# Observing the Mapping of Theta-Roles to the Hands in Libras

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Motivation In the literature on sign language linguistics, descriptions of the roles played by the dominant (DH) vs non-dominant hand (NDH) have focused to a great extent on restrictions at the lexical level (e.g., Battison 1978, Goldsmith & Brentari 1993, van der Hulst 1996, Crasborn 2011), or occasionally at the level of discourse-level buoys and topic-comment structures (Lillo-Martin & Klima 1990, Liddell 2003, Krifka 2007). However, there is much less crosslinguistic work on how, if at all, the DH and NDH may be employed syntactically. Geraci (2014) provides suggestive evidence from Italian Sign Language that each hand can map the distinct thematic roles in transitive verbal clauses, with the ipsilateral hand used for agents and the contralateral for patients, independently of word order. This finding is highly interesting from the perspective of redundancy, as subject and object are usually reliably encoded via word order and/or agreement. In the latter, arguments are placed in arbitrary locations in space and referred back to for reference-tracking. The 'need' for choosing the DHvs NDH (or ipsilateral and contralateral side) thus seems redundant employment of real-world topographic space as well as syntactic space, afforded by the modality of having two active articulators.

Although Geraci's evidence is limited to less than a dozen sentences in LIS and based on introspective evidence, we sought to verify the intuition on a larger scale quantitative level with elicited production of naturalistic sentence types, given that the discussion of NDH mapped to objects and DH mapped to subjects can even be found in Pélissier's (1856: Planche XIV) observations of pronominal uses of the thumb in LSF, where object pronouns use the NDH and subject pronouns the DH. To this end we conducted an elicitation experiment with 19 signers of Libras, in Rio de Janeiro, Brazil, using the Haifa Clips (Sandler et al 2005) as materials, given that they include a wide range of argument structures.

Materials, and Results A total of 242 two-argument productions were coded for DH vs NDH mapping and agent/patient roles. While a great deal of these productions involved exclusive use of the DH for both arguments (perhaps to be expected given encumbrance, weak drop, and other phonological considerations disfavoring use of the NDH), at least one-fifth of productions employed the pattern predicted by Geraci's (2014) linearization model, and crucially, only 6% of the productions showed the reverse pattern; see Figure 1.

Preference of Dominant vs Non-Dominant Hand in Encoding Thematic Roles in Libras
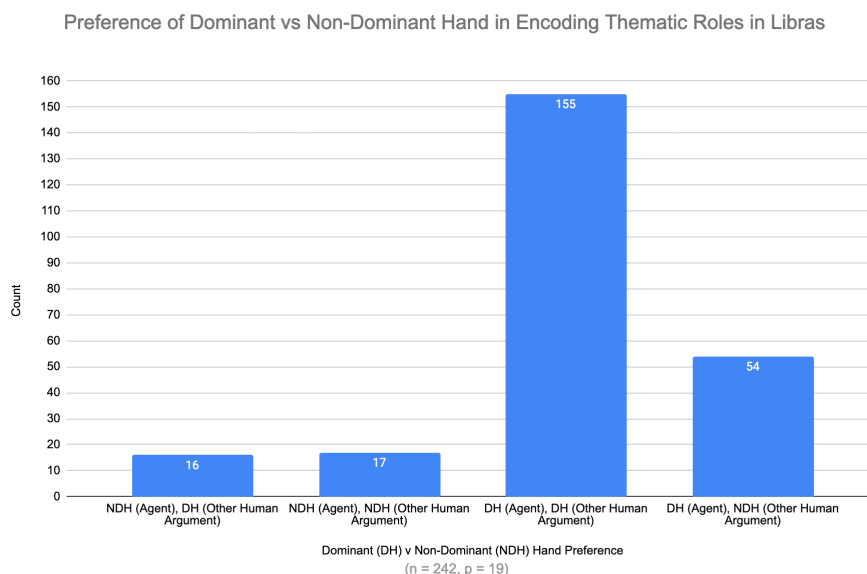
A χ2 test of independence was performed to determine the preference for using the dominant vs non-dominant hand to encode agentive vs non-agentive thematic roles.The relation between hand preference and thematic role assignment was significant, $\chi2$ (1, n = 242) = 7.87, p < 0.01, as Figure 1 reveals as well. In terms of individual-level grammars, five of the signers consistently mapped DH to agent and NDH to patient; none did the reverse. Moreover, these overall trends were maintained independently of whether the subject preceded the object or vice-versa in terms of syntactic word order.

Outlook Ours is the first study to quantitatively demonstrate a thematic-role driven linearization pattern of the dominant and non-dominant hand in sign language, providing confirmation for Geraci's (2014) hypothesis in terms of argument placement in space (which potentially feeds agreement as well, in agreeing verbs). As Geraci notes, however, other mechanisms may be at play in other sign languages, including one in which subjects may be mapped to locations closer to the body, while objects can be placed more far away on the z-axis, a pattern active in the younger generations of signers of Israeli sign language, and in Al-Sayyd Bedouin sign language (Padden, Meir, Aronoff & Sandler, 2010). For all examples in which there was a clear establishment of arguments within the z-axis in our Libras data, we found 20 examples with the agent closer to the body than the patient along the z-axis, and zero examples of the opposite, confirming this pattern for Libras as well (although further research is needed to establish how this lines up with word order – is it an agent-closest principle, or a first-argument-closest principle?) This research opens the door for further explorations of a quantitative nature, which might also explore analogues to the obviative/proximate distinctions as found in Algonquian languages within mappings to the ipsilateral and contralateral side, as well as potential disentangling of whether the mappings are subject-based or agent-based in production with psych-verb predicates (not contained within the Haifa clips stimulus set, but ripe for future elicitation), potentially exploring proposals for their syntactic grounding as locations (Landau 2009), with the kind of confirming evidence crucially available within the modality of sign (Schlenker 2018).

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