Running Head: Embodiment of Social Relations

The Embodiment of Power and Communalism in Space and Bodily Contact

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Imagine you visit a village on some remote island, with a culture you are not familiar with. On this island, you discover a number of strange behaviors that you try to make sense of. For instance, some of the islanders rub their noses with each other as a greeting. You also learn that others eat potions "using combinations of ingredient such as rocks from the tallest mountain-peaks and epiphytes growing atop the highest trees" (Fiske, 2004, p. 95). How would you interpret these behaviors? Perhaps you would guess those with nose to nose contact are generally close to each other, and those eating the potions made of high things enjoy or attain high status. What you have figured out then are perhaps the two most basic and important dimensions of social relations: community relations and power relations (Mead, 1934).

What is the basis of such a judgment that relates unknown behaviors to social relations? In the following, we will approach this question from the standpoint of Relational Models Theory (RMT) developed by A. P. Fiske (1992; Fiske & Haslam, 2005). This theory identifies community and power as two of the basic relational models humans use to structure and coordinate their social interactions. In a nutshell, when people have a community relation or *communal sharing* (CS), they focus on what they have in common. Thus, resources are seen as common in a CS relation and shared according to needs. Such a relation is typically found between mothers and their children in all cultures and among members of a group when this shared group identity is salient. It is also commonly found among members of a family clan in many cultures. A power relation or *authority ranking* (AR) means people structure their

interaction according to ordered differences.[1] These relations are very common in the workplace and in all institutions. They are also common between fathers and their children, and men and women in many cultures.

Since in a given relation the focus can be either on the commonalities or on status differences, the relational model can change over time. The applied relational model also depends on categorization processes, e.g., whether an individual categorizes somebody else as an ingroup or an outgroup member. Two other models, which are likely to be younger in phylogenetic terms and are learned later in ontogenetic terms, are *equality matching*, a model that underlies basic exchanges of goods or tit-for-tat types of relations, and *market pricing*, a model that underlies exchanges of goods using values assigned to them. In this chapter, we will concentrate on CS and AR.

According to RMT (Fiske, 2004), most of the many ways in which *community relations* are established, communicated and confirmed share a common representational basis or schema: Those who touch noses with each other might also dance in sync at the evening feast, and have the same tattoos on their faces. Furthermore, their huts might stand close together, and they might wear similar clothes. One could say their community relation is *embodied* in these behaviors and artifacts. RMT contends that these and most other embodiments of CS index the schema that the bodies of those in the relation share a common substance (which

[1] The term power usually refers to both a coercive form of control over another person's positive and negative reinforcements (Heckhausen, 1989) and other forms of asymmetric influence that are rather based on authority, expertise or legal hierarchical structures (e.g., Raven & French, 1959; Turner & Turner, 2005). Although many of the findings discussed in this chapter might be relevant for the first meaning of power, we are concentrating more on the second one, since it entails actually a superiors' pastoral responsibility for subordinates and, thus, is stronger associated to the cooperative character of relational models in general.

could be real, imagined, or implied). Fiske (2004) terms this underlying schema *consubstantial assimilation*. Thus, bodily contact, joint eating, and assimilation of outer appearance, by virtue of their connectedness to the sharing of a common substance, indicate the presence of a CS relation. The importance of this practice for close relations (e.g., kinship) has been noted already by early theorists (Durkheim, 1893) and remains a central topic in anthropology (Sobal, 2000).

Similarly, there are abundant ways of establishing, communicating and confirming authority ranking relations. In addition to eating highness potions, the more powerful might sit on larger chairs, wear bigger hats and live in larger huts. As for CS relations, RMT argues that these and most other behavioral and artifactual embodiments of AR relations share a common schematic basis, namely that they refer to order in space, especially on the vertical dimension. The more authority one has, the bigger, the taller, and the higher.[2] Thus, the medium of cultural conformation and communication of AR is order in space.

Why is it the case that humans think of CS as sharing essences, and of AR as order in space? It seems the answer has to do with the ways in which the human body interacts with other human bodies and the environment. For instance, babies literally share a substance from their mothers' bodies when being breast-fed, which helps establish a CS relation between mother and child. However, sharing essence in such close mother-child interactions has to be understood in a wider sense, including proximity and bodily contact. For instance, human

[2] In addition, Fiske provides substantial anthropological evidence that *force*, *coming earlier in time*, and *being in front* are further modal dimensions in which power is embodied. We do not discuss these here further because there is not yet much evidence from experimental psychological studies for each of these, and because we suspect that *coming earlier in time* and *being in front* depend on additional context cues to gain their meaning as embodiments of power. Therefore, a thorough discussion of them would be beyond the scope of the present chapter.

babies seek warmth and comfort through close bodily contact, similar to other primate babies (Harlow, 1958). From these experiences, the association of sharing bodily substances with CS relations might develop. Similarly, we interact with our bodies in an environment where gravity is a permanent unidirectional force pulling our bodies along the vertical dimension. Thus, being higher in space is associated with overcoming ubiquitous influence, and being lower is associated with giving in. This unidirectional force makes the vertical dimension distinct from other spatial dimensions and, thus, might be one basis for the embodiment of clearly asymmetric AR relations. It is also true that tall and strong persons are in general more able to force their will upon short and weak persons than vice versa. Children learn this, often painfully, and adults experience this as well. Again, it is easy to see this leads to an association of size and power. Apart from such a learning through individual experience, RMT assumes that the proclivity to interpret consubstantial assimilation as CS, and spatial order as AR could also be passed on as a genetic predisposition due to the survival value of quickly understanding social systems. According to RMT, this proclivity facilitates the passing on of collective forms of those representations from generation to generation within cultures trough communication, socialization and tradition (Fiske, 2004).

In sum, we assume the existence of universal cognitive schemata for the representation of social relations among humans. In particular, we claim the schema for CS relations contains behavioral manifestations of consubstantial assimilation, and the schema for AR relations contains behavioral manifestations of vertical order in space. These schemata prepare us to create and understand behaviors and artifacts that embody the two relational models, and thereby to establish, communicate, and confirm social relations – and to understand what people on a strange island - or anywhere in the world - do.

The Mental Representation of Relational Models: Cognitive Embodiment

Assuming schemata for CS and AR relying on consubstantial assimilation and order in space has an interesting implication: It suggests that our mental representation of CS and AR includes modal information about behaviors and spatial relations. Fiske (2004) explicitly argued that perceptual information about space (AR) and the body (CS) is *part* of mental representations, or, in other words, CS and AR are *cognitively embodied* in these modalities. Interestingly, this fits recent theorizing in cognitive psychology. The idea that conceptual knowledge can consist of perceptual information has recently received a lot of attention in research on perception and memory (Clark, 1996; Glenberg, 1997; Smith & Semin, 2004), and comprehensive theories are available which allow the modeling of such perceptually based knowledge. One prominent account is Barsalou's (1999) Perceptual Symbol Systems theory. Barsalou argued that conceptual knowledge consists of abstracted and generalized perceptual experiences, so-called *perceptual symbols*. Importantly, perceptual symbols keep the modal character of the perception that led to the symbols' formation, because thinking with perceptual symbols involves the activation of the same sensu-motoric areas that were involved in the acquisition of these perceptual symbols. Thus, perceptual symbols are not amodal, but still tied to the modality in which they were formed. Thinking that uses perceptual symbols involves the construction of mental simulations (Barsalou, 1999). Thus, the previous sensorimotor experience is partly re-enacted, but the simulations will be partial and sketchy, and adapted to the active context (i.e., situated). These assumptions are at odds with amodal theories of mental representation both in general psychology and in social cognition (cf. Niedenthal, Barsalou, Winkielman, Kraut-Gruber, & Ric, 2005).

The assumption that concept representations consist of schematic representations of perceptual content offers a way to model how the schematic knowledge about CS and AR is

represented mentally. Such an integration of Barsalou's (1999) and Fiske's (2004) theories suggests that CS and AR are mentally represented as highly schematized perceptual symbols. For CS, perceptual content about bodily contact and bodily sharing of substances is schematized into a perceptual symbol of *shared essences* (consubstantial assimilation). For AR, perceptual content of orders in space along the dimensions of size, height, and vertical position is schematized into a perceptual symbol for asymmetric *order in space*. These symbols are then used to run simulations that allow the understanding of unfamiliar behavioral and artifactual embodiments and, indeed, also the creation of new ones. When one thinks about CS relations, the perceptual symbol of shared essences will be activated. This leads to simulations using sensorimotor experiences of sharing substances, imitation or bodily contact (variants of consubstantial assimilation) to construct the relation. When one thinks about AR, sensorimotor experience of order in space will become active. Depending on other activated information, this can be about size, height, vertical position, or a mix of those. These simulations then represent the power relation. The concrete contents of these simulations will depend, of course, on personal learning history and the fit to the situation.

The implications of this hypothesis can be understood by contrasting it from one alternative: the possibility that social relations are inferred through propositional reasoning. Back on the island, when you perceive one hut as much larger than the other, you could categorize the hut as large and then, on the basis of knowledge about the world, form the proposition that the hut is belonging to a powerful person because you know large huts often belong to powerful persons. However, the perceptual symbol hypothesis suggests, because size is part of the power schema, the size of the hut has an immediate influence on your perception of its owner's power. Thus, we would expect that the perception of a large hut naturally goes along with thinking of the owner as powerful. Inferences could of course still

come into play, especially when you want to correct your impression of the owner on the basis of additional information, e.g., that he has only inherited it from his father, but is in fact not powerful in the community. In the following, we will further develop the integration of Barsalou's and Fiske's theories by first deriving criteria that can be used to distinguish between these two possibilities. We will then report first evidence suggesting that both CS and AR are represented as perceptual symbols.

Testing for Cognitive Embodiment

How is it possible to show that a social relation or a concept in general is mentally represented in modal form? We propose there are at least four types of empirical evidence that can demonstrate cognitive embodiment. A *first* type shows there is a correlation between human behavior and a state or process, or, in other words, there is *behavioral* or *artifactual evidence* for embodiment. For example, the observation that happy people tend to smile and smiling people are usually happy (Ekman & Friesen, 1971), is evidence for behavioral embodiment of happiness as smiling. This type of evidence is often so obvious that it is not studied empirically. Furthermore, some forms of embodiment do not involve overt behavior so no evidence for embodiment on the behavioral level can be collected.

The other three types of evidence measure the outcome of cognitive processes to infer the nature of the representations involved in them. Evidence for an embodied process thus means the process involves modal representations. The *second* type shows modal information has an influence on the assumed cognitive process and its direct outcomes, especially judgments and feelings. Thus, the difference from the first type is that not only behavior itself, but inputs for and outcomes of cognition are the focus of the investigation (although behavior will of course mostly be used as an index of the cognitive process). Since the kind of evidence

targeted here involves showing that modal information biases the cognitive processes, we will refer to this type of evidence as *bias evidence*.

When we speak of an embodiment effect, we assume there is an effect of the modal information on the cognitive process because the cognitive process uses representations in these modalities. However, bias and behavioral evidence are not sufficient to demonstrate such an embodiment, since they could still be explained by inferential processes. Modal information could be categorized in a higher mental process, become the basis of a propositional representation, and then be used to form a judgment. This process could lead to bias evidence. Thus, a *third* type of evidence is necessary to show that such a biasing influence is not mediated by inferential processes, and the influence happens in an automatic fashion. We will call this type of evidence *automaticity evidence*. Automaticity evidence often measures performance (e.g. speed or accuracy) in the cognitive process that is hypothesized to be embodied while modal information is presented simultaneously. The assumption is if the candidate modality is involved in the conceptual representation of the target concept or in generating a response, then any sensory input in this modality should influence the performance. Experiments testing for automaticity preclude influence of inferences on the performance measure, for instance through inducing mental load, time constraints or hindering the correct categorization. Thus, the ruling out of inferential processes which could explain a bias finding is a crucial feature of automaticity evidence. In addition, explicit measures can test whether conscious inferences took place. Finding automatic effects without effects on explicit measures is particularly good evidence against a high level inference (see for instance the chapter by Smith, this volume).

Finally, a *fourth* type of evidence shows that the use of the modal representation is necessary and important for the assumed process, and not an epiphenomenon. We will call

this type *mediational evidence*. Finding mediational evidence implies showing that the modal representations are not only able to *influence* a cognitive process, but also indeed *mediate* this process. Evidence for mediation of cognition through embodied representations is still rare. Some examples from outside the field of social relations are provided by Niedenthal et al. (2001) and Wilson and Knoblich (2005).

This typology can be used to sort the evidence, but it does not suggest one type of evidence is inherently better than another. Instead, the types of evidence are complementary. Behavioral/artifactual evidence and bias evidence are better suited to demonstrate the phenomenon in question and to demonstrate its importance in a given domain. Automaticity and mediational evidence, on the other hand, show more information about the process, and are able to rule out alternative explanations. A further type of evidence not discussed in this chapter is provided by brain-imaging techniques (see the chapters by Barsalou and Pulvermüller, this volume).

Evidence for Cognitive Embodiment of Communal Sharing

Equipped with this framework for empirical tests of cognitive embodiment, what is now the evidence that the relational models CS and AR are, in fact, embodied as shared essences and order in space? We will first discuss the evidence for CS, ordered by the different variants of consubstantial assimilation that Fiske (2004) discusses: physical proximity, bodily contact, imitation, and sharing of food.

Physical Proximity

Intergroup research on the well known contact hypothesis (Allport, 1954) has accumulated an impressive amount of evidence demonstrating that *physical proximity* improves attitudes towards members of outgroups (Dovidio, Gaertner, & Kawakami, 2003;

Pettigrew & Tropp, 2000). Among others, identification with a common ingroup including those outgroup members, interpersonal friendship and affect bonds, all typical instantiations of a CS relation, have been shown to be important mediators of this effect (Gaertner, Dovidio, & Bachman, 1996; Tropp & Pettigrew, 2005).

The behavioral embodiment of CS in physical proximity is shown more directly in social psychological work that used proximity behavior as an index for the need to affiliate: Wisman and Koole (2003) showed that increasing the need for affiliation through a manipulation making death salient led to a wish to sit within a group instead of sitting alone (see also Pleban & Tesser, 1981; Schachter, 1959; Shah, Brazy, & Higgins, 2004; Tice, 1992). Similarly, the artifactual embodiment of closeness has been used to construct measures of social distance: Aron, Aron and Smollan (1992) developed a scale consisting of overlapping circles representing the self and another person. They demonstrated that the perception of oneself as overlapping with another person was a valid indicator of social distance. This measure can also be used to measure the identification with groups (Schubert & Otten, 2002; Tropp & Wright, 2001).

Bodily Contact

Regarding *bodily contact*, there is ample evidence that touching influences helping behavior, which can be seen as a marker of CS relations (Cialdini, Brown, Lewis, Luce, & et al, 1997). Briefly touching the arm or shoulder for one or two seconds, in comparison to not touching, increased compliance with a variety of requests for help, such as to fill out a questionnaire (Hornik, 1987), to sign a petition (Willis & Hamm, 1980), to return a forgotten dime (Brockner, Pressman, Cabitt, & Moran, 1982), or to give away a dime (Kleinke, 1977). Awareness of the touch does not influence the compliance (Guéguen, 2002). Furthermore,

touching waitresses receive larger tips (Cruscoe & Wetzel, 1984; Stephen & Zweigenhaft, 1986).

All of these findings are primarily reflecting behavioral evidence of embodiment. In a series of recent studies, we have started to collect bias and automaticity evidence for the embodiment of CS as bodily contact. The type of CS relation we were interested in was strong identification with a social group. In a first study (Seibt et al., 2006), we were interested in whether experiencing bodily contact with a fellow ingroup member would induce feelings of identification with the ingroup. As in the studies just cited, we manipulated bodily contact by having an experimenter touch half of the participants on the shoulder for one second while handing over a questionnaire. Both the experimenter and the participants were students, and the questionnaire assessed identification with the student ingroup using a pictorial overlap scale (Schubert & Otten, 2002). As expected, we found that touched participants indicated a significantly higher overlap, i.e. a higher identification with their student ingroup. (There were no effects on participants' mood.) Furthermore, touch might even have an influence on the evaluation of persons who do not belong to the own ingroup (see Smith, this volume).

Still, although participants did not indicate any awareness of a possible influence by touch, conscious inferences could have mediated this effect. In a further series of studies, we also collected automaticity evidence ruling out such an interpretation (Schubert, Seibt, Waldzus, & Schmidt, 2005, in prep). With this set of studies, we investigated whether individuals have an automatic tendency to reciprocate bodily contact by members of their ingroup (i.e., those with whom they have a CS type relation) but not by members of an outgroup. The studies followed the typical paradigm for such an automaticity study by activating information in the modality suspected to be involved and assessing the reaction

time for a judgment of the investigated concept. The activated information consisted in these studies in fact of two different modalities at the same time, visual and motor information: We showed participants pictures of persons who were either standing in a normal posture or standing and extending their right hand, as if inviting a handshake (see Figure 1, this was the visual information). The shown persons belonged either to the ingroup of the participant or to a clearly visible outgroup; the participants' task was to categorize the persons according to their ingroup/outgroup membership. In order to answer, they were required to use a regularly sized but special keyboard with only 3 keys left (one in the middle and one on each side), which implemented the motor component. It was placed lengthwise between the participant and the screen. A person was categorized as an ingroup member either by pressing the key near the screen, moving the hand forward, or by pressing the key near the body, moving the hand backward. (Participants had to press the middle key to start each trial.) Thus, the task tested whether participants would be influenced in their hand movements by the outstretched hand of the person on the screen, depending on that person's category. If an ingroup categorization is embodied in bodily contact, the corresponding movement should be facilitated when bodily contact is offered. We tested this hypothesis in two studies using gender and age as categorization dimensions. We found in both studies the hypothesized pattern: Reaction times were influenced by the targets' hand postures for ingroup targets but not for outgroup targets. Specifically, for ingroup targets we found that forward movements were facilitated when the ingroup person offered a handshake, compared to no offered handshake, and the backward movements were impeded by an offered handshake, compared to no offered handshake. When an outgroup member offered a handshake, this had no effect on the participants' reactions. Only in the ingroup, bodily contact is automatically

reciprocated. Notably, the gender effect found in the gender study did not replicate in the age study, showing it was really the activated categorization driving the effect.[3] These findings represent initial automaticity evidence for the embodiment of CS as bodily contact. We can rule out conscious inferential processes as an alternative explanation for two reasons: First, the reaction times were far less then one second, making it unlikely that the participants drew inferences and reacted on their basis. Second, questioning of the participants after the study did not reveal any insight into our hypothesis that the offered handshake of an ingroup person would influence their own reactions.

Imitation

An extensive literature shows there is a pervasive tendency to imitate others who are perceived or whose stereotype is activated (Chartrand & Bargh, 1999; Dijksterhuis & Bargh, 2001). Meanwhile, there is also evidence that categorization borders moderate this tendency. *Automaticity evidence* comes from studies reported by Schubert and Häfner (2003) and Spears, Gordijn, Dijksterhuis, and Stapel (2004). They showed that the automatic enactment of activated group stereotypes found in various studies (e.g., Bargh, Chen, & Burrows, 1996; Dijksterhuis & van Knippenberg, 1998) can be impeded by depicting these groups clearly as outgroups. Thus, behavior of outgroups, i.e. groups with whom the participant does not have a CS relation is not imitated. This is automaticity evidence because the participants did not

[3] The described effects are not equivalent to approach-avoidance effects as described by Vaes, Paladino, Castelli, Leyens, and Giovanazzi (2003) or Castelli, Zogmaister, Smith, and Arcuri (2004), who originally developed the keyboard we used in this study. We found no simple approach-avoidance effect (i.e., a faster approach response to ingroup- and a faster avoidance response to outgroup members), and when scores for the bodily contact effect and the approach-avoidance effect are computed, they do not correlate. Our interpretation is that the approach-avoidance effect primarily reflects antipathy against the outgroup, whereas the effect of reciprocating bodily contact primarily reflects a CS relation to the ingroup.

intend consciously to imitate or not imitate. Further evidence is available for the mimicry of single individuals: Van Baaren, Maddux, Chartrand, de Bouter & van Knippenberg (2003) found individuals primed with words such as *together*, *group*, and *cooperate* were more likely to mimic another person unconsciously than individuals in a control condition. Priming with words such as *unique*, *alone*, and *individual* led to less mimicry. Although van Baaren et al. interpret these primes as activating an interdependent vs. an independent self-concept, we think it is also possible to understand these primes as activating versus not activating a CS relation. Furthermore, van Baaren, Holland, Steenaert, and van Knippenberg (2003) demonstrated that being mimicked without being aware of it led to similar consequences as being touched: mimicking waitresses receive larger tips. This can be interpreted as a form of helping behavior typical of CS relations (because it is unreciprocated). Van Baaren, Holland, Kawakami, and van Knippenberg (2004) found being mimicked leads to an increase in various types of helping behavior, replicating the effects of bodily contact with a different CS manipulation. Furthermore, van Baaren, Chartrand and Decety (2006) showed that mimicked individuals seated themselves closer to a stranger than persons who were not mimicked, which shows imitation and physical proximity, two of the assumed indicators of CS, are related. Finally, they found that being mimicked led to a feeling of closeness to other people in general (i.e., a stronger tendency to feel like in a CS relation). All these results, except those of the tipping study, can be considered automaticity findings since they largely rule out conscious inferences.

Food Sharing

Miller, Rozin and Fiske (1998) investigated if seeing people exchange food has an influence on the impression of their relation. They showed their participants a five minute videotape of a couple eating in a restaurant. In a brief sequence, the two persons either handed

each other salt and pepper or shared food with or without feeding. The findings confirmed the sharing of food is associated with personal, as opposed to professional, relationships, and feeding is associated with a sexual/romantic relationship, i.e. types of a CS relation.

In sum, there is ample evidence for behavioral and artifactual embodiment of CS as the sharing of essences. In addition, there is now also initial evidence for a biasing influence of imitation and bodily contact on feelings of identification, and even initial evidence that bodily contact automatically biases judgments about CS relations. However, no evidence has been reported so far that CS cognitions are indeed mediated by or rely on perceptual content related to sharing of essences.

Evidence for Cognitive Embodiment of Authority Ranking

As outlined before, Fiske argued that AR conformation involves a comparison of vertical positions or sizes. Because most of the available evidence confounds size and height, we first report on these two combined and then report evidence for the embodiment of AR in vertical position.

Size and Height

Behavioral embodiment of AR in size would mean people adjust their apparent size to the power they have. Hall, Coats and Smith LeBeau (2005) confirmed this in their recent meta-analysis of studies testing the relation between nonverbal behavior and impressions of power and dominance. They found postural openness (i.e. gestures making the appearance larger, e.g. arms and legs akimbo) is one of the very few behaviors that is correlated with actual power and dominance, along with facial expressiveness (Keltner, Gruenfeld, & Anderson, 2003). Similarly, there is evidence that people adjust their signature size to their

chronic status, both in Western societies and in Iran (Aiken & Zweigenhaft, 1978; Zweigenhaft, 1970).

However, there is also ample evidence for biasing effects of size and height on the *perception* of power. Perceived size can vary both because of the tallness (and width) and because of the posture of a person. Evidence suggests both sources of size variance influence impressions of power. Boyson, Pryer and Butler (1999) asked participants to rate a couple depicted on a picture; the woman's figure was manipulated to be considerably shorter, slightly shorter, or slightly taller than the man's figure. The woman was rated as more dominant than the man when she was pictured as taller. Tiedens and Fragale (2003) manipulated a confederate's behavior to be either expanded or constricted, and found higher ratings of dominance for the expanded confederate and predominantly complementary (instead of mimicking) behavior from the participants who interacted with the confederate (see also Montepare, 1995). Interestingly, the reverse, that is an influence of power on size judgments, is also true: The successful presidential candidate of the 1988 Canadian election was judged taller after than before the election, while the reverse was true for the losers (cf. Dannemaier & Thumin, 1964; Judge & Cable, 2004). Thus, the perception of power and that of size and height mutually bias each other.

One question remaining, however, is to what extent these effects are mediated by inferences of the type "I know tall persons are often dominant, so I assume this is the case here as well", or whether size has an immediate impact on the dominance rating because dominance *is* mentally represented as size. To test this latter hypothesis and rule out conscious inferences, we conducted a study using a reaction time paradigm and manipulating font size instead of body size (Schubert & Waldzus, 2005). Pairs of group labels (e.g., *teacher* and *student*) were presented to the participants. The pairs were constructed in such a way that

one group was clearly more powerful than the other. One half of the participants had to judge as quickly as possible which of the two groups was the powerful group by pressing the assigned response key; the other half had to judge which was the powerless group. One of the two presented group labels was always written in large font size (42 points), the other one in small font (12 point, Figure 2). Each pair was presented twice, with reversed font size in the second presentation. Both response latencies and errors in the judgment were analyzed as a function of whether the powerful or the powerless group was written in the larger font size. If larger size is associated with larger power, it should be easier to judge the group as more powerful when its label is written in a larger font than when it is written in a smaller font; the reverse was expected for powerless groups. We found the expected pattern. When the task was to find the powerful group, more errors were made when the powerful target groups were written in small letters than when they were written in large letters. The opposite was true when the task was to find the powerless group. Here, more errors were made when the powerless target groups were written in large letters than when they were written in small letters, resulting in a significant task by font size interaction effect. A similar pattern, though not significant, was found for the reaction times: When the task was to find the powerful group, responses were slower when the powerful target groups were written in smaller letters than when they were written in larger letters; when the task was to find the powerless group, there was no difference between the response latencies.

In a further study using a similar paradigm (Schubert & Waldzus, 2006), we presented not pairs of groups, but single group labels in either small or big font size. Participants had to judge whether the group is typically powerful or powerless. Replicating the previous findings, both reaction times and error data showed that large font size, compared to small font size, facilitated “powerful” answers (shorter reaction times, less errors), but impeded “powerless”

answers (longer reaction times, more errors). We interpret these reaction time findings as showing an automatic, unintended influence of modal information about size on thinking about power, and thus indicative of cognitive embodiment of power as size.

Vertical Position

Vertical position or elevation can be thought of as a surrogate or illusion of height. Anthropological evidence confirms elevation in space is used to constitute and communicate relative rank. Power can be embodied as elevation in architecture (Garvin & Riesenberg, 1952; Keating, 2000), furniture (Hewes, 1955), or the elevation can be expressed through spatial metaphors in language (Schwartz, 1981). Individuals can either benefit from association with high artifacts (e.g., sitting in a tall building), but also by being actually elevated themselves (e.g., sitting on the top floor in a tall building). Bias evidence is also available: Spiegel and Machotka (1974) collected ratings of men depicted in line drawings. One of the men stood on an elevated surface. The higher figure was rated as more superordinate, important, and haughty than the lower figure. Similar evidence was presented by Schwartz, Tesser, and Powell (1982). Their subjects were asked to identify the "socially dominant" person in 64 drawings of dyads. The persons in the dyads varied on a number of dimensions, such as sitting vs. standing, horizontal differences, and elevation in space. Elevation emerged as the strongest influence on the dominance ratings; elevated figures (standing on pedestals) were more likely judged as the dominant person.

In another series of studies, Giessner and Schubert (in press) collected similar evidence using a more unobtrusive manipulation of vertical location. Specifically, we asked participants to form judgments about a business manager who had several subordinates. In addition to a picture and biographical information about the manager, a typical organization graph visualized that he was on top and had five subordinates. Between participants, we

varied the length of the vertical line between manager and subordinates. Importantly, this length is not officially codified information in organization charts, and should be meaningless. Nevertheless, in three independent samples we found the length of the line had a significant effect on participants' judgments of the manager's power and authority. A longer line increased perceived power. Importantly, when questioned afterwards, participants were not aware of taking the length of the line into account, suggesting that the embodiment effect probably occurred automatically.

Another study in this series fulfills the criteria of automaticity evidence even better. Again, participants judged the power of a leader after reading information about him. However, between the impression formation and the judgment, an additional task was inserted that involved either the processing of large vertical or small vertical spatial differences, or the processing of large horizontal or small horizontal differences. We reasoned that the impression of the manager's power should be distorted by the processing of vertical, but not horizontal, differences. This was indeed the case: Processing large vertical difference led people to attribute more power to the manager, while processing small vertical differences led to the attribution of less power to the manager. Processing large vs. small horizontal differences did not affect the power judgments. In this study, no inference about the manager's power was possible from the height information processed as it was completely irrelevant to the impression formation task.

Further studies also show automaticity evidence for the cognitive embodiment of AR as differences in vertical position (Schubert, 2005). Using essentially the same interference paradigm as in the study on size previously described, group labels were presented on a screen, and the layout of the presentation included spatial information about elevation: In one study, pairs of groups were presented, and one group label was located above the other group

label. In this study, participants had to identify the more powerful group (or, in another condition, the powerless group) as quickly as possible by pressing a key. In another study, single group labels were presented either at the top or at the bottom of the screen, and the participants' task was to judge whether the presented group was typically powerful or powerless. The findings confirmed that the vertical positions on the screen significantly influenced the (very short) reaction times. Powerful groups at the top of the screen were more quickly identified as powerful, compared to at the bottom of the screen. This was true when they were presented alone or together with another group. In contrast, powerless groups at the bottom of the screen were more quickly identified as powerless, compared to at the top of the screen, again both when presented alone or together with another group. Thus, modal information about vertical position automatically biases our perception of power: we can more easily recognize powerful groups when they are on top and powerless groups when they are at the bottom. Further evidence confirmed that this effect is independent of the effect that things on top are also more quickly identified as positive; the task of the participants and thus the salient concept moderate whether the vertical dimension cognitively embodies valence or power. This was most clearly visible for dangerous yet powerful groups: The valence judgment (negative) of those groups was facilitated when they were presented at the bottom, but the power judgment (powerful) was facilitated when they were presented at the top.

In sum, behavioral, artefactual, bias and automaticity evidence confirms AR is embodied as size, height, and elevation in space. In addition, evidence shows elevation is automatically used as a medium to *express* authority and power (Giessner & Schubert, 2006). However, there is as yet no mediational evidence.

Conclusions

In this chapter, we used Barsalou's (1999) Symbol Systems theory to provide a theoretical framework for the cognitive underpinnings of Fiske's (1992, 2004b) Relational Model theory. Conceptualizing the cognitive representation of the two basic social relations *communal sharing* and *authority ranking* as perceptual symbols, we were able to integrate a broad range of findings, from behavioral and artifactual correlates of social relations to biased cognitions and evidence on the automatic influence of modal information on cognitive processes.

Notably, that there is so far no evidence that mental simulations of modal content mediate the processing of social-relational information, let alone that they mediate social processes. This is a shortcoming that this young line of research shares with the embodiment literature in general. It remains for future research to show the phenomena described here are not just epiphenomena, but are also crucial and important for thinking about social processes in the interpersonal or intergroup realm, and thus also for the processes themselves.

The integration we have presented and the findings we see as evidence for it focus primarily on the cognitive aspects, namely on the idea that relational models are mentally represented as modal information tied to perceptual content. Equipped with this evidence, the communicative aspects emphasized in RMT can now be investigated from a perceptual symbols perspective. Most importantly, we think there is a recursive relation between the cognitive representation of relations and their behavioral and artifactual embodiment. Humans enact the CS and AR perceptual symbols always anew by constructing artifacts and rituals, by using the respective metaphors in language, and by behaving accordingly. Thereby, they provide again stimuli that others (e.g., their children) can schematize, thereby enhancing and modifying the existing perceptual symbols of social relations. Thus, the learning and

reification of perceptual symbols of social relations reinforce each other and together lead to their perpetuation.

Implications of Embodied Relational Models

We hope that our approach also sheds light on further issues that might not be seen as directly related to embodiment at first. For instance, recognizing the embodied nature of social relations may foster a new perspective on the question of cultural universals. In the following, we will try to develop a speculative account of how cultural universals result from the embodiment of social relations. On the one hand, the environment provides us with concrete universal experiences requiring interpretation. Thus, in all cultures, it makes sense to ask who is above me, who is below, who is in front of me, who is behind, who moves with me in the same direction, in the same rhythm, and who does not. On the other hand, just as empirical data ultimately prove or falsify theories in science, our senses are the ultimate source of validation for our thoughts, together with communication and social consensus about what we have seen with our own eyes. Since sensumotoric experiences relate the mind to the empirical world, they deliver constraints distinguishing reality from the world of possibilities. If our thinking about social relations is embodied, it is subject to these empirical constraints. This is the source of universality. In the nature-nurture debate, some argued that our mind is almost infinitely flexible, and cultural anthropology has concentrated on cultural specifics. Acknowledging the construed character of social relations and the overwhelming cultural diversity, claims of universality in social relations (e.g., sexual relations) almost always rely on evolutionary arguments, but these are mostly post-hoc, which weakens their explanatory power. Since the blue-print of our body, our senses, and our physical world is universal, embodiment is a source of more concrete and more plausible claims of universality.

Let us give an example for how universal properties of authority ranking can be explained by embodiment of power in space: Physical ranking in terms of height or size is transitive. If A is higher than B and B is higher than C, A is higher than C. Theoretically, it is possible to think about a non-transitive power relation: A can have power over B, and B can have power over C, but A does not necessarily have power over C. Instead, C could have power over A. Such a relation, however, appears to be odd because it violates constraints that are natural in the physical world. As a result, our thinking about power is shaped by our experience with transitive size relations in the physical world. Without embodiment we would need extra assumptions to account for the transitivity of power. With embodiment this is not necessary because the rule of transitivity is a natural law applying to all embodiments of power such as size and height.

Another example considers the universal experience of the second principle of thermodynamics and CS. Once two substances are mixed, they will remain mixed (except for long lasting sedimentation processes that are not perceptually accessible). The separation of mixed substances needs extra effort to work against the tendency towards entropy. This experience is reflected in people's naïve understanding and theories about mixing substances. Because of this knowledge, we can speculate here, people might be inclined to think that single acts of consubstantial assimilation establish enduring CS relations. Furthermore, we would expect undoing CS relations will be considered more difficult than establishing them. To explain this without embodiment would necessitate extra assumptions about the limited, not totally impossible reversibility of CS relations contingent on extra effort. Building on the grounding of CS in thinking about substances, this difficult but possible reversibility follows from our experiences with properties of the physical world.

The body-based plausibility of the assumption that consubstantial assimilation creates communal sharing relations that are difficult to dissolve may also explain why immutability has been identified as one important component of psychological essentialism, that is, of the belief members of a certain group or category share a common essence, making them what they are and not something else (Medin & Ortony, 1989). Essentialism is closely linked to natural kinship, a typical kind of consubstantial assimilation. The idea that both, kinship and immutability go together in CS relationships is consistent with the finding that these two form a common dimension of essentialism that has to be distinguished from other dimensions such as discreetness and the assumption that all category members are similar, that is, the inductive potential of the category (Haslam, Rothschild, & Ernst, 2002; Rothbart & Taylor, 1992).

Another important consequence of the constraints implied in embodiment concerns the compatibility of different relational models in real life relations. RMT assumes that relations in real live are combinations of these different models, however, since they are embodied the possibility of combinations are limited. For instance, if AR relations are characterized by ordered differences in space and CS is embodied in physical proximity, the possible ways to combine these two are limited and require additional moderators. Future research may identify how such predictable incompatibilities shape human relations (such as incest taboos across authority ranking positions) and which universal or culturally specific patterns are used to eliminate those incompatibilities in domains where they would be dysfunctional.

As a last outlook, we would like to remind the reader that in this chapter we discussed only the embodiment of CS and AR, since they are phylogenetically older than other relationship types and their embodiment may be more obvious. In addition, more empirical evidence exists for the embodiment of these two relational models than for that of the other two. However, according to Barsalou's perceptual systems approach, even more abstract

concepts (such as those that are the basis of the other two types of relations, equality matching and market pricing) should be embodied. To explore the embodiments of these two relational models will be challenging, since they are constituted by concrete operations (e.g., exchange of placeholders) and by the calculation of ratios by means of an abstract universal but symbolic medium (e.g., money), respectively. One could assume their embodiment may be much more flexible and depending on historically and culturally varying conventions about symbolical meanings than the embodiment of CS and AR.

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Figures

Figure 1. Offered bodily contact influences latencies of ingroup membership judgments.

Figure 2. Varying font size influences power judgments.


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