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The influence of vertical motor responses on explicit and incidental processing of power words

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ABSTRACT

There is increasing evidence demonstrating that power judgment is affected by vertical information. Such interaction between vertical space and power (i.e., response facilitation under space–power congruent conditions) is generally elicited in paradigms that require participants to explicitly evaluate the power of the presented words. The current research explored the possibility that explicit evaluative processing is not a prerequisite for the emergence of this effect. Here we compared the influence of vertical information on a standard explicit power evaluation task with influence on a task that linked power with stimuli in a more incidental manner, requiring participants to report whether the words represented people or animals or the font of the words. The results revealed that although the effect is more modest, the interaction between responses and power is also evident in an incidental task. Furthermore, we also found that explicit semantic processing is a prerequisite to ensure such an effect.

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1. Introduction

How abstract concepts such as power are mentally represented is an essential question that has received much attention within the domain of cognitive psychology. In the psychological literature, power has been defined as the ability or capacity to influence others through the control of resources (Galinsky, Gruenfeld, & Magee, 2003; Keltner, Gruenfeld, & Anderson, 2003). In daily life, when we talk about power, we often use vertical information in our language. For example, leaders who supervise their employees have "high" status, or are "up" in the hierarchy, whereas the employees are at the "lower" levels of the hierarchy. Simply put, power is metaphorically understood as vertical height in physical space: "control is up, lack of control is down" (Lakoff, 1987; Lakoff & Johnson, 1980).

This idea is broadly in line with the grounded cognition framework (e.g., Barsalou, 1999, 2008; Glenberg, 1997), which argues that conceptual thinking involves perceptual simulation. Representing abstract concepts reactivates previously stored information from sensory-motor experience to form a simulation of this sensory-motor experience. Supporting this analogue, several lines of evidence suggest the interactions between sensory-motor experience and power (Chiao, 2010; Chiao et al., 2009; Giessner & Schubert, 2007; Mason, Magee, & Fiske, 2014; Schubert, 2005; Zanolie et al., 2012).

First, power judgments are affected by spatial information in the vertical dimensions provided by vision. In one of their experiments, Schubert (2005) presented participants with a series of pairs of group labels (e.g., employer–employee,

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master–servant), one at the top and the other at the bottom of the screen, and required them to judge which label was powerful. Participants reacted faster when powerful group labels appeared at top and powerless group labels appeared at the bottom. In the other experiments, single words referring to powerful or powerless groups were presented. Participants decided whether the word represented a powerful or powerless group. The stimulus position (either at the top or at the bottom of the computer screen) or response key (up or down cursor keys) was manipulated. Interactions between stimulus position or response key and power were found, i.e. participants responded faster to powerful groups when they appeared at the top of the screen and to powerless groups when they appeared at the bottom of the screen, and they responded faster to powerful groups with the up cursor key and to powerless groups with down cursor key.

Second, neuroimaging studies on a related abstract concept (i.e. social status) demonstrated that status judgment was mediated by parietal lobe regions that process up and down in allocentric space (Chiao, 2010; Chiao et al., 2009; Mason et al., 2014); these findings also point to partially overlapping mental representations of power and space. Given that people who have high status often hold power, status judgments likely also include power appraisal. Results from these neuroimaging studies thus implicate the parietal lobes as a locus of interactions between space and power.

A third stream of research has shown that processing the concept of power produced an implicit reorientation of visuospatial attention, whereby powerful words bias attention upwards and powerless words bias attention downwards. In a recent study, target letters preceded by power judgment of words were identified faster when their spatial position was congruent with the perceived power of the preceding word than when it was incongruent (Zanolie et al., 2012). Higher P1 amplitude was also recorded for congruent trials (Zanolie et al., 2012). These effects are thought to result from an up–down image schema automatically activated during power processing.

If power is really represented as vertical space in human mind, such up–down image schema may also be activated under conditions that do not necessitate the explicit power appraisal. However, the extant literature focuses largely on tasks in which the power value of items was explicitly evaluated. This kind of explicit power appraisal is relatively unusual in daily life. In most daily tasks, power-processing occurs in relatively automatic associations between internal power representation and external stimuli (e.g., Meier & Dionne, 2009), which are not necessarily explicit. These automatic associations might be better reflected by incidental links between power and external stimuli. For example, when obeying a manager's order, one never directly asks "Is my boss powerful?" Instead, incidental power-processing predicts such behaviors automatically. The aim of the current investigation is to examine the interactions between vertical dimension and power under such indirect conditions.

To test this, we compared the influence of vertical information on a standard explicit power evaluation task with vertical influence on a task that linked power with stimuli more incidentally. The explicit task involved a standard power judgment paradigm (Schubert, 2005; Schubert, Waldzus, & Giessner, 2009; Zanolie et al., 2012) in which participants decided whether the words represented a powerful or powerless group. The incidental task, in contrast, required participants to report whether the words represented people or animals (Experiment 1) or the font of the words (Experiment 2). To induce vertical dimension to the task, we manipulated vertical motor responses, which produce a strong influence on explicit power judgments (Schubert, 2005). Up and down motor response (up or down cursor keys) is analogous to vertical movement of an external object (Hommel, Musseler, Aschersleben, & Prinz, 2001; Neumann & Strack, 2000). Compared to vertical location, Schubert (2005) showed vertical motor responses not only affected response latency, but also accuracy of power judgments.

2. Experiment 1

To replicate the previous study (see Schubert, 2005), an interaction between response key and power was expected to emerge under conditions of explicit power appraisal, i.e. participants should respond faster to powerful words with the up cursor key, and faster to powerless words with the down cursor key. We also predicted an interaction to emerge under conditions of incidental power-item associations.

2.1. Method

2.1.1. Participants

Forty-eight right-handed volunteers from the university community with normal or corrected-to-normal vision (27 males, 24.02 years old (SD = 3.23)) participated in this experiment. Half of the participants were assigned to the explicit condition and the other half were assigned to the incidental condition. Before the experiment, all the participants were asked which was their dominant hand, i.e., which hand they used to write or hold chopsticks. All the participants reported that they were right-handed.

2.1.2. Materials

Sixty-four group labels in two 'kind' groups (32 people and 32 animals) were selected as materials (see Appendix A). Half of the labels (16 people & 16 animals) referred to powerful groups (e.g., king) and the other half to powerless groups (e.g., servant). Another 5 group labels adopted as practice items appeared twice in the beginning of each block. Following the method of Schubert (2005), 12 participants (6 males) who were not included in the formal experiment were recruited to rate the power of each word on a 7-point Likert scale, 1 indicating extremely powerless and 7 indicating extremely powerful. The

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