Spatiotemporal Metaphors and its Perceptual Alignment in Temporal Cognition

The question of whether language affects thought has a long history of debate in the field of linguistics. Previous work has used spatiotemporal metaphors as a test bed to investigate the relationship between language and thought (e.g., Boroditsky, 2001; Gu et al., 2019). These studies show that spatiotemporal metaphors in language promotes structural alignment between space and time domains, which may lead to the transfer of relational structures from the spatial realm to the temporal domain (Boroditsky, 2001: 20). Here, we ask whether different space-time linguistic mappings shape temporal cognition. We use spatiotemporal metaphors in Mandarin to investigate whether the preference for a given spatiotemporal metaphor affects how native speakers conceptualize certain time units. Mandarin has two types of spatiotemporal metaphors: horizontal (*qián* "front" and *hòu* "back") and vertical (*shàng* "up" and *xià* "down"). We hypothesize that native speakers prefer different spatial metaphors when talking about different units of time (for instance, people prefer horizontal metaphors over vertical metaphors when talking about the unit 'hour'). **Experiment 1** is a norming study that examines what spatiotemporal metaphors native speakers prefer for eight time units (i.e., second, minute, hour, day, week, month, year and century). Participants were presented with a forced-choice task where they chose between two sentences containing one of the time units expressed using a vertical and a horizontal metaphor respectively. The results of Experiment 1 show that people prefer horizontal metaphors for hour and day, and vertical metaphors for week, month, and century. No statistically significant preference is shown on second, minute, and year. **Experiment 2** consists of a priming study, where participants are primed with images depicting two objects in either a vertical or horizontal relation (see Fig. 1). After being shown a prime image, participants were asked to answer a time-related question of the form "Christmas day is later than Mid-Autumn Day." Shorter reaction times (RTs) in providing an answer to the target question would indicate that the participants benefitted from the prime. A paired t-test shows that the difference in RTs after horizontal prime and after vertical prime in hour and day questions is less than the difference in week, month, and century questions (see Fig. 2). People benefit from vertical primes overall, but relatively, they benefit from horizontal prime for hour and day and vertical prime for week, month and year. This result aligns with our observation in Experiment 1 that people prefer horizontal metaphors in hour and day, and vertical metaphors in week, month, and century. The preference in metaphor reflects on RTs. Taken together our results support the view that the space-time mapping in language affects temporal cognition, and that language specific devices expressing temporal relations such as spatiotemporal metaphors impact the way in which time is cognitively construed.

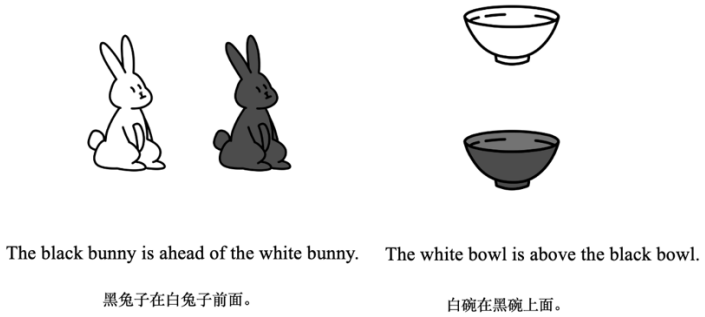

Fig. 1 Example of Horizontal and Vertical Prime

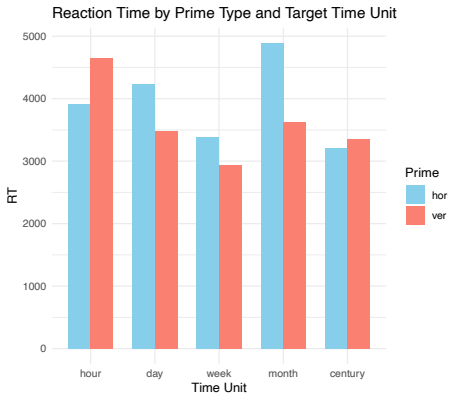

Fig 2. RT by Prime Type and Time Unit

Citation

Boroditsky, (2001). Does language shape thought?: Mandarin and English speaker's conception of time.

Gu et al. (2019). Having a different pointing of view about the future: The effect of signs on co-speech gestures about time in Mandarin–CSL bimodal bilinguals.