

**Tel-Aviv University  
The School of Philosophy, Linguistics and Science Studies  
Department of Linguistics**

## **THURSDAY INTERDISCIPLINARY COLLOQUIUM**

**Thursday 31.12.2020  
16:15-17:45**

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### **Neuroimaging of scalar implicatures: task differences and individual differences**

Statements such as ‘Some elephants are mammals’ have two distinct interpretations: certain speakers accept them as true, adopting a logical interpretation (‘some and possibly all’), while most speakers reject them as false, following a pragmatic interpretation (‘some but not all’; see Noveck, 2001). The pragmatic interpretation is arrived at through the calculation of a scalar implicature (SI). The rates of speakers who respond pragmatically or logically can vary across different experimental manipulations (e.g. Papafragou and Musolino, 2003). Our study uses neuroimaging tools in order to better understand these behavioral differences between speakers and across tasks. Such tools provide more sensitive measures that can discern between various underlying processes, which cannot be detected behaviorally. Our main aims were (1) determine whether participants that respond logically or pragmatically recruit the same linguistic and extra-linguistic networks, and (2) examine brain activation differences between tasks in order to better understand the underlying processes involved in SI calculation.

We performed two experiments, each using a different task, and examined brain activation in response to conditions that promote scalar implicature calculation. We examined differences between the tasks, as well as between a group of individuals that gave pragmatic responses and a group of individuals that gave logical responses. Experiment 1 used a simple verification task, which typically shows both pragmatic and logical responses. For the critical SI condition, we observed activations in frontal and prefrontal regions, such as the left inferior frontal gyrus (IFG), left medial frontal gyrus (MeFG) and left anterior middle frontal regions (MFG; Brodmann Area 10) in both pragmatic and logical responders. These results might suggest that SIs are calculated even when logical responses are given.

Experiment 2 used a picture-selection task, which typically shows only pragmatic responses. We examined brain activation within the brain regions observed Experiment 1. Critically, BA10, that was linked to decision making, did not show activation differences for sentences with and without SIs in Experiment 2. This seems to suggest that decision making process is critically involved in the verification task.

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