

THE ROLE OF LEXICAL PROPERTIES AND REFERENTIAL CONTEXTS IN THE PROCESSING OF SYNTACTIC AMBIGUITIES BY CHILDREN AND ADULTS

Maísa Sancassani (University of Campinas – Brazil)

Contact: maisa.sanc@gmail.com

A mainstream of psycholinguistics takes language as an autonomous, encapsulated module (Fodor, 1983), immune to other systems such as the visual or perceptual ones. From this point of view, the parser uses a portion of its grammar knowledge isolated from world knowledge and other information for the initial identification of syntagmatic relations. Tanenhaus et al. (1995), among many others, point out that adults, when presented to biased visual contexts, use extralinguistic information in order to process syntactic ambiguities, showing that they are sensitive to the Principle of Referential Support (Altmann & Steedman, 1988; Crain & Steedman, 1985). When five-year-old children undergo similar tests (Trueswell et al., 1999), however, they rely on syntactically based parsing principles or on the lexical properties of the input and ignore referential information. Here, we tested the effect of visual context and lexical bias during the processing of ambiguities. 36 children and 31 adults were asked to manipulate toys in response to globally ambiguous verbal instructions like "clean the zebra with the brush", in which the prepositional phrase can be interpreted as an instrument of the action (VP-attachment) or modifier of the object (NP-attachment). We used the technique of the Visual World Paradigm (Trueswell, 2008) in which eye-gazes and gestures are monitored in order to obtain measures of the final processing of the sentences and measures of the real-time processing. The disambiguation can be influenced by two factors: (a) the lexical bias of the verbs contained in the instructions – structural information; low-level evidence –, or (b) visual context – reference information; high-level evidence –, which is manipulated through different arrangements of objects in a platform. We obtained measures of the final processing of the sentences (participant's gestures in response to the instruction) and measures of the real-time processing (tracking of participant's eye movements). Our goal was to verify whether non-linguistic information is able to interfere with syntactic processing and, if so, whether they are processed equally in all stages of language development. Our results reveal that high-level global cues (reference bias) influence real-time processing equally in adults and children, while low-level local cues (lexical bias) interfere with biased stimuli. In the presence of neutral lexical properties, adults perform actions that correspond to NP-attachment only in competitive referential contexts and children prefer VP-attachment interpretation in all cases. We concluded that the lexical neutrality allows for the manifestation of the Principle of Referential Support in adults; children, on the other hand, manifest a certain effect (still to be defined) in which VP-attachment structures are preferred. These findings ensure the Continuity Assumption according to which children and adults access the same cognitive mechanisms in processing language in all phases of development (Crain 1991; 2002; Crain and Wexler 2000; Meroni & Crain, 2003; Pinker, 1984). The results also align with the lexicalist theories such as the Constraint-Satisfaction (MacDonald, Pearlmutter & Seidenberg, 1994; MacDonald & Seidenberg, 2006; Trueswell & Tanenhaus, 1994), in which multiple information compete for generating a single interpretation. This theory predicts that, during the development of the parser, structural information such as verbs bias emerge earlier and more robustly than less reliable ones such as the discourse-pragmatic cues.

Keywords: language development; online processing; offline processing; syntactic ambiguity; referentiality.

References

- ALTMANN, G.; STEEDMAN, M. (1988). Interaction with context during human sentence processing. *Cognition*, 30, 191-238.
- CRAIN, S.; STEEDMAN, M. (1985). On not being led up the garden path: The use of context by the psychological parser. In: DOWTY, D.; KARRATTUNEN, L.; ZWICKY, A. (Eds.). *Natural language parsing*. Cambridge, MA: Cambridge University Press.
- CRAIN, S. (1991). Language acquisition in the absence of experience. *Behavioral and Brain Sciences*. Vol. 14, 597-650.
- CRAIN, S.; MERONI, L. (2002). *Children's use of referential context*. Paper presented at the 27th Annual Boston University Conference on Language Development, November 2002, Boston, MA.
- CRAIN, S.; WEXLER, K. (2000). Methodology in the study of language acquisition. In: RITCHIE, W.C.; BHATIA, T.K. (Eds.) *Handbook on Language Acquisition*. San Diego, CA: Academic Press.
- FODOR, J. A. (1983). *Modularity of Mind*. Cambridge, MA: MIT Press.
- MACDONALD, M. C.; SEIDENBERG, M. S. (2006) Constraint Satisfaction Accounts of Lexical and Sentence Comprehension. In: TRAXLER, M.; GERNSBACHER, M. A. (Eds.) *Handbook of psycholinguistics*. Amsterdam: Elsevier.
- MACDONALD, M. C.; PEARLMUTTER, N. J.; SEIDENBERG, M. S. (1994). The lexical nature of syntactic ambiguity resolution. *Psychological Review*, 101, 676-703.
- MERONI, L.; CRAIN, S. (2003). *On not being led down the kindergarten-path*. Proceedings of the 27th Boston University Conference on Language Development, 531-544, Cascadilla Press, Somerville, MA.
- PINKER, S. (1984). *Language learnability and language development*. Cambridge, MA: Harvard University Press.
- TANENHAUS, M. K.; SPIVEY-KNOWLTON, M. J.; EBERHARD, K. M.; SEDIVY, J. C. (1995). Integration of visual and linguistic information in spoken language comprehension. *Science*, 268, 1632-1634.
- TRUESWELL, J. C. (2008). Using eye movements as a developmental measure within psycholinguistics. In: SEKERINA, I. A.; FERNÁNDEZ, E. M.; CLAHSSEN, H. (Eds.) *Language Processing in Children*. Amsterdam: John Benjamins.
- TRUESWELL, J. C.; TANENHAUS, M. K. (1994). Toward a lexicalist framework of constraint-based syntactic ambiguity resolution. In: CLIFTON, C.; FRAZIER, L. (Eds.). *Perspectives on sentence processing*. Hillsdale, NJ: Erlbaum.