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# Emergent Meaning in Affective Space: Conceptual and Spatial Congruence Produces Positive Evaluations

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## Abstract

Based on the theory of conceptual metaphor we investigated the evaluative consequences of a match (or mismatch) of different conceptual relations (good vs. bad; abstract vs. concrete) with their corresponding spatial relation (UP vs. DOWN). Good and bad words that were either abstract or concrete were presented in an up or down spatial location. Words for which the conceptual dimensions matched the spatial dimension were evaluated most favorably. When neither of the two conceptual dimensions matched the spatial dimension, ratings were not as favorable as when the dimensions did match, but were still significantly more favorable than when one conceptual category was matched with the spatial category (e.g., UP and abstract), while the other one was not (e.g., UP and bad). Results suggest that a metacognitive feeling of fluency can produce an additional layer of evaluative information that is independent of actual stimulus valence.

## Background

A recent theory of conceptual structure proposes that bodily processes influence and constrain cognitive information processing, and that the resulting knowledge is structured in a largely metaphorical way (Gibbs, 1994; Lakoff & Johnson, 1980, 1999). According to this view, the body is a source of knowledge, and by means of conceptual metaphors, very basic “embodied” concepts are mapped onto more abstract concepts. For instance, the basic orientation of the human body in space (certain things are “up” or “down”, relative to the body) is used when conceptualizing abstract categories, such as emotions, when metaphorically talking about “feeling up” or “down”. Thus, metaphor, defined as “*understanding and experiencing one kind of thing in terms of another* (Lakoff & Johnson, 1999, p. 5, emphasis in original),” does not merely concern language usage. How we use metaphor to talk about things also has implications for how we act upon, and think about those things.

Central to the theory of conceptual metaphor is the notion of “image schema” (Johnson, 1987, 1999), which describes a pattern of perceptual experience that emerges from very basic bodily activities. For instance, the sensorimotor experience of moving with one’s own body through space

results in the image schema of VERTICALITY, or the understanding that we usually function in an upright position, with a clear up-down orientation. Indeed, spatial perceptions and spatial language are closely intertwined (Hayward & Tarr, 1995; Miller & Johnson-Laird, 1976; Richardson, Spivey, Barsalou, & McRae, 2003; Tolaas, 1991). Spatial metaphors derived from the concrete concept of VERTICALITY can be used to describe various abstract concepts:

GOOD IS UP; BAD IS DOWN:

Things going *downhill*; Feeling *down* in the dumps

ABSTRACT IS UP; CONCRETE IS DOWN:

*Higher-order* categories; *sub-types*

Thus, many image schemata are hypothesized to be derived from the basic experience of the body functioning in three-dimensional space: By definition, all human behavior takes place in space. As a consequence, the source domain of space provides a metaphor for multiple target domains (Lakoff & Johnson, 1980, 1999).

Indeed, evidence has been obtained supporting the notion that concrete spatial relations provide opportunities for mapping conceptual relations. For instance, time is often conceptualized as movement through space (Boroditsky, 2000; Boroditsky & Ramscar, 2002; Gentner & Imai, 1992; Gentner, Imai, & Boroditsky, 2002). Graphs are easier to understand when an increase in quantity is represented by an increase in slope, corresponding to the spatial metaphor of MORE IS UP (Gattis & Holyoak, 1996). Inferences about given premises are more accurate when the premises are mapped onto a spatial medium, compared to when they are not (Schnall & Gattis, 1998). Positive words are categorized faster when they are presented in an upward location, whereas negative words are categorized faster when they are in a downward location (Meier & Robinson, 2004). Thus, when spatial relations can be mapped onto corresponding conceptual relations, cognitive operations are facilitated.

In the current study we investigated the confluence of spatial relations and conceptual relations. As noted earlier, spatial concepts, such as VERTICALITY, serve as the source domain for various target domains, such as goodness/badness, and concreteness/abstractness. Figure 1

describes the relationship between the source domain VERTICALITY and those two target domains. Both target domains have an implicit connection with the source domain. For example, the concept “love” is good and abstract, and both those conceptual categories are conceptualized as UP.

Table 1: Relationship between spatial and conceptual dimensions.

|       |      | CONCEPT |              |
|-------|------|---------|--------------|
|       |      | VALENCE | CONCRETENESS |
| SPACE | UP   | Good    | Abstract     |
|       | DOWN | Bad     | Concrete     |

The goal of the current study was to investigate the effect of a match (or mismatch) of two different conceptual relations with their corresponding spatial relation. The spatial dimension we investigated was VERTICALITY (UP vs. DOWN), and the two conceptual dimensions were VALENCE (*good* vs. *bad*) and CONCRETENESS (*concrete* vs. *abstract*). The spatial dimension was varied by a simple perceptual manipulation: The stimulus word, which consisted of a good (or bad) word that was either abstract (or concrete) was placed either on top, or on the bottom of the page on which participants evaluated the word.

Table 2 describes the different ways in which the relations can either be matched or mismatched. *Congruent relations* are present when both relations are matched, such as when good, abstract concepts are UP (top panel of Table 2, denoted by “+ +”), but also when both relations are mismatched, such as when bad, concrete concepts are UP (denoted by “- -”). In the latter case neither of the conceptual dimensions matches the spatial dimension, therefore no conflict between the spatial and conceptual relations exists. In contrast, *incongruent relations* are present when only one of the two conceptual dimensions matches the spatial dimension, and the other one does not.

We expected that the extent to which the two conceptual dimensions were in accordance with the spatial dimension would influence the perceived valence of the stimulus words. Specifically, we predicted that when both relationships are matched, as is the case for the congruent “+ +” conditions, stimuli should be rated more favorably. Further, for the congruent “- -” conditions, stimuli should be perceived as less positive than in the congruent “+ +” conditions, but as more positive than in any of the incongruent “+ -” “- +” conditions. This hypothesis regarding the mapping of spatial and conceptual dimensions was tested by presenting participants with strongly positive

and strongly negative words that were either abstract or concrete, and thus the content of the words crossed both conceptual dimensions of goodness/badness and abstractness/concreteness. Each word was presented either on top, or on the bottom of a piece of paper, and participants evaluated how good the word was.

Table 2: Congruent (“+ +” “- -”) and incongruent (“+ -” “- +”) relations of spatial and conceptual dimensions.

| Stimulus                                 | SPACE | VALENCE                 | CONCRETENESS                     |
|--|-------|-------------------------|----------------------------------|
|  |       | Good = UP<br>Bad = DOWN | Abstract = UP<br>Concrete = DOWN |
| Good<br>Abstract<br>e.g., <i>talent</i>  | UP    | +                       | +                                |
| Good<br>Concrete<br>e.g., <i>palace</i>  | UP    | +                       | -                                |
| Bad<br>Abstract<br>e.g., <i>malice</i>   | UP    | -                       | +                                |
| Bad<br>Concrete<br>e.g., <i>bullet</i>   | UP    | -                       | -                                |
| Bad<br>Concrete<br>e.g., <i>blisters</i> | DOWN  | +                       | +                                |
| Bad<br>Abstract<br>e.g., <i>neglect</i>  | DOWN  | +                       | -                                |
| Good<br>Concrete<br>e.g., <i>circus</i>  | DOWN  | -                       | +                                |
| Good<br>Abstract<br>e.g., <i>passion</i> | DOWN  | -                       | -                                |

## Method

### Participants

Participants were 61 undergraduate students from the University of Virginia who received course credit.

**Procedure**

Participants filled out a survey as part of an experimental session. Instructions specified that the participant’s task was to make a judgment about how good or how bad certain words were. It was emphasized to participants that they should go with their first intuition, and that judgments should be made according to what they personally thought, rather than what other people might think.

The word stimuli were presented in the following manner (see Figures 1 and 2). Each stimulus was printed on a separate sheet of paper measuring 4 ¼ by 5 ½ inches. A horizontal line was drawn in the middle of the paper to emphasize up and down locations. The stimulus word was printed either in the space on top of the line (in the upper half of the page), or below the line (in the lower half of the page). Each word was followed by a rating scale on which the participant evaluated the word from 1 (very good) to 7 (very bad). All stimuli were assembled into a booklet that presented the stimuli in a fixed random order. Half of the stimuli were strongly positive words, the other half were strongly negative words. These words were selected from a word list for which normative affective ratings have been established (Bradley & Lang, 1999), and were matched for word length and word frequency. For each valence, half of the words were abstract (e.g., “honor,” “greed”), the other half were concrete (e.g., “bouquet,” “thief”), thus resulting in eight different experimental conditions. Each stimulus was presented only once, and each participant received all conditions.

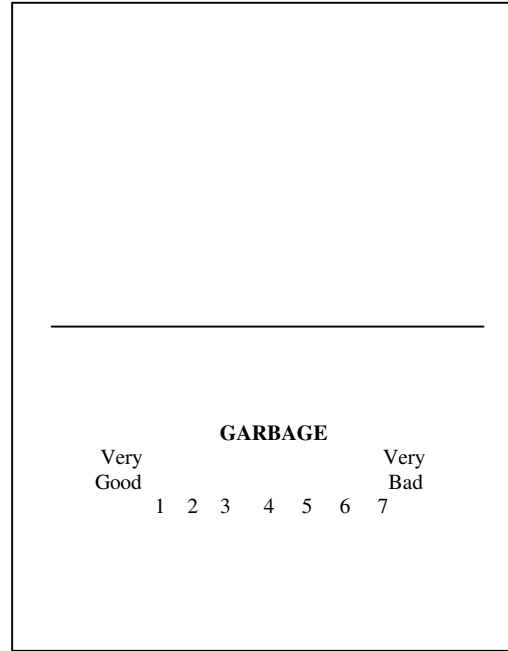


Figure 2: Spatial set-up of survey: “Bad”concrete item in downward location.

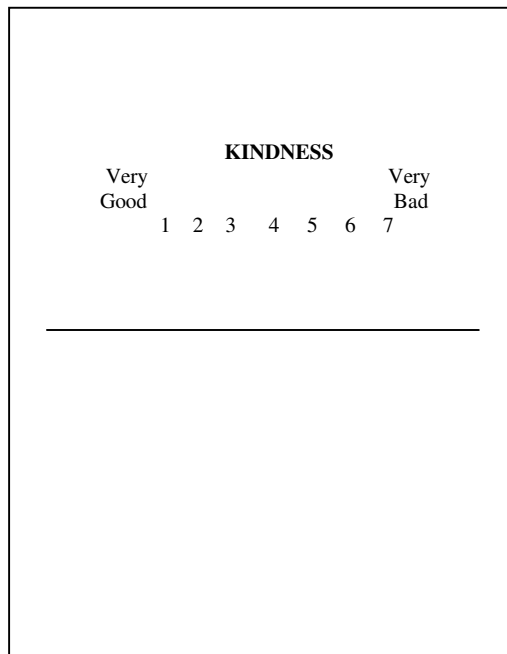


Figure 1: Spatial set-up of survey: “Good”abstract item in upward location.

Table 3: List of word stimuli.

| Good Words |           | Bad Words |           |
|------------|-----------|-----------|-----------|
| Abstract   | Concrete  | Abstract  | Concrete  |
| joy        | toy       | sin       | fat       |
| fun        | kiss      | scorn     | tomb      |
| wise       | gift      | greed     | bomb      |
| honor      | jewel     | upset     | thief     |
| brave      | dinner    | devil     | bullet    |
| talent     | palace    | deceit    | prison    |
| fantasy    | circus    | malice    | poison    |
| miracle    | delight   | misery    | blister   |
| passion    | sunset    | hatred    | morgue    |
| kindness   | bouquet   | failure   | garbage   |
| intimate   | treasure  | neglect   | hostage   |
| ambition   | sunlight  | jealousy  | mosquito  |
| affection  | butterfly | ignorance | hurricane |

**Results**

Because the valence of the words was strongly positive or strongly negative, and no interaction effect of valence and spatial position was expected (i.e., positive words were not expected to be rated as negative, or negative words as positive depending as a function of their spatial location), separate within-subjects ANOVAs were conducted for positive and negative items. For “good” words, the

interaction of spatial position and level of abstractness was significant,  $F(1, 60) = 64.48, p < .0001$ , with the highest mean for the congruent condition, namely abstract positive words presented in the up location ( $M = 5.43, SD = .40$ ) (see Figure 3). Subsequent paired-samples t-tests showed that words in the congruent condition received significantly higher positive ratings than concrete positive words in the up location ( $t(60) = -15.95, p < .0001$ ), abstract positive words in the down location ( $t(60) = -2.18, p < .03$ ), and concrete positive words in the down location ( $t(60) = -7.91, p < .0001$ ). Thus, when the perceptual dimension (UP) was matched with both conceptual dimensions (*good* and *abstract*), evaluations of the positive words became even more positive compared to when they were not.

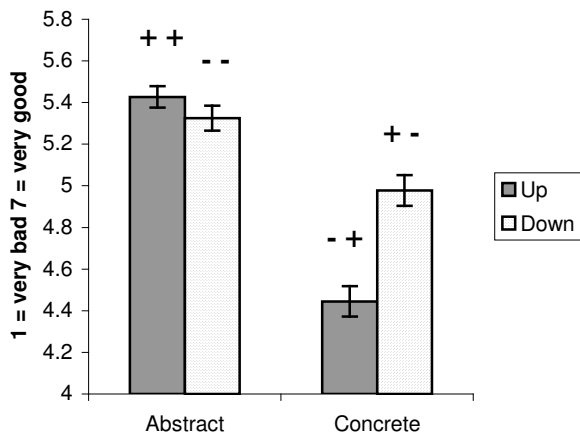


Figure 3: Mean ratings for "good" words.

For the "bad" words, there was also a significant interaction of space and level of abstractness,  $F(1, 60) = 54.60, p < .0001$ . Words in the congruent condition, that is, concrete negative words presented in the down location received the most *positive* ratings ( $M = 1.39, SD = .39$ ), and differed significantly from abstract negative words in the down location ( $t(60) = 11.06, p < .0001$ ), concrete negative words in the up location ( $t(60) = 9.24, p < .0001$ ), and abstract negative words in the up location ( $t(60) = 10.68, p < .0001$ ) (see Figure 4). Remarkably, this match between the perceptual dimension and its corresponding two conceptual dimensions did not result in making the negative words more extreme, and thus more negative; rather, as was the case for the positive words, it led to more positive ratings for the negative words.

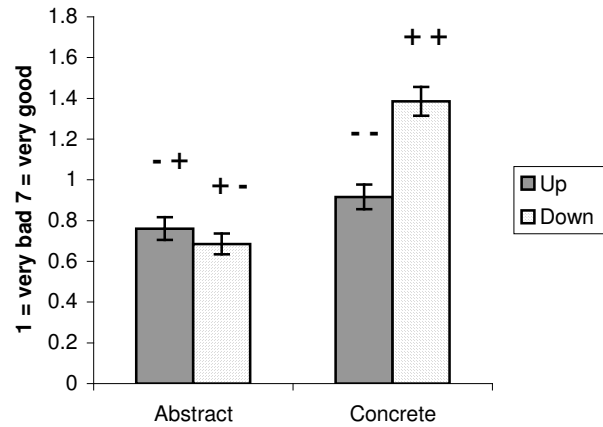


Figure 4: Mean ratings for "bad" words.

The analyses so far have dealt with the "+ +" match conditions of perceptual and conceptual dimension, denoted with two plus signs in Table 2. In addition, more positive ratings were also observed for the "- -" match conditions, denoted with two minus signs in Table 2, where the spatial dimension neither matched the valence, nor the level of abstractness of the words.

To compare specifically the congruent "+ +" with the congruent "- -" conditions, as well as with the incongruent "+ -" "- +" conditions of spatial dimension with the two conceptual dimensions, composite scores were computed. As predicted, the composite average rating for the two congruent "+ +" conditions ( $M = 3.41, SD = .23$ ) was significantly more positive than the composite average rating for the two congruent "- -" conditions ( $M = 3.12, SD = .26$ ),  $t(60) = -8.49, p < .0001$  (see Figure 7). In addition, the composite average rating for the two congruent "- -" conditions was significantly more positive than the incongruent "+ -" "- +" conditions ( $M = 2.72, SD = .23$ ),  $t(60) = -9.83, p < .0001$ .

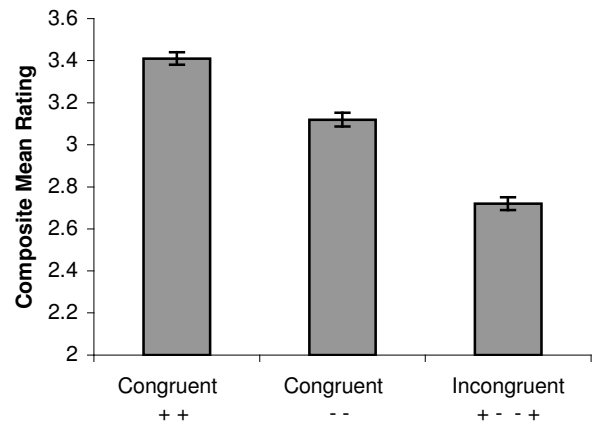


Figure 5: Composite ratings for congruent and incongruent matching conditions.

To summarize, abstract positive words presented in an up location, and concrete negative words presented in a down location were evaluated most favorably. Furthermore, when neither of the two conceptual dimensions matched the spatial dimension, that is when abstract good words were down, or when concrete bad words were up, ratings were not as favorable as when the dimensions did match, but were still significantly more favorable than when one conceptual category was matched with the spatial category (e.g., UP and abstract), while the other one was not (e.g., UP and bad).

## Discussion

We found evidence for a connection between a spatial source domain and two conceptual target domains. A match between the source domain of VERTICALITY and the two corresponding target domains of goodness/badness and abstractness/concreteness resulted in more positive evaluations for affectively toned material, regardless of whether this material was positive or negative in valence. Abstract good things were rated as even better when they were presented on top of the page, but concrete bad things were also rated as better when they were presented on the bottom of the page.

The finding regarding the negative words might be considered surprising. A different outcome might have been that the meaning of bad things was intensified with congruent spatial and conceptual dimension, so that bad things became even worse. But this is not what we found. How can this somewhat counterintuitive finding be explained? One possibility is that if conceptual relations are indeed as inherently connected to spatial relations as our findings suggest, then people are more familiar with spatially represented conceptual structure. As a consequence of this familiarity, these mappings are experienced as more pleasant. Indeed, it has been well documented that the repeated presentation of a stimulus is sufficient to increase positive affect toward that stimulus, relative to a stimulus that has not been presented repeatedly. In a classic study originating the work on the so-called mere exposure effect, Zajonc (1968) presented Chinese-looking characters, nonsense words, or yearbook photographs for either 0, 2, 5, 10 or 25 times to participants. Participants subsequently rated how “good” or “bad” the meaning of the Chinese characters, or of the nonsense words was, and how much they liked the person shown in the photographs. For all three kinds of stimuli, participants’ ratings became more positive with increased number of presentation. Many studies have since replicated and extended this basic effect, suggesting that the mere exposure effect is a very robust phenomenon (Bornstein, 1989).

Thus, it is possible that external conceptual organization that conforms with one’s own representational structure is perceived as more familiar, and therefore, as more pleasing. Perhaps our results may be regarded a *representational mere exposure effect*, where the highest positive valence is assigned to those conceptual organizations that have the highest degree of familiarity. In this regard, it is instructive

to review the explanations that have been put forward to explain the mere exposure effect.

Some have proposed that fluency of cognitive operations can explain why people like things better the more often they experience them. Fluency refers to properties of continuous information processing, such as the speed, or ease of processing (Jacoby, Kelley, & Dywan, 1989). These properties emerge as a feature of the *process*, rather than the *content* of cognitive functioning (Winkielman, Schwarz, Fazendeiro, & Reber, 2003). Generally, high fluency, that is, fast and effortless processing of information, signals positive states of the environment, and of one’s cognitive processes. As a consequence, fluency can result in positive affect, as well as positive evaluations of target stimuli toward which fluency is experienced. Research on this effect has generated compelling evidence for the fluency hypothesis (Winkielman et al., 2003).

Further, studies involving affective evaluations in particular demonstrate an asymmetric effect, such that only positive evaluations, but not negative evaluations, are influenced by fluency manipulations, regardless of how questions concerning the ratings are worded. For instance, Reber et al. (1998) found that high fluency led to increased judgments of liking and decreased judgments of disliking. Similarly, Winkielman and Cacioppo (2001) instructed half of their participants to report positive affect, and half of the participants to indicate negative affect after a fluency manipulation. Only those reporting on positive affect showed increased positive affect when exposed to high fluency, whereas those reporting negative affect did not show such an effect. Our finding that congruence between spatial and conceptual dimensions led to increased positive ratings even for negative words is consistent with this documented asymmetric effect where only positive evaluations increase as a function of fluency, but not negative evaluations.

An additional finding in the present study was that not only words in the congruent “+ +” conditions, but also words in the congruent “- -” conditions were rated more positively than words in the incongruent “+ -” “- +” conditions. Other data are consistent with the present finding that sometimes two negatives combine to make a positive, so to speak. For instance, according to the *affective certainty* model (Tamir, Robinson and Clore, 2002), when personality traits match with current affective states, people experience facilitated performance on motivationally relevant cognitive tasks. Thus, people who are generally happy, and who found themselves in a happy mood, were more successful at processing affectively valenced information, but the same was true of people who are generally unhappy and found themselves in an unhappy mood, compared with people who are in conflict regarding their beliefs about themselves, and their actual experiences. Similarly, in the present study, more fluency, and therefore higher positive ratings was the result of a lack of representational conflict between the source domain and the

target domain, even if that meant that neither of the target domains could be mapped onto the source domain.

In conclusion, we found that “metaphorical” mappings between inherent spatial and conceptual relations can produce an additional layer of complexity, where the confluence of source domain and target domains has emergent affective properties: Both good and bad things are evaluated as more positive when an explicit spatial representation fits with implicit conceptual structure. In such situations, metacognitive processes involving perceived fluency provide information that goes well beyond representational content itself.

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