More than a metaphor:

How the understanding of power is grounded in experience

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Abstract

Power relations are a universal form of human sociality. Judgment and thinking about power is intimately tied to spatial cues: Nonverbal communication, cultural production of power symbols, and metaphors of power all make use of the vertical spatial dimension. We argue that this overlap is due to a grounding of the concept of power in spatial thought. Evidence confirming this proposition can be found in experiments showing the impact of highly schematized spatial cues on judgments of power. We will discuss how semantic network theories, embodied theories of cognition, and conceptual metaphor theory fare in explaining and predicting the combined evidence on nonverbal behavior, cultural production, and metaphors. In particular, we will ask what role language in the form of metaphors plays for our understanding of power as size and elevation: Whether it is causal, or mainly an outcome of other processes that are not based on language.

More than a metaphor:

How the understanding of power is grounded in experience

"Diverse languages refer to social authority as *power* or *force*. These linguistic practices are more than simply lexical metaphors; they are collective cognitive representations of what [authority ranking] consists of: Authority **is** being above, greater, and more powerful."

A. P. Fiske (2004, p. 100)

Power is a concept that is important to every human being's social life. From early on, infants have to cope with others' influence over them, and to find ways to gain influence on others' behavior themselves. Finding the right position in authority structures remains an important task throughout life. Accordingly, judging another person's potential for having influence over oneself, and judging one's own potential to influence another person, are spontaneously and efficiently performed daily tasks. Judgments of other people's power use a host of nonverbal cues from the human body and its dynamic movement: face, posture, size, expressiveness, voice (Hall, Coats, & Smith LeBeau, 2005).

Unlike other animals, humans also use cues that go beyond the body, namely elements of the created environment (architecture, furniture, clothes), to judge power. Cues from the human body which are interpreted as indicating power, such as size and elevation, are also interpreted when they appear disconnected from the body in the form of large cars and high towers. In addition, power and status are metaphorically described as spatial relations to such an extent that power and space are intuitively identical. It seems

that we are so used to talk of power and status as size and elevation that these have almost come to define the concept of power itself.

It also seems that as potential influence based on bodily strength becomes less important in hierarchically structured societies with institutionalized forms of power, the understanding of power relies more heavily on expressions of size and elevation in cultural artifacts. This tendency to extract cues of power and status from culturally specific artifacts may have been instrumental for developing social hierarchies in larger groups lacking constant face-to-face interaction in the first place (Earle, 2004). It may also be a necessary condition for the constitution of enduring shared representations of power relations, and thereby allow the coordination of actions and complementary role behavior in larger groups (A. P. Fiske, 1991). As larger groups could not be dominated by bodily force alone, legitimacy and consensus became important for the maintenance of power structures. Artifacts emphasizing size and elevation such as crowns and temples enhance both. Consequently, they stabilize societies, but they also make it harder to get rid of despots.

In the current chapter, we explore the complex web of nonverbal cues, cultural production of power symbols, and metaphors of power. The goal is to look at them together instead of separately, and to discuss which theories can explain their commonalities. We first elaborate on the nonverbal cues used for the judgment of power, and then report recent experimental evidence on the impact of their schematized versions. We will then discuss the role of metaphors as underlying our understanding of power and size, and how various theories fare in explaining and predicting the complete picture. In particular, we will ask what role language in the form of metaphors plays for our understanding of power as size and elevation: Whether it is causal, or mainly an

outcome of other processes that are not based on language. Our review will be structured by the idea that nonverbal cues to power serve as a template for the use of spatial cues in other modalities – language and artifacts.

In order to allow us a broad overview, throughout this chapter we will simply subsume various related but actually distinct concepts like dominance, power, authority and leadership under the concept of power, in line with other general reviews of the literature (Hall et al., 2005).

Size and Strength Determines Influence

For any animal that competes with others for resources (e.g., food or mates), or strives to actually consume other animals as food, bodily strength is a crucial factor of success. Animals are attuned to indices of strength and size, which are very predictive of competitiveness. Freedman (1979, p. 92) summarized this as “throughout nature the rule is the bigger, the more dangerous”. Some prey animals have evolved means to create the illusion of body size and thus strength to deter predators.

In humans, we can distinguish two components of the link between power on the one hand and strength because of larger size on the other. First, larger bodily strength allows moving others and coercing them (e.g., the larger toddler hustling a smaller child or taking away a toy from him/her). Second, larger strength frees a person from pressures others try to put on them, and allows them to not yield to others’ attempts to influence them (e.g., the larger child resists attempts of a smaller child to push her away). Let us call these two aspects influence and self-determination.

Humans experience the impact of size difference on relative power from very early on. Infants and toddlers have to cope with the bodily strength of their parents and older

children when trying to achieve influence, or when trying to resist influence by others. Larger toddlers are more likely to use physical means of social influence: taller, heavier and bulkier children at age 3 have been found to be more aggressive, and body characteristics at this age in fact predict aggression at age 11 (Raine, Reynolds, Venables, Mednick, & Farrington, 1998). Size differences between men and women continue to be a determinant for violence between the genders even at adult age (Felson, 2002).

Appraisals of Power Are Tuned to Cues of Strength and Size

Thinking is for doing, and social cognition is for preparing and coordinating social interactions (S. T. Fiske, 1992). Accordingly, one of the most important functions of the processing of nonverbal social signals is to provide a fast appraisal of other individuals upon encounter. Two basic questions seem to be central: Does the other person mean good or harm for me? And, is the person capable of actually having that influence on me? These questions lead to judgments on the two dimensions of trustworthiness and dominance (Oosterhof & Todorov, 2008) or warmth and competence (S. T. Fiske, Cuddy, & Glick, 2007). Abundant evidence shows that dominance judgments are based on nonverbal cues indicating bodily strength. In the following, we will discuss evidence on height, facial features and expressions, posture, and gestures.

Height

When strange males approach children of 9-12 months, the height at which the children themselves are determines their affective reaction. Weinraumb and Putney (1978) found that children who are placed lower (89 or 127 cm) react more negatively than children who are placed higher (183 cm) height. Apparently, children are afraid of strangers (at

least males) towering over them. In adults, perceiving somebody from below (i.e., looking up to her or him) leads to the perception that this person is more dominant, compared to looking down on him (Giessner, Ryan, & Schubert, 2009; Kraft, 1987).

Height is comparative – somebody is only tall or short in comparison to the others, and to the perceiver. Nevertheless, on average, bodily height is a robust predictor of achieved status and income at least for men (Hensley & Cooper, 1987; Melamed & Bozionelos, 1992; Gawley, Perks, & Curtis, 2009; Mueller & Mazur, 2001; Judge & Cable, 2004).

However, it is possible that height is only a proxy to the more important dimension of muscular strength. Muscular strength, especially of the upper body, is crucial for fighting ability in close combat. Humans are capable to easily and accurately judge fighting ability and muscular strength (Sell et al., 2008).

Face

Children and women are, on average, shorter and weaker than men. Accordingly, faces that exhibit features of maturity and masculinity are judged to be more dominant than faces that appear to belong to young or female individuals, presumably because both traits signal physical strength (Oosterhof & Todorov, 2008). Indeed, judged dominance and masculinity of men's faces predict their handgrip strength (Fink, Neave, & Seydel, 2007). Furthermore, dominance and masculinity apparent in men's faces may index physiological parameters that are relevant for dominance, such as prenatal testosterone levels (Neave, Laing, Fink, & Manning, 2003), and serve as an honest signal to men's potential to achieve a high status (Mueller & Mazur, 1997). To judge a lack of maturity and masculinity, both the shape of the face as well as features of the face itself are

interpreted. Such a lack of maturity and masculinity is called babyishness. Adult men score lowest on this dimension, and babies highest, with adult women falling in between. Features most consistently associated with babyishness are (1) low rather than high vertical placement of facial features, (2) short rather than long features, (3) a small, round, or receding jaw rather than a large jaw, and (4) large or round eyes rather than small eyes (Marsh, Adams, & Kleck, 2005; Zebrowitz & Montepare, 1992). Such features elicit protective responses and caretaking behavior (Berry & McArthur, 1985; Berry & McArthur, 1986).

The association of mature features with dominance extends beyond features of the resting face to facial expressions of emotions. Some facial expressions seem to mimic features of mature vs. immature faces and elicit the associated reactions in observers. The facial expressions of surprise and fear, the function of which is to motivate others to careful and helpful treatment, mimic the face of a baby. The facial expression of anger, in contrast, which entails the motivation to have influence on others and change them, leads to the perception that the expressing person is more dominant, and it does so by mimicking the mature face (Marsh et al., 2005; Zebrowitz, Kikuchi, & Fellous, 2007; Hess, Blairy, & Kleck, 2000; Knutson, 1996; Chiao et al., 2008).

Posture

Apart from actual body size and height, and their correlates maturity and masculinity, apparent body size and height in the form of extended or constricted postures also influence appraisals of power and dominance. An open body posture is produced by extended arms and legs: composed of open and extended legs, arms away from the body, or behind the head. Such a posture is a valid sign of actual power or dominance in

the sense that it is more often shown by dominant or high status individuals, and it is also frequently used as a cue in power judgments (Hall et al., 2005). Note that this tendency extends to behavioral patterns: The size of one's signature increases with social status (Aiken & Zweigenhaft, 1978; Zweigenhaft, 1970). The opposite is a crouched and constricted posture that diminishes apparent body size. Perceiving such postures seems to have effects even without the necessity of a conscious judgment of power. Individuals who interact with a person showing either an expanded or constricted body posture are more likely to adopt the opposite posture than to mimic the perceived posture, leading to compatible postures in terms of an ad hoc developing status hierarchy. Furthermore, assuming the compatible instead of the mimicking posture leads to more positive affect (Tiedens & Fragale, 2003). Thus, body postures indicative of power not only influence perceptions and impressions, but directly social behavior.

Just as mature features of the face seem to be mimicked by emotional displays of anger, the extended body posture indicating high status seems to be mimicked by the display of pride. The pride expression typically involves upward extended arms and an elevated head (Tracy & Robins, 2004). It is likely that this posture is biologically innate, as it is also shown by congenitally blind athletes after winning (Tracy & Matsumoto, 2008).[1] The extended body posture might in fact have several different connotations that relate to power. First, it might simply simulate a larger body and thereby larger strength. Second, it might indicate that one's actions are unconstrained by the environment, or self-determined. This would be in line with findings that greater emotional expressiveness is also a valid sign of power (Hall et al., 2005), and that action orientation is perceived as indicating power (Magee, 2009).

The opposite of pride, embarrassment and shame, should then be expressed by a constricted posture. Not surprisingly, then, a bowed head, constricting the body, is part of the appeasement behavior shown by humans when they are embarrassed. Along with the typical shrugged shoulders, it decreases perceived body size. The same behavior is shown by other mammals, such as macaques, baboons, and wolves (Keltner & Buswell, 1997). Darwin (1872) hypothesized that behaviors that reduce apparent body size reduce aggression by others, and this seems indeed to work: Playground aggression often stops when the attacked child decreases displayed body size, for instance by crouching down to tie shoes (Ginsburg, Pollman, & Wauson, 1977). In adults, the bowed head induces impressions of submissiveness and inferiority, while a raised head induces impressions of dominance (Mignault & Chaudhuri, 2003).

In sum, we see that a number of nonverbal cues are used to judge power. These cues seem all to be related to strength and thus potential for influence and self-determination. In addition, it becomes apparent that emotional expressions such as those for embarrassment, anger, surprise, fear, or pride, use these same cues to convey dominance/power or submission/powerlessness. It is not yet clear whether all these different indices are proxies for one underlying dimension, such as the ability to prevail in close combat, which seems to be most closely correlated with upper body strength, or whether they developed from different sources. Other sources could include the ability to withstand or withdraw, which might be closely correlated with total body mass, but also with speed and ability to climb, or the motivation to fight, which might be correlated with certain testosterone-markers in the face.

Size and Strength cues influence power judgments even when schematized and abstracted

We have seen that bodily cues about size and strength are important cues for power appraisals – but how can we explain that architecture and indeed language makes use of the same kinds of cues? Is there a connection in the sense that affordances inherent in the ecology of human bodies shape also the more generalized use of power cues? If so, the same cues need to function even if they are very schematized and abstracted from the human body.

The starting point of schematization may already be the cue of elevation, which is another nonverbal cue that is used in judgments. For instance, if in simple drawings of two persons one is depicted as standing higher (on a pedestal), then that person is judged to be more dominant (Schwartz, Tesser, & Powell, 1982; Spiegel & Machotka, 1974). It is not directly clear how this could indicate bodily strength. One possibility is to assume that there is, on average, an ecological advantage of being higher up when it comes to inner-species fights, as gravity makes throwing, jumping and hitting more effective combat means for those in a higher position. Another, and more convincing, possibility is that the cues associated with power are much more abstract and schematic than the concrete nonverbal cues described above, such as shape of the face and size of the body.

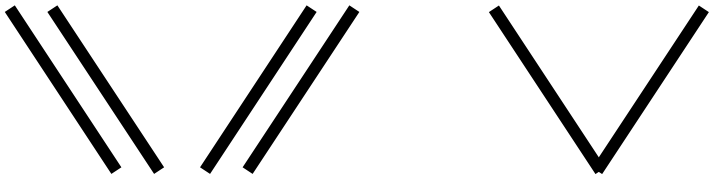

Figure 1. Acute angles with downward pointing vertices convey potency, negative evaluation, and activity (Aronoff et al., 1988)

Indeed, it seems that nonverbal cues of power can be schematized to a considerable extent. Simple line drawings featuring diagonal lines and acute angles with downward pointing vertices (see Figure 1) are sufficient to elicit judgments of greater potency, greater activity, and less positivity (Aronoff, Barclay, & Stevenson, 1988). Similarly, diagonal and angular movement patterns convey threat, while round movement patterns convey warmth (Aronoff, Woike, & Hyman, 1992; Aronoff, 2006).

The pictures and movements presented in the studies by Aronoff and colleagues are still very suggestive of the human body; some of them might be interpreted as depicting specific body parts (e.g., eyebrows). Yet, recent evidence shows that the stimuli can be even more abstract and still elicit the same impression. When pictures of faces are presented at the top of the screen, the person is judged to be more powerful than when the same pictures are shown at the bottom of the screen (Meier, Hauser, Robinson, Kelland Friesen, & Schjeldahl, 2007). The same holds when pictures of a powerful animal such as a lion or wolf are shown on a screen: Presentation at the top leads to more respect for the animal than presentation at the bottom (Schubert, 2005). The elevation of pictures has downstream consequences as well: Men judge females depicted at the bottom as more attractive, while women judge males depicted at the top as more attractive (Meier & Dionne, 2009).

In a study by Giessner and Schubert (2007), participants read a short description of a male manager next to a chart depicting the simple organizational structure: the manager, symbolized by a box, and below, connected to him with a vertical line, his five subordinates. Two versions of this organigram were used. They differed only in the length of the vertical line and thus the elevation of the manager above his subordinates. The vertical difference was either about the height of one of the boxes itself, or twice as high. After reviewing the information, participants judged the power this manager had. Those participants who saw the picture with the more elevated manager judged him as more powerful. Thus, even when an elevation is perceived without any clear reference to the human body, it is still interpreted as a cue to power.

These studies already schematize vertical space to a considerable extent. However, one might still wonder whether the pictorial representation of the faces or the organigram elicited some kind of reference to the human body. For instance, it could be that the manager box is somehow interpreted as symbolizing his body. Can the elevation cue be abstracted even further?

One way to explore this question is to use just words that are shown on a computer screen, and to vary their vertical location. Furthermore, instead of looking at the judgment outcome itself, one can investigate the response latency with which it is made. This approach has been used in other domains, for instance to investigate representations of words that are referring to concrete objects: When one has the task to judge whether the word *branch* is semantically associated with *root*, this decision is made more quickly when *branch* is displayed above *root* rather than the other way around (Zwaan & Yaxley, 2003).

Adopting the same approach for studying elevation as a cue for power appraisals has the advantage that the cue is very abstract. A number of studies reported in Schubert (2005) confirm indeed that nevertheless, elevation influences power appraisals. When typical pairs of powerful and powerless groups are shown on the screen (e.g., *master* and *slave*), the powerful group is more quickly identified when it is at the top, and the powerless group is more quickly identified when it is at the bottom. Even when just one group label is shown on the screen, and either at the top or at the bottom, a compatible vertical position speeds up response latencies. Moreover, a visual elevation cue is not even necessary: Categorizing a group label that appears in the middle of the screen as powerful is easier when the up arrow button on the keyboard has to be pressed rather than the down arrow button, and the reverse holds for categorizing powerless groups.

Vertical location on a screen has been found to also influence valence judgments. Positive words such as *ethical* are judged more quickly as positive when they were shown at the top rather than at the bottom of the screen, while the opposite is true for negative words (Meier & Robinson, 2004; Schubert, 2005). Another study showed that the effects for power judgments are independent of the valence of a group label. When judging power, the valence of a group is rather unimportant for facilitation by vertical location. In contrast, when judging valence, the power of a group is rather unimportant. Thus, judging *dictator* as powerful is facilitated when it is shown at the top, but judging *dictator* as bad is facilitated when it is shown at the bottom of the screen (Schubert, 2005).

The group labels used in these studies were well-known powerful or powerless groups. Does the same also hold for power relations among people one has just recently learned about? Recent evidence suggests that the answer is yes (von Hecker, Conway, &

Sankaran, 2009). In these studies, participants learned about a hierarchy among four persons. They were then shown the names of two out of the four persons above each other on the screen, either in a manner that was compatible with the hierarchy (powerful on top, powerless at the bottom) or not. They had to identify either the more powerful or the less powerful target by pressing the up vs. down arrow button to indicate whether it was up or down on the screen, respectively. Results showed that targets were more quickly identified when they were in the compatible positions.

As we have seen above, elevation is one nonverbal cue to power judgments, but there is by far more evidence that actual and apparent body size drives power judgments. Thus, the question arises: Is there evidence that schematized and abstracted size cues influence power judgments as well? Such evidence has been reported recently (Schubert, Waldzus, & Giessner, 2009; Schubert, Waldzus, & Seibt, 2008). The paradigm used in these studies is similar to the response latency paradigms by Schubert (2005). Group labels were presented on the screen, but this time always in the middle of it. What varied was the font size; it was either regular or more than twice as large and bold. In one study, participants saw two groups at once, one powerful and one powerless, with the font size either compatible or incompatible, and had to find the more powerful or the less powerful group. In two other studies, participants saw always only one group, and had to categorize it as either powerful or powerless. Response latencies and accuracy were analyzed. The consistent outcome was that if the font size is compatible with the group's power, the judgments are facilitated (i.e., quicker and more accurate).

If we look at this line of evidence, we see that even with more and more schematization, the effects of spatial cues on power judgments persist. The study with the most extreme schematization is perhaps one study also published in Giessner and Schubert (2007). In

this study, participants again read about a manager and then judged his power and influence. However, between the information and the judgment, they had to perform an ostensibly unrelated task of repeatedly comparing two lines, a standard and a target line. Participants always had to estimate how much longer the target line was as compared to the standard line. Four different groups of participants saw four different versions of this task: The two lines either differed a lot or just slightly, and they were either vertically or horizontally arranged. Judgments of the manager after the line comparison task were influenced by the difference between the lines only when they were vertical. Those who repeatedly saw two vertical lines that differed a lot judged the manager to have more influence over his subordinates than those who repeatedly saw two vertical lines that differed only a little bit. In contrast, the length difference did not matter when the lines were shown horizontally. This suggests that even if a vertical spatial difference is activated completely independently of a social target, it can nevertheless have an influence on power judgments.

Taken together, these findings show that judgments of power take into account spatial cues about elevation or size even when these cues are so schematic and abstract that they do not convey anything about actual strength differences.

More recent evidence shows that the link between space and power might in fact extend beyond perception and influence the expectation of perception – or, in other words, attention. This research used a paradigm developed by Meier and Robinson (2004). In an innovative experiment, they had participants first categorize words that appeared on a screen as either positive or negative, and then identify a letter on the screen as either a *p* or a *q.* The letter was either displayed at the top or at the bottom of the screen. After seeing a negative word, participants could identify the letter more quickly when it

appeared at the bottom of the screen rather than at the top. The reverse was true for positive words (albeit not significantly). This experiment suggests that understanding something positive immediately orients attention towards the upper half of the frame of reference. Does this also hold for power stimuli? In a recent paper, van Dantzig and colleagues explored this question (van Dantzig, Boot, Pecher, Giessner, & Schubert, 2008). They repeated Meier and Robinson's experiment, but this time participants categorized group labels presented via headphones as either powerful or powerless before identifying the *p* or *q*. Results confirmed that understanding the label of a powerful or powerless group also orients attention upwards vs. downwards, respectively.

More evidence on how power influences attention has been recently published by Robinson, Moeller, and colleagues. These studies did not investigate the effects of the power attributed to a stimulus, but at the effects of dominance as a personality trait. They showed that individuals who described themselves as more dominant attended more to stimuli in the vertical dimension than individuals who described themselves as less dominant (Moeller, Robinson, & Zabelina, 2008). Other studies show that dominant individuals, but not non-dominant individuals, attend more to stimuli that appear up rather than down (Robinson, Zabelina, Ode, & Moeller, 2008). Even though these results are not perfectly consistent with each other, the results suggest that one's expectations and motivations in social relations constantly influences spatial attention even when no social stimuli are present.

The social use of schematized vertical cues

As we just saw, spatial cues about elevation and size enter power judgments even if they are dissociated from the human body, schematized, and abstracted. We argue that it is precisely this fact that allows these cues to be used in human communication about social relations. This starts at a very basic level, as a study by Giessner and Schubert (2007) has shown: In a reversal of the manager study already cited above, participants read descriptions of either a powerful or a less powerful manager of a group of subordinates. They were then asked to illustrate the organizational structure by placing a picture of the manager in a picture where the subordinates were already shown, more or less aligned on a horizontal axis. Those who had read about the powerful manager placed his picture significantly higher than those who had read about the less powerful manager.

This result was found even though no explicit communicative intention was associated with the pictures. We can expect that such effects are even stronger if there is a communicative context present. Because they are indices of power, size and elevation will be used in many different ways to reinforce and perpetuate human hierarchies. A recent review by Alan Page Fiske (2004) concludes that the use of elevation and size to communicate hierarchy is a culturally universal practice. The best evidence comes from systematic anthropological field work in the Pacific region: Solomon Islands (White, 1985), Tikopia (Firth, 1970), Micronesia (Garvin & Riesenberg, 1952; Keating, 2000), and Fiji (Toren, 1999). The practices identified in this field work use both the body and artifacts. First, cultural practices induce bodily behaviors that ritualize postures which elicit appraisals of high or low dominance and power. Bowing as a sign of submission and deference is common. Other prescribed behaviors are sitting vs. standing and

walking on knees. Alltogether, vertical positions in the environment are tightly regulated. Second, architecture and furniture is used to create differences in elevation: Kings sit on thrones; houses of people with higher rank are built on platforms (Toren, 1990; Hewes, 1955). These features are nicely illustrated by the description that Garvin and Riesenberg (1952, p. 211) provide of the ceremonials in the communal house of the Ponape in Micronesia:

> The building is arranged with low platforms on the two sides and a higher platform at the front; the Nahnmwarrki, Nahnken [feudal chiefs], their wives, and sometimes other high chiefs … sit on the high front platform facing the rest of the people on the side platforms and on the central ground-level area; the Nahnmwarrki's position is farthest to the front. No one, with certain exceptions, may sit or stand so that his head is higher than that of the Nahnmwarrki. In passing a man of high rank a commoner must bend low, and he must crawl before a seated chief. If a man wishes to climb a tree near the house of a man of high title, he must first obtain permission from that man; and he must descend if a chief comes near.

A. P. Fiske (2004) points out that such evidence is available for many other places and times, ranging from ancient Egypt and Rome (Firth, 1970) to Mayans in Chiapas to modern day advertisements (Goffman, 1976). Indeed, a large chair behind a large desk can still prime students to feel and act as if they were powerful (Chen, Lee-Chai, & Bargh, 2001).

Cognition and the Space-Power Link: Association, Perceptual Symbol, or Metaphor?

We have seen that size and elevation cues are used to appraise power when they appear as features of the human body. The same is true when the cues are not features of the human body. The latter fact is exploited by cultural practices to communicate and solidify hierarchies. An important question is how the cues in their schematized form can still be understood as denoting power. The remainder of this chapter will evaluate the proposed answers to this question.

This question is crucial in order to explore some effects that we have not mentioned so far. The evidence presented until now concerned effects of spatial and other perceived cues on power judgments. However, there is also evidence for the reversed causal direction. For instance, several studies have shown that judgments about someone else's dominance distort the judged height of that person. Persons who are thought to be more dominant, or have authority, are also judged to be taller (Wilson, 1968; Dannemaier & Thumin, 1964; Higham & Carment, 1992). This shows that there is a bidirectional link between the concepts of space and power in human mental representation. Together, the persisting impact of schematized cues and the existence of a bidirectional link lead to the question how the power-space link is mentally represented.

There are currently three main approaches that compete for an explanation of this link: semantic network theories, simulation theories, and metaphor theories. All three make different proposals regarding the connection between concrete and abstract cues. Typically, the literature on embodiment pits the simulation account against the semantic network account. In many papers (including our own past work), the simulation account

is not differentiated at all from the conceptual metaphor account. However, we hope to show in the remainder of this chapter that it is fruitful to examine all three accounts separately regarding the evidence presented in this chapter.

Semantic Network Theories

Semantic network theories propose that learning about the social environment implies the construction of a network in which abstract representations come to stand for perceived stimuli (objects, people, behaviors, events). These formed representations are assumed to be amodal – they have lost the sensory and motor qualities of the original experience of the event (Anderson, 1983; Anderson, 1993). They are typically depicted as nodes in a network with uni- or bidirectional links. In the depictions, the nodes are labeled, and indeed one can think of these nodes as *quasi verbal*. It is assumed that the activation of one node spreads to other nodes. Because of this spreading activation, the perception of one stimulus can prime other knowledge and thereby influence subsequent thought, feeling and behavior. Such semantic network theories have been inspiring the field of cognition and social cognition for over three decades and let to tremendous advances (Greenwald et al., 2001; Smith, 1998). In particular, they helped to identify and understand automatic effects and overcome the notion that the human mind is governed by conscious, rational thought (Bargh, 1997).

One big problem that this form of theorizing is facing is the so-called symbol grounding problem (Harnad, 1990). Put simply, the question is how the nodes in the network acquire their labels, if they always only refer to other nodes. Other, more empirical, challenges have been findings that show rather direct effects of cognition on behavior and of behavior on cognition (Glenberg, 1997; Hommel, Müsseler, Aschersleben, &

Prinz, 2001; Barsalou, 2008; Niedenthal, 2007). Some theorists tried to integrate such findings with classic semantic network theories by assuming that in addition to quasi-verbal amodal nodes, the network also includes direct links to perceptual and motor representations (Bargh, Chen, & Burrows, 1996; Dijksterhuis & Bargh, 2001; Mussweiler, 2006).

To explain the link between spatial cues and power with semantic network models, one could assume that the categorization of stimuli as high or big becomes associated over time with their categorization as powerful. This results in a bidirectional link between the nodes for high/big and powerful, and, because of spreading activation, allows for priming of one by the other. To evaluate how such a theory is able to account for the presented findings, the most interesting test cases are the interference paradigm studies (Schubert, 2005; Schubert et al., 2009; von Hecker et al., 2009), because they put most constraints on the theory and rule out conscious processes. How could one explain the finding that a group label presented at the top is more quickly categorized as powerful with semantic network theory? One could argue that perceiving the elevated word triggers the categorization of the spatial location as high, thereby activating a node representing “high,” from which activation spreads to the associated node “powerful,” which then facilitates the categorization of the presented group label as powerful.

Would this theoretical notion be able to explain the findings? Of course. Indeed, it seems that so far, there is almost no finding that could not be explained by a variant of semantic network theory, especially if one assumes the inclusion of modal content in the network. Some have thus argued that semantic network theory risks being unfalsifiable. But the bigger problem might be that semantic network theory would not *a priori*

predict the kind of effects presented earlier (Barsalou, 1999), while that is the case for the second category of theories, simulation theories.

Simulation Theories

There are many different theories proposed under the label embodiment, and they often focus on very different assumptions (Wilson, 2002). The assumption that is most relevant for the present purpose is the idea that cognition is *modal*. In Wilson's words, the idea is that "even when decoupled from the environment, the activity of the mind is grounded in mechanisms that evolved for interaction with the environment—that is, mechanisms of sensory processing and motor control" (p. 626). This is what we refer to as simulation.

Perhaps the most frequently used theory of this kind is perceptual symbol systems (PSS) theory. In this theory, Barsalou (1999) implemented the grounding idea by proposing that primary modality-specific perception areas in the brain are not only crucial for perception, but also for a host of higher level cognitive processes such as working memory, long term memory, and conceptual knowledge representation. The key assumption is that these cognitive processes re-activate the modality-specific perception areas that were involved in learning the recalled or simulated content. Each cognitive process consists of simulations that re-activate modality-specific perceptual areas. For instance, working memory processes activate the primary visual cortex when they simulate a visual experience. It is worth noting that PSS includes propositions on how it is implemented in brain functioning. The theory is supported by a large body of evidence with behavioral measures (such as production, recognition, and judgment), as well as with neuropsychological methods (Barsalou, 2008).

Again, how could we explain the findings on the space-power link using this theory? To answer this question, we first have to look at how "powerful" is represented according to PSS. The theory proposes that aspects of experience that are attended to get stored in memory in schematic form. Such a schematized and stored element of experience is called a perceptual symbol. Importantly, re-activation of the perceptual symbol entails activation of the perceptual areas involved in its acquisition. These perceptual symbols can then be combined productively to form propositions. When experiences with powerful others or the self in a powerful position are made, a number of perceptual symbols are likely to be acquired – about bodily strength, height, vertical positions, postures, but also introspective states like emotions. These perceptual symbols are not recordings of the complete situations in which the experience were made. Instead, they are very selective and schematized aspects of the experience. For instance, experiences of moving other's bodies, or being pushed, of perceiving something big, or of looking up will be retained as perceptual symbols. These perceptual symbols get combined and associated with each other. They can then be used to run simulations of powerful others and being in power. Together, the frame of perceptual symbols and the simulations make up our knowledge about power.

Concerning the evidence collected with the interference paradigms, one could argue that in order to judge the power of a group or person (e.g. *master*) whose label is perceived, the power needs to be simulated. Because this simulation will entail the activation of perceptual symbols of vertical positions, the actually perceived information about vertical positions will interfere with or facilitate the simulation and thus influence the response latency of the power judgment.

Simulation theories like PSS can explain the findings on the space-power link just as easily as semantic network theories. In addition, however, they predict these findings *a priori*, and provide a more parsimonious explanation than semantic network models that conceptualize modal and amodal content to be linked in one network. By saying this, we do not claim that these kinds of associative networks do not exist or are not important. On the contrary, assuming a role for both, embodied simulations and associative networks, can help us make more precise predictions regarding the effects of activating the concept "power". Thinking of a group that is powerful should then have different consequences than thinking of an associate of power such as *plug* (Solomon & Barsalou, 2004; Louwerse & Jeuniaux, 2009). Whereas perceiving "generals" should redirect attention upwards, perceiving "plug" should rather redirect it downward. Yet, in a fraction of a second, both concepts might prime "high" through priming "power".

However, perhaps the biggest advantage of simulation theories is that they allow prediction and explanation of the implementation of these processes in the human brain. Recent research started to locate brain regions that are involved in dominance judgments from facial expressions and head postures (Chiao et al., 2008), and the inference of power from more abstract cues such as status insignias (Chiao et al., 2009).

Conceptual Metaphor Theory

Conceptual metaphor theory grew out of the work of the cognitive linguists George Lakoff and Mark Johnson on metaphors. In their influential book "Metaphors we live by" (Lakoff & Johnson, 1980), they argued that much of human cognitive processes are grounded in metaphors. Of special importance to our current purposes, they proposed that so-called orientational metaphors that build on spatial orientation organize whole

systems of concepts. In particular, they argue that the concepts of *control* and *status* are understood on the basis of orientational metaphors that use the vertical spatial dimension: "HAVING CONTROL OR FORCE IS UP; BEING SUBJECT TO CONTROL OR FORCE IS DOWN," and "HIGH STATUS IS UP; LOW STATUS IS DOWN" (p. 15f).

The central claim of conceptual metaphor theory is that metaphors are not merely vehicles to talk about one thing by referring to something else. Rather, they help to understand and experience one thing in terms of something else: One domain, such as vertical space, acts as the source domain from which knowledge is transferred to the other domain, power. The source domain of a metaphor can thereby bring a certain structure to the target domain, and allow inferences that would not be possible without it. For instance, conceptualizing powerful as up in space can imply that the powerful entity has accumulated potential energy that can be unleashed onto the powerless down at the bottom.

Again, how would this theory explain the interference effects? Actually, conceptual metaphor theory itself does not provide a psychological process model for such effects. However, Boroditsky (2000; 2001) has proposed a process model that builds on CMT and argues for asymmetric effects: Activation of the source domain should change judgments in the target domain, but activation of the target domain should not change perceptions in the source domain because the target domain depends on the source domain, but not the other way around. This notion can explain well the fact that spatial cues bias power judgments. However, it has problems explaining why power judgments do bias subsequent spatial attention (van Dantzig et al., 2008, see also the chapter by Santiago et al. in this volume).

The relation between the so-called target and source domain thus seems critical for a judgment on whether simulation or metaphor theories provide a more useful account. Simulation theorists acknowledge the role of metaphoric mapping in the elaboration of conceptual representations, but they sometimes argue that metaphors cannot be sufficient to explain the mental representation of abstract concepts. Barsalou (1999, p. 600) for instance stated:

> A direct, nonmetaphorical representation of an abstract domain is essential for two reasons: first, it constitutes the most basic understanding of the domain. Knowing only that anger is like liquid exploding from a container hardly constitutes an adequate concept. If this is all that people know, they are far from having an adequate understanding of anger. Second, a direct representation of an abstract domain is necessary to guide the mapping of a concrete domain into it. A concrete domain cannot be mapped systematically into an abstract domain that has no content.

Let us look in more detail at conceptual metaphor theory to evaluate this critique. Lakoff and Johnston (1980) acknowledge that orientational metaphors like CONTROL IS UP arise from "the fact that we have bodies of the sort we have and that they function as they do in our physical environment" (p. 14). In other words, sensory and bodily experience with the natural and the culturally created environment is assumed to give rise to these metaphors. Regarding CONTROL IS UP, the cause is assumed to lie in experiences in which physical size and physical strength correlate, and those in which vertical position and power correlate. This statement reveals that conceptual metaphor theory, just like simulation theories, builds on correlated experiences and their abstraction, at least when it comes to this kind of metaphors.

Furthermore, Lakoff and Johnson (1980) acknowledged that the shortcuts referring to the metaphors, such as "CONTROL IS UP", may be misleading because they suggest an abstractness that goes beyond the abstractness present in the mental representation. For instance, the experiential basis of the metaphor MORE IS UP may differ from that of RATIONAL IS UP in a way that is not captured by the assigned label UP. The two UPs are not identical. This points again to the importance of the actual experience.

Recent formulations of the theory emphasize the grounding of metaphors in concrete experiences even more. Lakoff and Johnson (1999) emphasized the idea that correlations of experiences cause the formation of metaphors by (1) integrating C. Johnson's work on conflation and (2) adopting Grady's notion of primary metaphors (instead of orientational metaphors).

C. Johnson (1999) hypothesized that two concepts joined in a primary metaphor like MORE IS UP or AFFECTION IS WARMTH are for the learning child in the beginning not separated at all, but simply experienced as one, which leads to the creating of strong associations. Only later, the two concepts get cognitively differentiated, but the associations persist.

Grady (1997; 2007; 2005) also emphasized the grounding of conceptual metaphors in correlated experiences. He noted that observing correlations like those between higher and being more as a result of putting liquid into a container or piling things on top of each other "experientially motivates" the formation and use of conceptual metaphors like MORE IS UP:

> Source concepts for primary metaphors include UP, DOWN, HEAVY … , various simple "force-dynamic" concepts … , and so on. Corresponding target

> concepts are such basic building blocks of mental experience as DOMINANT …. These metaphors appear to arise directly from experience…. (Grady, 2007, p. 192f)

Grady (2007) also pointed out that because humans everywhere share the same kind of bodies and thus similar patterns of experience, a large part of the universality of certain metaphors can be explained by universality of correlated experiences.

Surprisingly, however, Grady (2007) also stated that while the source concept is directly experienced, the target concept is not. The examples he cited for this include UP IS DOMINANCE, DOWN IS SAD, HEAVY IS DIFFICULT, BRIGHT IS HAPPY, FORWARD IS SUCCESS, BACKWARD IS THE PAST, SWEET IS APPEALING. For these concepts, he claimed that "the unidirectionality … is consistent and absolute. In each case, the perceptual concept is the source and is mapped onto the nonperceptual concept" (p. 193). From this assumed asymmetry in perceptual quality, Grady also derived a strong claim about unidirectionality of usage. For instance, he notes that as a result of the unidirectionality of HEAVY IS IMPORTANT, we can communicate that an issue is important by saying it is heavy, but we cannot indicate that a laptop is heavy by saying it is important.

It seems however that there is a logical problem with this analysis: How can an experiential correlation between quantity and height give rise to the metaphor MORE IS UP if more is never experienced directly? It appears that the notions of experiential correlation and conflation contradict the claim that a target and a source concept can be identified in absolute terms. In fact, most of the target concepts listed by Grady appear to have some directly perceivable aspects: Being dominated is experienced when being

subject to physical force; happiness, sadness and appeal have clear introspective components independent of the source concepts, etc.[2]

In fact, in their early work, Lakoff and Johnson (1980) noted that the apparent asymmetry in metaphor use is not due to physical experiences being more "basic than other kinds of experience, whether emotional, mental, cultural, or whatever" (p. 59). Instead, they argued that what makes physical experiences useful for conceptualizing other kinds of experiences via metaphors is that they are more "clearly delineated" (ibid.). However, a definition of that term is missing.

All things considered, it appears that conceptual metaphor theory and simulation theories are rather compatible when it comes to the processes they assume regarding concepts represented in orientational metaphors (Lakoff & Johnson, 1980) or primary metaphors (Grady, 1997; Lakoff & Johnson, 1999). At least for orientational/primary metaphors, conceptual metaphor theory clearly and consistently states that their formation is driven by correlations between different experiences. Simulation theories assume the same process to be at work when they argue that attention and schematization form modal representations of abstract concepts (Barsalou, 1999). Asymmetry effects between target and source domain, however, need a more precise characterization of the cognitive processes involved in the respective tasks. To our best knowledge, simulation theories are also mute on this point (see also Lupianez, this volume; van Dantzig et al., 2008).

Synthesizing Embodiment and Conceptual Metaphor Accounts for the Embodiment of Power

The comparison of semantic network approaches, embodiment and simulation accounts, and conceptual metaphor accounts suggests that simulation theories seem to be best equipped to explain the combined evidence on the effects of bodily and abstracted cues to power. The emerging picture is that a host of experiences in several modalities lead to the formation of perceptual symbols of power. Furthermore, these experiences correlate with each other, and therefore become associated with each other. These will include experiences with bodily force (with the self being both a subject and an object), size, and elevation. In addition, perceptual symbols in other modalities are likely: certain postures such as making a fist (Schubert, 2004; Schubert & Koole, 2009), standing upright (Stepper & Strack, 1993; Roberts & Arefi-Afshar, 2007), and possibly also loudness and a deep voice. Combined, they form a frame that allows the simulation of various aspects of the concept of power.

Is there an innate proclivity to associate size and spatial relations?

Many of these perceptual symbols can and will arise simply from the way the human body functions when interacting with the physical and social environment. From the invariance of the human body across cultures alone one could predict the similarity of most perceptual symbols across cultures (Lakoff & Johnson, 1980; Clark, 1973): Size is likely to equate power in most cultures as the default, even though this default can be overridden with practice (Schubert et al., 2009).

In addition, it is possible that humans have an innate proclivity to learn at least some of the associations described above, in particular the link between body size, and more

generally size, and power. Gorillas, chimpanzees and bonobos establish dominance hierarchies with displays of fighting ability – often in the form of bluffing. In these displays, the large and sharp canines are shown, and the large erectile hair increases apparent body size (Boehm, 1999; Eibl-Eibesfeldt, 1971). Even though humans have lost the innately well-prepared displays and the profuse bristling bodily hair that accompanied those displays, it seems possible that we retained the disposition to associate the perception of such displays with power. It would have been acquired throughout evolution of Homo sapiens and its predecessors in the repeated task of learning these perceptual symbols. A process called Baldwinian selection can select for mechanisms that allow the fast and effortless learning (Richards, 1987). For instance, Baldwinian selection presumably equipped primates with a very efficient mechanism to learn fear of snakes (Öhman & Mineka, 2003). A. P. Fiske (2000; 2004) proposed that Baldwinian selection also supports the association of power and order in vertical space.

The existence of such an innate proclivity to represent dominance hierarchies and to identify them in vertical spatial relations would explain the early onset of this skill. Indeed, recent evidence suggests that children around the age of 1 readily attribute dominance to larger agents even if they have non-human bodies (Thomsen, Frankenhuis, & Carey, 2009). Further, it would account for the overwhelming cultural ubiquity of associations between power and elevation or size (Fiske, 2004).

If such a proclivity exists, it would instantiate another “core system” of human cognition (Carey & Spelke, 1996), along with systems for the representation of objects, agents, numbers, geometry, and us vs. them (Spelke & Kinzler, 2007; Thomsen et al., 2009). These core systems provide a basis for the development of human cognition, and humans share them with many other animals. However, as all infants are also

universally and from the beginning of their life confronted with others that are at the same time larger and more powerful, it will be crucial to go beyond showing the early onset of associating power with size.

Profiting from conceptual metaphor theory

We have seen that the space-power link can be fruitfully understood as the outcome of a learning process that involves modal representations, and that simulation theories are well-equipped to describe this process and predict its outcomes. Does this mean that we do not need conceptual metaphor theory to understand the metaphor that CONTROL IS UP? The answer is complex. On the one hand, the proponents of conceptual metaphor theory themselves propose a learning process based on experiential correlations for primary metaphors such as CONTROL IS UP, and thus come very close to embodiment theories concerning the acquisition process. It seems that understanding the space-power link based on perceptual symbols might allow a better understanding than couching it as primary metaphor.

On the other hand, metaphor theory seems to be better equipped to explain certain aspects of the space-power relation that we did not mention yet: the potential for inferential reasoning, the guiding role of language during schematization, and the usefulness of metaphors to identify perceptual symbols. Let us expand on these points.

Conceptual metaphor theory argues that a metaphor supports inferential reasoning about the target domain by recruiting constraints from and cognitive processes developed for the source domain. Applied to the field of power, this means: Our understanding of power and social status is based on reasoning about space and spatial order, and inferential processes developed for spatial reasoning. We want to give one example of

inferences about space that seem to be applied to power (Schubert et al., 2009). Power is inherently *relational* because in addition to pure physical influence, it relies on many aspects that are only defined as a combination of the characteristics of the involved individuals: what is positive and negative for them, their ability to create these positive and negative reinforcements, their perceived legitimacy, etc. Because of this relational quality of power, a situation in which A has power over B and B has power over C does not necessarily imply that A has also power over C. However, if power is understood as size or elevation in space, one might easily commit the error of assuming transitivity because size and elevation, in contrast to power, are comparative, and not relational. Thus, understanding power as size might lead to the erroneous conclusion that A has power over C. Indeed, social hierarchies that use elevation as a crucial index of *status* construct it in a way that implies transitivity (A. P. Fiske, 2004).

Another domain in which a synthesis of metaphor and simulation approaches can contribute to the understanding of the space-power link is language. The linguistic representation of the space-power link in the form of metaphors is the primary interest of metaphor theory. Indeed, metaphors speaking of power as elevation, size and force seem to be used in most languages (Schwartz, 1981; A. P. Fiske, 2004). The simulation account assumes that each individual performs the schematization process anew and from scratch.

Metaphors, however, are transmitted in language; they are socially shared and may exist to a certain degree independent of the original experiential correlation. This explains why they are able to guide which correlations in the environment are picked and used for grounding conceptual representations. For example, “when things get better or easier (for instance, when health improves after illness), for English or German speakers,

things go ‘uphill’/’bergauf,’ for Italians they go ‘downhill’, they are ‘in discesa’” (A. Maass, personal communication, 12.08.2009).[3] Clearly, both metaphors are grounded in experienced correlations, but different ones are used, and language determines to a certain degree which are abstracted (in this example energetic states or opportunities to relax). When we acknowledge that the schematization process assumed by simulation theories works not only on experiences with the natural environment, but also on experiences with the culturally created environment in the form of artifacts such as furniture, and architecture, we see that a similar process might take place also outside of language. Cultures reify the perceptual symbols and metaphors in their environment, and these reifications serve as input for schematization processes of other individuals.

Acknowledging the importance of language for perceptual symbol has another effect. Simulation theories emphasize that language understanding is more than just a transcription of verbal content into a semantic network; in contrast, they hold that perceptual simulations of described scenes are constructed (Fischer & Zwaan, 2008; Zwaan, 2004). If such simulations are constructed during the understanding of space-power metaphors, we see another ecology emerging in which power and space are experienced as correlated. Perceptual content transmitted by metaphors and simulated during language understanding may serve again as input to schematization. This ecology adds to the correlated experiences of space and power in bodily interactions and cultural artifacts.

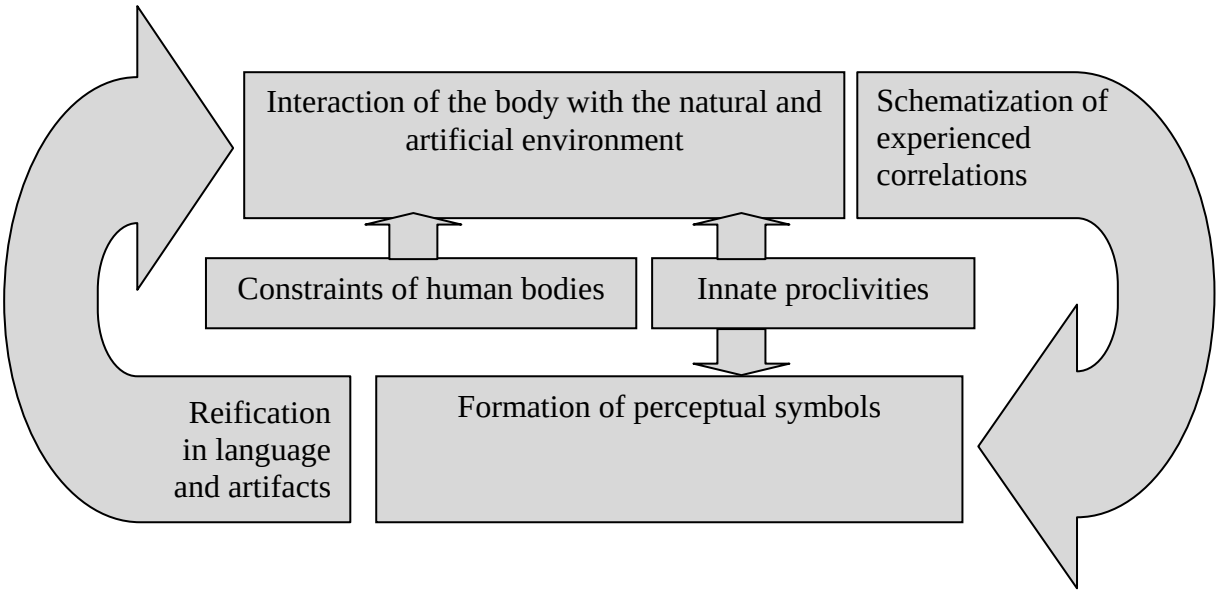

Figure 2. A model of schematization and reification of perceptual symbols, synthesizing individual and cultural processes

When we take these aspects together, we arrive at a model of perceptual symbol processes that takes both individual learning and cultural transmission processes into account. We depict that model in Figure 2. Human bodies constrain the possible interactions with the natural and artificial environment. The experiences made during these interactions are schematized into perceptual symbols. These symbols are themselves again reified in metaphors and artifacts, which serve as content for future interactions and guide further schematizations. Innate proclivities may guide both interactions and schematization processes.

An analysis of space-power metaphors might in fact be fruitful to understand the space-power link in more detail. So far, we have implicitly assumed that the link between up and powerful refers to a rather static situation that simply refers to arrangements in space. Several different spatial prepositions or constructions are used to refer to this link: in English, the powerful is denoted as *up*, as *above*, but also as *over*, while

powerless is associated with *down*, *below*, but also *under*. Are these terms interchangeable, and do they mean the same? Recent analyses of the use of spatial prepositions for descriptions of concrete situations suggest that these terms actually imply different things, or, in other words, seem to entail different simulations of the described situations (Coventry & Garrod, 2004; Deane, 2009; Vandeloise, 1991). Some spatial prepositions, such as *above/below*, seem to imply primarily geometric information about vertical position. Other spatial prepositions, such as *over/under*, seem to imply primarily functional information that may sometimes override geometric relations. For instance, if a man uses an umbrella against a rainstorm that comes from the front rather than from above, one can still say that the umbrella is *over* the man, even though in a geometric sense it is *in front* of the man – implying protection by and thus a functional relation between the umbrella and the man (Coventry, Prat-Sala, & Richards, 2001).

Given that these spatial prepositions have slightly different meanings when used for concrete situations, it seems likely that they also have different meanings when applied metaphorically. The prepositions *above/below* seem to be used primarily to refer to social status, which is the honor or prestige attached to one's position in society, while metaphorical uses of *over/under* seem to refer primarily to social influence (O'Keefe, 1996). These meanings map very well on the distinction between geometrical and functional meaning of spatial prepositions (Coventry & Garrod, 2004).

We can speculate that in addition to the vertical differences implied in above/below and the potential for influence implied by over/under, a third area of power metaphors may be the direct application of influence. This third aspect is expressed with metaphors like *having somebody in one's grip* (the same metaphor exists in German, *jemanden in der*

Hand haben, and Italian, *avere qualcuno in pugno*). In functional terms, this refers to an actually exerted control over the other's location (Coventry & Garrod, 2004). This basically implies a restriction of self-determination. A very similar meaning may be implied by the metaphor of the powerful as *puppet masters* who *pull the strings*.

Outlook

We have started with a notion of power as being rooted in direct physical influence. This kind of power is readily judged from various nonverbal cues. We have seen that schematized versions of these cues are appraised as communicating power and reified in cultural artifacts. Finally, we argued that these processes are rooted in schematization and simulation abilities of the human mind, and amplified and communicated by language. We contend that it is this ability for schematizing and abstracting nonverbal cues of power that provides the basis for using space and spatial order for the constitution and conformation of power in authority relations, as described by A. P. Fiske (2004).

In the current chapter, we emphasized the interconnections and similarities between the various levels: bodily cues, nonverbal communication, mental representation, and language. However, the sheer amount of evidence available strongly suggests that *differentiation* may be what is needed in future research. As an outlook, we want to provide two examples for such possible differentiations.

As we have seen before, the aspects of influence and self-determination might require slightly different qualities which could have led to different embodiments in language, metaphors, perceptual symbols and cultural artifacts. It is also possible that the long cultural history of using elevation to denote power has led to differences in the

embodiment of force-based, coercive power and hierarchy-based, consensual power. Embodiments for the first kind should include grip, strength, pressure, etc., while those for the latter kind should include elevation, omnipresence, and spatio-temporal extension.

Other perceptual symbols to distinguish are those of status and influence. The concept of power often entails both. Furthermore, power and status are mutually reinforcing (Magee & Galinsky, 2008). Nevertheless, within this field, several different variables can be distinguished that we have used synonymously here, as the field of nonverbal communication typically does (Hall et al., 2005). For instance, leadership and dominance could be both subsumed under the concept of power as we have used it here, but they are clearly different concepts (Van Vugt, Hogan, & Kaiser, 2008; Van Vugt, 2006). It remains a task for the future to investigate to which extent these concepts have different embodiments and are described with different metaphors and perceptual symbols, such as horizontal movement patterns (Menon, Sim, Fu, Chiu, & Hong, 2009). For instance, it could be that size and force metaphors are more typically used for dominance and social influence, but elevation metaphors are more typically used for status. We believe that a synthesis of conceptual metaphor theory and embodiment theory needs to include a closer analysis of *different* metaphors of power.

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Footnotes

[1] An alternative explanation could be that blind athletes are systematically reinforced during their career when displaying this kind of posture, or even explicitly taught how to behave when they win.

[2] Let us take another example: the metaphor that TIME IS MOTION IN SPACE. This may be the metaphor with the strongest evidence for asymmetry effects: Reasoning about time and reproduction of time intervals is affected by previously perceived spatial cues, but the reverse is not true (Casasanto & Boroditsky, 2008; Boroditsky, 2000). But even for this clearly asymmetrically used concept, Lakoff and Johnson (1980) note that it is grounded in experiencing "the correlation between an object moving toward us and the time it takes to get to us" (p. 59). Put differently, a rudimentary form of experiencing time (perhaps only short intervals) might exist before correlated experiences give rise to the spatialization of time (Jaynes, 1976) and the development of the proper metaphor, which then enhances the way time can be understood.

[3] The GETTING BETTER IS DOWNWARD metaphor does not extent to power. Gaining social status is associated with upward movement also in Italian, as in "*arrampicatore sociale*" (the "*social climber*") or "*raggiungere la cima*" (reaching the top; M. Bianchi, personal communication, 21.10.2009).

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