

Abstract emotional language embodiment in Chinese-English bilinguals: A study of a web-suited valence-space vertical paradigm

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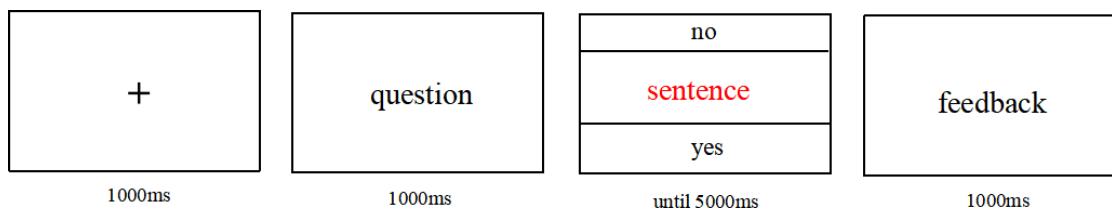
Embodied cognition theories emphasize the role of *mental imagery* or *internal simulation* in language comprehension and processing, underlying the intimate connection between cognition and sensorimotor experiences (e.g. Barsalou 1999; Pecher et al. 2011). The conceptual metaphor theory (Lakoff and Johnson 1980) proposes that not only concrete concepts but also abstract concepts, such as human emotions, can be embodied by being mapped to sensorimotor experiences. For instance, the pair of orientational metaphors “positive is up; negative is down” refers to the fact that a drooping posture often accompanies feelings of sadness and depression, whereas an upright posture aligns with positive emotional states. While empirical evidence supports the embodiment of spatial relations in native language processing, the extent of embodiment in second languages (L2) is still debated, particularly in emotional and figurative language comprehension.

To investigate the embodiment of metaphor concepts in emotional language comprehension in both L1 Chinese and L2 English, we designed a web-based sentence valence-space vertical paradigm informed by previous research (ACE paradigm: Glenberg and Kaschak 2002; emotion-specific vertical Stroop paradigm: Lachmair et al. 2011; Dudschig et al. 2014, 2015; Schütte et al. 2023). Thirty-five Chinese-English late bilinguals participated in three experiments, in which they read positive and negative sentences as critical trials, and neutral statements as fillers in L1 Chinese (Experiment 1, Table 1) and L2 English (Experiment 2 and 3), and had to answer the question “Does this sentence contain emotion?” by dragging the mouse vertically up or down (Figure 1).

Table 1. Examples of critical (positive and negative) and filler (neutral) stimuli sentences in Chinese and English.

	Positive	Negative	Neutral
Chinese	你情绪高涨。	你在绝望的深渊。	你走进房间。
English	You are feeling high.	You are in low spirits.	You walk into the room.

Figure 1. Trial structure in a web-suited valence-space vertical paradigm to examine the valence-space compatibility effect in current study.



The results showed the predicted *valence x response direction* interaction only in reaction times (RTs) in L1 Chinese. In L2 English, however, a robust positive facilitation was found, i.e., positive sentences were responded to significantly faster. Mouse movement times (MTs) were significantly shorter in the up direction in L1 Chinese. In L2 English, MTs were shorter in response to positive sentences, with a significant facilitation in the positive and up condition.

All in all, the results confirm the embodiment of emotional metaphors in L1 Chinese and suggest the embodiment of positive emotions in L2 (e.g., Sheikh and Titone 2016), with the spatial aspect accessed with some delay in figurative language processing.

References

Barsalou, Lawrence W. (1999), Perceptual symbol systems, *Behavioral and Brain Sciences* 22(4), 577-660. (DOI: 10.1017/s0140525x99002149)

Dudschig, Carolin, Irmgard De La Vega and Barbara Kaup (2014), Embodiment and second-language: Automatic activation of motor responses during processing spatially associated L2 words and emotion L2 words in a vertical Stroop paradigm, *Brain and Language* 132, 14-21. (DOI:10.1016/j.bandl.2014.02.002)

Dudschig, Carolin, Irmgard De La Vega and Barbara Kaup (2015), What's up? Emotion-specific activation of vertical space during language processing, *Acta Psychologica* 156, 143- 155. (DOI: 10.1017/s0140525x99002149)

Glenberg, Arthur M., and Michael P. Kaschak (2002), Grounding language in action, *Psychonomic Bulletin and Review* 9(3), 558-565. (DOI: 10.1016/j.actpsy.2014.09.015)

Lachmair, Martin, Carolin Dudschig, Monica De Filippis, Irmgard De La Vega and Barbara Kaup (2011), Root versus roof: automatic activation of location information during word processing, *Psychonomic Bulletin and Review* 18(6), 1180-1188. (DOI: 10.3758/s13423-011-0158-x)

Lakoff, George, and Mark Johnson (1980), *Metaphors we live by*. University of Chicago, Chicago,IL.

Pecher, Diane, Inge Boot and Saskia Van Dantzig (2011), Abstract concepts: Sensory-motor grounding, metaphors, and beyond, *Psychology of Learning and Motivation* 54, 217-248. (DOI: 10.1016/B978-0-12-385527-5.00007-3)

Schütt, Emanuel, Ian Grant Mackenzie, Barbara Kaup and Carolin Dudschig (2023), Replacing vertical actions by mouse movements: a web-suited paradigm for investigating vertical spatial associations, *Psychological Research* 87(1), 194-209. (DOI: 10.1007/s00426-022-01650-6)

Sheikh, Naveed A. and Debra Titone (2016), The embodiment of emotional words in a second language: An eye-movement study, *Cognition and Emotion* 30(3), 488-500. (DOI: 10.1080/02699931.2015.101814)