Good is Up: A Metaphor or a Confound?

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Introduction

Socially Situated Cognition

Cognition is for action – this is the first assumption that characterizes a recent theoretical approach – *Socially Situated Cognition* (SSC; Semin & Smith, 2002; Smith & Semin, 2004; see Garrido, Azevedo, & Palma, 2011; Semin, Garrido, & Palma, 2012; Semin, Garrido, & Palma, in press, for reviews). SSC represents an attempt to finally close this chain, providing a systemic generic approach that links all its elements that influence and are influenced by cognition. SSC assumes that the individual cannot be isolated in his own cognitive activity but, instead, this activity is part of a more complex system that ultimately serves adaptive action. The main ideas are not new, as they are implicitly reflected in previous studies of social and cognitive psychology. However, the assumptions underlying the relation between cognition and action completely changed the level of analysis that now considers the impact of the body, mind, and the physical and social context in cognition (e.g., Barsalou, Niedenthal, Barbey, & Ruppert, 2003; Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005; Smith & Semin, 2004).

Along with developments within social psychology, results in fields like robotics (Brooks, 1999), cognitive anthropology (Hutchings, 1995), cognitive psychology (Barsalou 1999) and development psychology (Thelen & Smith, 1994) have fed this approach sustained in the following assumptions: a) cognition is for action and mental representations are action-oriented; b) cognition is socially situated; c) cognition is distributed across other people and the environment; d) and cognition is embodied (e.g., Semin & Smith, 2002; Smith & Semin, 2004; Semin et al 2012, Semin et al., in press).

The first assumption postulates that cognition serves adaptive behaviour and mental representations are just "good enough" for practical and action-oriented purposes. For example, the perceivers' use of cognitive shortcuts and heuristics is now often considered adaptive (e.g., Chaiken, Liberman, & Eagly, 1989). In this view some aspects of social perception such as greater sensitivity to negative than to positive information are now viewed as useful (e.g., Skowronski & Carlston, 1989; Wentura, Rothermund, & Rak, 2000) for instance to a perceiver that is forming impressions that although not totally accurate allow a smooth and predictable social interaction (Snyder, 1993).

The "power of situation" is the second premise of this approach: cognition results from dynamic processes of interaction between an agent, a task and the social and physical environment (Smith & Semin, 2004). The way the physical environment affects memory is illustrated in a classic study of Godden and Baddeley (1975). They asked divers to study words lists either on a beach or 20 feet underwater and they showed that words' recall was better when the encoding and retrieval environment were the same. Moreover, when asked to give a causal explanation for a mass murder event, participants that read "Institute for Social Research" in the header of the provided questionnaire used more situational explanations, and the ones that read "Institute for Personality Research" gave more dispositional explanations (Norenzayan & Schwarz, 1999). These results show that even the subtlest situational cues can influence fundamental and automatic cognitive processes and thus action.

Furthermore, people use the physical and social environment to distribute and preserve knowledge. For example, we place the empty laundry detergent box near the door to remind us to buy a new one. This allows us to offload our cognitive system (Kirsh, 1995). People also rely on each other to encode and retrieve information, to make decisions and to perform their daily cognitive tasks (e.g., Garcia-Marques, Garrido, Hamilton, & Ferreira, 2012; Garrido, Garcia-Marques, & Hamilton, 2012a, 2012b; Hutchins, 1995; Levine, Resnick, & Higgins, 1993; Wegner, 1986).

Finally, the embodied nature of cognition has been widely documented in social psychology studies, showing that cognitive processes underlying attitudes (Cacioppo, Priester, & Berntson, 1993; Neuman & Strack, 2000; Wells & Petty, 1980) and memory (Foerster & Strack, 1996; Palma, Garrido & Semin, 2011) directly rely on sensorimotor systems, and hence, in our bodies. These studies show for example that bodily activity can influence emotional states and that the adoption of specific emotional expressions/postures can activate the correspondent emotional states, influencing judgments (e.g., Duclos, et al., 1989; Foroni & Semin, 2009; Schnall & Laird, 2003; Strack, Martin & Stepper, 1988). Other studies show that the implicit activation of concepts or the perception of an emotional expression leads to performing that particular behaviour (e.g., Bargh, Chen, & Burrows, 1996) or mimic that expression (e.g., Dimberg, Thunberg & Elmehed, 2000; Niedenthal, 2007).

Grounded Cognition

All of these studies suggest a close relation between body and social and emotional information processing. However, only the recent *grounded cognition* theories, that interpret knowledge acquisition and use as processes anchored on the brain' modality systems, could explain such evidences and predict its effects *a priori* (Barsalou et al., 2003; Smith & Semin, 2004) .

Indeed previous amodal theories (represented by the computer metaphor) sustain that knowledge is represented in a semantic system separated from the brain modal systems. Cognition and mental representations are dependent of abstract amodal symbols that make a re-description of the original experience, establishing an arbitrary relation with the perceptive, motor and introspective states that produce them (Newell & Simon, 1972; Pylyshyn, 1984). However, new developments (Barsalou, 1999; Clark, 1997; Glenberg & Robertson, 2000; Lakoff & Johnson, 1980, 1999; Prinz, 2002) suggest that cognition is grounded in diverse ways, including simulations, situated action and corporal states (Barsalou, 1999; Damásio, 1994; Gallese, 2003; Glenberg, 1997). This perspective suggests that even when cognition is performed *offline*, the perceptive symbols (i.e., the multimodal representations captured during the original experience), and its instances, are re-enacted to simulate what the brain represented for the originally associated perception, action and introspection (*Perceptual Symbolic Systems* – PSS; Barsalou, 1999, see also, Barsalou, 2007; Barsalou, 2008a for a review).

Currently, many proposals converge in the idea that from the more complex thought to the most basic automatic representational forms both activate simulation and perceptive representation processes (e.g., Barsalou, 1999; Borghi, Glenberg, & Kaschak, 2004). An example of this is when we think about a concept's meaning the perceptive information becomes available (e.g., Pecher, Zeelenberg, & Barsalou, 2003).

Illustrating the application of this proposal to concrete concepts, Zwaan and Yaxley (2003) showed that semantic relatedness judgments were faster when the words presentation followed an iconic relation with their referents. More specifically, they showed that when the word "attic" was presented above the word "basement" the judgments of semantic relatedness were faster (vs. "basement" bellow "attic"), verifying a spatial dimension activation even when there is no direct reference to the objects' location. Moreover, Borghi and his colleagues (2004) showed that language can also activate perceptive information. Participants were presented with sentences that made them adopt an inside, outside or a mixed spatial perspective in relation to a car. Further they saw a probe that named either a part of the car or a part that did not belong to the object. The authors found an interaction between participants' spatial perspective and the object location (e.g., an inside perspective led to a faster verification of the inside parts of the car like the steering wheels vs. identification of outside parts). Together, these results support the idea that cognition is grounded in perception and action (Barsalou, 1999; Glenberg, 1997), reinforcing the argument of mental simulation based on the re-enactment of the original states for perception, action and introspection (Barsalou, 1999; Barsalou, 2008a,b).

Nevertheless, as above mentioned, the activation of representational processes is not limited to concrete concepts. This framework has also led to a surge of research exploring how abstract target concepts such as affection, time, or power are grounded in source concepts such as temperature or space. The association between these concepts is not random, but expresses instead the structure of our thought and of our more basic and primitive experiences. These associations are reflected in language, namely in the everyday use of metaphors.

Cognition and Conceptual Metaphors

When people think and communicate about the world they often use conceptual metaphors. These metaphors constitute a cognitive tool that facilitates the understanding of abstract concepts (Lakoff & Johnson, 1980). We talk about sad events that put us *down*, a sunny day that makes us feel *up*, we feel *close* to friends and family, refer to people we know as *warm* or *cold* and we think about colleagues that are in *higher* positions with whom we can learn. These and other examples illustrate how the use of metaphors constitutes a common way of thinking and communicating.

Nietzsche (1873/1974) was the first to argue that the truth cannot be understood or accessed directly, but is apprehended in terms of more concrete experiences. This perspective is consistent with the current interpretations of metaphors use, including the Conceptual Metaphor Theory (CMT) advanced by Lakoff and Johnson (1980, 1999). According to this theory, human beings depend largely on their primary sensorimotor experiences and use concrete domains to think and communicate about abstract concepts that they cannot experience physically. Currently it is accepted that we do not use metaphors only to communicate, to express thoughts or feelings, but also to structure thought. Hence, metaphors do not serve only communicative purposes, but are also a central component of human cognition assuming an important role on the conceptual system and serving representational goals (e.g., for an overview see Crawford, 2009; Laudau, Meier, & Keefer, 2010).

Specifically, conceptual metaphors provide the grounding of concepts that we cannot touch, smell, or see in concepts that are based on primary sensorimotor experiences such as space, temperature, brightness, physical largeness, weight or distance (e.g., Lakoff & Johnson,1980). Metaphors are thus treated as mental associations between basic *source concepts* that are derived from interactions with the physical world and *target concepts* that represent relatively more abstract referents (e.g., Landau, et al., 2010; Van Dantzig, Boot, Giessner, Shubert, & Pecher, 2008). For example, it has been shown that affect is grounded in temperature (e.g., someone who is appreciated is warm, see Izjerman & Semin, 2009, 2010; Semin & Garrido, 2011; Williams & Bargh, 2008). Literature has also evidenced that time is grounded in space (e.g., the future is represented forward and to the right, the past behind or to the left) and that horizontal spatial information can influence temporal judgements (see Boroditsky, 2000, 2001; Boroditsky & Ramscar, 2002; Casasanto, & Boroditsky, 2008), or the categorization of words with temporal connotation (e.g., Lakens, Semin, & Garrido, 2010; Torralbo, Santiago, & Lupiáñez, 2006). On the other hand, verticality seams to anchor power, divine figures and valence.

Grounding Concepts in Space – The Powerful, the Devine and the Good

When someone has a *high* status or is on *top* of the hierarchy, has control *over* the others that have a *lower* status. Thinking about power can be influenced by the spatial information that is inherently included in this concept, either in a real context, or in metaphorical thought. Results reported by Schubert (2005) indicate that powerful groups (e.g., master) were identified faster when they appeared above the powerless groups (e.g. servant), and powerless groups were judged more quickly when they were presented below the powerful groups. Additionally, participants were faster and more accurate when identifying powerful and powerless groups while making judgments using an upward movement or a downward movement, respectively.

Moreover, literature shows the grounding of divine figures (i.e., God and Devil) in the vertical dimension. Participants were faster to categorize words related to God when these were presented together with words related to up (e.g., Almighty and ascendant) and the same was true for Devil related words and down related concepts (Meier, Hauser, Robinson, Friesen, & Schjeldahl, 2007). The authors also conclude that social judgments and memory were influenced by this metaphorical relation. Namely, participants classified people as believing more in God when their photograph appears on the top of the screen (vs. on the bottom) and remembered photographs related to God as appearing more on the top (and Devil as appearing more on the bottom) when compared to neutral words.

One of the most consistent proposals on the relation between abstract concepts and the activation of different spatial dimensions, suggests that we structure reality by using an implicit metaphorical relation in which the affective abstract concepts of “good” and “bad” are spatially represented as “up” and “down”, respectively (e.g., Crawford, Margolies, Drake, & Murphy; 2006; Meier & Robinson, 2004). For example, Meier and Robison (2004) used a reaction time paradigm to demonstrate that positive words (e.g., ethical, friendly) were classified more rapidly as positive when presented at the top rather than at the bottom of a monitor, while the opposite was true for negative words. The authors also verified that the mere perception and evaluation of words with different valence activated different spatial areas, which were congruent with the respective vertical metaphor.

The grounding of affect in vertical space was subsequently extended to spatial *memory* (Crawford et al., 2006). More specifically, the authors verify that memory for location of positive images was biased upwards relative to negative images. More recently, Casasanto and Dijkstra (2010) demonstrated the impact of our physical movements on cognition, namely the faster retrieval and generation of positive autobiographical memories when participants performed upward movements (vs. negative memories with downward movements). In a congruent way, Palma, Garrido and Semin (2011) showed that participants recall more behaviours of a stereotypical target when the valence associated to the target and the spatial position where the behaviours were shown on the computer screen were congruent (e.g., childcare professional behaviours presented at the top of the screen). They also demonstrated that a congruent movement direction (upwards for positive behaviours and downwards for negative behaviours) led to an increasing in the recall.

These and other findings suggest a close relation between body and cognition, valence and space and support the “good is up metaphor”.

Overview of the studies

The implicit relation between valence and spatial position is well established as well as the main paradigms and empirical results that support it. Nevertheless, the underlying mechanisms of this relation are not sufficiently clear. It is suggested that there is an association between the basic *source concepts* (e.g., top or bottom, up or down) and *target concepts* (e.g., good or bad). However, a close inspection to the stimulus materials (e.g., words) used in the reported studies reveals the grounds for a potential confound. In fact, the positive and negative words used in the reported studies are only controlled for valence but not for their spatial content, namely the vertical spatial location to which they are associated with. This potential confound, lead us to question if the positive and negative words activate different areas of the visual space due to their valence, as the theoretical proposals that try to explain these effects suggest, or because their *spatial content* (until now, not controlled) directly alludes to different spatial locations. For example, do we represent “sun” *up* because its valence is positive, or because the sun *is* actually *up?* To disentangle the contributions of both valence and spatial content to the “good is up” metaphor does not seem to be a particularly difficult task, namely with concrete concepts for which both valence and spatial content are easy to determine. Nevertheless, in what regards abstract concepts this becomes more complex. Do we represent “death” *down* due to its negative valence, or because at least in Western cultures we die and we are buried *under* the ground? We suggest that there might be a confound between valence and spatial content, namely that concepts are represented up (vs. down) not because they are positive (vs. negative) but because their spatial content is actually seen as “up” (vs. “down”) in the physical space.

The general goal of our two studies is then to clarify the metaphorical relation between valence and vertical spatial position, by investigating the potential role of the spatial content in this relation and their (joint) contribution to the “good is up” metaphor. In Study 1 we pre-tested a set of words rated independently for valence and spatial content and subsequently we examined the relation between valence and spatial content correlating both dimensions. From Study 1 we selected the stimulus materials to be used in Study 2 which further explores the role of valence, spatial content and spatial position in an interference paradigm.

Study 1

The main goal of Study 1 was to obtain a set of words simultaneously tested for valence and spatial content in order to avoid a potential confound between these two dimensions in future studies. Moreover, this study also explores the possible confound between these two dimensions, that is, whether words evaluated as positive are also evaluated as having and upper spatial content (as compared with negative words) and whether words evaluated as negative are evaluated as having a lower spatial content (vs. positive words).

Method

Participants

A sample of 240 undergraduates (192 female), aged between 17 and 63 years old (*M* = 24.80; *DP* = 7.51), from ISCTE-IUL and Faculdade de Psicologia da Universidade de Lisboa participated voluntarily on this study.

Materials

In a first phase we collected words previously evaluated for valence (positive and negative) and familiarity by Portuguese samples (Garcia-Marques, 2003; Gaspar, 2009). In a second phase, a sample of 24 participants was asked to spontaneously generate words associated with different vertical spatial content ("up" and "down"). These lists of words were then combined and after eliminating different tenses of the same verb, synonyms and redundancies a final list composed by 336 words was obtained. This final list was then divided in four sub-lists (A, B, C and D), each with 84 words. To avoid context effects the order of presentation of each sub-list was varied (Order 1 and Order 2, by using *Randomizer* (http://www.randomizer.org/). Overall there were eight sub-lists of words.

Procedure

The eight sub-lists were presented to 240 participants who evaluated the words regarding their valence (positive or negative) and their spatial content (up or down). Each of the 8 sub-lists was evaluated by 30 participants, half of them evaluated the words for valence and the other half the words' spatial content. To the participants that had to evaluate the words' valence it was referred that they should indicate the faster and the more spontaneously as possible the valence of each word in a 7 points scale, putting a circle around the answer that better illustrate their opinion. To clarify the task it was given an example with the words "love" and "death" and it was said that "love" was representative of a "positive" word and "death" was representative of a "negative" word. The other half of the participants was asked to evaluate the words concerning their spatial content (up and down) also in a 7 points scale (1- "down" to 7- "up"), putting a circle around the answer that better illustrate their opinion. It was also given an example presenting the word "basement" as representative of the spatial content "down" and the word "attic" as representative of the spatial content "up".

Results and Discussion

The means, confidence intervals and standard deviations were calculated for each word and for each dimension. Based on the confidence intervals, it was possible to identify and classify the stimulus words in different groups for valence and spatial content. Thus, words evaluated with an upper bound average score bellow 3 in the valence scale were classified as “negative”. Words evaluated with an upper bound average score bellow 3 in the spatial content scale were classified with a spatial content associated with “down”. Words mean score with a lower bound above 5 in the valence scale were classified as “positive”. Words mean score with a lower bound above 5 in the spatial content scale were classified as associated with “up”. Finally, words with mean scores between 3 and 5 were classified as “neutral” in valence and as “intermediate” in spatial content. Words with means not falling in these intervals were excluded in further analysis (e.g, between 4 and 6).

Overall, for the valence dimension we obtained 61 “negative”, 63 “positive”, and 94 “neutral” words. For the spatial content dimension, 79 words were classified as “down”, 66 as “up”, and 45 with an “intermediate” spatial location. Further, when we analyzed the combined results of both dimensions, namely the percentage of words with upper and lower spatial content when the words’ valence was positive and when it was negative, and the percentage of positive and negative words in words evaluated as upper or lower in spatial content, the pattern of results that emerged was in itself very informative for understanding the association between both dimensions. From the 63 words identified as positive 25 (39.68%) were associated with superior spatial regions, 10 of them were associated with “intermediate” spatial areas and only one (1.59%) was associated with inferior spatial regions. On the other hand, of 61 words identified as negative, 35 (57.38%) presented a spatial content associated with “down”, 4 were associated with intermediate areas, and none of the negative words was associated with “up”. Moreover, 44.30% of the words associated with “down” are negative and 37.88% of the words considered “at the top” are positive and none of them is considered negative.

Additionally we performed a correlation analysis between the two dimensions. Not surprisingly the correlation between valence and spatial content was positive and strong (r =.617; p < .000), indicating that the higher the valence the upper their associated spatial content. This pattern of results thus suggests a strong relation between the valence of the words and their spatial content, indicating that positive words are inherently associated with and located at “upper” regions of the vertical space, whereas negative words are associated and located in “lower” spatial locations. Further this pattern was noticed for concrete but also for abstract concepts, which do not have any objective spatial content, but are apparently grounded in concrete dimensions (Lakoff & Johnson, 1980).

These results show a strong association between the two dimensions, valence and spatial content, which can lead us to question if they are orthogonal. Moreover, the same pattern was revealed for abstract concepts suggesting that these concepts are anchored in concrete concepts, like space, which structures our thought and facilitates their understanding and communication. If valence and spatial content have such a strong relation, what are the implications of such relation when studying the association between valence and spatial position? Do we have to start considering the words' spatial content on this relation? Can we argue that there might be a *confound* between valence and spatial content and that spatial position does not anchor valence but instead the spatial content associated with the concepts? Can we still affirm that affect is grounded in the vertical space, and that this relation is purely metaphoric? In our second study we tried to disentangle the contributions of each dimension in study and clarify the implications of a possible confound between valence and spatial content.

Study 2

In a second experiment we further explored the potential confound between the valence of the words and their spatial content. For that we replicated the paradigm used by Meier and Robinson (2004, experiment 1) using an additional interference condition. We expected that, like Meier and Robinson's results suggest, when valence and spatial position are congruent (positive words appearing at the top of the computer screen and negative words appearing at the bottom of the computer screen) participants would be faster in their valence judgments. In contrast, when valence and spatial position do not match with the vertical spatial metaphor (positive words at the bottom and negative words at the top), it was expected a slowdown in the valence judgments.

Additionally, we tried to clarify a potential confound between valence and spatial content. We assumed that positive words evaluated as upper in spatial content and negative words evaluated as lower in spatial content would constitute the conditions under which both valence and spatial content would concur for the metaphorical relation between valence and vertical space. Therefore faster judgements were expected when there is congruency between valence, spatial content, and spatial position, in particular when the words presented are those evaluated more extremely in both valence and spatial content dimensions. However we introduced another condition where the match between valence and spatial content was not so strong. Notably, a perfect interference condition would include positive words considered down in spatial content and negative words evaluated up in spatial content. However as the results from our pilot study revealed, we could not find such words. Therefore we used positive and negative words evaluated as "intermediate" regarding spatial content. We expected slower reaction times in evaluating positive words appearing at the top and negative words appearing on the bottom in this condition compared to the other condition where valence and spatial content are more extreme.

Method

Participants

A sample of 33 students of ISCTE–IUL (84.5% girls; age: M = 20.06; DP = 6.99), participated on this experiment in exchange for course credits.

Materials

Participants were asked to evaluate a set of 32 words pretested for valence and spatial content (Garrido, Azevedo, Prada & Santos, 2011). Half of these words were positive and the other half were negative. Half of the positive words were evaluated with upper spatial content (e.g., sun, master) and half of the negative words were evaluated with lower spatial content (e.g., sewage, rabble). These two sets of words constituted the matching conditions. The other half of the positive and negative words were more intermediate in spatial content (e.g., dolphin, ethical and crime, purgatory, respectively). These two set of words constituted the mismatching condition.

Procedure

Prior to the presentation of each word, a fixation point was presented at the centre of the screen for 300 ms. The words then appeared at the top or at the bottom of the screen in a random order. Participants were told to evaluate the word's valence as quickly and as accurately as possible, pressing the "Q" key of the keyboard for negative words and the "P" key for positive words. If the response was inaccurate, the word "INCORRECT" appeared in red for 1.5 seconds. Accurate trials were separated by a blank screen for 500 ms.

Results and Discussion

Inaccurate trials were dropped from the analysis (3.55%) as well as trials with response latencies 2.5 SD above or below the latency mean. In total (13.78%) of the trials were excluded from the subsequent analysis. A 2 (valence: positive vs. negative) X 2 (position: top vs. bottom) X 2 (condition: matching vs. mismatching) repeated measures analysis of variance (ANOVA) was performed on the response latencies. A valence main effect F (1, 32) = 24.02, p < .000, η^2_P = .429, was observed indicating that participants were faster to evaluate positive (*M* = 733.52; *SE* = 18.94) than negative words (*M* = 775.75; *SE* = 21.49). This result is consistent with previous studies reporting faster reaction times in the evaluation of positive stimulus (e.g., Meier & Robinson, 2004; Shubert, 2005). The effect of the condition F(1,32) = 2.53, p < .122, η^2_P = .073 indicating that participants were faster to evaluate words in the matching (*M* = 748.74; *SE* = 20.73) than in the mismatching conditions (*M* = 760.53; *SE* = 19.53) did not reach conventional levels of significance. A significant interaction effect between condition and position was also observed, F (1,32) = 4.74, p < .037, η^2_P = .129. This interaction indicates that the words were only evaluated faster in the matching condition when they were presented and the bottom. Finally, a significant interaction effect between condition and valence, F (1,32) = 6.81, p < .014, η^2_P = .175, indicates that only the positive words were evaluated faster in the matching condition. Contrary to what was demonstrated by Meier and Robinson (2004) Valence X Position interaction was not significant, F < 1. We suggest that this non significant interaction may derive from the fact that the spatial content impact on this relation was not considered in the analysis.

Subsequently and to test our specific predictions we conducted a set of planed comparisons separately for matching (i.e., extreme spatial content, congruent with the valence) and mismatching conditions (i.e., intermediate spatial content). Results from the matching conditions indicate that negative words that were also lower in spatial content, were identified faster when appearing on the bottom of the screen (*M* = 769.80; *SE* = 22.48) than on the top of the screen (*M* = 794.11, *SE* = 25.86) On the other hand, positive words evaluated upper in spatial content, were judged faster when appearing at the top (*M* = 709.28, *SE* = 22.25) than when appearing at the bottom of the screen (*M* = 721.78, *SE* = 22.06). However the observed differences did not reach conventional significance levels t (32) = 1.40, p < .08 (one tailed).

Finally, we computed a compatible (i.e., positive valence/upper spatial content/at the top and negative valence/lower spatial content/at the bottom) and an incompatible (i.e., positive valence/upper spatial content/at the bottom and negative valence/lower spatial content/at the top) variable and compared the two levels of this variable in matching and mismatching conditions. The analysis of variance 2 (condition: matching vs. mismatching) X

2 (compatibility: compatible vs. incompatible) only yielded an interaction effect, F (1,32) = 3.88, p < .005, $\eta^2{}_P$ = .105. Planed comparison indicated that in matching conditions participants' judgments were faster when valence was compatible with spatial position (M = 739. 55, SE = 19.99) than when valence was incompatible with spatial position (M = 757.95, SE = 22.14), although this difference was only marginal t(32) = 1.443, p< .079 (one tailed). The same analysis conducted on the mismatching conditions revealed, as expected, that the judgments were equally fast in compatible (M = 765.98, SE = 20.52) and incompatible conditions (M = 755.08, SE = 18.54) (p > .2). Moreover the combined analysis of compatible vs. incompatible trials was not significant (F < 1). These results, although marginal are in line with our predictions, since it was hypothesised that the grounding of affect in space would only be revealed when valence, spatial content and spatial position are compatible.

General Discussion

In these two studies we attempt to clarify the metaphorical relation between valence and spatial position and the impact of words' spatial content on this relation. We hypothesised that there might be a confound between valence and spatial content and then concrete concepts are represented up (vs. down) not because they are positive (vs. negative) but because their spatial content is actually seen as upper (vs. lower) in the physical space.

The results of the pilot study indicate that people spontaneously evaluate positive words as upper and negative words as lower in space. This pattern of results suggests that what is good is *situated* up and what is bad is *situated* down by people, establishing a direct association between the two concepts. Additionally, this might suggest that the spatial representation of the valenced words may not result of the grounding of valence in the vertical spatial position but instead depends on the objective spatial location in which the concepts are situated. As the abstract concepts are grounded in concrete concepts with the same valence associated, the same might be true for these concepts, to which the spatial content evaluation is dependent, in last instance, of the concrete concepts in which they are grounded.

Further, we tried to examine the relation between the three different variables - valence, spatial content and spatial position - and how they contribute to the "good is up" metaphor. Our experimental attempt to disentangle this confound suggests that positive words presented "on the top" and negative words presented "on the bottom" are evaluated faster only when the words' spatial content actually matches the congruent spatial position. That means, that only when the three conditions matched (valence, spatial content and spatial position), the results obtained by Meier and Robinson (2004) were replicated.

These results lead us to some questions that remain unanswered. For example, if the results obtained in the "good is up" studies are due to a relation between spatial content and spatial position to which extent can we interpret the results as caused by a grounded relation between valence and spatial position and not just as a merely objective association between spatial content and spatial position? That means, can we affirm that the relation between valence and spatial position is metaphorical? Is it embodied? Maybe the answer to these questions will help us to understand why the relation between valence and spatial position seems to be unidirectional (Meier & Robinson, 2004), why does valence activate spatial position but the contrary does not happen, even though recent research points in the opposite way for other concepts, suggesting that in metaphorical relations the influence is bidirectional (e.g., Ijzerman & Semin, 2009, 2010; Semin & Garrido, 2011; Zhong & Leonardelli, 2008). We can suggest, for example, that spatial position does not activate valence, because its relation is with the words' spatial content.

On the other hand, we can also explore the possibility that the relation between valence and spatial position depends on and occurs by means of the words' spatial content. Therefore we suggest further studies that use positive words that are lower in spatial content and negative words that are upper in spatial content, so that the spatial content contributions on the "good is up" metaphor will be more clear.

Finally, it is important to explore whether these results hold separately for concrete and abstract concepts. Although our studies include both concrete and abstract concepts, separate analyses were not conducted. It is possible to speculate that the role of spatial content can moderate the "good is up" effects in distinct ways.

Despite some methodological weaknesses, the size of the sample and the modest significance of our results, these studies may constitute preliminary evidence of a potential empirical confound and introduce some boundaries to a general grounding of affect in the vertical space which deserves further research.

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