

Keeping track of spatial information of objects in mapping language on visual information

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In recent years, an increasing volume of research has explored the processes by which listeners/readers mentally ‘simulate’ motion events in language processing. In particular, the issue of the updating of spatial representations has attracted much attention in research that investigates the mapping between linguistic and visual stimuli (e.g., Zwaan et al., 2004; Richardson & Matlock, 2007).

We present three ‘visual-world’ experiments in this paper. In Experiment 1, we demonstrate how discourse context could modulate listeners’ expectations with respect to the locations of depicted objects (cf. Altmann & Kamide, 2004). The results showed that listeners identify objects in their ‘interpreted’ positions more often when the discourse indicates movement of the objects than when it does not. (e.g., the table was looked at more often at the end of the second sentence in ‘*The woman will move the glass onto the table. Then, she will pour the wine carefully into the glass.*’ than ‘*The woman is too lazy to move the glass onto the table. Instead, she will...*’).

Experiment 2 focuses on spatial information regarding the causal agent. For example, participants saw a scene depicting a girl, a bicycle and a teddy bear all close together, a house near the girl, a church a little further than the house, and another (identical) house on the far side of the church. Participants heard either ‘*The girl will push the bicycle past the church*’ or ‘*The girl will throw the teddy past the church*’ followed by ‘*And then, she will go into the house*’. In the 1st case, but not the 2nd, the girl can be inferred to move towards the further house. During ‘*the house*’ there were indeed more looks to the further house in this condition than in the ‘*throw*’ condition. Also, during ‘*she will*’ in the second sentence, the girl was looked at more often when the girl had not moved than when she had. These results suggest that the spatial location of the agent can be inferred from combinatory semantic information and world knowledge (‘*push*’ does not entail the agent’s motion, as in ‘*push the button*’).

Experiment 3 is similar, but explores the time-course with which temporal information (replacing ‘*and then*’ with ‘*but first*’) can modulate the tracking of the current spatial positions of the protagonists in the event.

The data suggest a complex interplay between linguistic and world knowledge during the tracking of situation-relevant changes in location.