

# **Decoding Affirmative and Negated Action-Related Sentences in the Brain with Distributional Semantic Models**

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## **Abstract**

Recent work shows that distributional semantic models can be used to decode patterns of brain activity associated with individual words and sentence meanings. However, it is yet unclear to what extent such models can be used to study and decode brain activity patterns associated with specific aspects of semantic composition such as the negation function. In this paper, we investigate the extent to which distributional semantic models of action-verbs correlate with brain activity associated with negated and affirmative sentences containing hand-action verbs. Our results show reduced correlations for sentences where the verb is in the negated context, as compared to the affirmative one, within brain regions implicated in action-semantic processing. The results lend support to the idea that negation involves reduced access to aspects of the affirmative representation and pave the way for further testing alternate distributional-based semantic models of negation against human semantic processing in the brain.