

VISUAL PERCEPTION AND PHYSICAL ACTION IN VALENCE WORD LEARNING

Sho Akamine (Max Planck Institute for Psycholinguistics), Akari Omine (Okinawa International University), Tsuyoshi Kohatsu (University of the Basque Country), Keiyu Niikuni (Niigata Seiryō University) & Manami Sato (Okinawa International University)
sho.akamine@mpi.nl

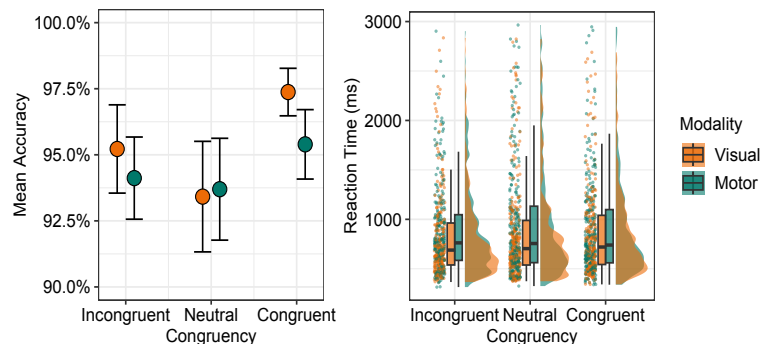
Introduction: People understand and express abstract ideas (e.g., positive/negative valence) in terms of concrete ideas (e.g., up/down) [1]. Empirical research shows that upward and downward motor actions can generate positive and negative feelings and memories [2]. Moreover, metaphor-congruent motor actions facilitate word learning [3], although no study has tested how visual perception might contribute to this effect.

Purpose: This study examines the roles of visual perception and physical actions of up and down movement in the learning of words that carry either positive or negative valence.

Materials: Stimuli were 48 pronounceable English pseudowords based on frequently used English words (e.g., *posaro*, 'potato') with: (i) 5 letters, 2 syllables; (ii) 6 letters, 2 syllables; (iii) 6 letters, 3 syllables; or (iv) 7 letters, 3 syllables. The pseudowords were assigned meanings associated with Japanese translations of positive (e.g., 'joy') and negative (e.g., 'trouble') valence words from the ANEW corpus [4]. Each participant saw a balance of positive and negative words. Stimuli were presented via digital flashcards, each with one English pseudoword on the upper part and its Japanese translation on the lower part.

Experiment: Thirty right-handed native Japanese speakers participated in six sets consisting of a study session and a test session. In the study session, participants studied eight flashcards (four positive, four negative; six seconds) three times. They were instructed to think about whether each word had a positive or negative meaning [3]. In the test session, they selected the correct translation for each pseudoword from a pair of translations, one correct and another that fit a different pseudoword in the same study session.

Conditions: Six conditions were created by manipulating two factors: Modality (Visual/Motor) and Directional Congruency (Metaphor-Congruent/Incongruent/Neutral). In the Visual conditions, during the study phase, each pseudoword automatically moved up or down (depending on Directional Congruency) to clear the screen for the next item. In the Motor conditions, participants either tapped the word (no directionality) or swiped it upward or downward to clear the screen. In the Metaphor-Congruent conditions, positive words moved upward either automatically (in the Visual condition) or by being swiped upward (in the Motor condition), while negative words automatically moved (Visual condition) or were swiped (Motor condition) downward. In contrast, in the Motor/Metaphor-Incongruent condition, the word valence and the (automatic or manual) directionality were the opposite. In the Motor/Neutral condition, the participants tapped the screen to proceed.



Results: LME, with random intercepts for participants and items, yielded two main results: (1) Significantly higher accuracy in the Congruent (96.1%) than in the Neutral (93.5%) ($p < .05$) conditions, regardless of Modality; (2) A significant main effect of Modality ($p < .05$) on reaction time, showing that pseudowords were recognized faster when learned in the Visual condition.

Discussion: This study empirically supports prior research [3] showing that directional congruency between word movement and valence improves word learning. The study also reports a new finding: the automatic movement of learning objects in accordance with valence supports learning more powerfully than participants' movements. This is inconsistent with the prior claim [3] of a privileged role for physical action in improving word learning.

References: [1] Lakoff, G. & Johnson, M., 2003; [2] Casasanto, D. & Dijkstra, K., 2010; [3] Casasanto, D. & de Bruin, A., 2019; [4] Bradley, M. M. & Lang, P. J., 1999.