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# The semantics of space: Integrating linguistic typology and cognitive neuroscience

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## Abstract

In the cognitive neuroscience literature on the distinction between categorical and coordinate spatial relations, it has often been observed that categorical spatial relations are referred to linguistically by words like English prepositions, many of which specify binary oppositions—e.g., *above/below*, *left/right*, *on/off*, *in/out*. However, the actual semantic content of English prepositions, and of comparable word classes in other languages, has not been carefully considered. This paper has three aims. The first and most important aim is to inform cognitive neuroscientists interested in spatial representation about relevant research on the kinds of categorical spatial relations that are encoded in the 6000+ languages of the world. Emphasis is placed on cross-linguistic similarities and differences involving deictic relations, topological relations, and projective relations, the last of which are organized around three distinct frames of reference—“intrinsic, relative, and absolute. The second aim is to review what is

currently known about the neuroanatomical correlates of linguistically encoded categorical spatial relations, with special focus on the left supramarginal and angular gyri, and to suggest ways in which cross-linguistic data can help guide future research in this area of inquiry. The third aim is to explore the interface between language and other mental systems, specifically by summarizing studies which suggest that although linguistic and perceptual/cognitive representations of space are at least partially distinct, language nevertheless has the power to bring about not only modifications of perceptual sensitivities but also adjustments of cognitive styles.



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## Keywords

Language; Linguistic typology; Prepositions; Semantics; Space

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