

A number - object word priming effect:
low numbers prime "root" and high numbers prime "roof"

EITHER

Both language and numeric processing have been shown to have strong spatial associations. Those findings have typically been interpreted as evidence against cognition as an amodal and abstract system (Barsalou, 1999). In the language domain, for example, it has been shown that words referring to entities that are typically located in the upper visual field (e.g. *roof*) facilitate hand responses that involve an upwards motion (Lachmair et al., 2011), in contrast words referring to entities that are typically located in a lower position (e.g. *root*) facilitate downwards responses. Interestingly, similar spatial associations have been reported for numeric processing (e.g. Schwarz & Keus, 2004). Hereby it is suggested that humans have a mental representation of numbers in space, whereby high numbers (e.g. 9) are associated with right and upper spatial positions, and low numbers (e.g. 1) with the left and lower positions. Thus, both linguistic and numeric cognition are related to spatial processing, supporting the view that all cognitive processes are grounded in experience. Despite growing evidence regarding the grounding of language and number processing in space, little is known regarding the interactions between those domains themselves. Does number processing affect linguistic processing? How do those processes relate to each other? In the present study we are concerned with the relations between numeric and linguistic processing. If the spatial associations of language and numbers are directly related, we would expect to find strong interactions between number and language processing. Thus, we conducted an experiment where words referring to entities typically located in the upper or lower visual field (e.g. *roof* vs. *root*) were preceded by a 100 ms visually presented high or low number (1, 2 vs. 8, 9). Participants had to perform a lexical decision task. The results show a significant priming effect: words denoting a referent with a typical upper location in the world, such as *roof*, were processed faster with a large number prime (8, 9) than with a small number prime (1, 2). The reversed pattern holds for words denoting a referent with a lower location in the world, such as *root*: small numbers as primes facilitated processing of those words. Hereby words were controlled for the size of their referents.

In summary, these findings suggest that word reading can be facilitated by number primes that are spatially related to congruent positions (e.g. 1, 2 = down vs. 8, 9 = up). We currently conduct two further experiments where we want to replicate this effect with two other sets of stimuli: nouns with a positive or negative valence and verbs. Implications for the embodied cognition view will be discussed.

Literature

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