

Exploring Systematic Spatial Association Effects Arising from Language Experience Alone

Evidence suggests that language encodes spatial knowledge often attributed to sensorimotor experience. This study examines whether language alone can encode spatial information by testing how non-spatial directional biases retrieved from natural language influence human spatial intuitions and motor responses. To this end, we used words not typically linked to spatial locations as stimuli, uniformly distributed based on their linguistic index (LI), which quantified their association with vertical space using a text-based computational model. In Experiment 1, participants rated the spatial association of non-spatial words using the Best-Worst Scaling method. Results showed that LI significantly predicted human associations ($p < 0.001$), supporting the idea that spatial structures can emerge from language use. In Experiment 2, participants categorized words as abstract or concrete by dragging them to a lower or upper target in a mouse-tracking task. Results revealed an interaction between LI and movement direction: words linguistically associated with 'up' slowed downward movements ($p = 0.045$). These findings suggest linguistic exposure alone can shape spatial knowledge, challenging strong embodiment theories.