Title
When dog is more wolf than bone: Computational and electrophysiological evidence for featural organization of semantic memory

Permalink
https://escholarship.org/uc/item/3nn78523

Journal

ISSN
1069-7977

Authors
Laszlo, Sarah
Armstrong, Blair
MacInnes, Joseph
et al.

Publication Date
2010

Peer reviewed
When dog is more wolf than bone: Computational and electrophysiological evidence for featural organization of semantic memory

Sarah Laszlo
Carnegie Mellon University

Blair Armstrong
Carnegie Mellon University

Joseph MacInnes
Oculus Info. Inc.

David Plaut
Carnegie Mellon University

Kara Federmeier
University of Illinois, Urbana-Champaign

Abstract: Semantic space algorithms account for human performance in semantic tasks via knowledge representations derived from the analysis of large text corpora. The N400 Event-Related Potential (ERP) component is thought to reflect automatic access of the same lexical-semantic information. We trained LSA (Landauer & Dumais, 1997) and HAL (Lund & Burgess, 1997) on a random selection of Wikipedia articles and compared the algorithms’ performance at predicting the similarity between N400 waveforms elicited during reading. HAL was best at explaining the ERP data, suggesting that its representations—thought to be more semantic-featural than lexical-associative in nature—are most similar to those automatically accessed during N400 processing. These results are consistent with findings that, although the N400 is sensitive to lexical relationships, it seems to represent access of information arranged primarily by semantic features. Preliminary evaluations of other algorithms (e.g., COALS, Rohde, Gonnerman & Plaut, submitted) further support this conclusion.