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**A helping hand putting in order: visuomotor routines organize numerical and non-numerical sequences in space.**

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Summary: Theories of embodied cognition emphasize the importance of sensorimotor schemas linked to external world experience for representing conceptual knowledge. Accordingly, some researchers have proposed that the spatial representation of numerical and non-numerical sequences relies on visuomotor routines, like reading habit and finger counting. There is a growing interest in how these two routines contribute to the spatial representation of ordinal sequences, although no investigation has so far directly compared them. The present study aims to investigate how these routines contribute to represent ordinal information in space. To address this issue, bilingual participants reading either from left-to-right or right-to-left were required to map ordinal information to all fingers of their right dominant hand. Critically, we manipulated both the direction of the mapping and the language of the verbal information. More specifically, a finger-mapping compatibility task was adopted in three experiments to explore the spatial representation of numerical (digit numbers and number words) and non-numerical (days of the week, presented in Hebrew and in English) sequences. Results showed that numerical information was preferentially mapped according to participants' finger counting habits, regardless of hand posture (prone and supine), number notation and reading habit. However, for non-numerical ordinal sequences, reading and finger counting directions both contributed to determine a preferential spatial mapping. These findings indicate that abstract knowledge representation relies on multiple over-trained visuomotor routines. More generally, these results highlight the capacity of our cognitive system to flexibly represent abstract ordered information, by relying on different directional experiences (finger counting, reading direction) depending on the stimuli and on the task at hand.

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