Processing Lexical Semantics without Encoding: Reduced Relative Effect and Verb Type

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This talk provides a new account of the relationship between argument structure and garden pathing difficulty. Stevenson and Merlo [1997] showed that the reduced-relative garden path effect can be affected by verb type; reduced relatives with unergatives ((1b): *raced*) are appreciably more difficult to comprehend than reduced-relatives with unaccusatives ((1a): *melted*). This is surprising on accounts of fixed structural preference [Frazier, 1979, Crocker, 1996], which do not predict such asymmetries. In general, reduced-relative garden paths exhibit a temporary active/passive ambiguity. Although the initial active-voice analysis is intransitive, the final reduced-relative analysis is passive, transitive and causativized.

Thus, Stevenson and Merlo [1997] suggest that causative v applies lexically for unaccusatives but syntactically for unergatives. Our account instead argues that the causative processing asymmetry in (1) is already explained by the causative production asymmetry in (2). In (2a), the unaccusative verb 'baked' participates in the causative alternation regardless of PP attachment, whereas in (2b), the causative form requires argument attachment of the PP. The directed-motion construction literature [Hoekstra, 1988, Folli and Harley, 2006, Zubizaretta and Oh, 2007] suggests that while such directed-motion intransitives as in (3) are ambiguous between an adjunct (locative) and an argument (directional) attachment of PP, only argument attachment licenses the causative directed motion construction in (2b).

We argue that unlike unaccusatives, unergative reduced-relatives require PP-attachment reanalysis before the active-passive ambiguity of the reduced relative can be resolved. This is shown in Figures 1. and 2., where square boxes represent incremental sentence fragments and diamonds indicate the grammatical interpretation of intermediate parser states. We model the interaction in the parser between PP attachment ambiguity and the reduced-relative ambiguity with the Entropy Reduction Hypothesis (ERH) [Hale, 2006]. The ERH models disambiguation effort as the reduction in analytic entropy from the locally ambiguous token (a.,b. in Figures 1. & 2.) to the disambiguated sentence string (a.,b.,c. in Figures 1. & 2.). The competence analysis was formalized as a Minimalist Grammar (MG) in the style of Stabler [1997], employing a Distributed Morphology [Halle and Marantz, 1993] decomposition of argument structure. Entropies were computed for the MG derivations corresponding to the ambiguous token and the disambiguated string, for each of the unaccusative and unergative conditions. The ERH yields an entropy reduction only for unergatives, deriving the correct prediction that unaccusative garden paths are resolved earlier and more easily. The new constructional account avoids special appeal to modularity and does not require a distinction between 'lexical' and 'syntactic' causation. At the same time, it makes new predictions regarding the role of the PP, which was neglected on previous accounts.

(1) a. **The butter melted** in the microwave was lumpy.
     b. **The horse raced** *past the barn* fell. [Stevenson and Merlo, 1997]

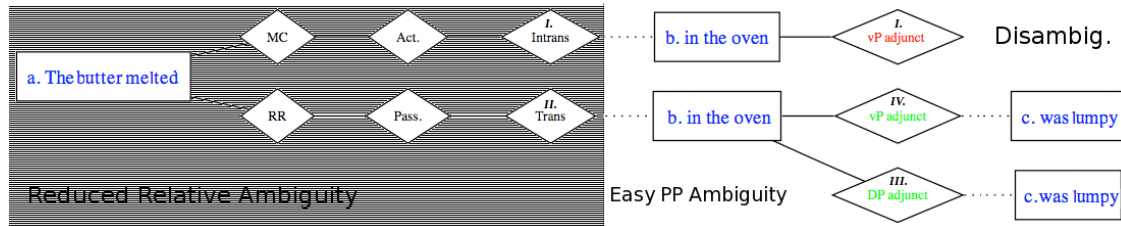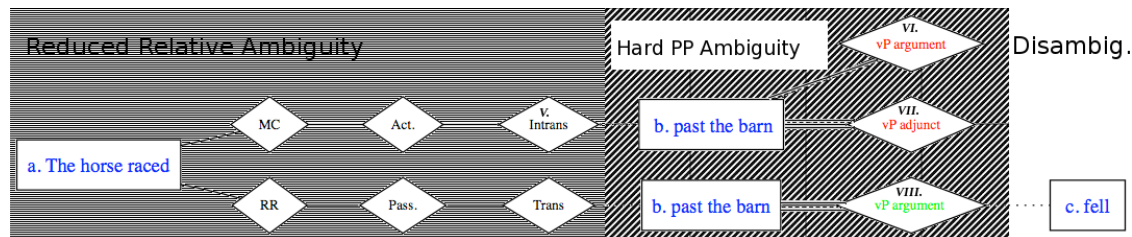|	a. **The window broke**.	Pat **broke the window**.
(2)	b. **The soldiers marched** *to their tents*.	d. The general **marched the soldiers** *(to the tents)*.
		[Levin and Rappaport-Havov, 1995]

Figure 1: Unaccusative Analysis: Preserved Rejected

Figure 2: Unergative Analysis: Preserved Rejected

References

M.W. Crocker. Computational Psycholinguistics: An Interdisciplinary Approach to the Study of Language. Kluwer Academic Publishers, 1996.

R. Folli and H. Harley. On the Licensing of Causatives of Directed Motion: Waltzing Matilda All Over. Studia Linguistica, 60(2):121–155, 2006.

L. Frazier. On Comprehending Sentences: syntactic parsing strategies. PhD thesis, University of Connecticut, 1979.

J. Hale. Uncertainity About The Rest of The Sentence. Cognitive Science, 2006.

M. Halle and A. Marantz. Distributed morphology and the pieces of inflection. The View from Building, 20:111–176, 1993.

T. Hoekstra. Small Clause Results. Lingua, 74:101–139, 1988.

B. Levin and M. Rappaport-Havov. Unaccusativity: at the Syntax- Lexical Semantics Interface. MIT Press, 1995.

E. Stabler. Derivational minimalism. In Logical Aspects of Computational Linguistics., pages 68–95. Springer, 1997.

S. Stevenson and P. Merlo. Lexical Structure and Parsing Complexity. Language and Cognitive Processes, 12(2), 1997.

M. L. Zubizaretta and E. Oh. On the Syntactic Composition of Manner and Motion, volume 48 of Linguistic Inquiries Monographs. MIT Press, 2007.