

3.1.3 Coreference in ditransitive constructions

Having identified how and where R-loci are anchored, we now look at whether the endpoints of a verb’s path movement for ditransitives matches the locations of the arguments set up in space. To do so, we refer back to Table 2 in §2.3.2. Recall that these ditransitives involve two humans and the transfer of an inanimate object between them.

Constructions with the verbs GIVE, THROW and TAKE, in Table 5, show that 44 out of the 60 sentences have at least one argument located in space. Furthermore, about a third of the verbs (24 verbs) exhibit coreference with one of the arguments, by matching its beginning and/or endpoint with an R-locus.

Table 5: Coreference with the verbs GIVE, THROW and TAKE (N=60)

A. Arguments in space	B. Verb axis	C. Coreference with arguments	Number of occurrences
0	Z	0	16
1	X+Z		12
2	Z		6
	X+Z		1
1	Z	1	15
	X+Z		1
	X		1
2	Z	2	4
	Z		2
		X+Z	1

The most common constructions involve one argument set in space and 40% of the sentences include coreference with at least one R-locus. Figure 8 exemplifies a sentence with coreference of the verb THROW with the indirect object along a Z-axis, translated as ‘woman throws shirt to boy’.



Figure 8: Example of coreference of the verb THROW with indirect object in distal R-locus along a Z-axis.

In the data, we observe that even though most sentences set up at least one argument in space, verbs in most ditransitive events do not always agree with those R-loci. It must also be noted that, while most verb movements occur on the Z-axis (proximal to distal and vice-versa, N=55), a few diagonal paths (X+Z-axis, N=4) are present, and half are with coreference. On top of this, one of the sentences with TAKE is produced on the X-axis with coreference with one of the arguments.

Having described the elements of verb agreement in the LGG data, we now report on patterns found in word order.

3.2 Word order

Having defined the necessary criteria to determine clause units for the word order analysis, we observed that the overwhelming majority of constructions, 83%, include all arguments. The fact that we obtain signed sentences that have all arguments explicitly referred to can be surprising in an emerging SL, since we have seen in section 1.2.1 that it would be expected for signers to typically break a transitive event in two separate noun-verb sentences. However, we have to keep in mind that we are analysing the STAND sign as a locative, modifying a noun, and not as a separate predicate (see §2.3.1). Additionally, there are multiple verb constructions that could have been otherwise analysed as separate predicates (see §2.4.2).

Syntactic structures were then examined according to transitivity type and animacy. As such, the current section begins by looking at simple transitive constructions with one human and one inanimate object (in §3.2.1) and then with two humans (in §3.2.2). In section 3.2.3, we will look at word order in ditransitive events.

3.2.1 Simple transitive constructions with one human and one inanimate object

In the 66 responses to simple transitive events featuring one human and one inanimate object (A1 in Table 1), we observe that the majority are consistent with an SOV order, as shown in Figure 9.

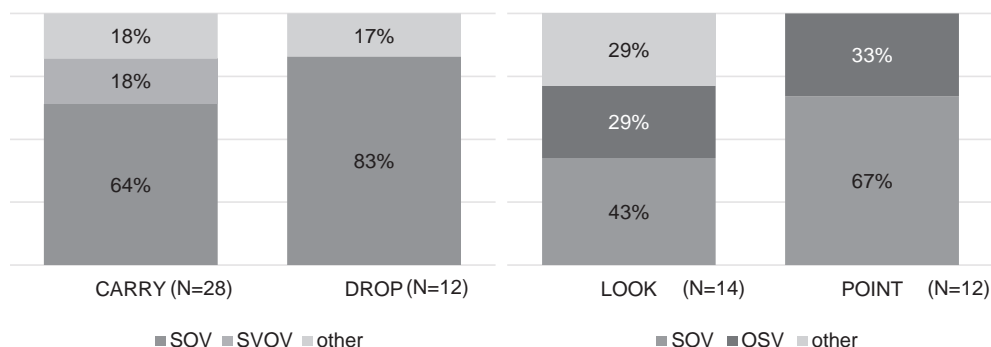


Figure 9: Word order in transitive verbs with one human and one inanimate object as arguments.

In these sentences, SOV is the most prominent order, although this pattern is somewhat different in constructions with LOOK, which have a significant number of OSV patterns and other word orders, especially single verb sequences (included in ‘other’). Similarly, sentences with POINT also have a relatively high number of OSV patterns.

3.2.2 Simple transitive constructions with humans

The significance of human objects in syntax (see §1.2 and §1.3.2) appears to be demonstrated by the responses shown in Figure10, regarding the verbs WAVE, PUSH and PULL.

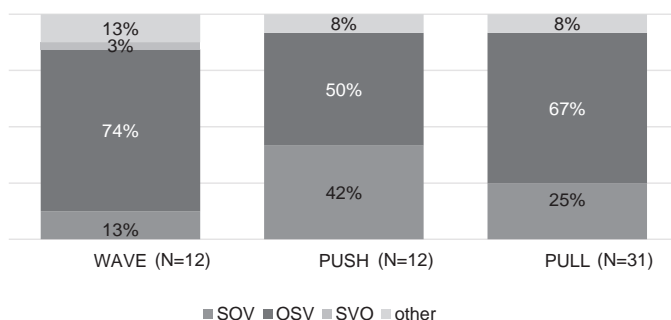


Figure 10: Word order in transitive verbs with two humans as arguments.

These transitive constructions with both human participants show a strong consistency in word order, patterning as OSV; e.g., ‘BOY (WOMAN ME) PUSH’ in Figure11.

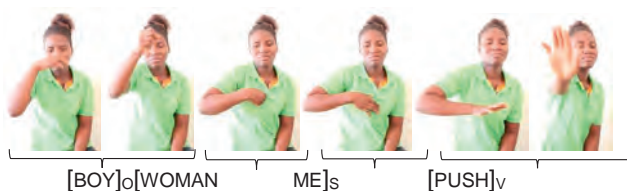


Figure 11: Example of a OSV sentence with PUSH.

3.2.3 Ditransitive constructions with two humans and one inanimate object³

In the LGG sentences with three arguments, the verb is systematically found in a final position. In 70% of the cases, the verb is immediately preceded by the direct

³ Direct object is abbreviated here as ‘O’ and the indirect object as ‘I’.

object, with most frequent orders being ISOV or SIOV, as illustrated in Figure 12. There also seems to be a preference to place the indirect object before the subject in the regular agreement verbs GIVE and THROW (leading to IS[O]V order) and in the backward verb TAKE (leading to I[O]SV order). In addition, the theme, i.e. the direct object, tends to immediately follow the source argument, either the subject in regular verbs ([I]SOV) or the indirect object in backward verbs (IO[SV]).

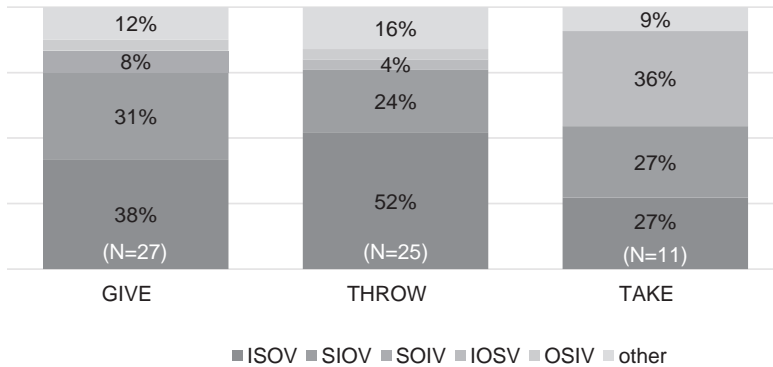


Figure 12: Word order in ditransitive verbs with two humans and an inanimate object as arguments.

Overall, it seems that in this emerging language of LGG, inanimate direct objects tend to occur immediately before verbs, both transitive and ditransitive, patterning like [S]OV and [IS/SI]OV, respectively. When there are two human arguments, the human object tends to precede the subject in transitives, presenting patterns like OSV (e.g., PUSH, PULL). In the majority of ditransitive sentences, the direct object comes immediately before the verb, as in [IS]/[SI]OV. Moreover, the two human arguments in ditransitives seem to follow the same order as transitives, with the human object preceding the subject, as in I[O]S[O]V.

4. Discussion

The analysis of argument structure in LGG took into consideration (1) the way components of verb agreement are being assembled and (2) the consistency of word order patterns across verb types.

A striking feature of the LGG responses is the relatively extensive use of stand by LGG signers. It appears to be taking on the functional characteristics of a localising device for human arguments, especially with objects in which stand is usually placed in a distal position away from the body. Locations of subjects, though smaller in number, are also indicated with stand in a proximal spatial position. Thus, in LGG, this sign seems to have been grammaticalized as part of the nominal phrase (following Vermeerbergen et al. 2007 and Johnston et al., 2007). In comparison, displaced nominal signs were the most used localising mechanism in NSL (Flaherty, 2014),

while they were used the second most in LGG, with 43% of occurrences within sentences. Finally, pointing signs for argument location occur very infrequently in LGG data, in stark contrast with other SLs. Altogether, this indicates a relatively unique pattern for how locations in space are indicated compared with other young and emerging sign languages.

Yet in spite of having stand as a localising device and establishing at least one argument in space in the majority of sentences, verbs do not always agree with R-loci. In fact, only half of them contain some coreference, and largely along the Z-axis. A verb directionality strongly anchored on the Z-axis is also observed in other emerging SLs, such as Nicaraguan SL and Al-Sayyid Bedouin SL. A similar pattern was noted in the 60-year old Kenyan SL (Morgan 2020) and in the early cohorts of ISL as well. In addition, we observe that, by assigning two R-loci in space (25% of the occurrences), the verb in LGG occasionally leaves the body. However, KSL verbs are more likely to have diagonal X+Z-axis movement, contrasting with the predominance of the Z-axis found in LGG.

In relation to word order, most sentences in LGG explicitly include all arguments (having in mind that the stand sign is interpreted as part of the noun phrase). This was not the case in the emergent school-based SL of Nicaragua. In NSL, the first two generations tend to split sentences in two human argument events (Senghas et al. 1997); however, such distinction could be due to methodological differences. In spite of this, the verb is found to appear constantly in final position, similarly to other SLs (cf. Baker et al., 2016, for Dutch SL, Indopakistani SL and Italian SL).

In transitive constructions with a non-human direct object there is a preference for SOV order, as seen in many other established and emerging SLs. In contrast, a significant percentage of sentences with OSV order appears in transitive events between two human arguments. The presence of two human arguments seems to correlate with an increase in OSV order in other emerging SLs as well, including NSL (Flaherty, 2014), and the village SLs of Al-Sayyid Bedouin (Meir et al., 2017) and Central Taurus (Ergin, 2017). This may be a step toward topicalization of the object, but LGG signers did not use grammatical markers, such as eyebrow raises or pauses, which have been found to indicate syntactic topics in other sign languages.

In ditransitive sentences with three arguments, the verb is consistently found in final position and in most cases is immediately preceded by the non-human direct object (i.e., ISOV and SIOV orders). There is also a noteworthy preference to indicate the indirect object before the subject. In Central Taurus SL, ISOV is similarly the predominant word order in three argument clauses (Ergin, 2017).

On the whole, the most prominent patterns for argument structure in LGG are (1) an active mechanism of locating referents in space primarily using the sign stand; (2) a consistent verb path along the Z-axis involving at least one established R-locus; (3) an overarching verb final position; and (4) a clear distinction between SOV and OSV orders for non-human and human objects respectively.

5. Conclusion

A verb agreement system appears to be emerging in LGG through localising devices and a consistent verb directionality moving away from the body. In addition, coreference seems to be efficient with at least one of the arguments in a significant number of both transitive and ditransitive constructions. Word order, in turn, shows consistent word orders patterns, especially depending on whether the object is human.

This study adds a new piece to the puzzle of the emergence of argument structure in new SLs. It shows that this very young school-based SL exhibits patterns that are quite similar to other young SLs that have been studied thus far, including village SLs. However, one note worthy way that LGG differs is in the frequent use of the sign *STAND*, which appears to have taken on the grammatical function of establishing human entities in space. While a similar construction has been observed in other SLs, the frequency of its use in this LGG data suggests an established convention within the tight-knit language community in Bissau.

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