Grammaticalization of the Body and Space in Nicaraguan Sign Language

Kathryn Montemurro, Molly Flaherty, Marie Coppola, Susan Goldin-Meadow, and Diane Brentari

1. Introduction

Given that sign languages are situated in the visual-spatial modality, it follows that they are well-studied for their use of space, specifically as it relates to person and agreement. Evidence from emerging language provides a window into such morphosyntactic systems through their development in real time. One such language is Nicaraguan Sign Language (NSL), a sign language that emerged in the late 1970s after a deaf school opened in the capital city of Managua. Deaf children in Managua who previously grew up without access to a spoken or signed language interacted at school through their own set of individual homesign gesture systems and created a language community. Eventually, these students converged on a shared linguistic system to form the first cohort of NSL (C1). The language continued to develop as more children entered the school, joining and expanding the deaf NSL community (C2, C3) and building upon the incomplete input of C1 (Senghas et al. 2001, Senghas 2003).

We focus our study on the grammatical use of space, which serves a dual function in established sign languages like American Sign Language (ASL)[1]. Signers use space to establish the locus of a person or participant, and later may refer back to those for verbal agreement. We hereby use the term *spatial modulation* for person reference, which in turn covers both the establishment of the locus in the antecedent, and inflectional uses in verbal morphology. Signers generally establish reference with a pronominal point or a localized lexical label to a designated space, which then serves as a referential locus (Lillo-Martin & Klima 1990, Meir 1998, 2002). Loci are morphemic; person and number features attach to each locus (Mathur 2000) and disambiguate relations between referents. When used anaphorically, movement or orientation changes between loci track and maintain reference, and keep constant the linguistic referent to which they are

attached. Agreement, therefore, is between previously assigned (R-)loci, generally of the subject and object of the verb (Padden 1983)[2].

Loci contrast paradigmatically yet, when we discuss spatial modulation, we must also look at the use of the body, itself an anchor in space. In sign languages, the body is crucial in grammatical person distinctions and person referencing. Meier (1990) for American Sign Language, followed by Engberg-Pedersen (1993) for Danish Sign Language, argue that there is only a grammatical distinction between the body and space, that is to say between first and non-first person. The body is assigned first person, and any referent assigned to a locus in neutral space, is therefore non-first i.e. second or third person.

However, the body may also be used in accordance with role shift, in which the body of the signer embodies that of the character. With a slight shift of the shoulders and/or a change in eye gaze, the signer conveys that events and actions are from the perspective of another character (Engberg-Pedersen 1995, Lillo-Martin 1995, Quer 2005), relegating the body to a secondary character from that of grammatical first person as the signer, and thereby shifting reference (Engberg-Pedersen 1993). Shifted reference is defined as using the reference to the signer's body from a `quoted sender's point of view ... to refer to somebody other than the quoting sender' (1993:103, 1995). These two uses combine in spatial modulation and argument marking, as who is being represented on the body, the signer or another character, depends on how the body is used. Furthermore, how these two uses, one fixed and one relative, interact depends on the person system in place.

Building on previous studies (Senghas et al. 2001, Senghas 1995, 2003, 2010, Kocab et al. 2015), we use the introduction of new cohorts of NSL signers as a proxy for stages of language development. NSL allows us to explore the pathways through which space and the body grammaticalize for person and agreement systems in an emerging signed language. Given the constellation of phenomena which span both person reference and verbal agreement, we isolate four specific devices: (a) the use of space (and consequently of the body as an anchor in space), (b) the axis of loci used (e.g. front-back or left-right), (c) the use of role shift, and (d) the use of a two-verb structure. We trace the grammaticalization of these devices in relation to one another, and crucially look at their emergence within the lens of developing linguistic person and agreement systems.

2. Methods
2.1. Participants

We analyze the productions of four participant groups of deaf Nicaraguan individuals: adult homesigners, first cohort signers of NSL (C1), second cohort signers of NSL (C2), and third cohort signers of NSL (C3). Our participant pool consists of 4 adult homesigners (1 female, 3 male; mean age 32 years at test, age

---

[2] Handshape features in classifiers also exhibit a form of agreement, though of a different type. Simplifying, they agree with the size and shape of the object. See Supalla (1986) for a more detailed discussion on classifiers in American Sign Language

range 26-35) who are not a part of the deaf school or signing community. We have 4 cohort 1 signers who all entered school before 1983 (2 female, 2 males; mean age 42 years at test, age range 35-45). The 5 cohort 2 signers entered school between 1984 and 1990 (2 female, 3 males; mean age 28 years at test, age range 26-31). The 7 cohort 3 signers entered the school beginning in 1991 (1 female, 6 males; mean age 21 years at test, age range 19-23). All NSL-signing participants entered school before the age of 5. All use NSL or their respective homesign system as their primary means of communication.

2.2. Stimuli and procedures

Participants were shown short (1-5 second) video clips on a computer screen and asked to describe what they saw. Vignettes consisted of two animate participants and a single event. All were intended to elicit the third person[3].

Figure 1. Still from a vignette of a woman pinching a man on the arm.

In total, our stimulus set contains 14 different verbs, all of which can take two animate participants. Some verbs were include multiple instances. Events included both verbs of transfer (e.g. *the woman gives the man a book*) and verbs of direction (e.g. *the woman squeezes the man on the arm*).

2.3. Coding

The total number of responses analyzed per cohort was: 53 for homesign, 53 for C1, 68 for C2, and 54 for C3. All responses were transcribed in ELAN. The sign stream was divided into individual signs and glossed. Any sign relating either to the establishment of an animate referent or the relation between them was coded for spatial properties: the use of space or the body in reference and agreement, the axis of the locus associated with its referent, and use of role shift.

---

[3] At present, all data collected was intended to elicit the third person. More data collection is needed for full person and agreement paradigms.

3. Results
3.1. Use of space

We first look at the overall frequency of spatial modulation in our data. Given in Figure 2, we see the proportion of utterances modulated in space across participant groups, meaning the proportion of utterances in which signers establish spatial reference. If the sign was articulated in any non-neutral location, it was marked as spatially modulated. Signs modulated for person reference included a point to space or the body, a spatialized lexical item, or a positional body part classifier[4].
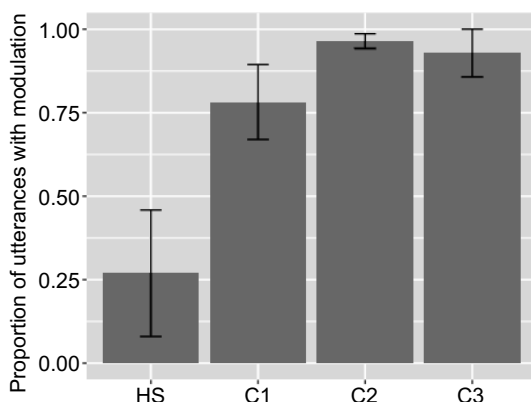

Figure 2. Out of all coded responses, the proportion of which exhibit spatial modulation, by participant group. N=53 for HS, 53 for C1, 68 for C2, and 54 for C3.

Homesigners show little spatial modulation overall. While generally labeling the animate referents in their responses, they did not often involve space in doing so. In contrast, NSL signers use a good deal of space in their responses, with little difference in frequency across cohorts. All three NSL participant groups, consistently establish discourse referents through spatial modulation. They differentiate participants in the event with a distinction in the assignment of a locus. However, the way in which spatial devices are used differs greatly.

3.2. Axis

One such way participant groups differ is the axis upon which loci are set up and re-used. In establishing referents, there are two main axes available: the front-back axis and the left-right axis (Figure 3).

---

[4] See Kocab et al. (2015) for more complete discussion on reference marking devices.

a.   IX:self(3p)   MAN:j   IX:3p   WOMAN:i[5]

b.   ONE[6]:j   MAN:j   ONE:i   WOMAN:i
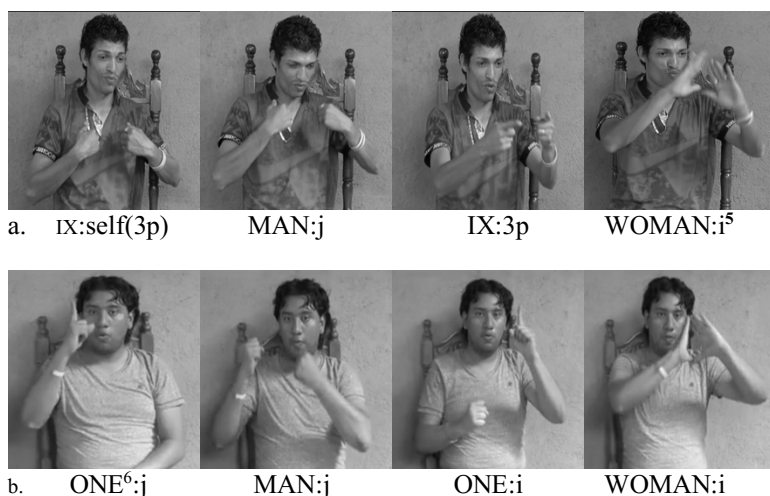
Figure 3. In (a), a C2 signer establishes both discourse referents on the front-back axis. He points to his chest and then signs MAN, assigning *man* to the body. He then points to space and signs WOMAN, assigning *woman* to neutral space directly out from the body. In (b), a C3 signer establishes both referents on the left-right axis. The signer articulates ONE MAN to his right and ONE WOMAN to his left.

Given in Figure 4, we show the proportion of axis preference by participant group.

---

[5] Transcription conventions are as follows: IX is an index (point), IX:3p means 3rd person; **rs:** indicates role shift, with participant role indicated after hyphen; spatial co-reference is indicated by :i for subject and :j for object; :i,j shows agreements

[6] The sign ONE is used before lexical items for animate participants. It is possibly a definiteness marker, though its function in the noun phrase remains outside the scope of this paper.
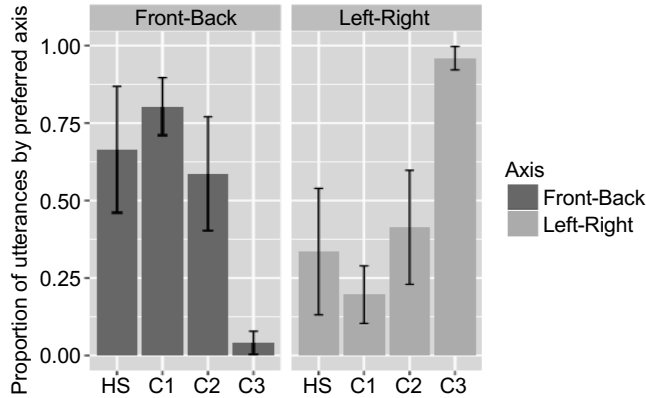
Figure 4. Of the utterances exhibiting spatial modulation, the proportion which occur on each axis, by participant group. N=8 for HS, 41 for C1, 65 for C2, and 51 for C3.

Of all the participant groups, it is C3 where we find a shift in axis preference to left-right. Homesigners do not show a clear preference for axis, though it should be noted that only 8 total utterances showed any form of modulation in our set. C1 signers in our sample clearly favor the front-back axis. In C2, there is no strong preference due to individual variation. Some signers pattern like C1 and others like C3 in their preference. In axis, this means that some C2 signers seem to have also made the shift, as two of our five participants predominantly uses the lateral axis for reference.

In utilizing the front-back axis to establish referents, signers pose neutral space in opposition to the body. With an assignment-to-self, the body functions as an anchor for a fixed participant in the event. By C3, with both third person referents displaced from the body, the body is no longer used for assignment of third person referents, which has significance for our next device.

3.3. Role shift

Another manner in which the body interacts with space is role shift. A sign was designated as shifted if there was a lean of the shoulders or torso in accordance with a participant in the event (Engberg-Pedersen 1995). Given in Figure 5 is the proportion of utterances which employed role shift in order to differentiate between participant relations (i.e. subject and object).
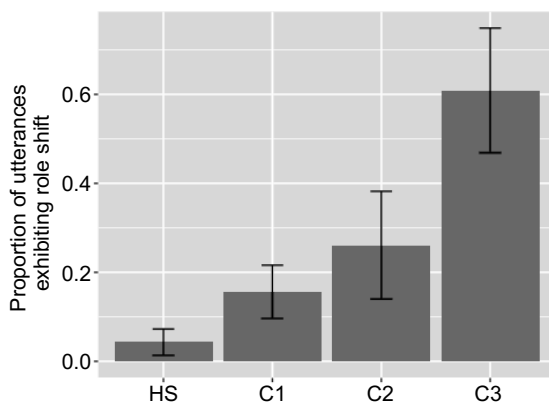
Figure 5. Of all coded responses, the proportion of utterances which employed role shift, by participant group. N=53 for HS, 53 for C1, 68 for C2, and 54 for C3.

In Figure 5, we find a sharp increase in the use of role shift in C3, with little occurring in earlier groups. Notably, an increase in role shift coincides with a strong preference for the left-right axis (see Figure 4). The intersection of roles the body may assume means that the development of role shift has consequences on argument marking. While pointing to the body can assign a participant role to the signer's body, most sign languages reserve the body for the first person. This means earlier cohorts may use role shift to signal reference in contrast to other participants in the event, but are not using role shift to differentiate their bodies as the signer from their body in constructed action. In its grammatical development, signers must navigate the body's use as a locus in person reference with its use in role shift. The left-right axis and its relation to shifted reference means the body itself can take on more than one role throughout an utterance or discourse, even though it can only act as a single locus.

3.4. Two-verb agreement

We have seen that all three NSL cohorts use space to mark person but differ on axis preference and frequency of role shift. Given the interaction of these devices, an important distinction in frequency is found in verbal agreement. In our study, if a sign moved toward or away from a previously established locus, it was marked as spatially modulated and exhibiting agreement. Agreement is with the subject and/or object of the verb and is dependent on the previous establishment of the referent or referents.

In looking at agreement on the verb, however, we must first explain the form of the verb phrase itself. Most responses utilize a two-verb construction (Figure 6) in which the a first verb (V1) moves outward across from the body and the second verb (V2) is signed inward toward the body. The verb ordering tends to follow V1 then V2 (Flaherty 2014). The point of contact is the location on the

body in the stimulus. These two-verb structures have been analyzed as passives for argument-marking purposes[7] (Kegl 1990, Morgen and Woll 2002, Flaherty 2014).

Figure 6. An example verb sequence for *scratch* in which the two verbs differ based on the outward or inward orientation and path movement.

In Figure 7, we show the proportion of each verb type that agrees with previously established loci[8]. A verb was marked as exhibiting agreement if the direction or orientation of the sign correctly aligned with previously established loci.
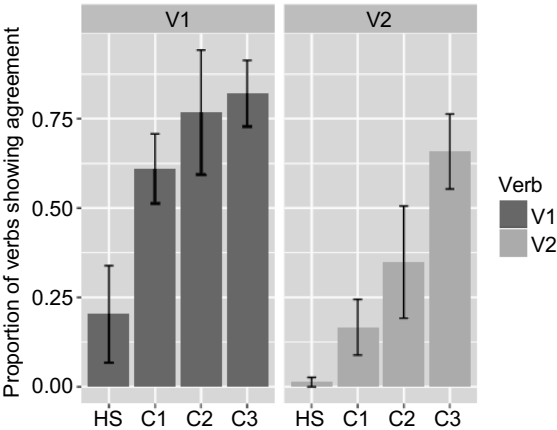

Figure 7. Of all the verbs in our data set, the proportion which agree for at least one person in the event, based on verb type (V1 or V2). For homesign V1 total n=41 and V2 n=48; C1 n=51 for V1, n= 49 for V2; C2 n=70 for V1, n=39 for V2; C3 n=38 for V1, n=38 for V2.

---

[7] In stimuli with a concrete location on the body (e.g. *pinch on the cheek),* V2 adds information to the construction: the location of the action of the body.

[8] One C3 signers utilizes a distinct agreement pattern which moves away from the V1-V2 pattern. This signer utilizes an emergent agreement auxiliary (see Flaherty 2014 for a description) and has been excluded from the V1-V2 agreement analysis.

While V1 exhibits agreement relatively regularly across the NSL groups, V2 does not exhibit agreement with a high degree frequency until C3. Looking to the V1-V2 structure of the verb, we find interactions between the devices used and the outcome in agreement. V2 moves inward toward the body, and yet, C1 and many C2 signers utilize their bodies to represent the subject argument. Due to the front-back axis and infrequent role shifting, the direction of V1 which moves outward and of V2 which moves inward, are in conflict with the directionality of the event, depending on which role was assigned to the body. The verbs cannot show agreement in both directions, as they have opposite referents attached.

However, given in figure 8, we see how each of the changes to devices come together in a system of person and agreement in C3.

| MAN:j | WOMAN:i | i:rs(S)-punch-1:j | i:rs(O)-punch-2:j |
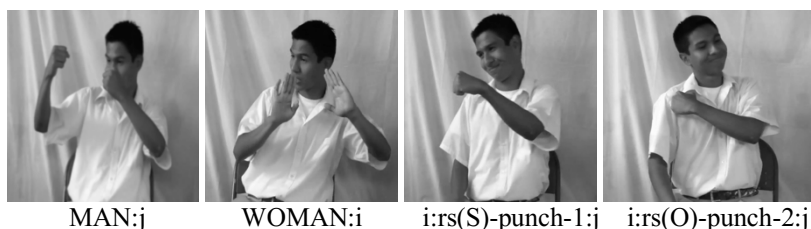
Figure 8. A C3 signer response to the vignette of a woman punching a man on the arm.

The signer establishes the woman (subject) and man (object) each on the left-right axis with a localized lexical sign. Re-using those loci and articulating with role shift, the signer articulates *punch* from the locus on the subject, to that of the object of the verb. Having shifted to occupy the locus of the man who undergoes the punching action, when receiving V2, the signer can partition their body as the object of the verb, from their arm as the subject (Dudis 2004), and incorporate double agreement on both verbs.

4. Discussion

The use of space has been shown to take time to develop in emerging sign language (Senghas et al. 2001, Senghas 2003, 2010). However, it is not only space that is co-opted into the grammar, but the body as well. The two offer paradigmatic and grammatical contrasts. Overall, homesigners produce few spatial modulations. Meanwhile, NSL cohorts produce substantially more, but differ greatly in how they modulate signs. We find two main patterns in device use across cohorts, most closely aligning with behaviors exhibited by C1 and C3 comparatively. Falling in the middle, in C2 we find high variation within cohort involving usage of devices, particularly of axis and role shift, with some patterning as C1, others like C3, and two who mix devices.

For most C1 signers, loci are established so that the signer's body represents one of the participants in the event, either the subject or object, with the second

referent assigned to neutral space. When posed in opposition to the body, the axis utilized to establish discourse referents is the front-back axis. In general there is little role shift. Many NSL signers use a two-verb structure (Flaherty 2014), yet we find that agreement in C1 generally occurs on a single verb within the construction.

In contrast, C3 localizes referents in neutral space. Both third person referents have been displaced from the body using the left-right axis, as attested in other young and emerging languages (see Padden et al. 2010). This change in axis is accompanied by an increase in the use of role shift on the verb aligned with established loci which clarifies participant relations and allows for a higher proportion of agreement on both verbs. The left-right axis frees up the body for third-person shifted reference (Engberg-Pedersen 1995) rather than acting as a fixed participant.

This shift in axis preference in directional verbs is similarly found in Al-Sayyid Bedouin Sign Language (ABSL), where Padden et al. (2010) show that later cohorts of signers also prefer the left-right axis and 'show more flexibility and a tendency to use the signing space broadly. Disengaging from the body and using verb forms that move from side point to side' (2010:582). Disengagement from the body may also relate to the development of grammatical person distinctions, in which the first person feature attached to the body necessitates role shift in order to re-assign the body.

Though the body is an efficient stand-in for one participant in a singular event, it does not generalize to a person system as it lacks a systematic distinction between the signer's body and space. The body vs. space on the front-back axis is built on a contrast or differentiation between participants in the event, but is specific to those two participants. While we do not have any elicited first-person in our data set, as most sign languages reserve the body for first person, we would predict that signers who utilize the front-back axis do not yet make a first/non-first distinction (Meier 1990). Most major changes to the system and an increase in use of devices occur in C3. By this point, we hypothesize there may be a morphological person and agreement system, where the body is reserved for first person as in the majority of mature sign languages. However, a linguistic system is needed in order to navigate competing pressures of each device and generalize to a system across a wide range of configurations that must be expressed within the morphosyntactic domain.

5. Conclusion

As we follow the development of spatial modulation through particular devices, we can trace pathways of grammaticalization of the body and space through patterned stages in the development of NSL. Precursors to spatial grammar are present in the modulations of early participant groups. Crucially early cohorts differentiate participants in an event by using their body in opposition to neutral space, but do not have a generalized person system. It is this

interaction of the body and space which is crucial to the emergence of a morphological person and agreement system.

However, the current study has limitations. Until full verbal paradigms are collected, all conclusions drawn here are preliminary. More data is needed to further probe the emergent spatial morphosyntax in NSL. In order to obtain a fuller sense of the system as a whole, we must elicit more varied data. We will elicit different number and person configurations as well as a variety of construction types (e.g. reciprocal, reflexive) to push the spatial modulation system in order to see how far it can go with and without grammatical distinctions in place.

References

Coppola, Marie and Ann Senghas, 2010. Deixis in an emerging sign language. In Diane Brentari (Ed.) *Sign Languages.* Cambridge University Press. 543-569.

Coppola, Marie and Wing Chee So. 2005. Abstract and Object-Anchored Deixis: Pointing and Spatial Layout in Adult Homesign Systems in Nicaragua. In D. Bamman, T. Magnitskaia, and C. Zaller (Eds. *Proceedings of the Boston University Conference on Language Developmen*t, 30: 119-130.. Boston: Cascadilla Press.

Cormier, Kearsey, Schembri, Adam and Woll, Bencie. 2013. Pronouns and pointing in sign languages. *Lingua*, 137 , 230-247.

Dudis, Paul. 2004. Body partitioning and real-space blends. *Cognitive Linguistics*, 15 (2), 223-238.

Engberg-Pedersen, Elisabeth. 1995. Point of View Expressed Through Shifters. In Karen Emmorey and Judy Snitzer Reilly. (Eds.) *Language, Gesture, and Space.* Lawrence Erlbaum Associates, Hillsdalle, Nl. 111-154.

Flaherty, Molly. 2014. The emergence of argument structure in Nicaraguan Sign Language. University of Chicago, unpublished dissertation.

Kocab, Annemarie, Jennie Pyers and Ann Senghas. 2015. Referential shift in Nicaraguan Sign Language: A transition from lexical to spatial devices. *Frontiers in Psychology*. 2015.

Lillo-Martin, Diane. The point of view predicate in American Sign Language. Karen Emmorey and Judy Snitzer Reilly. Lawrence Erlbaum Associates, Hillsdalle, Nl, 1995, 155-170.

Lillo-Martin, D., & Klima, E. (1990). Pointing out differences: ASl pronouns in syntactic theory. In S. D. Fischer & P. Siple (Eds.), *Theoretical issues in sign language research, Volume 1.* University of Chicago Press. 191-210.

Lillo-Martin, Diane and Meier, Richard. 2011. On the linguistic status of `agreement' in sign languages. *Theoretical Linguistics*. 37:3-4. 95-141.

Mathur, Gaurav y Christian Rathmann. 2010. Verb agreement in sign language morphology. CUP. 173-196.

Meier, Richard. Person deixis in American Sign Language. 1990. In S. D. Fischer & P. Siple (Eds.), *Theoretical issues in sign language research, Volume 1.* University of Chicago Press. 175-190.

Meir, Irit. 2012. The evolution of verb classes and verb agreement in sign languages. *Theoretical Linguistics*. 38. 145-152.

Meir, Irit, Carol Padden, Mark Aronoff, & Wendy Sandler. 2007. Body as subject. *Journal of Linguistics*, 43:03

Morgan, Gary and Bencie Woll. 2002. The development of complex sentences in British Sign Language. In G. Morgan & B. Woll (Eds.), *Directions in sign language acquisition* 255-275. John Benjamins.

Padden, Carol. 1983. Interaction of Morphology and Syntax in American Sign Language. New York: Garland.

Padden, Carol, Irit Meir, Mark Aronoff, and Wendy Sandler. 2010. The grammar of space in two new sign languages. In *Sign Language.* (Ed.) Diane Brentari. Cambridge, UK: Cambridge University Press, 2010, 570-592.

Pyers, Jennie y Ann Senghas. 2007. Reported action in Nicaraguan and American Sign Languages: Emerging versus established systems. In *Visible Variation.* (Eds.) Pamela Perniss and Roland Pfau and Markus Steinbach. Amsterdam: Mouton de Gruyter. 279-302.

Quer, Josep. 2005. Context shift and indexical variables in sign languages. In Proceedings of the 15th Semantics and Linguistic Theory Conference. 152–68.

Pfau, Roland and Markus Steinbach. 2011. Grammaticalization in sign languages. In The *Oxford Handbook of Grammaticalization.* Oxford University Press, 2011.

Senghas, Ann. 2003. Intergenerational influence and ontogenetic development in the emergence of spatial grammar in Nicaraguan Sign Language. *Cognitive Development*. 18:4, 511-531.

Senghas, Ann. 2010. The emergence of two functions for spatial devices in Nicaraguan Sign Language. *Human Development*. 53:5 287-302.

Senghas, Ann, Marie Coppola, Elissa Newport Ted Supalla 1997. Argument structure in Nicaraguan Sign Language: The emergence of grammatical devices. E. Hughes, M. Hughes, and A. Greenhill (Eds.), *Proceedings of the Boston University Conference on Language Development,* 21, 550-561. Boston: Cascadilla Press.

Proceedings of the 43rd annual Boston University Conference on Language Development

edited by Megan M. Brown
and Brady Dailey

Cascadilla Press   Somerville, MA   2019

Ordering information

To order a copy of the proceedings or to place a standing order, contact:

Cascadilla Press, P.O. Box 440355, Somerville, MA 02144, USA
phone: 1-617-776-2370, sales@cascadilla.com, www.cascadilla.com