WHO chased the bird? Narrative cohesion in Nicaraguan signing

Marie Coppola[1,2], Deanna Gagne[1], and Ann Senghas[3]

[1]University of Connecticut, Department of Psychology
[2]University of Connecticut, Department of Linguistics
[3]Barnard College, Columbia University, Department of Psychology

Narrative cohesion is the use of linguistic devices to signal relationships among clauses in a narrative (Stromqvist & Verhoeven 2004; Halliday & Hasan 1976). While such relationships include a variety of relationships (e.g., temporal or causal) between clauses, we focus here on establishing reference. Referring expressions must be more informative (e.g., noun phrases) when a referent has not yet been introduced in the discourse, or when another referent is active, or more accessible. Conversely, referring expressions can be less informative (e.g., pronouns) when a referent is highly accessible, particularly when it is the active referent (Chafe 1975; Ariel 1991). This pattern is robust cross-linguistically and across modalities. Studies of the effect of modality on language structure generally find few structural differences between sign and spoken languages. Those that do exist relate to the visuo-manual modality's use of space to express linguistic structure; such as spatial verb agreement and simultaneous expression of components of motion events in classifier constructions (see Meier 2002 and references).

How are patterns of narrative cohesion acquired by children? English-speaking adults use lexical nouns (as opposed to pronouns) the first time a character is mentioned, and pronouns (as opposed to lexical nouns) to maintain reference to that character. Children are not sensitive to discourse context and the accessibility of referents, and do not use these devices in an adult-like way for narrative cohesion until around 9 years of age (Karmiloff-Smith 1985). Children acquiring established sign languages produce a range of forms similar to that of signing adults, including non-manual forms and enactments of a character's actions (*constructed action*). Like children acquiring spoken language, they do not reliably show the adult pattern of using full noun phrases the first time a character is mentioned (Morgan 2006). Overall, the acquisition literature suggests that narrative cohesion is not an automatic consequence of language structure at the lexical and syntactic levels. Here we ask whether narrative cohesion in an emerging language resembles that of established languages, and whether it arises immediately once lexical and syntactic structures are in place.

To investigate this, we look to Nicaraguan Sign Language (NSL), a rapidly emerging language approximately thirty years old. NSL possesses a range of syntactic devices to refer to characters. In particular, the use of pronominal points and a switch-reference device developed over the first two decades of its emergence (Coppola & Senghas 2010). To investigate the development of discourse structure, particularly the role of an emerging linguistic community on narrative development, we asked whether signers in Nicaragua used these devices for narrative cohesion, and, in using them, unambiguously identified the characters within their narratives.

We can envision at least two scenarios regarding how discourse conventions might emerge in a new language: 1) Discourse pressure might drive the creation of grammatical devices to serve sentential functions; then, once the grammatical means are available, complex discourse would utilize them. Here, discourse structure emerges immediately. 2) Grammatical elements arise from a different source, emerging independently of discourse-specific pressures. Here, discourse structure would not be temporally tied to grammatical structure, and might develop more gradually. In the present study, we approach these two possibilities by asking first, what linguistic devices are used to refer to characters; and second, how these devices are used to *introduce* characters in a narrative, the first step in creating narrative cohesion.

NSL is a newly emergent sign language that arose in Managua, the capital of Nicaragua (Kegl & Iwata 1989; Senghas 1995). In the late 1970s and early 1980s, rapidly expanding special

education programs in Managua brought many deaf children together in numbers greater than before. Initially there were 50 deaf children, increasing to over four hundred by the mid-1980s (Polich 2005). Although instruction was in Spanish, students socialized with each other using gestures, soon converging on a common system of signs. The language continued to develop as new children entered the community every year and learned to sign from older peers. We have been documenting how the language grew more complex over time, with the youngest children driving the changes (e.g., Senghas & Coppola 2001; Senghas 2003; Senghas et al. 2004). Today approximately 1400 signers from 1-45 years of age use NSL as their primary, everyday language.

To examine different periods in the language's emergence, we grouped participants into three age cohorts, based on the period in which individuals first arrived. Those children who arrived in the 1970s and early 1980s (now adults) form the *first cohort*, those who arrived in the mid- to late-1980s (now adolescents) form the *second cohort*, and those who arrived in the 1990s (now children) form the *third cohort*. To capture the "initial state" of the language, we also included four deaf adults who never entered the programs in Managua. These individuals had each developed a system of idiosyncratic gestures, created for basic communication within the family, known as *homesign.* As adults, these homesigners have had, at most, sporadic contact with NSL; none has a regular communication partner who signs NSL, none uses NSL vocabulary, and none has even rudimentary knowledge of NSL grammar. They come from different regions of the country and do not interact with each other. The homesigners represent the types of communication systems used by deaf Nicaraguans before NSL developed.

Method: Participants.

Location	Group type	Group	Year of Entry into the *Nicaraguan* Deaf Community	Mean age of exposure to sign language	Language used	Mean age at testing (years)
Nicaragua	No language exposure	Homesigners (n=4)	n/a	n/a	Homesign	25.80
	Emerging sign language	Cohort 1 (n=4)	1977-1980	3.83 years	NSL	26.33
		Cohort 2 (n=4)	1985-1990	3.24 years	NSL	15.61
		Cohort 3 (n=4)	1994	4.28 years	NSL	11.78
United States	Established sign language	Signers	n/a – not in Nicaragua	4.70 months	ASL	38.70

Task. Participants individually watched the animated cartoon "Canary Row" (described in McNeill 1992) and retold its story, while being videotaped. NSL Signers from Cohorts 1-3 retold the story to a cohort peer. In previous data collection, the homesigners' everyday communication partners (hearing members of their families) often interrupted their narratives due to a lack of comprehension. To elicit uninterrupted narratives, we asked homesigners to retell the story to an experimenter who was very familiar with their homesign system. Signers of American Sign Language (ASL) retold the story to an experimenter (a native signer of ASL).

Coding. For one segment of the story, ("Bellhop"), all clauses associated with the two main characters (Sylvester and Granny) were identified, and classified as either a first mention of that character *(Introduction)* or a subsequent mention (*Maintenance* or *Reintroduction)*. For each clause, we noted the linguistic device used to indicate the subject. If the subject was neither expressed via an independent argument, nor marked on the predicate, it was coded as Absent.

Analysis 1. The range of linguistic devices used by each group to refer to Subjects, regardless of discourse context, is shown in Figure 1. Like established languages, homesigners and NSL signers all use Noun Phrases and Pro-forms to express subjects. Deverbal Anaphors (e.g., "the walker") were observed in Cohort 3 signing only, in three instances. There were strikingly few examples of constructed action by homesigners. For all groups, subjects were often Absent. Sign languages, and many spoken languages, permit such Absent subjects in certain discourse contexts,

such as subsequent mentions where the subject is accessible (Sandler & Lillo-Martin 2006). Sign languages also often express the subject's identity on the predicate (Sandler & Lillo-Martin 2006); such expressions were not observed here.
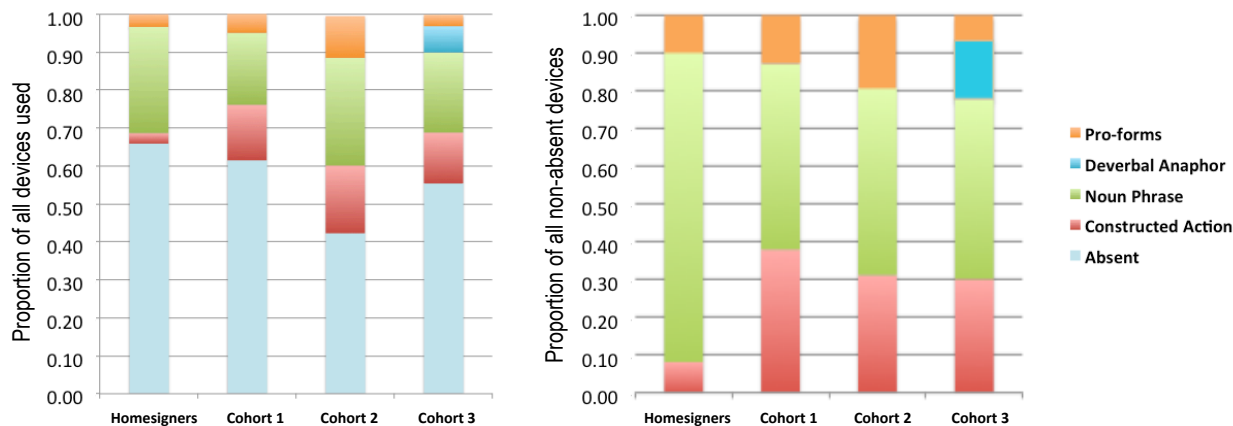

Figure 1. (left). All devices used to express subjects by group (n=342); (right) All devices used to express subjects by group, excluding clauses in which the subject was not expressed (n=151).

Analysis 2. We then examined how each group expressed the subject in Introductions (Figure 2). For the three groups of NSL signers, every Introduction included one of the devices observed in Analysis 1. Only Homesigners produced Introductions with the subject Absent.

Figure 2. Proportion of Introductions (first mentions) of the cat and Granny that were expressed with any device (blue) vs. with a noun phrase (red). Proportions for individual participants are shown with circles and triangles; the solid line indicates the mean. The proportion of Introductions expressed with a noun phrase increases across the evolution of Nicaraguan signing.
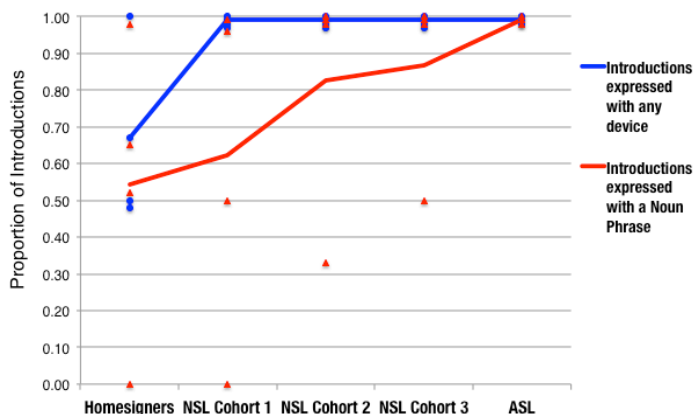
Analysis 3. It has been reported that signers of British Sign Language (BSL), the only sign language examined for this aspect of narrative structure, always use Noun Phrases (NPs) the first time they mention a character, consistent with the established cross-linguistic pattern for Introductions (Cormier et al. submitted). Here we asked whether Nicaraguan participants pattern like signers of a mature language in this regard. Specifically, we examined the Introductions to determine whether the Nicaraguan participants and ASL signers used NPs, *vs.* any other device (including Absent subjects). ASL signers invariably used NPs to express subjects in Introductions. Across the cohorts of NSL signers, the proportion of NPs increased, though there is still variability within all of the Nicaraguan groups (see Figure 2).

Discussion

To summarize, all Nicaraguan groups produced the same types of linguistic devices to refer to characters within a narrative, with the exception of deverbal anaphors, which were observed in Cohort 3 signing only. Furthermore, the informativeness of the referring expressions in Introductions has increased over the evolution of NSL. The narrative cohesion patterns developing in NSL are approaching that of established languages.

It is striking that Homesigners (and only Homesigners) sometimes produce Introductions with Absent subjects. This is not a result of having fewer devices at hand; in other discourse contexts, Homesigners produce NPs in a proportion similar to the other groups. What differences between the Homesigners and the NSL signers might account for this divergence in informativeness of Introductions? All three of the NSL cohorts benefitted from interaction within large peer linguistic community. The second and third cohorts also benefitted from a more developed language model in childhood, while the first cohort presumably began as a group of homesigners. We suspect that their interaction plays a key role. Another difference is that homesigners have had minimal formal education. However, we speculate that similarly unschooled hearing Spanish speakers would likely produce NPs in Introductions, and intend to test this alternative account.

Note that pre-adolescent Cohort 3 participants produced narratives that were more adult-like than did the homesigners, who were on average twice their age. The homesign narratives had gaps where subjects belonged, even though homesigners have developed lexical and syntactic devices to mark subjects (Coppola & Newport 2005). Apparently, the mere availability of linguistic devices does not guarantee a cohesive narrative. These findings suggest that linguistic input, and interaction in a linguistic community, are required for such conventions to emerge. Life experience and cognitive maturation alone are insufficient to support the robust expression of narrative cohesion.

References

Ariel, M. (1991). The function of accessibility in a theory of grammar. *J.of Pragmatics*, 16(5), 443-463.

Chafe, W. (1976). Givenness, Contrastiveness, Definiteness, Subjects, Topics, and Point of View. In C. N. Li (Ed.), *Subject and Topic* (pp. 25-55). New York: Academic.

Coppola, M., & Newport, E. L. (2005). Grammatical subjects in home sign: Abstract linguistic structure in adult primary gesture systems without linguistic input. *Proceedings of the National Academy of Sciences, 102* (52) 19249-19253.

Coppola, M., & Senghas, A. (2010). Deixis in an emerging sign language. In D. Brentari (Ed.), *Sign languages: A Cambridge language survey* (pp. 543-569). Cambridge University Press.

Cormier, K., Smith S & Zwets, M. (submitted). Framing constructed action in BSL narratives.

Halliday, M. & Hasan, R. (1976). *Cohesion in spoken and written English.* London: Longman's.

Karmiloff-Smith, A. (1985). Language and cognitive processes from a developmental perspective. *Language and Cognitive Processes, 1*(1), 61- 85.

Kegl, J., & Iwata, G. (1989). Lenguaje de signos nicaragüense: A pidgin sheds light on the 'creole?'. In R. Carlson, et al. (Eds.), Proc., Pacific Linguistics Conference (266–294). Eugene, OR: Univ. of Oregon.

McNeill, D. (1992). *Hand and mind: What gestures reveal about thought.* Univ. of Chicago Press.

Meier, R. P., Cormier, K., & Quinto-Pozos, D. (Eds.). (2002). *Modality and structure in signed and spoken languages*. Cambridge University Press.

Monaghan, L., Schmaling, C., and Nakamura, K. *Many ways to be Deaf: International Variation in Deaf Communities* (pp. 260-282). Washington, D.C.: Gallaudet University Press.

Morgan, G. (2006). The development of narrative skills in British Sign Language. *Advances in the sign language development of deaf children*, 314-343.

Polich, L. (2005). The Emergence of the Deaf Community in Nicaragua: "With Sign Language You Can Learn So Much." Washington, DC: Gallaudet University Press.

Sandler, W., & Lillo-Martin, D. (2006). *Sign language and linguistic universals*. Cambridge Univ. Press.

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

Senghas, A., & Coppola, M. (2001). Children creating language: How Nicaraguan Sign Language acquired a spatial grammar. *Psychological Science, 12*(4), 323-328.

Senghas, A., Kita, S., & Özyürek, A. (2004). Children creating core properties of language: Evidence from an emerging sign language in Nicaragua. *Science*, 305(5691), 1779-1782.

Strömqvist, S., & Verhoeven, L. T. (2004). *Relating events in narrative: volume 2: Typological and contextual perspectives*. Mahwah, NJ: Lawrence Erlbaum.