

Shared processes in passives and unaccusatives: Evidence from ERPs

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Derived subjects; Unaccusativity; Passives; Unergatives; Event Related Potentials (ERPs); N400; P600; English

The subjects of passives and unaccusatives are similar in that they are both interpreted as themes, unlike subjects of typical transitives and unergatives. This similarity is thought to result from a shared syntactic structure: both passives and unaccusatives involve movement of an underlying object to surface subject position (Burzio, 1986). Previous research using behavioral techniques appears to confirm this hypothesis by showing evidence of reactivation of the surface subject in the trace position (Friedmann et al., 2008). However, these results could also be attributed to the fact that the surface subjects in both constructions share the same thematic role (i.e., theme); thus, reactivation effects could be indexing thematic mapping operations (Melinger, 2006), and not movement. One way to differentiate between these structural and interpretive processes is to use techniques and measures that are differentially sensitive to the two types of processing.

Here, we used event-related potentials (ERPs) to distinguish between structural and thematic processes by assuming a time-course model of language processing proposed by Friederici (2005). We predicted that passives and unaccusatives would result in additional processes (representing either movement or thematic mapping operations) that would be evidenced by differences in ERP activity compared to unergatives (which require no addition processing). We further predicted that if reactivation effects are related to movement, we would see modulation of ERP components associated with structural processing (i.e., early left anterior negativity (eLAN) and/or P600) for both passives and unaccusatives compared to unergatives. Alternatively, if reactivation involves thematic mapping, we would see modulation of ERP components associated with argument and lexical processing (e.g., LAN and N400).

Fourteen adults read 192 randomly ordered sentences comprising a 3x2 design (verb type x plausibility) (Table 1). The subject noun phrase was always animate so as to bias the parser to adopt an initial agent interpretation for all three verb types. Since N400s are elicited by factors other than thematic interpretation, plausibility was also manipulated to provide additional evidence that LAN/N400 responses were sensitive to thematic interpretation. Sentences were presented visually, word-by-word (650ms, 50ms ISI), and ERPs were time-locked to the onset of the main verb. Results of a grand average and a temporal-spatial principal components analysis revealed that the earliest point of difference between conditions was at approximately 400ms. Passives and unaccusatives elicited a centrally-distributed N400 effect compared to unergatives. In addition, there was also a significant verb x plausibility interaction, with implausible unergatives more negative compared to plausible unergatives only.

We take these findings as evidence for a thematic account of the similarities between passives and unaccusatives. Under this view, the larger amplitude N400 for the passives and unaccusatives compared to the unergatives reflects more effortful mapping of the initial agent interpretation to the required theme interpretation for that subject. The absence of plausibility effects on passives and unaccusatives suggests that this thematic reanalysis stage may have blocked or delayed plausibility evaluation for subjects in these constructions. However, plausibility evaluation was preserved in unergatives in which there was no conflict between thematic interpretations of the subject.

Table 1

Verb type/Plausibility	Plausible	Implausible
Passive	The general was saluted	The dancer was saluted
Unaccusative	The lover had swooned	The cop had swooned
Unergative	The newborn had cried	The builder had cried