Grounding
Social Relations

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Het Belichamen van Sociale Relaties
(met een samenvatting in het Nederlands)

Proefschrift

ter verkrijging van de graad van doctor aan de Universiteit Utrecht op gezag van de rector magnificus, prof.dr. J.C. Stoof, ingevolge het besluit van het college voor promoties in het openbaar te verdedigen op maandag 15 november 2010 des middags te 12.45 uur

door

Hans IJzerman
geboren op *16 februari 1981*
te *Rotterdam*

Promotor: Prof. dr. G. R. Semin
Co-Promotor: Dr. D. Cohen

Dit proefschrift werd mede mogelijk gemaakt met financiële steun van de Koninklijke Nederlandse Akademie van Wetenschappen (ISK/4583/PAH).

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Preface

The present dissertation deals with how social relationships are processed and understood, mostly through examining the role of physical warmth. That is the simple version. What you will read in the following pages is the more elaborate version. In five chapters, I will discuss what role the body plays in creating concepts central to relationships and cultures. Within social psychology, an enormous interest has emerged on what role physical experiences play in human thinking. This stream of thought is called *embodiment.* The initial focus in embodiment was on putting people in different body postures and examining what the effect is of these postures on how people think, act, and feel. For example, putting people in an upright posture makes them feel more pride (Stepper & Strack, 1993). Letting people make a movement associated with pushing objects away makes one more negative about an irrelevant, novel object as compared to a movement pulling objects closer (Cacioppo, Priester, & Berntson, 1993). These experiments were all done such that people were not aware of the movement – the manipulation happened unobtrusively. These are interesting findings, as they show that the body plays a role in how people think about the world.

More recently, researchers have focused on somewhat more complex concepts. How do people process seemingly more abstract ideas, such as power? Researchers have shown that people can process such abstract concepts also experientially. One influential paper shows how when one has to respond to powerful words, one does so more rapidly when offered on the top of the screen as compared to the bottom of the screen (Schubert, 2005). The theory that has had the most impact recently in regards to how abstract ideas are understood through such experience-based concepts is *Conceptual Metaphor Theory* (Lakoff & Johnson, 1999). Conceptual Metaphor Theory will also play a central role in the current dissertation.

In the current dissertation, I will discuss the role of physical warmth in processing information about interpersonal relations. An intuitive example of the role of temperature in social relationships are descriptions like 'being a *cold* fish' or 'receiving a *warm* welcome'. Such metaphors indicate a distant or perhaps unfriendly person versus a very sociable and pleasant arrival. Conceptual Metaphor Theory poses that such expressions should be taken literally; the physical experience of warmth and coldness really do play an important role in thinking about relationships. Through Section 1.1 and Chapter 2 I will contrast Conceptual Metaphor Theory with an influential idea in cognition, the so-called *amodal approach*. In Section 1.1 I will give some theoretical background to Chapter 2, which contains three empirical investigations in how physical temperature affects the way people perceive and think, at least in relation to others.

Subsequently, in Section 1.2 and in Chapter 3 I will outline some of the limitations of Conceptual Metaphor Theory. One of the most salient proposals of Conceptual Metaphor Theory is that inferences from metaphors are unidirectional. Put simply, this means that a very concrete experience should affect a more abstract idea, but the abstract idea is not likely to affect the very concrete experience. More specifically, an often researched relationship is that between time and space. One could think of an example that stresses the space->time relationship: finishing one's dissertation sometimes appears to be *far away.* The reverse is more difficult to conceptualize; in fact, research has shown an asymmetry between the two concepts: concepts of space affect how one thinks about time, but not vice versa (Casasanto & Boroditsky, 2008). In the second section of Chapter 1 and in Chapter 3 I

will propose that this asymmetry is less relevant for social relations; physical and social distance between self and other should affect perceptions of temperature in a similar way that physical temperature affects the way people perceive and think in social contexts.

The third section of Chapter 1 is meant to give some extra detail to this reasoning. Why are social concepts (such as a social connection with others, or concepts related to power) different from abstract concepts like time? In the third section, I will build on theories describing social relations (Relational Models Theory; A. P. Fiske, 1992) and development (attachment theory; Bowlby, 1969) to argue that people have innate building blocks to engage in social interactions. At a very early stage in life, people need to know who is warm and trustworthy versus cold and hostile. In other words, babies first rely on perceptual input as opposed to more abstract, semantic representations. I will discuss the idea here that Conceptual Metaphors *can* develop as a function of these innate concepts, but that they are not necessary to engage in social interaction. In this section, I will propose a model that details four different levels of meaning: 1) Innate Meaning, 2) Embodied Meaning, 3) Referential Meaning, and 4) Metaphorical Structuring.

The final section of Chapter 1 and Chapter 4 will utilize the different levels of meaning. In Chapter 4, we discuss the role of culture in relation to the body. From Anthropology comes the suggestion that people develop certain techniques of the body (Mauss, 1979) or a *habitus* (Bourdieu, 1977) which they acquire throughout life. Culture teaches people a way of *being* in the world. For example, without truly paying attention to a concept (like honor) or posture (upright or slouched) an association can be formed between the two concepts; upright postures might become associated with the idea that familism, male potency, and female purity are paramount. Or, in fact, such concepts might be inhibited in cultures that do not take such values central.

Finally, my closing chapter (Chapter 5) will address an existing dataset from cultural psychology with the knowledge acquired in this dissertation. In two previous articles, Kashima and Kashima (1998, 2003) addressed the effect of language and temperature on cultural values. They argued that temperature moderates the relationship between language and temperature. Based on the knowledge acquired in Chapter 2, we suggest that rather than moderating, temperature is an important factor as it *affects* the way people use language, which subsequently affects the way people construe cultural syndromes. Chapter 5 thus forms a fruitful departure point for new research, as it shows that even on a macro-level one can investigate how ‘body, psyche, and culture make each other up’.

Section 1.1 When “Warmth is Affection”

1.1 When "Warmth is Affection"

Some say the world will end in fire;
Some say in ice.
From what I've tasted from desire
I hold with those who favor fire.
But if I had to perish twice,
I think I know enough of hate
To know that for destruction ice
Is also great
And would suffice. ~ Robert Frost

In several different language families, warmth is linked with affection metaphorically. For example, one gives an ex-partner 'the cold shoulder' or has developed 'warm feelings' towards one's current (or desired) lover. The connection between experience and seemingly more abstract cogitation is the focus of the majority of the current dissertation. In three of the chapters I will focus in particular on the warmth-coldness dimension of interpersonal relations. Concepts that create a sense of oneness between bodies of (at least) two people (getting in sync, staying in touch) seem dominant when describing social relations. The connection between experience and more abstract entities has been one subject of study within the field of cognitive linguistics. Lakoff and Johnson (1999) summarized the literature on metaphors that function in similar ways as concepts such as warmth and affection. They coined these *primary metaphors*: correlates they claim to be learned early in life, without a choice, and which are part of the 'cognitive unconscious'. In the present section, I will discuss how Lakoff and Johnson's (1999) approach differs from a previously dominant approach to social cognition, the so-called 'amodal approach'. Furthermore, I will discuss how Lakoff and Johnson's (1999) theories are supported by findings within the field of embodied cognition and explain how my findings show the importance of sensorimotor representations in thinking about relationships.

Lakoff and Johnson (1980, 1999) are two of the most prominent people (Google Scholar puts them at close to 18,000 citations for both books at the time of writing this dissertation) who coined the idea that abstract (target) concepts *need* to be grounded in concrete (source) experiences. Their idea puts on center stage the proposition that the body is *more* than just an output device. Although this idea was certainly not new (not even within the last century; cf. Bourdieu, 1977; Mauss, 1979) Lakoff and Johnson (1999) have provided a provocative framework to challenge the then dominant approaches within cognitive (social) psychology, called Conceptual Metaphor Theory. The dominant view that subsequently followed (at

least, what the current thesis presupposes) assumes that thinking requires a synthesis of body and mind, rather than a separate system from the neck up. Within social psychology, the idea that the body supports the mind in thought was first empirically supported by putting participants unobtrusively in bodily positions and isolating the effect of relatively simple bodily positions on behaviors and/or cognitions. Lakoff and Johnson's (1999) hypotheses go beyond the relatively simple presuppositions of connections between postures and ideas, as their theory integrates the body with more abstract concepts.

Prior to Lakoff and Johnson's (1999) ideas on how experience structures abstract thought, a different view was dominant in terms of explaining cognition. In the current dissertation, the foci on the distinctions between such earlier views in cognition and Conceptual Metaphor Theory will remain relatively brief, given that the main focus of the work described here has been within interpersonal relations from a grounded perspective. However, putting forward alternatives makes for an easier framework and a common ground to elaborate from different theories.

Simplified, the dominant alternative view following the cognitive revolution presumed that people perceive situations and 'translate' the situation into an arbitrary, *amodal* symbol. In such an amodal approach, the situation could be translated to a symbol that could range from something like "asda" to "6232" to "^^^", or something else that is completely arbitrary. Symbols that are translated from perception to an arbitrary symbol are thus mostly independent from the original perceptual content. Semantic network theories propose named translation from perceptual input to an arbitrary, 'language-like' symbol (though not a *linguistic* symbol, see also the following section and Chapter 3). Activating one of the symbols is assumed to activate a network of different symbols; thus, one can *prime* a concept and subsequently activate an entire semantic network. Actions that follow are performed on the basis of supposed computational operations (Fodor, 1975; Pylyshyn, 1984), though no evidence for this has been provided (cf. Barsalou, 2008a; . Niedenthal et al., 2005) and has even been countered in neurological evidence (Anderson, in press). Nevertheless, the idea that has been utilized in amodal approaches and semantic network theories has proven extremely fruitful in advancing the domain of social cognition (Greenwald et al., 2002). However, such an idea has also inherently divorced action and cogitation from their perceptual bases and created a metaphor that proposed the mind to be an enormous, but solitary, information-processing unit.

For the purpose of Chapter 2, I will focus here on cognition that occurs as a function of social interaction related to sensorimotor representations. We have used Conceptual Metaphor Theory to explain our findings in Chapter 2. I will argue here how Conceptual Metaphor Theory creates a better fit in terms of *thinking* about relationships as compared to named amodal approaches.

Amodal representations face the so-called *symbol grounding problem* (see Harnad, 1990). Semantic network theories presume a non-adaptive, non-social role for action in cogitation. They are closed circuits, without entry for adaptive action. One way of thinking about the symbol grounding problem is thinking about concepts like warmth or coldness. When I mention that my ex-girlfriend is someone that acts very cold to me, or instead that I like being in touch with my ex-girlfriends, I utilize experiences or ideas from the external world to represent my thoughts. How are such thoughts and the external world related? The connection between the physical experience that I used to describe my sentiments and the more abstract concepts is unclear. This is thus one of the problems amodal representations face. Such a problem might especially apply to interpersonal cognition. When I interact with someone, that person might frown or smile. This frown or smile should then activate certain concepts and subsequently activate a chain of thought. A node is thus assumed to be activated which then results in computation activating other nodes to prepare for action. Especially for interactions, such higher-level, slow evaluations (cf. Fodor, 1985) seem problematic; the human mind has evolved or has been designed for (immediate) adaptive action (cf. Smith & Semin, 2004), in particular for interpersonal interactions (cf. Caporael, 1997).

How can one then solve the symbol grounding problem? One way one could approach the symbol grounding problem is by examining findings within embodied cognition. Within social psychology, an interest has emerged that has been invested in integrating the solitary mind with sensorimotor representations (Cacioppo, Priester, & Berntson, 1993; Strack, Martin, & Stepper, 1988; Wells & Petty, 1980). Sufficient evidence has been marshaled now to suppose that bodily simulation and embodied processes are more than just epiphenomenal, as has been claimed (cf. Mahon & Caramazza, 2008), especially in interpersonal contexts. For example, one very important stream of research has discussed how interpersonal communication rests on embodied simulation. Glenberg and Kaschak (2002) found that participants were faster at judging a sentence describing movement in the same direction as in which participants were moving. Other studies on language have revealed that the words

‘kick’, ‘pick’, and ‘lick’ activate brain areas related to activation of the muscles that are used to perform similar motions (Hauk, Johnsrude, & Pulvermüller, 2004). While these relatively simple notions have provided stimulating evidence, they do not yet do justice to complexities involved in language comprehension. To go beyond such findings, Zwaan (2009a) recently summarized a number of more elaborate and complex examples which illustrate how differences in time (after a moment vs. after an hour), content (full vs. empty beer glasses), adverbial modifiers (slowly or quickly), and even longer stories, affect people’s actions when reading. For example, when participants are requested to turn a knob while reading an action associated with that action (such as opening a bottle) they are quicker to do so when the turning of the knob is congruent as compared to incongruent. Yet, the speed of this motion is adjusted in concordance with the speed expressed in the adverbial modifier (slowly or quickly). These research examples indicate that simulation of action might be a necessary operative for any type of language comprehension. Some of the experts in this area claim that simulation is a *prerequisite* for comprehending communicative processes (e.g. Barsalou, 1999; Glenberg & Kaschak, 2002; Zwaan, 2004; but see also Louwerse & Jeuniaux, 2010). Rolf Zwaan even goes as far as to claim that, “comprehension is not the manipulation of abstract, arbitrary, and amodal symbols, a language of thought. Rather, comprehension is the generation of vicarious experiences making use of the comprehender’s experiential repertoire” (Zwaan, 2009a; p. 1145; see also Zwaan 2004).

Zwaan’s (2004, 2009a) claim rests on the assumption that not even a quasi-verbal system of amodal symbols is necessary for comprehending others’ actions, intentions, and emotions (and one might even go as far as that he denies their existence). The idea that amodal symbols are not necessary for comprehension has been further supported in work within interpersonal cognition; people run simulations to comprehend the interaction partner (e.g., Decety & Grèzes, 2006; Gallese & Lakoff, 2005; Rizzolatti, Fogassi, & Gallese, 2001). Mental simulation in this regard is claimed to be “the reenactment of perceptual, motor, and introspective states *acquired* during interaction with the word, body, and mind” (Barsalou, 2008b, p. 618), which Zwaan (2004) also calls “experiential traces”. The simulation perspective has received greater support by the discovery of the presence of the so-called mirror neurons (cf. Gallese & Lakoff, 2005; Rizzolatti et al., 2001). Yet, its contribution has gone relatively unnoticed in relatively more complex cogitation regarding interpersonal processes, at least within empirical research (but see Lakoff & Johnson, 1999).

Although intuitively it seems relatively unrelated to interpersonal interaction, Lakoff and Johnson (1999) have argued for the centrality of metaphor in understanding and processing abstract (target) concepts – even within social relations. One important dimension they discuss within the framework of interpersonal relationships is subsumed under the metaphor "warmth is affection". Lakoff and Johnson (1999) argued that affection is an abstract concept of which the conceptual understanding is formed through earlier correlated experiences of warmth (Lakoff & Johnson, 1980). The subsequent formation of the association between the two is part of the idea they summarized in their chapter on *primary metaphor* (Lakoff & Johnson, 1999; pp. 45–59). Primary metaphors are formed through co-experiences between concrete (source) experience and subjective (target) judgments. In Lakoff and Johnson's view, some of such conceptual metaphors are universal; they claim the correlation between experiences and subjective judgments in these instances to be acquired automatically and, importantly, *not* innate. Universal conceptual metaphors do not necessarily have to be expressed in language, but sometimes are expressed, for example, in art or ritual.

Lakoff and Johnson's (1999) ideas of primary metaphor in social relations correspond to the metaphors (social) psychologists have utilized to create a coherent conceptual framework for interpersonal cognition and behavior. Namely, judgments of others primarily rests on the warmth-coldness dimension within domains such as impression formation, person perception, interpersonal relations, and the judging of in- versus outgroups (Asch, 1946; S. T. Fiske, Cuddy, & Glick, 2007; Simpson, Rholes, & Philips, 1996; Wojciszke, Bazinska, & Jaworski, 1998; see also Chapters 2 and 3). The framework that social psychologists have laid out indicates the relevance of the dimension in interpersonal processes. In Chapter 2, we therefore took seriously Lakoff and Johnson's (1999) idea that metaphors on warmth should be taken literally by investigating the effect of *physical* warmth on domains such as basic perceptual foci, language use, and the perception of psychological distance.

The idea that we examined in Chapter 2 focuses on the experience of warmth in connection to people's social perception and behavior. Capturing affection in sentiments of warmth, Lakoff and Johnson (1999) have argued, occurs as a result of being held early in life by one's mother. The link between warmth and affection is a form of structuring thought in metaphor; affection, however, should not be limited to warmth; the co-occurrences include sources such as being held by one's mother, having empathic sex, et cetera (all of which involve touch, warmth, moving in synchrony, and so forth; see A. P. Fiske, 2004a), which are

subsequently connected to the subjective judgment of affection. The experience of being held by the mother thus becomes a necessary precursor in order to be able to process and comprehend more abstract notions of sociality. Lakoff and Johnson's (1999) thesis on the universality of such a conceptual metaphor seems in part derived from attachment theories which pose that interpersonal warmth is required for a baby in order to survive (cf. Bowlby, 1969; Harlow, 1958). Conceptual Metaphor Theory therefore formed a fruitful departure point for Chapter 2.

Prior to our empirical examination of the systemic interdependence of warmth and feelings of distance, language use, and perception, the notion that physical warmth is connected to psychological warmth had already penetrated social psychology. To test the idea that physical sensations of warmth can affect interpersonal judgments and social behaviors, Williams and Bargh (2008a) put participants in warm versus cold conditions (via a warm or cold cup or a warm versus cold pack). In the warm condition, participants rated a third party as more social and were themselves more generous (both of which are indicative of a *warm* personality). The latter researchers argued that the insular cortex is central in the processing of both physical and psychological warmth (cf. Meyer-Lindenberg, 2008). Williams and Bargh's (2008) findings were extended to supposed feelings of distance by Zhong and Leonardelli (2008), who demonstrated that participants *felt* colder and greater need for warmer foods after recollection or experience of social exclusion. In my second chapter we mainly focused on inducing the concrete experience of physical warmth and explain how such experience is intimately tied to people's perception, their language use, and their psychological sense of distance to others.

Chapter 2 thus built on the notion that interpersonal interaction in its essence is *grounded.* We predicted and found that physical feelings of warmth increase participants' feelings of psychological proximity with a random other (Experiment 1), a fixed other (Experiment 2), and also increase participants' relational focus and amounts of verbs used. These findings in concert show a systemic interdependence between environmental conditions, language, perception, and the construal of social relations. In the following section I will address some of the issues that might be related to using Conceptual Metaphor Theory as an explanatory framework. Finally, our findings in Chapter 2 could have been predicted *a priori,* which would be more difficult from a semantic network perspective (cf. Niedenthal et al., 2005). Semantic network theories *can* explain these findings post hoc. Instead, the findings in Chapter 2, based on conceptual metaphors (Lakoff & Johnson, 1999), supported that

interpersonal cognition is grounded in sensorimotor experiences which provide adaptive grounds for action.

Section 1.2 Conceptual Metaphor’s Big Chill?

1.2 Conceptual Metaphor's Big Chill?

Study Sciences till you are blind
Study intellectuals till you are cold
Yet Science cannot teach intellect
Much less can intellect teach Affection… ~ William Blake (p. 605).

William Blake to some degree had a point here, although he eventually concluded that which he called the natural, spiritual, and celestial cannot teach one another, as they are separate. Following from the previous section, one might be surprised that I quote Blake's work. A separation instead of an intimate interdependence is certainly not what I would claim. However, Blake provided a luminous insight: one should extract developmental differences between 'Affection' and the intellect. I will discuss this distinction here, by examining some of the challenges Conceptual Metaphor Theory faces. Further, in Chapter 3 we showed that affection is *not* necessarily an abstracted target domain, but in fact might be *more than a metaphor* (Schubert, Waldzus, & Seibt, 2010). Lakoff and Johnson (1999) have argued to the contrary in that "the greater inferential complexity of the sensory and motor domains gives the metaphors an asymmetric character, with inferences flowing in one direction only" (p. 57-58).

The proposition of unidirectionality seems to support work in social psychology; research in our field on interpersonal processes to some extent has focused on cognitive outcomes and conscious control relying on reflective inferences. The idea of inferences is in line with Lakoff and Johnson's (1999) idea of unidirectionality. I will explain this in the present section. Yet, rather than the proposed unidirectionality, first we showed in Chapter 3 how the effects of warmth and affection are bi-directional. Furthermore, we also demonstrated in Chapter 3 how manipulating the "cognitive outcomes" that are often seen as central to relationships are comparable to physically grounded manipulations of distance in terms of their outcomes. More specifically, we hypothesized and found in Chapter 3 that verbally and physically manipulating social proximity led to similarly changed perceptions of temperature.

What I will propose here is that two intertwined conceptual systems exist for comprehending social relations: one which in its essence is embodied and one which builds on the body architecture through more abstract inferences. In order to explore these propositions, in the present section I will explicate 1) a possible commensurability of online and offline embodiments – or, hard and soft representations – of warmth and proximity *and* 2) explain the bi-directionality of the metaphor *warmth is affection,* rather than to support

the claim that "the preservation of inference is the most salient property of conceptual metaphors" (Lakoff & Johnson, 1999, p. 56). In order to explain the theory behind the propositions, first I will discuss how Conceptual Metaphor Theory fits with major theories in social psychology, subsequently discuss how perspectives of inferring about relationships face what I will call the *Grounded Sociality Problem*, and finally discuss how our hypotheses in Chapter 3 addressed issues associated with the Grounded Sociality Problem. Prior to discussing this idea, I want to emphasize that I will utilize the term 'interpersonal cognition' in the current section rather than 'social cognition' in order to make a distinction from the assumptions from the current state of the art in social (and in particular embodied, or *grounded*) cognition with the study of cognition in interpersonal relations.

In the previous section, I have discussed to some degree the relevance of interpersonal and physical warmth in social relations. Furthermore, I have pointed out Lakoff and Johnson's (1999) arguments on primary metaphor. At the start of the present section, I will critically assess Lakoff and Johnson's (1999) claim that primary metaphors necessarily possess an asymmetrical character. To reiterate, Lakoff and Johnson (1999) elaborate on the idea of primary, ontogenetically developed metaphors. Central to the current work, they discuss metaphors essential to social relations on warmth and affection. Such metaphors correspond to the frameworks social psychologists have utilized to create a coherent conceptual framework for interpersonal cognition and behavior. Namely, judgments of others primarily rests on the warmth-coldness dimension within domains such as impression formation, person perception, interpersonal relations, and the judging of in- versus outgroups (Asch, 1946; S. T. Fiske, Cuddy, & Glick, 2007; Simpson, Rholes, & Philips, 1996; Wojciszke, Bazinska, & Jaworski, 1998; see also Chapters 2 and 3).

The framework that social psychologists have laid out regarding the warmth-coldness dimension of social relationships is related to the argument that the desire to seek relationships (focused on the desire for warm, close contact) with other people is one of the most central motives for human beings. People establish attachments to others readily and under different types of circumstances (Bowlby, 1969). Lack or loss of these attachments is detrimental to well-being, causing emotional distress and decrements to health, happiness, and adjustment (Baumeister & Leary, 1995). Furthermore, for most mammals, close contact in which warmth is provided is necessary for infants to survive. Taken together, this seems to hint at an innate structure in which concepts of warmth in interpersonal relations are easily learned and applied.

The idea for such innate structures seems at odds with Conceptual Metaphor Theory. Lakoff and Johnson (1999) explicitly reject the idea of innateness of universal conceptual metaphors. I will explore the idea of innateness further in the next section. Currently of relevance is the proposition that an abstract target domain (affection) is grounded in a concrete experience (physical warmth). This idea of grounding the abstract target in the concrete source seems to presuppose that the concepts of relationships in their essence are abstract (though in some instances this idea might be considered refuted; cf. Gallese & Lakoff, 2005). The thesis that conceptual metaphors are the necessary operative for interpersonal relations seems to sustain the idea that relationships rest on reflective inferences and 'cognitive outcomes', rather than 'inherently' grounded processes. The idea of reflective inferences concords with the dominant focus in interpersonal cognition; research in romantic relationships have often relied on reflective inferences and conscious control (see, e. g., Agnew, Van Lange, Rusbult, & Langston, 1991; Finkel & Campbell, 2001; Wieselquist, Rusbult, Foster, & Agnew, 1999). By focusing on reflective inferences or cognitive outcomes of a relationship, one focuses on processes that do not take central the essence of a relationship, namely, its experience. Through measuring reflective inferences about the self in relation to another person (by utilizing pronoun measures, self-other overlap, and centrality of the relationship; cf. Agnew et al., 1999), the unit of analysis primarily relies on symbolic representations of relationships.

What is important to note is that these reflective inferences need not be represented semantically. Namely, Lakoff and Johnson (1999) do claim that conceptual metaphors can be expressed in ritual and/or art – other forms of symbolism which might be unrelated to language. The manner in which reflective inferences become represented is to date relatively unclear; namely, one of the challenges Conceptual Metaphor Theory faces is the development of a process model (also for the underlying processes for interpersonal interaction). One proposal that Lakoff and Johnson (1980, 1999) have put is the development of *image schemas.* The proposal of image schemas assumes that people build abstract ideas on more concrete experiences. Image schemas thus run parallel to building a tower; the higher the tower, the more abstract an idea becomes – built on the concrete, grounded experience (see also Santiago, Román, & Ouellet, 2010). Santiago and colleagues (2010) call this the *Strict Directionality Hypothesis.* One important addition that runs parallel to the idea of image schemas and the Strict Directionality Hypothesis is Boroditsky's (2000;

2001) process model of metaphors. She argues, in line with Lakoff and Johnson's (1999) suggestion on the preservation of inference and for asymmetrical effects; activating an experience changes the perception of the abstract concept, but not vice versa. Boroditsky's (2000) claim presumes that language builds the relationship between abstract and concrete domains, en lieu of experience. The development of named relationship between abstract target and concrete source domains is aptly called *metaphorical structuring*.

Metaphorical structuring thus proposes that people rely on abstract cogitation and linguistic representations to reflect about concepts. The focus of research within interpersonal cognition seems to rely on assumptions similar to metaphorical structuring: An array of research has focused on inferred construals of the self in relation to a(n) (significant) other (for an overview, see Vohs & Finkel, 2006). Moreover, relationships are oftentimes analyzed through conscious control (Finkel & Campbell, 2001). Another example relies on how the self can be defined in relation to others (e.g., independence vs., interdependence; Cross & Morris, 2003). One way in which the conceptualization of the self in this way has been used is to report how people retrieve memories about others (Cross, Gore, & More, 2002).

An influential theory that is related to the idea of reflective inferences has focused on a conceptualization of the relational self (including relationship-specific affective, cognitive, and behavioral structures) in a model of *cognitive interdependence* (Agnew & Etcheverry, 2006; Agnew, Van Lange, Rusbult, & Langston, 1998). This model of cognitive interdependence focuses on the 'mental representations' of a relationship, which has allowed empirical examination of the effects of interpersonal events on a person's feelings, ideas, and actions. Cognitive interdependence thus describes the 'self-in-relationship'. Some applications of this model have focused on commitment in romantic relationships (Agnew et al., 1998), forming close friendships (Ruscher, Santuzzi, & Hammer, 2003), outcomes of interpersonal situations (Kelley et al., 2002), et cetera. Cognitive interdependence in terms of commitment in romantic relationships was measured in these reports in three ways which I referred to earlier: 1) a pronoun measure providing a mean to tap relationship-relevant thought structures, 2) a graphic display of self-other overlap, and 3) a self-report measure of the centrality of one's relationship (Agnew & Etcheverry, 2006; Agnew et al., 1998). Though the value of approaching relationships in this manner has indubitably proven its value, in practice, mentioned measurements tap highly abstracted versions of the relationship,

ignoring its *sine qua non*, namely, the *experience* of being-in-a-relationship with another person.

If one would assume a centrality for reliance on abstract representations based on inferences within relationships, one would ignore the classical social psychological idea that people are often poor at assessing one's own higher order thoughts (q.v. Nisbett & Wilson, 1977). Ignoring experience in relationships thus seems to lead to an inability to answer the question 1) how people come to conceptualize these higher abstracted forms of relationships and 2) how these relationships are in actuality formed and maintained. Still, within interpersonal cognition often the way to assess relationships is by reflecting on such higher order thoughts. Researchers have thus inquired about relationships with their participants through self-reports, pronoun measures, or inferred distance between the participant and the significant other. By doing so, one assumes that the appropriate way to assess relationships is by reflecting about them in abstract inferences. The primary way of thinking about one's relationship has thus been conceptualized through conscious control and abstract inferences, rather than non-semantic expressions of warmth and touch. Although one *can* certainly express and reflect about one's relationship in abstract inferences, abstract inferences are not the primary vehicle utilized for interpersonal relationships. One might even suppose that the grounding problem extends into interpersonal cognition. The problem within interpersonal cognition as discussed above differs significantly from the symbol grounding problem, as conceptual metaphors do not rely on amodal symbols. Yet, the process behind forming such conceptual metaphors is unclear. Thus, rather than the symbol grounding problem, I will refer to this as the *Grounded Sociality Problem.*

Central to the Grounded Sociality Problem is the question whether reflective inferences and metaphorical structuring can most appropriately address processes central to interpersonal relations. Of course, studying such reflective inferences has been very fruitful in advancing the study of interpersonal relations (q.v. Vohs & Finkel, 2006). Yet, studying relationships through reflective inferences might not portray the complete picture. One important hypothesis from cognitive anthropology emphasizes that the way that people experience relationships is through the focus on what the 'participants' of the relationship have in common – or what their shared essence is constituted of (Relational Models Theory; A. P. Fiske, 1992). Exemplary for such shared essence is dance, sharing food, sex, or other intense,

non-semantic interpersonal expressions. Do such expressions rely on abstract, symbolic representations of interpersonal relations? Or are they 'spontaneous' instantiations of close relationships that rely on feelings of closeness *between* people?

The connection might be established through extending interdependence theories. Holmes (2002) and Kelley et al. (2002) captured the situated experience of the relationship by further defining Lewin's (1936) famous equation that behavior is defined by person (P) and social environment (B = *f*[P, E]). Holmes (2002) and Kelley et al. (2002) noted that the interaction (I) between persons A and B is conceptualized in relation to one another in the context of the specific social situation (S) in which the action transpires (I = *f*[S, A, B], see also Rusbult & Van Lange, 2003). The way that cognitive interdependence is generally measured thus generalizes over these specific situations in which the situation's participants reflect upon the relation between self and other (see also earlier comments on Nisbett & Wilson, 1977). The idea proposed here emphasizes that one should extend participants' interdependence by focusing on the experience of the relationships and the unity between its participants, instead of the abstract inferences of the separate individuals within the relationship. In other words, reflective inferences and abstract cogitation are not the *primary* movers within relationships. Indeed, the idea that symbolic representations have developed as the primary medium for close relationships is erroneous. Interpersonal relationships, particularly close ones, operate at automatic, implicit levels, and *not* at semantic levels (A. P. Fiske, 2004b). This is the assumption which we tested in Chapter 3. We hypothesized and found that if social relations indeed do not rely on reflective inferences and metaphorical structuring, then inducing participants to be socially close (through physical distance) leads them to perceive ambient temperature as higher.

Second, if interpersonal relationships in their essence operate on automatic and implicit levels, then it seems likely to assume that the system that utilizes cognitive outcomes is built on top of the systems essential to social relations (cf. research on language in section 1). Michael Anderson (in press) concluded that linguistic representations corresponding to soft interfaces of cognition rely to some extent on redeployment of other, more ancient brain areas. Further, simulation perspectives support the idea that even simply reading a word can activate muscle movement or related brain areas (Hauk, Johnsrude, & Pulvermüller, 2004; Zwaan, 2009a). We will thus hypothesize and test that inducing participants to feel more similar or different should make them perceive the ambient temperature to be higher or

lower. In other words, interpersonal relationships and their symbolic representations rely on the architecture of the body.

Section 1.3 Innate Social Relations?

1.3 Innate Social Relations?

When he is born, an infant is far from being a tabula rasa. On the contrary, not only is he equipped with a number of behavioral systems ready to be activated, but each system is already biased so that it is activated by stimuli falling within one or more broad ranges, is terminated by stimuli falling within other broad ranges, and is strengthened or weakened by stimuli of yet other kinds. Amongst these systems there are already some that provide the building bricks of attachment. ~ John Bowlby (1969; p. 265)

In the second section, I have discussed the *Grounded Sociality Problem*. After showing in Chapter 2 how physical warmth altered participants' perception and language use in order to engage in a relationship, in Chapter 3 we demonstrated how inducing psychological or physical closeness induces a perception of higher temperature. This bi-directionality of closeness and warmth speaks against the Strict Directionality Hypothesis mentioned in the previous section. Our findings strongly support the notion that the link between warmth and affection is "more than a metaphor" (Schubert, Waldzus, & Seibt, 2010). However, the idea that warmth is more than a metaphor leaves room for an alternative model. In fact, Bowlby's (1969) claim might be essential for developing further theories on the connection between physical and social warmth, as children might already possess elementary building blocks – especially for perceiving social warmth. In the current section, I will put forth an alternative theory, starting with Bowlby's (1969) attachment theory and A. P. Fiske's (1992) Relational Models Theory. I will first discuss how infants rely and form basic perceptual representations, subsequently how our findings on warmth in relationships fit to the idea of innate structures for interpersonal cognition, and finally propose a testable model that will include 1) the proposal of innate social meaning, 2) embodied meaning, 3) referential meaning, and 4) metaphorical structuring.

Lakoff and Johnson (1999) propose an ontogenetic argument as to how people learn concepts of warmth and affection jointly, early in life. Indeed, infants first come to rely on embodied (and perceptual) representations, which only later become abstracted into more symbolic representations (Daum, Sommerville, & Prinz, 2009), such as metaphors which have a referential meaning. One can refer to warmth semantically, indicating the experience one had as a child. Thus, confirming Lakoff and Johnson's (1999) hypothesis, babies experience warmth through the touch of the mother (or the father). Yet, in Chapter 3 we have shown that such experiences of warmth are very primary experiences, contradicting the Strict Directionality Hypothesis. Perceptual inputs give important information and in- and of themselves contain information about the (social) world. Only later in life, one

referentially refers to the experience of warmth to express more abstracted feelings of affection. When discussing concepts related to basic sociality, human beings thus use substitutes to direct the attention to feelings of psychological closeness. Someone is a cold fish, is in sync with someone, or has lost touch. However, nonverbal communication through for example touch is still used (and perhaps more commonplace in some cultures than others). At a very basic level, people learn how to mirror one another, what touch is appropriate, et cetera. In the previous section I have discussed how these types of interactions do not *require* reflective inferences, although often reflective inferences become helpful in forming some kind of basic referential understanding. Yet, approximately six months after birth, infants are already able to recognize others' action (e.g., Daum, Prinz, Ascherleben, 2008). Daum et al. (2009) suggest that infants in these early stages do not possess the abilities to encode interactions in an advanced language; early interactions are thus necessarily formed through processes grounded in perception and action. However, referential meanings through symbolic representations of early interactions can be a source for children (and for adults alike) to move beyond direct embodied interactions. In other words, discussing more complex interactions on the basis of, for example, in- and outgroups in metaphors can help associating (or distancing) by seeing them as warm or cold. Conceptualizing such groups then becomes possible on the basis of referential metaphors for groups with which one is not confronted face-to-face (e.g., Caporael, 1997, 2007). To reiterate, symbolic representations are not *required,* but aid in extending concepts that are grounded in dyadic interactions to larger groups. Finally, symbolic representations that become detached from experience *can* structure experience, but not without its attachment to embodied meaning.

Conceptual Metaphor Theory on its own can thus not answer how representations in interpersonal cognition are formed and maintained. Instead, Alan Fiske (e.g., 1992, 2000, 2004a, 2004b) has proposed a model of human relationships that provides an integrative framework to identify relational structures. His model puts forward a way to conceptualize and locate different embodiments (not only warmth, but also synchrony and touch) of similar types of relationships within a broader framework. A. P. Fiske (1992) has argued that human relationships can be framed in terms of four essential and universal Relational Models, three of which rely on concrete operations. The proposition is rather simple: people relate to each other in just four ways. Namely, interactions can be structured according to 1)

what people have in common, 2) ordered differences, 3) additive imbalances, and 4) abstract ratios.

In the third chapter, we applied this model and focus on what people have in common – to what they *communally share* (CS). Feelings of CS are derived from what people have in common and rely on a feeling of oneness between people. A focus on warmth is related to the basis of people's interpretations of such social relations, that is to say dyadic interaction. Such dyadic interaction already occurs in people's first experiences, namely child birth. However, the essence of CS relationships might go beyond such early experiences. Evolution has been suggested to have prepared human beings by providing elementary kinds of social relations which rely on basic perceptual input (Thomsen, Frankenhuis, & Carey, 2010). Some support has been provided for the idea that CS relations are in place early in life; small, just-linguistic infants are already able to help realize others' intentions (Warneken & Tomasello, 2006), while non-human primates are sometimes even able to help experimenters (Silk, 2005). It seems viable to assume that the relationship between physical and social warmth occurs at several different levels, namely through 1) Innate Social Meaning, 2) Embodied Meaning, 3) Referential Meaning, and 4) Metaphorical Structuring.

Innate Social Meaning

Bowlby (1969) has cited a number of examples of elementary building bricks for basic perceptual input, for example CS acts that involve touch (e.g., clinging or sucking). Yet, no explicit empirical evidence has been provided in terms of perceptual input early in life for CS domains. Thomsen and colleagues (2010) have found empirical support for a propensity to learn basic social relations quickly and through perceptual input in the domain of ordered differences (more often referred to as Authority Ranking). Young infants rely on perceptual input from larger as compared to smaller agents when attending to relations of dominance versus submission. The evidence Thomsen and colleagues (2010) have provided suggests that indeed basic structures are present to learn ordered differences promptly. These first interpersonal experiences later form the basis of referential structuring and are allegedly extended to interactions beyond the dyad (see also Caporael, 1997, 2007).

Similar evidence has been provided in terms of CS relationships. Over and Carpenter (2009) show that infants as young as 18 months old are able to represent helping relationships; when primed with photographs that depict helping behavior they are more likely to help

someone than those infants primed with individuality. Such helping behaviors are indicative of a communal sharing type of orientation. In the domain of developing prosocial orientations in relation to warmth, Fransson, Karlsson, and Nilsson's (2005) research has provided provocative suggestions for basic perceptual input; they demonstrated that when a baby was held by the mother, the mean difference between core and skin temperature is much lower than when the baby was in its cot. Contact with the mother in this study was concluded to be vital to prevent hypothermia (indicated by large standard deviations in temperature), which is a major cause of deterioration and death in the neonatal period. Furthermore, oxytocin has been not only shown to mediate the benefits of positive social interaction, but also to be released by stimuli such as touch and warm temperature (Uvnäs-Moberg, 1998). Oxytocin-deficient mice in addition have impaired abilities to regulate temperature (specifically resistance to colder temperatures; Kasahara et al., 2007). Moreover, infants whose mother received oxytocin during labor had a significantly higher temperature at the scalp during birth than those in comparable control groups (Beck, Flowers, & Blair, 1979). As a side note, but interestingly enough, the usage of 3,4-Methylenedioxymethamphetamine (more popularly known as ecstasy) has been suggested to have gained in popularity in warmer conditions because of the combination of oxytocin release and the warmer (which are argued to induce greater prosocial behavior) circumstances, ironically increasing the chances for hypothermia (Hargreaves, Hunt, Cornish, & McGregor, 2007).

Aforementioned findings suggest that CS relationships are innate. Further support for the innateness suggestion can be found in the idea that such social relations do not only occur with human beings; indeed, the (social) conceptual system runs continuously from animals to humans (cf. Barsalou, 2005). For example, acts that maintain CS bonds appear to run parallel between humans and other non-human primates. As I have discussed earlier, the learning of others' actions (which contributes to the formation of relational bonds; cf. literature on mimicry Chartrand & Bargh, 1999) is based on a so-called mirror-neuron system, which is both active in both humans and monkeys (Gallese, 2003; Rizzolatti et al., 2001). Furthermore, maintaining relational bonds has at least some basic similarities for CS relationships in primates and humans; a silent bared-teeth display (similar to the human smile) amongst common chimpanzees and Barbary Macaques is often used in situations of reconciliation replacing conflictive by affiliative behavior (for an overview, see Preuschoft & Van Hooff, 1997). Partners in communal (versus exchange) relationships show similar

appeasement smiles to their angry partner (Häfner & IJzerman, 2010). Relationships and their maintenance are thus formed and broken through similar physical interactions across different species. In short, CS relationships are grounded in building bricks of attachment such as warmth (see Chapter 2), physical distance (Williams & Bargh, 2008), synchrony (Hove & Risen, 2009; Lakens, 2010; Paladino, Mazzurega, Pavani, & Schubert, 2010), or displays of specific emotions that maintain relational bonds in different situations (Häfner & IJzerman, 2010).

In line with the innateness to engage in social relations, Thomsen and colleagues (2010) found that infants recognize ordered differences. Fransson and colleagues (2005) provide provocative suggestions for a similar type of structures for physical warmth. If indeed the innateness hypothesis for CS relations holds, one would expect that the experience of physical warmth would extend from adults (our Chapters 2 and 3) to young infants.

Embodied Meaning

In the previous section I have described one of the instantiations of CS relationships. Such instantiations seem present early in life, but are thus initially conceptualized through situated experiences with attachment figures (cf. Bowlby, 1969). As mentioned before, Daum et al. (2009) suggest that infants in these early stages do not possess the abilities to encode interactions in an advanced language; early interactions are thus necessarily formed through processes grounded in perception and action. On the basis of these embodied interactions, people develop certain *techniques of the body* (Mauss, 1979), or a *habitus* (Bourdieu, 1977) for interpersonal interactions. Such a *habitus* for CS relationships can be formed through acts of *consubstantial assimilation* (A. P. Fiske, 2004a, 2004b; see also comments on touch earlier in this section). Acts of consubstantial assimilation are acts that connect the body and create a certain feeling of oneness. Such acts seem likely to have evolved out of a flexible generalization of mammalian parental care (A. P. Fiske, 2004a) and in early life acts of consubstantial assimilation are the perceptual input that correspond to the existing, innate modules for CS relations (see also Caporael, 2007). Such techniques operate outside the domain of semantic representations, but instead operate through non-semantic expressions (cf. A. P. Fiske, 2004a).

The literature reviewed above suggests that the structures for CS relationships are innate proclivities, though this claim remains to be empirically tested. The lack of empirical tests in

this area does keep a small opening for the possibility that the connection between warmth and communal sharing (or in Lakoff and Johnson's terms, affection) is learned and is *not* innate (and, in principle, that the influence of babies' bodies on later, higher-order cognition is epiphenomenal; cf. Mahon & Caramazza, 2008). In either case, the experiences that associate warmth with affection become entrenched perceptual memories that have co-occurred with certain other experiences (see also Schubert & Koole, 2009).

Further suggestions for the *Embodied Meaning* account comes through the proposition that the human mind is constrained and adapted in particular to forming bonds to attachment figures. The literature I have discussed here largely corresponds to one of the most influential theories on how people develop relationships, namely attachment theory. Attachment theory suggests that relationships with significant others are critical throughout the lifespan, in both infancy and adulthood (q.v. Bowlby, 1969). Early in life, people will already experience difference situations in being held and touched, suggestively creating substantial individual differences in the way acts of CS are interpreted (Ainsworth, Blehar, Waters, & Wall, 1979).

On top of that, one can also make a cultural difference argument. Namely, people in different cultures certainly form different paradigms (which A. P. Fiske, 2010, calls *preos,* or specific ways in which people respond to or experience [different ranges of] warmth) for CS relationships, substantial similarities are presumed. People have the same type of bodies with similar types of affordances the world over. That is, people around the world procreate, they give birth, they hold hands, walk side-by-side, et cetera. Though there are certainly important differences in which human cognition operates across cultures (see Nisbett, 2003, for excellent examples), the coordination of human minds has at least some basic cross-cultural similarities and seems to be evolutionarily prepared (q.v. Cohen & Leung, 2009; A. P. Fiske, 2004b). People from different cultures are assumed to relate to each other in similar ways and form referential representations of early or innate experiences of CS, namely through approach, synchrony, warmth, et cetera.[1] These experiences then can become a 'habitus' and *can* subsequently become represented in language referentially or through

[1]Northern Ghanaian languages do not possess similar types of metaphors as compared to, for example, English or Dutch. The focus in Northern Ghanaian languages is on the *cooling* of relationships (but no similar metaphors for warmth exist; Jon Kirby, 2010; personal communication via International Relational Models Lab). This could suggest that although the importance of the warmth-coldness dimension is present, the anchors in different cultures have become different as a function of culturally situated meanings of interpersonal relations.

other types of symbolic representations. If the *Embodied Meaning* account holds, then temperature representations of social relations should be present in terms of perceptual representations; social distance versus proximity should really *be* cold or warm.

Referential Meaning

One additional question that remains is how people conceptualize more complex models on the basis of embodied interactions. People come to differ in certain regards on how they use the body and what kind of 'techniques' they develop. Bowlby (1969) suggested that infants build some kind of internal models. Yet, the nature of these 'internal models' remain unclear. Infants' internal models might rely on linguistic representations. However, some researchers claim that even for such linguistic representations embodied processes are necessary to comprehend one's (social) environment (see Pickering & Garrod, 2009; Zwaan, 2009a), via for example mimicry (Chartrand & Bargh, 1999) or complementary actions (Häfner & IJzerman, 2010; Tiedens & Fragale, 2003). Our results in Chapter 3 would suggest a similar notion. Yet, some people have argued for problems of a(n) (strictly) embodied account of cognition (Dove, 2009; Mahon & Caramazza, 2008; but see also Louwerse & Jeuniaux, 2010). For example, Mahon and Caramazza (2008) state that "given that an embodied theory of cognition would have to admit 'disembodied' cognitive processes in order to account for the representation of abstract concepts, why have a special theory just for concepts of concrete objects and actions?" (p. 60). Nonetheless, from the literature reviewed above it appears that people's bodies might be relevant for developing knowledge about such 'situated' concepts such as giving birth, having sex, and eating. The body in this instance might be quite helpful in generating conceptual thought.

Louwerse and Jeuniaux (2010) instead proposed a somewhat more feasible model by integrating linguistic and embodied representations. They suggest two alternatives. Louwerse and Jeuniaux' (2010) second suggestion seem to correspond to Zajonc and Markus' (1984) propositions between hard and soft interfaces of cognition (see also Cohen & Leung, 2007; Leung & Cohen, 2007). Hard or soft interfaces of cognition refer to instances of interactions of the body with real or imagined environmental stimuli. However, Louwerse and Jeuniaux (2010) also suggest how 'linguistic' and 'embodied' processing might rely on shallower versus deeper processing (cf. Louwerse & Jeuniaux, 2008). The latter inferences I presume to concord with our findings in Chapter 3; both semantic and physical manipulations of social closeness activate 'embodied processing'. In Chapter 3, we proposed

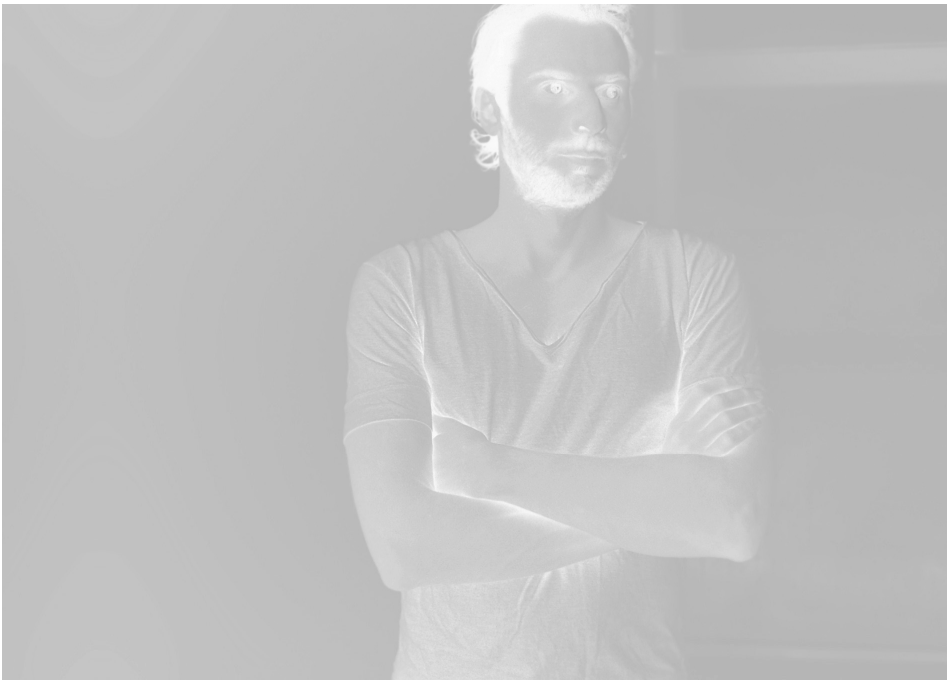
that splitting the hard and soft interfaces might not be as logical as appears from other dual-processing theories. Imagining another person close to you or having another person close to you might rely on similar type of bodily activations. Even more so, performing actions, watching other perform actions, and imagining actions all rely on the same brain areas (e.g., Decety et al., 1997; Jeannerod, 1994). Michael Anderson (in press) concludes that linguistic representations which correspond to soft interfaces of cognition rely to some extent on redeployment of other brain areas. This is an important suggestion for the development of thinking, also in interpersonal interactions. The *Referential Meaning* account thus relies and builds on the *Embodied Meaning* account. In other words, one can apply the ideas of Conceptual Metaphor Theory and the Strict Directionality Hypothesis to the *Referential Meaning* account. If the *Referential Meaning* account holds, then anchoring temperature questions in research on proximity differently should lead to 1) different temperature perceptions *and* 2) changes in perceptual representations of warmth or coldness.

Metaphorical Structuring

In the first section I discussed how the warmth metaphor is present in many languages. Furthermore, I have argued that warmth serves as an innate concept to comprehend social relations. One way of considering whether warmth is an innate and universal concept is by surveying languages across the world. Such a survey across linguists and social scientists by the International Relational Models Lab reveals that the warmth-coldness dimension is *not* a universal across languages. At least some languages in the following families know the metaphors: Altaic (Turkish), Sino-Tibetan (Chinese), Indo-European (English, Dari, Dutch, Farsi, Spanish, Portuguese, Czech, Russian, German), Japonic (Japanese). As an example, the Chinese have several different metaphors related to interpersonal/physical warmth (wennuan (温暖), nuanyi (暖意), wenqing (温情), with their counterparts in coldness: lengku (冷酷), lengdan (冷淡), lengmo (冷漠). The first two words for both warmth and coldness can both describe human emotion and physical temperature, while the third one is only used to describe emotion. However, they have been argued to appear in the Chinese language only in the 20th century (Ming Xue Li, 2010; personal communication via International Relational Models Lab), but have been present in early Indo-European texts and are likely to have been present in proto-Indo-European. The metaphor is absent in at least one language in the following families: Uralic (Finnish), Uto-Aztecan (Mono), Kiowa-Tanoan (Hopi), ancient Sumerian languages, Eskimo-Aleut (Inuit), and Gur-Voltaic (Moore).

What does the absence in the different languages mean? This is a question for empirical investigation. What should become apparent from the theory that I am sketching is that referential metaphors *can* be used to communicate about social relations. However, Uralic or Eskimo-Aluet languages might use temperature indications for something more relevant than social relations: survival. This serves as an excellent illustration for metaphorical structuring: the original proposal by Boroditsky (2001) is that metaphors structure experience. This can be indeed the case for temperature metaphors in Uralic or Eskimo-Aluet. While initially, Eskimo or Finnish babies might be born with similar body architectures, their bodily experience could be structured through symbolic representations, even when the symbolic representations have lost its significance (e.g., a Finnish person in Italy). Using the metaphors to refer to temperature-constructs other than social relations culturally could inhibit and structure primary building blocks. Yet, *Embodied Meaning* is required to process the concepts represented in metaphors. The question then remains whether this could permanently alter the body's architecture.

Section 1.4 From Experience to Culture to Experience



1.4 From Experience to Culture to Experience

Some folks look at me and see a certain swagger*, which in Texas is called 'walking'. ~ George W. Bush at the Republican National Convention in 2004 (Safire, 2005).*

Cultures [treat] the body as a memory; they entrust to it in abbreviated and practical form […] the fundamental principles of [...] culture. ~ Bourdieu (1977, p. 94)

We end the fourth chapter by discussing the problems that might underlie simplistic views of embodiment; namely, predispositions are *not* determinants, and connections between given bodily comportments and certain affective or cognitive states are underspecified. To provide an integrative framework for (grounded) cognition, it is essential to test factors that are related to context and culture. These can provide further support for the *Embodied Meaning* or the *Referential Meaning* account. In the current section, I will provide further exploration into contexts, practices, rules, and so on, that a) in a given context, help people associate a certain bodily comportment with certain basic affective and cognitive responses and b) help elaborate those basic affective and cognitive responses into more complex representations, ideas, and values. In the current section, I will explicate the emphases from grounded cognition and how the ideas from grounded cognition dovetail with those from culturally situated cognition.

Researchers from embodied cognition have identified how bodily influences affect cognition and behavior in different circumstances (see, e.g., Cacioppo, Priester, & Berntson, 1993; Casasanto & Boroditsky, 2008; Meier & Robinson, 2004; Meier, Hauser, Robinson, Friesen, & Schjeldahl, 2007, Sherman & Clore, 2009; Schnall, Haidt, Clore, & Jordan, 2008; Schubert, 2005; Strack, Martin, & Stepper, 1988; Wells & Petty, 1980). These paradigms have proven important in showing that the body is integrated with certain specific mindsets. When nodding while testing a headset, one might agree with a message more because one is unobtrusively manipulated to make a movement that has become associated with agreement (Wells & Petty, 1980). Yet, thinking and the physical are not necessarily connected through simple determinants. James (1884) noted, for example, that running and

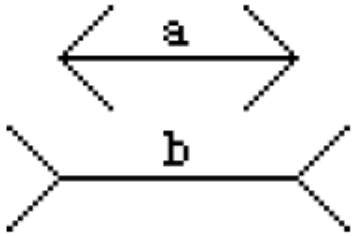


Figure 1. Mueller-Leyer illusion. The lines labeled 'a' and 'b' in each figure are the same length. Many participants in the Western world perceive line 'b' as longer than line 'a' (from Henrich, Heine, & Norenzayan, in press).

fear are associated – but so are running and excitement, running and pursuit, and running and simply getting exercise; in other words, context matters.

To state that context matters and that different comportments can mean different things in different situations is *not* to say that connections between bodily comportment and certain frames of minds are arbitrary. As I discussed in the previous section, I do believe that some embodiments are pre-wired in the sense that humans are evolutionarily prepared to associate certain bodily actions and comportments with certain basic affective and cognitive reactions. Such pre-wired embodiments, for example, include the integration of postures and psychological states of dominance or submission, affinity or affection, and so on (q.v. Cohen & Leung, 2009; A. P. Fiske, 2004; IJzerman & Semin, 2009). Furthermore, specific situations can determine which bodily postures possess which meaning in what context, in which culture.

In the fourth chapter we attempted to put forward a more integrative account of context and complex embodiments. In order to do so, we examined how culture is *grounded* in relation to individual positions towards the cultural discourse in what way. The way to examine such an account is by examining specific cultural contexts, which in and of itself is complex. Cultural psychologists have faced a similar struggle to integrate thinking in culture as social cognition researchers in integrating context in thinking. For example, lab findings are often assumed as universals, particularly in lower level cognitions. The most famous example is that of the Mueller-Leyer illusion (see Figure 1 above). Many Western participants perceive line 'b' to be longer than 'a'. However, cultural research shows that this is not a universal illusion, although this is commonly assumed. Segall et al. (1966) found that

the San-foragers from the Kalahari desert do not possess the same illusion. Segall and colleagues (1996) suggest that visual exposure to “carpentered corners” favor certain calibrations for modern environments, thereby creating the illusion (see also Henrich, Heine, & Norenzayan, in press). I suggest that not only for such relatively simple visual illusions, but also for more complex embodiment paradigms, the integration between research in social cognition and cultural psychology is crucial. This to some extent addresses issues in social cognition as to the function of cognition and how it can aid in adaptation to the environment.

The norms for different contexts that guide different human cultures manifest themselves in many different ways. People in different cultures utter different sentences, take part in different institutions, and communicate using different symbols. The integration of culture and mind has been of great interest to psychologists, who often claim that culture and mind “make each other up.” This is an important truth, but leaves one important factor out – namely, the *techniques of the body* (Mauss, 1979). Bourdieu (1977) even notes that:

> nothing seems more ineffable, more incommunicable, more inimitable, and therefore, more precious, than the values given body, made body by the transubstantiation achieved by the hidden persuasion of an implicit pedagogy,
> capable of instilling a whole cosmology, an ethic, a metaphysic, a political philosophy, through injunctions as insignificant as ‘stand up straight’ or don’t hold your knife in your left hand. (p. 94).

He perhaps overstates the case (q.v. Cohen & Leung, 2009). However, in our research, we do presuppose that culture is carried not only in beliefs, values, and attitudes, but that people also carry it in their physical bodies. Swaggering walks, deferent postures, stiff comportments and so on embody a certain way of *being* in the world. In other words, it is culture (Cohen, Leung, & IJzerman, 2009), people’s relationships (A. P. Fiske, Thomsen, & Thein, 2009), and complex bi-directional feedback loops (Maass, 2009) that determine how culture, psyche, *and body* make each other up. In Chapter 4, we discussed the complex systems involved with this integration. These complex systems revolve around core cultural ideas that are based on sociomoral emotions guiding people in sustaining (and sanctioning and transforming) social relationships.

Lakoff and Johnson (1999) have claimed that metaphors regarding morality (or norms guiding human culture) "are grounded in the nature of [people's] bodies and social interactions, and they are thus anything but arbitrary and unconstrained. They all appear to be grounded in [people's] various experiences of well-being, especially physical well-being" (p. 290). They further discuss that "honorable persons are those who can be counted on to pay their moral debts. In other words, an honorable person does what's right and fair. To insult someone is to inflict a *metaphorical* harm on that person." (Lakoff & Johnson, 1999, p. 295; italics added). In the fourth chapter, we examined the role the physical body plays in moral imperatives, grounded in social interactions for cultures with very different core belief systems. In such core belief systems, harm inflicted is anything *but* metaphorical. Research in neuroscience has indicated that moral emotions that guide human behavior and thought are intrinsically social – and thus very concrete and non-metaphorical (see also the earlier sections). Namely, moral emotions share common substrates (like the medial orbitofrontal cortex, medial gyrus, and superior temporal sulcus) with tasks that involve social behaviors (Moll et al., 2002). The redeployment of brain areas used for social decisions might indicate that moral emotions are inherently social (see also A. P. Fiske, 2002). Morality is considered in this view as "the sets of customs and values that are embraced by a cultural group to guide social conduct…[which] is a product of evolutionary pressures that have shaped social cognitive and motivational mechanisms" (Moll, Zahn, De Oliveira-Sousa, Krueger, & Grafman, 2005, p. 799).

These customs and values are sanctioned and recognized through moral emotions such as pride and shame, which are universally recognizable emotions (Tracy & Matsumoto, 2008). However, pride and shame by themselves are devoid of intentional content -- pride or shame *about what*? -- without cultural contexts that define what is right, appropriate, and expected. The cultural contexts we examined are characterized by very different core beliefs. Namely, we examined cultural imperatives of an Honor and of a Dignity culture. We presupposed that broad differences between such imperatives exist at broader cultural levels, based on well-documented differences in the social psychological literature. Whereas an individual's self esteem is important in determining personal worth in Honor *and* Dignity cultures, the role of social esteem in determining one's personal worth is more important in Honor cultures than in Dignity cultures. Honor thus refers to people's value both in their own eyes and in the eyes of others (e.g., Nisbett & Cohen, 1996; Stewart, 1994).

The importance of one's honor has been argued to have evolved out of different physical and cultural affordances like herding economies versus agricultural ones (Nisbett & Cohen, 1996; Schneider, 1971). In a herding economy without central rule, the herd, one's central livelihood, is constantly at stake; a necessity of building a tough reputation arises in order to form a deterrent to theft. One's honor and reputation is thus to be defended, through violence, if necessary. A defining characteristic for Honor cultures is the extent to which one's personal worth and status are determined interpersonally (Miller, 1993; Nisbett & Cohen, 1996; Rodriguez Mosquera, Manstead, & Fischer, 2000; Stewart, 1994). Important features for Honor cultures are the extent to which people adhere to values of female purity, reputation, male sexual potency, and familism (Fischer, Manstead, & Rodriguez Mosquera, 1999).

In contrast, the central tenant of a Dignity culture is the inalienable worth of the individual. A person with a sense of dignity is a sturdy person, whose inner, imperturbable sense of worth keeps him or her behaving according to internal standards, rather than the whims of the situation. Threats to an individual's autonomy are more important in a Dignity culture than in an Honor culture (Rodriguez Mosquera et al., 2002). In Ayers' (1984) metaphor, "Dignity might be likened to an internal skeleton, to a hard structure at the center of the self" (p. 20). This hard structure makes a person of dignity invulnerable to affronts by others and gives him or her the fortitude – the backbone – to behave correctly in situations that demand strength or resolve.

These differences in core beliefs and attitudes have been shown to lead to distinct emotional and behavioral responses to, for example, insult at a cultural (Cohen, Nisbett, Bowdle, & Schwarz, 1996) and individual level (IJzerman, Van Dijk, & Gallucci, 2007). Further, in areas (North vs. South of the United States) that differ in their beliefs in regard to honor, employers differ in their level of sympathy appropriated to job applicants who had allegedly committed an honor crime as compared to a nonhonor crime (Cohen & Nisbett, 1997). Such differences not only perpetuate in societies through such institutions, laws, and norms, but also through people's interactions and their bodily comportment.[2]

[2]In Algeria, female prostitutes are characterized by their 'masculine' way of posing, called *tataqassil* or *tataqarrad*. Standing like a man is the way that "only whores do. It means that you offer your stomach. It is the defining posture of Fatima, the female owner of a brothel. It is a posture of power" (Jansen, 1990, p. 19).

In the experiments of Chapter 4, we demonstrated the integration of cultural values and body comportments. Holding one's body in a certain way can increase the endorsement of and sensitivity to one's cultural ideals, and endorsement or rejection of cultural ideals can lead to expansion or shrinkage of one's body comportment. For men from Honor cultures, a head-high, chin-up, straightback posture is associated with greater endorsement of female chastity, familial loyalty, and concern with reputation and greater endorsement of honor-related violence. For those from a Dignity culture, a head-high, chin-up straightback posture is associated with greater rejection of honor-related violence. Using subtle word primes related to Honor can temporarily make Anglo Americans look like their counterparts from a culture of Honor in terms of embodiment effects. However, without such primes, these embodiment effects did not occur -- and even reversed among those Anglos who were buffered by a strong sense that human worth is inalienable. Among Anglos with a strong belief in inalienable worth, a heads-up posture was associated with a tendency to *reject* honor values.

Our findings emphasized some aspects of a more dynamic nature of embodiment – the interaction between the *Embodied* and *Referential Meaning* account. The same type of posture can mean different things when dynamically coupled to different contexts. Such postures are designed to function in their social context and need not necessarily be mediated by the *Referential Meaning* account (q.v. Griffiths & Scarantino, 2009). Though Griffiths and Scarantino (2009) do not go as far as to claim that, in their case, emotions are extended such that the representation lies in the social and environmental context, this certainly remains a possibility. A first step is possibly to examine to what extent external agents and the environment influence individual agents over time. Subsequently, one can examine how, above and beyond environmental representations, individual agents can change course of actions distinct from such cultural and situational contexts. It seems unlikely we will be able to research such interactions over time and through space with relatively less complex lab experiments. A challenge in the near future is thus to examine more dynamical feedback models. Regarding the study of embodiment and culture, one could potentially achieve this by examining complex models of larger populations, in which the subsistence of certain norms can be studied (i.e., population thinking; q.v. Richerson & Boyd, 2006; see also Chapter 5). Population thinking can influence the way people conceptualize different types of relations, different types of norms, and so forth. Examining rite, ritual, and temporal and spatial dynamics in pursuit of a radically embedded, embodied

cultural psychology seems a fruitful departure point to examine how emergent meaning arises from the dynamical, organizing principles between body, psyche, and culture (q.v. Cohen et al. 2009; Marsh et al., 2009).

Chapter 2

The Thermometer of Social Relations: Mapping Social Proximity on Temperature

This chapter is based on:

IJzerman, H., & Semin, G. R. (2009). The thermometer of social relationships: Mapping social proximity on temperature. *Psychological Science, 20,* 1214 - 1220.

The concepts of temperature and social proximity are often jointly expressed in metaphors such as "holding *warm* feelings towards someone" or "giving someone the *cold* shoulder". Where do such sayings stem from? Lakoff and Johnson (1999) proposed under *embodied realism* that concrete experiences (e.g., temperature) ground abstract concepts (e.g., affection). Metaphors summarized by "*warmth* is *affection*" thus offer a conceptualization of one of the most central abstract ideas for human beings; namely, when judging others, people predominantly judge on 'warmth' (Asch, 1946; S. T. Fiske et al., 2007). However, rather than affection, which has been shown to be induced by warmth (Williams & Bargh, 2008a), we address the more broadly defined term *social proximity*. In the current chapter, we examined how notions of temperature ground the abstract idea of affection by scrutinizing the effects of temperature alterations on social proximity, language, and perception of reality.

The comprehension of abstract thought processes has presented a challenge in recent attempts to link thought, perception, and action. An answer to this is to be found in the use of sensory-based metaphors, which allow people to represent and communicate abstract concepts that would otherwise have no link to sensorimotor experiences. Diverse studies have shown that abstract thought includes more grounding in physical and perceptual content than oftentimes assumed (cf. Barsalou, 2008a; Glenberg, 1997).

Embodied grounding has been shown in many instances, for example, in relation to memory (Glenberg, 1997) and, important for this chapter, abstract concepts (such as time, Boroditsky & Ramscar, 2002; and even culture, Leung & Cohen, 2007). For instance, Boroditsky and Ramscar (2002) demonstrated that participants' experience of space influenced time perception; they asked participants when Wednesday's meeting would take place if it was moved *forward* two days. The more one's body had moved forward, the more one was likely to answer Friday, as compared to Monday. Even highly complex cultural abstract concepts affect the psychological placement of the body; Asian Americans are more likely to narrate from a third party's physical perspective than their own, as compared to European Americans (Leung & Cohen, 2007). In this latter study, when participants were reflecting about abstract concepts, they physically simulated the concrete experiences associated with the abstract ideas. In the current line of research, we investigated the reverse: do physical experiences associated with an abstract idea influence perceptual focus and language use?

This question is derived in part from Lakoff and Johnson's (1999) argument about the purpose of metaphors, namely that the perceptual content of concrete experiences is used to ground abstract ideas (Barsalou, 2008a; Lakoff & Johnson, 1999). In other words, abstract concepts and concrete experiences that are jointly expressed in a metaphor are co-experienced. In the case of the example driving the research reported here, namely "*warmth is affection*", Lakoff and Johnson (1999, p. 45 – 60) argue that this co-experience is primary; everybody experiences – as a baby – the feeling of being held affectionately by one's mother, inducing a warm sensation. This association is underlined by evidence that the insular cortex is involved in processing both psychological and physical warmth (q.v. Williams & Bargh, 2008a). As a result, people express and share the abstract notion of affection in terms of the co-experienced sensation of warmth. Examples are abundant in mainstream culture; 'the cold shoulder' and 'a cold fish' are examples related to social distance, while 'warm embrace' and 'giving a warm welcome' are metaphors representing social proximity.

Overview

Based on this, we proposed that manipulating ambient temperature should influence the abstract idea of social proximity. We defined social proximity as *perceived* distance between self and other, which is different from physical distance (see also Williams & Bargh, 2008b). In the first experiment we examined the hypothesis that the experience of perceived social proximity or distance will be a function of comfortable temperature increases or decreases, respectively.

In the second experiment, we examined the effect of a different temperature manipulation on perceived social distance and extend its implications by examining systematic differences in language use in an ostensibly independent study. This is derived from research showing that social proximity and distance are manifested in language, with distance showing more abstract language use and proximity more concrete language use (Semin, 2007; see also Construal Level Theory; Liberman, Trope, & Stephan, 2007). The final study is designed to extend these findings by examining the consequences of differences in ambient temperature not only for language use, but also for perceptual processes. The argument here is that if warmth induces a focus on relationships and reduces social distance, then it should also affect perceptual processes. In contrast to a condition in which temperature is reduced, we examined if increased ambient temperature induces a predominantly relational perceptual focus, relative to when ambient temperature is low.

Experiment 1: Warming and Cooling of Social Relationships

The first experiment investigated the hypothesis that an increase in temperature within a comfortable range should increase perceived social proximity. This was inspired by recent research by Williams and Bargh (2008a), who used Asch's (1946) impression formation paradigm to show that third parties were seen as warmer and friendlier after they had held a hot cup of coffee, as compared to an iced cup of coffee. In our study, we introduced a new dependent variable: participants were handed either a warm or a cold beverage and were then asked to rate perceived social proximity to another person.

Method

Participants

Thirty-three students (84.8% female)[3] were recruited via leaflets and paid 2 Euros for participation. Participants were randomly allocated to the cold (16) or the warm (17) condition.

Procedure

Participants entered the laboratory and were asked to hold the beverage temporarily, while the experimenter ostensibly installed the questionnaire on the laptop. They then rated themselves and a person they know on the Inclusion of Other in Self-scale (IOS; Aron, Aron, & Smollan, 1992) after filling out an unrelated questionnaire. We used a seven-point version of the IOS-scale, with two circles indicating a perceived degree of overlap between self and other. The more overlap between the circles (and the higher the score), the higher the inclusion, indicating higher social proximity. After the experiment, participants were thanked and debriefed via an orally-administered, funneled debriefing, as recommended by Bargh and Chartrand (2000); no participant indicated suspicion towards the experiment's purpose.

Results

An independent samples t-test revealed that participants who were handed a warm beverage (M = 5.12, SD = 1.22) found the overlap to a known other to be significantly greater than participants who were handed a cold beverage (M = 4.13, SD = 1.41), $t(32) = -2.17$, p_{rep} = .93, Cohen's d = 0.78, confirming our hypothesis that the warm condition induced greater social proximity than the cold condition.

[3]In all three experiments in this chapter, we analyzed data from only one cultural group, namely, native Dutch participants. Participants from different cultural backgrounds can vary in perceptual focus (Nisbett & Miyamoto, 2005), language use (Semin, Görts, Nandram, & Semin-Goossens, 2002), or self-other overlap (Uskul, Hynie, & Lalonde, 2004).

Experiment 2: Linguistic Warming and Cooling Effects

The second study was designed to generalize the manipulation to ambient temperature and extend its effects to language use. Whereas the prediction for perceived social distance remained identical, the target of perceived social distance was now a specific person (the experimenter) instead of an idiosyncratic choice by the participants as in the previous experiment.

Prior to measuring perceived social distance to the experimenter, we first examined language use. We expected that if a higher ambient temperature induced greater social proximity, then the description of social events would be more concrete in warmer conditions. This hypothesis was derived from two sources of evidence. First, research on language use in independent and interdependent cultures has revealed that people from cultures that anchor the self in interdependencies (i.e., put the self in close proximity with others) tend to use more concrete language than people from independent cultures, who put distance between the self and others (Maass, Karasawa, Politi, & Suga, 2006; Semin et al., 2002). Second, construal level theory has marshalled considerable empirical evidence revealing a systematic tendency to represent proximity concretely and distance abstractly (see Liberman et al., 2007, for a review), and this relationship holds in the case of language used to represent social proximity and distance (see Semin, 2007, for a review).

Method

Participants

Fifty-two students (M_{age} = 21.30, SD_{age} = 2.70; 55.8% female) were recruited via leaflets and paid 3 Euros for 10-15 minutes participation. Participants were assigned randomly to the cold (27) or the warm condition (25).

Procedure

Upon entering the laboratory, participants were seated in the room, which was either cold (15–18 degrees Celsius) or warm (22–24 degrees Celsius).[4] They first viewed a film fragment lasting 39 seconds showing animated chess figures making movements unrelated to chess

[4]Van Ooijen, Van Marken Lichtenbelt, Van Steenhoven, and Westerterp (2004) suggested that the temperature ranges we used alter metabolic responses, so an alternative explanation of our findings might be that the temperature manipulation influenced performance as a result of fatigue. However, Van Ooijen et al. (2004) observed an effect on metabolism only after a 45-min exposure, whereas the exposure in the present study was much briefer.

TABLE 1

Definitions and example criteria of interpersonal predicates defined by the Linguistic Category Model (LCM), adapted from Coenen, Hedebouw, and Semin (2006)

Category	*Examples*	*Definition*
DAV	Hit, yell, walk	Verb that refers to a single, specific action with a clear beginning and end, and with a physically invariant feature
IAV/SAV	Help, tease, amaze, anger	Verbs that refer to a general group of behaviors with a clear beginning and clear end, without a physically invariant feature, referring to either an action or its emotional consequences
SV	Admire, hate, appreciate	Verb that refers to an enduring cognitive or emotional state with no clear beginning and end
Adj.	Honest, reliable, aggressive	Adjectives that refer to a characteristic or feature qualifying a person

and were asked to give a description of "in their own words" what they had seen in the film fragment (cf. Stapel & Semin, 2007, film fragment can be downloaded online).[5] This language production was coded for abstraction level by a rater blind to participants' experimental condition and according to Semin and Fiedler's (1988) LCM coding manual (downloadable from Semin's website).

The model distinguishes four categories, which can represent the very same event in four different ways, ranging from a very concrete description to a very abstract one. Thus, the same event can be described as "John *punched* David", "John *hurt* David", "John *hates* David" or "John is *aggressive*". These four predicates correspond to the four linguistic categories in the model, which are *Descriptive Action Verbs* (DAV), *Interpretative Action Verbs* (IAV), *State Verbs* (SV), and *Adjectives* (Adj.) (for exact definitions and examples, see Table 1 above; linguistic categories ranging from concrete on the top to abstract on the bottom). These linguistic categories have been shown to be represented on a concrete-abstract dimension (Semin & Fiedler, 1988; 1989). In line with the model, verbs and

[5]Because of the measurement's sensitivity, we chose this neutral film fragment in order to avoid valence problems or additional sources of error that might have arisen, for example, if we had used randomly imagined target persons or target persons of a different gender than the participant. The abstraction level of language people use to describe others depends on both valence and the status of the others' group: People tend to use concrete language when describing negative behaviors of in-groups and abstract language when describing negative behaviors of out-groups. Conversely, people tend to use abstract language when describing positive behaviors of in-groups and concrete language when describing positive behaviors of out-groups (Maass, Salvi, Arcuri, & Semin, 1989). The analyses demonstrated that the valence of participants' descriptions of the chess pieces was unrelated to abstraction in language use, both in Experiment 2, $t(50) = -1.65$, $p_{rep} = .87$, and in Experiment 3, $t(38) = 0.275$, $p_{rep} = .58$.

adjectives were counted and scored in the following manner: DAV = 1, IAV = 2, SV = 3, and Adj. = 4. Their sum total was divided by the weighted total number of predicates, to give the mean abstraction level. This score could thus vary from 1 (concrete) to 4 (abstract) and provided a measurement of the abstraction level of participants' description of the film fragment. Intercoder reliability was obtained over 20% of the stories and was satisfactory (Cohen's κ = .66). Finally, participants completed the IOS-scale, now in relation to the experimenter. Participants were thanked and debriefed via a funneled debriefing; no participant indicated suspicion towards the experiment's purpose.

Results

An independent samples t-test confirmed the hypothesis that 'warm' participants described the fragment more concretely (M = 2.23, SD = 0.49) than 'cold' participants, (M = 2.64, SD = 0.55), $t(50) = 2.78$, $p_{rep} = .97$, Cohen's $d = 0.79$. We analyzed the IOS measure in an ANOVA, inserting experimenter as a categorically independent covariate, since three different experimenters were involved in the data collection. The data replicated findings from the first experiment; 'warm' participants (M = 2.63, SD = 1.52) felt significantly closer to the experimenter than 'cold' participants (M = 2.08, SD = 1.04), $F(1, 48) = 2.95$, $p_{rep} = .88$, $\eta_p^2 = .058$.

Experiment 3: Warm Similarities and Cold Rules

In a third study, we extended our findings by examining if an increase in ambient temperature would induce a predominantly relational perceptual focus relative to when ambient temperature is low. This prediction was based on the following reasoning. Concrete language use has been shown not only to signal social proximity (Liberman et al., 2007; Semin, 2007), but also a perceptual focus on relations between objects and a detail-oriented analytic processing style (Beukeboom & Semin, 2006), in contrast to abstract language.

A converging argument is to be found in cultural psychology, which suggests that cultures emphasizing interdependence (placing the self in general in higher social proximity to others) are more likely to emphasize relationships, whereas cultures emphasizing independence (placing the self in general in lower social proximity to others) are more likely to emphasize properties (Nisbett & Miyamoto, 2005). Similar conclusions have been drawn from a wide array of research; interdependents do not only categorize objects on the basis of interrelatedness (Ji, Peng, & Nisbett, 2000), but also perceive Rorschach cards more as a

pattern (Abel & Hsu, 1949), and detect more changes in relationships between objects (Masuda & Nisbett, 2001), while independents categorize objects on the basis of shared categories (and on features of the object), focus on details, or detect changes of central properties of objects. In line with Maass et al. (2006) and Semin et al. (2002), Nisbett and Miyamoto (2005) argue that this focus results from socialization processes: 'interdependent' mothers use more verbs in order to stress relationships whereas 'independent' mothers use more adjectives in order to label properties and categories (see also Tardif, Gelman, & Xu, 2003).

We used the same type of manipulation as in Experiment 2 and included a perceptual focus task. Subsequently, participants were asked to describe the same film fragment as in Experiment 2. Based on the above reasoning and on the fact that warmer temperatures led to more concrete language use (Experiment 2), we hypothesized that a higher temperature would produce a focus on relations or 'interdependence' between objects portrayed in our perceptual focus task, mediated by language use.

Method

Participants

Thirty-nine participants (M_{age} = 21.05, SD_{age} = 3.27; 43.6% female) were recruited via leaflets at Utrecht University and paid 3 Euros for 10-15 minutes participation. They were randomly assigned to the cold (17) the warm (22) condition.

Procedure

Participants were presented with 24 randomized trials of a perceptual focus-task, modeled after Kimchi and Palmer (1982). They examined a target object, for example, a triangle (larger pattern) made up of three smaller triangles (properties). They were to judge which of two alternative figures was most similar to the target object: for instance, a larger pattern in the shape of a triangle made of three smaller figures (squares) (relational or interdependent perspective, 2 points) or a larger square made up of four triangles (property or independent perspective, 1 point). For an example trial, see Figure 2 on the next page. In 12 of the 24

Figure 2. Example item of the perceptual focus task. "A" is an example of a relational perspective, "B' of a property perspective.

trails, the target and the smaller figures constituting the target had the same shape; in the other 12 they did not (e.g., the target is a larger triangle constituted by small squares).[6] Participants then described the film fragment from Experiment 2. Again, participants were thanked and debriefed via a funneled debriefing; no participant indicated suspicion towards the experiment's purpose.

Results

We performed a multiple regression analysis with temperature-condition as independent variable. This analysis confirmed that 'warm' participants had a greater relational perspective than 'cold' participants, $t(38) = 2.25$, $p_{rep} = .94$, $B = 0.082$, $sr = .345$, and that 'warm' participants used more concrete language than 'cold' participants, $t(38) = -3.53$, $p_{rep} = .99$, $B = -0.451$, $sr = -.526$. we measured and scored event descriptions according to the method outlined in Experiment 2, with higher scores indicating higher abstraction levels (intercoder reliability was high, Cohen's κ = .77).

When including both language abstraction and temperature-condition in the regression analysis, more concrete language predicted a more relational focus, $t(38) = -2.41$, $p_{rep} = .95$, $B = -0.107$, $sr = -.346$, while the effect of the temperature-condition became nonsignificant, $t(38) < 1$, $p_{rep} = .72$, thereby meeting Baron and Kenny's (1986) all four conditions for full

[6]Whether each of the alternative figures was made up of smaller figures of the same shape could have influenced participants' choices. A repeated measures analysis of variance revealed, however, that this factor had no systematic effects related to the manipulation; the Condition X Alternative Type interaction was not significant, $F(4, 35) < 1$, $p_{rep} = .65$.

mediation. Additional analyses indicated that this mediator was robust (Sobel's z = 3.47, p_{rep} = .99).[7]

General Discussion

In this chapter, we examined the metaphorical mapping of perceived social proximity on temperature and the interface between ambient temperature, social relationships, language, and perception in a relational context. Our findings lend support to Lakoff and Johnson's (1999) embodied realism as well as Williams and Bargh's (2008a) and Zhong and Leonardelli's (2008) evidence that temperature differences have a direct relation with social relations. We showed how temperature differences are directly tied to social proximity. Furthermore, it is possible to argue that the temperature manipulation used by Williams and Bargh (2008a) primed the concept of warm or cold and that the pattern of impression formation results they report are driven by semantic similarity inferences (Semin, 1989). This leaves the room for a semantically driven explanation, based on word associations between warmth and affection. Such an alternative explanation is unlikely to account for the systemic relationship demonstrated in the current set of studies; namely, how environmentally induced conditions (differences in temperature) shape not only language use, but also perception and the construal of social relationships. In other words, the current evidence is difficult to interpret with a representational or amodal account.

Our findings have a number of implications. One obvious implication concerns the effect of lab temperatures on social-cognitive processes in experimental studies, such as those examining the effect of mood on processing (e.g., Isen, 1987; Martin & Clore, 2001; Schwarz & Clore, 1996). A second implication concerns the repeated finding that warmer conditions induced both concrete event descriptions and a relational focus. One could argue that our results contradict prior research investigating perceptual focus on the form (or shape) versus texture (or material) of the elements used in our perceptual-focus task (cf. Kimchi & Palmer, 1982): Stapel and Semin (2007) demonstrated that priming individuals with concrete language induced a focus on the texture of the materials (the ''trees'' in the forest). These

[7]In the current experiment, we also included participants' perception of temperature as a manipulation check, measured *after* our main dependent variables. The manipulation proved successful as participants perceived the colder room (M = 16.64, SD = 1.52) as colder than the warmer room (M = 22.56, SD = 0.84), $F(1, 38)$ = 208.24, p_{rep} = .99, η_p^2 = .849. Moreover, females (M = 18.94, SD = 4.85) perceived the room in general as colder than males (M = 20.09, SD = 2.71), $F(1, 38)$ = 4.23, p_{rep} = .92, η_p^2 = .108, with no significant interaction ($F(1, 38)$ = 2.65, p_{rep} = .87), introducing variance between conditions unrelated to the current hypotheses. We therefore controlled for sex in all analyses in Experiment 3.

findings align with research finding that people from interdependent cultures, who use more concrete language, are more focused on situational details than people from independent cultures, who use less concrete language (e.g., Morris & Peng, 1994). However, we demonstrated that putting participants in higher-temperature rooms affected the use of relationships in making similarity judgments, rendering salient the configuration of the relationship between objects. The usage of verbs as glue in representing relationships is conceptually different from using verbs to focus on detail and (perceptually) on texture (vs. trait; see also the trait-vs.-texture and global-vs.-local distinctions in Kimchi & Palmer, 1982). Indeed, our temperature manipulation induced a configurational focus on relational patterns, rather than properties (see also Abel & Hsu, 1949; Chiu, 1972; Ji et al., 2000; Masuda & Nisbett, 2001; Nisbett & Miyamoto, 2005).

The third and central implication holds for embodied grounding. Barsalou (2008) indicated the difficulties associated with grounding abstract concepts. Lakoff and Johnson (1999) argue that these abstract concepts are grounded in concrete experiences. Some evidence exists for this notion (e.g., Boroditsky & Ramscar, 2002). Our research appends further to this evidence in that "the cognitive system evolved to support action in specific situations", stressing "interactions between perception, action, the body, the environment, and other agents" (Barsalou, 2008a, p. 2). An essential element of human functioning, interpersonal distance, is grounded in temperature; warmer conditions indicate social proximity, a focus on actions, and on relational aspects of reality. We thus provide evidence for grounding social proximity in temperature. Furthermore, other research (Zhong & Leonardelli, 2008) suggested a reverse relationship: social exclusion leaves people to actually *feel* colder, thereby possibly confirming Lakoff and Johnson's (1999) proposal of a primary metaphor.

Finally, the understanding of the metaphorical mapping of social proximity on temperature travels beyond the scope of (social) psychology. It is not coincidental that many of the links we draw between environment, relationships, and perception stem from cultural psychology. One of the most prominent theories in the development of societies was furthered by Diamond (1997). He elaborately discussed how proximal factors shape human behavior. The present line of research offers a step in understanding how and under what circumstances proximal factors have influenced (and still influence) the cognitive system's adaptation for action. To gain better understanding of human adaptation for action, researchers must go beyond descriptive analyses of temperature or other concrete

experiences, and investigate the social-cognitive processes underlying the effects of these experiences.

Chapter 3:

Temperature as a Ground for Social Proximity

This chapter is based on:
IJzerman, H., & Semin, G. R. (in press). Temperature as a ground for social proximity. *Journal of Experimental Social Psychology*.

People often describe their feelings as warm when they are thinking about a trustworthy and loving partner. Conversely, popular culture often describes the absence of a partner as giving rise to a cold, distant sensation. Such feelings might appear as a result of physical distance from a partner, or worse, upon hearing those awful words that end a relationship and puts the beloved away from the self psychologically. The concept of warmth has in fact been identified in social psychological research as a central concept driving how people perceive others (Asch, 1946; S. T. Fiske, Cuddy, & Glicke, 2007). As recent findings have indicated, such descriptions about temperature and interpersonal closeness should be taken literally (see also Lakoff & Johnson, 1999). The experiences and recollection of social exclusion truly induce perceptions of coldness and desire for warmth (Zhong & Leonardelli, 2008). In earlier work, we (IJzerman & Semin, 2009) found that changes in ambient temperature alter relationship construal, perception, and communication. In the current article, we introduce a grounded perspective on interpersonal relations and report research that examined how physically as well as verbally induced feelings of social proximity lead to changes in perceptions of ambient temperature. We conclude by discussing implications of our findings on temperature perception for research in interpersonal relationships.

A common approach to conceptualize interpersonal relationships is by focusing on cognitive outcomes of relationships, such as mental representations expressed in descriptions of the relationship, amounts of pronouns used in relation to the partner, et cetera (cf. Agnew, Van Lange, Rusbult, & Langston, 1998). This has been called 'cognitive interdependence'. Cognitive interdependence commonly generalizes over specific situations in which the situation's participants reflect upon relation between self and other. The cognitive outcomes are reflective inferences, which can lead to an inaccurate assessment of the relationship (q.v. Nisbett & Wilson, 1977). In the current paper, we append to these highly abstracted cognitive outcomes in relationships. The focus is on the *sine qua non* of the relationship, namely, its experience. We examined the importance of the experience of the relationship by inducing proximity of another person verbally or physically. Our conceptualization of relationships is based on recent views in grounded cognition (often referred to as *embodiment).*

Grounding Relations in Situations

Grounded cognition (for an overview, see Semin & Smith, 2008) is an alternative to the view that higher-level mental content is driven by abstract, language-like representations (Fodor, 1975). In the newly emerging cognitive sciences that were also embraced by psychology, the human mind was compared to a computer as a solitary processing unit. In this mind-as-computer metaphor, human cognition was divorced from its sensorimotor bases, and seen as independent from action, perception, and introspection. Instead of a Cartesian perspective of a mind separated from a body, psychological research in the last decade has now recognized the importance of a unity between mind and body with the body in interaction with other agents in the world (see also Sheets-Johnstone, 2009). A wide of array of research now supports the view that human cognition is grounded in and shaped by sensorimotor experiences (for an overview, see Barsalou, 2008a).

This idea of grounded cognition was recognized and extended to human interactions and expressed in one of the most basic elements of A. P. Fiske's relational model, Communal Sharing (CS). CS relationships emphasize the common essence between participants that connect their bodies. CS relationships are grounded in people's actions that later become abstracted, forming the basis to communicate about and for norms regulating relationships. The common essence, as A. P. Fiske (2004) suggests, is grounded in actions that connect people's bodies (giving birth, feeding, empathic sex, grooming, et cetera). The contact between bodies represents the equivalence of and evokes a feeling of 'oneness' between persons.

The proposal that a feeling of oneness is tied to action connecting people's bodies has been examined in parallel by researchers in social cognition, who investigated whether social concepts such as psychological closeness are perceptually processed (IJzerman & Semin, 2009; Paladino, Mazzurega, Pavani, & Schubert, 2010; Williams & Bargh, 2008a&b; Zhong & Leonardelli, 2008). These social concepts are experienced in *situations* entailing concrete experiences in interpersonal relationships, for example, eye-gaze, smiling, physical distance, or approach or avoidance postures (see also Argyle & Dean, 1965). These situations are experienced and conceptualized in childhood (cf. Lakoff & Johnson, 1999), though they might also be evolutionarily prepared proclivities (cf. Cohen & Leung, 2009). Such situations become abstracted only later and co-expressed in metaphors. The psychological or social

distance to another person is thus a more abstracted version of the direct physical distance when in interaction with this other person.

Earlier views converging on A. P. Fiske's notion of common essence comes from Bowlby (1969) who argues for the importance of (1) close physical contact and (2) warm feelings to the parent during infancy as a prerequisite for many animals to survive. People thus first come to understand social relations through situations of physical prioximity and warmth. Subsequently, they attach non-perceived, abstracted aspects *to* these situations through which they make inferences *about* these situations (Schubert & Koole, 2009). We will first address this association of physical proximity with social relations and warmth, after which we will discuss the concept of social relations in terms of temperature perceptions.

Grounding Interpersonal Relations in Physical Proximity

Physical closeness between people influences affiliative behaviors in general; when their intimate space is violated, people will gaze less towards one another while a distance too large will increase eye gaze, arguably to balance the social distance equilibrium (Argyle & Dean, 1965). Williams and Bargh (2008b) indicated the importance of this spatial representation to social concepts; when increasing spatial distance between self-irrelevant objects, participants show greater enjoyment of embarrassment of other people, less distress from violent media, lower estimates of calories in unhealthy food, and less emotional attachment to family and hometowns.

Williams and Bargh' (2008b) research supports the idea that physical distance or proximity shapes much of people's social life. The importance of perception of physical proximity has been recognized as one of the major means to measure social relations in the relationship literature as exemplified by the Inclusion of Self in Other-scale (IOS; Aron, Aron, & Smollan, 1992). The IOS utilizes a representation of physical distance to indicate a degree of intimacy and feelings of interpersonal closeness towards others (both in terms of feeling and behaving, see Aron et al., 1992). This type of scale has proven effective to relate feelings of social distance with connectedness to other ingroup members (Tropp & Wright, 2001), forgiveness (McCullough et al. 1998), other cognitive measures of closeness (Aron, Aron, Tudor, & Nelson, 1991), et cetera. In prior research, we also found that participants in a warm condition revealed a sense of greater physical proximity than those in a cold condition, expressed in the IOS (IJzerman & Semin, 2009).

Grounding Interpersonal Relations in Warmth

Social psychologists have often used a semantic concept of (psychological) warmth to indicate different levels of social relationships between people. For example, people recruit warmth and coldness to describe their social relations, and when judging others, people predominantly do so on (psychological) warmth (Asch, 1946; S. T. Fiske et al., 2007). S. T. Fiske et al. (2007) argued that judgments on (psychological) warmth determine the likelihood to approach or avoid another, making judgments on (psychological) warmth (versus hostility) a fundamental aspect of evaluation. They also suggested that the concept of warmth is central to human survival, as its detection displays whether another's intentions are trustworthy. Further, the concept of (psychological) warmth has been viewed as an important dimension in romantic relationships: for example, Simpson, Rholes, and Philips (1996) found that couples that were judged as 'warmer' reported less distress and anger in their relationship.

In addition, Lakoff and Johnson (1999) proposed that people conceptualize social relations in physical experiences of temperature related to the connection between bodies. They posed that people first co-experience (source) situations in which physical experiences are tied to more abstract (target) representations of affection, which are later co-expressed in metaphors (e.g., 'a *cold* fish' or 'a *warm* embrace'), when explicit reflection or communication about these social relations is required. Already in infancy, people co-experience close contact, affection, and warmth when held by the caregiver (q.v. Lakoff & Johnson, 1999). Williams and Bargh (2008a) tested the resulting hypothesis that the actual physical sensation of warmth can influence social relations. They found that participants saw a target person as more sociable and were themselves more generous in a physically warm condition as compared to a physically cold condition. We further investigated this concept and found that warm conditions (as compared to cold conditions) shape participants' language use and perception related to social relations. By indicating that participants also felt closer to others in warmer conditions, we built upon Williams and Bargh's (2008a) concept of affection to a more direct construal of social proximity. Moreover, our results support that the experience of interpersonal relations is influenced by contextual cues. These environmental cues thus change the manner in which people utilize language and perceive the environment as a function of their perception of social distance (IJzerman & Semin, 2009).

Social Proximity Altering Temperature Perceptions

Recent research has addressed the question whether processing abstract concepts activates specific concrete experiences. Lakoff and Johnson (1999) suggested that the co-occurrence of an abstract concept and a concrete experience possesses an asymmetric character, with inferences flowing in one direction only. This argument is underlined in research by Casasanto and Boroditsky (2008) who found that priming the experience of space affected how people represented time, but priming information about time did not influence how people processed the concept of space. Recent evidence by Zhong and Leonardelli (2008) has suggested that this asymmetric relationship between a target domain and a concrete experience does not hold for social relations; people perceived lower temperatures and preferred warm food when they recalled or virtually experienced social exclusion. In other words, the social relations that people experience in situations from early on in life are embodied and are only later in life abstracted when people communicate about them in metaphor or otherwise. Yet, one should raise the question whether participants, after social exclusion, experience *cold* anger or *cold* distance. Indeed, participants become more aggressive after they have been excluded in experiments (Warburton, Williams, & Cairns, 2005). In the current research, we thus extend Zhong and Leonardelli's (2008) research to situate interpersonal relations in a wider framework of abstractions from sensorimotor representations.

Overview of the Current Studies

In our research, a first test was to investigate whether a sense of social distance experienced in terms of experimentally induced physical proximity extended to perceptions of temperature perception. Furthermore, we wanted to abstract experiences of physical proximity into feelings of closeness (or distance) primed through language, as "much of (our) mental representation of the physical world is in fact constituted not out of direct experience but out of reused perceptual representations, with the reuse guided by what we hear in language" (Boroditsky & Prinz, 2008, p. 112). Thus, Experiments 1 through 4 tested whether a verbally induced sense of social proximity or distance induces perceptions of higher or lower temperature. Across four studies, we thus tested two central ideas, namely that 1) greater physical proximity induces a perception of higher temperature, and 2) greater social proximity (or distance) manipulated through semantic primes induces perceptions of higher (or lower) ambient temperature. It is important to note here that such perceived

differences in temperature are subtle and automatic; we thus predicted that perceived temperatures centered on comfortable ranges of actually measured temperatures.

Experiment 1: *Being* Closer and Feeling Warmer

In prior research, we found that putting people in higher temperature rooms induced a sense of reduced social distance towards another person (IJzerman & Semin, 2009). Furthermore, Zhong and Leonardelli (2008) found that participants felt *colder* after social exclusion. Williams and Bargh (2008b) demonstrated the relevance of spatial representation to social concepts. We now wanted to test the hypothesis more directly to examine whether a directly experienced sense of *social proximity* induces feelings of warmth. In the current experiment we thus predicted that physical closeness leads participants to perceive a higher ambient temperature.

We placed participants either close or far from two confederates; temperature perception was asked under the guise of a laboratory test. Participants were asked to estimate ambient temperature (in degrees Celsius). This targeted temperature question was embedded in a list of questions in the laboratory test, in order to hide the purpose of the experiment.

Method

Participants

Fifty (*only* native Dutch, M_{age} = 21.0, SD_{age} = 3.69; 72% female) Utrecht University students were recruited via leaflets around campus and paid 2 Euros for 5-10 minutes participation. Twenty-four were in the far condition; twenty-six were in the close condition.[8]

Procedure

One participant joined two other 'participants' (whom they did not know and in reality were confederates blind to the experiments' purpose), in a room where temperature was held constant. They were placed in a triangular position standing at a lectern either close (50 centimeters) or far (270 centimeters)[9] from the confederates. Given that participants' body

[8]Consistent with our previous empirical chapter, we only analyzed data from native Dutch participants. Depending on cultural background, participants can vary on perceptual focus, language use, or self-other overlap (q.v. IJzerman & Semin, 2009). Also, in all studies participants were thanked and debriefed via funneled debriefing as recommended by Bargh and Chartrand (2000). Only in Experiment 4 two participants indicated that they were aware of the purpose of the study, as they had participated in similar previous studies. We removed these participants from our further analyses.

[9]We based these distances on the distinctions made by Hall (1955) in his research on physical proximity in the United States. For strangers in interaction, 50 centimeters is the maximum level of interpersonal proximity

heat could have potentially altered temperature perception between the close- and far-conditions, we hid a thermometer under the participant's lectern (outside the view of the participant), which was read at the end of the experiment.

Confederates (one male and one female) switched positions across participants, such that for half of the participants the male was standing on the participant's left. In order to call attention to the others, participant and confederates were first asked to describe one another in terms of what the person does or who the other is in terms of relationships or categories. This first test was an ostensible task about the intuition of strangers, where participants, without any prior knowledge about the others, were to generate as much information about this stranger as possible. Confederates in reality were instructed (prior to the experiment) not to write about the other, but merely write about what they opted for. Consequently, we asked participants to engage in an ostensibly unrelated laboratory test. They were asked to estimate ambient temperature (in degrees Celsius) and to judge the laboratory on 7-point Likert-scales on temperature-comfort, space, crowdedness, ceiling-height, noise, light, and perceived freedom.[10] Our targeted temperature question was embedded in a list of questions, in order to hide the purpose of the experiment.

Results

A univariate analysis of variance revealed that participants who were placed closer to the confederates perceived a significantly higher ambient temperature (M = 19.88, SD = 1.75) than those placed further (M = 19.33, SD = 1.31), $F(1, 48) = 4.25$, $p = .045$, $\eta_p^2 = .083$ (Cohen's $d = .36$) [11], thereby confirming our hypothesis that physical closeness induces a perception of higher ambient temperature. A viable alternative explanation is that body heat might have

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without discomfort. Given the cultural similarities between the Netherlands and the United States (Hofstede, 1980), we chose to maintain this distance.

[10]Across our experiments, the only significant consistent finding of the social proximity is that on temperature. We therefore refrain from reporting the non-significant findings on these other variables.

[11]Argyle and Dean (1965) argue that one way people attempt to restore an equilibrium level of physical proximity is by increasing language production. We counted our confederates' language production on the first task. The averaged total of words was indeed higher in the far condition (M = 39.65, SD = 15.10) than in the close condition (M = 26.90, SD = 7.47), $F(1, 49) = 14.77$, $p < .001$, $\eta_p^2 = .235$. In our subsequent analyses we used this variable as a control for our confederates' behavior towards participants. Further, the real temperature remained constant throughout the experiment. Inserting the measured temperature in the room as a covariate did not significantly change the results of these analyses ($p = .046$).

altered the actual temperature. We therefore analyzed the real temperature measured *in between* the participant and the confederates per round of the experiment and found no significant differences between the close and far condition, $F(1, 49) = 0.678$, $p = .414$.

Experiment 2: The Warmth of Similarity, An Internet Test

A subsequent test was to test whether a higher degree of semantically primed feelings of closeness would lead to perceptions of different ambient temperatures. Semantically primed feelings of closeness are abstracted versions of a relationship with another person, as compared to the direct physical distance experienced with the other. According to research on interpersonal relationships, people draw inferences about others on the basis of available, salient information about the other. When this information portrays a larger amount of information on similarity particularly in attitudes, background, and to a lesser degree in personality, people are suggested to feel a greater sense of similarity with the other (Heider, 1958). We thus asked participants to pick an avatar under the guise of an investigation of intuition and personality and name either three or ten similarities about a stranger on the basis of the avatar the other had ostensibly picked.

A greater sense of similarity induces a greater amount of intimacy (e.g., Reis & Shaver, 1988), which leads people to be more likely to 'confuse' themselves with the other, indicating psychological closeness (Aron et al., 1991). We predicted, in line with our first study, that naming a greater amount of information on similarities leads to a perception of higher ambient temperature. In the first part of this experiment we predicted that naming more similarities leads to feeling more similar to the target person. In the second part of this experiment we predicted that naming more similarities leads to perception of higher ambient temperature.

However, the generation of a greater number of similarities is not indubitably linked to a greater feeling of similarity (and thus higher ambient temperature). Research on ease-of-retrieval showed that across different reports, accessibility of content has played a major role in attitude judgments and moods (Schwarz, 1998), memory judgments (Winkielman, Schwarz, & Belli, 1998), et cetera. In these studies, participants found it more difficult to recall many than few chunks of information making them rely on different strategies for recall. In the current set of studies, we asked participants to name either three or ten interpersonal judgments about a target-participant in agreement (or disagreement) with

their own personality, *after* participants had described themselves extensively. In order to rule out the hypothesis that people would rely on different strategies for recall because of ease-of-retrieval processes, it is important to test whether participants find it more difficult to name chunks of interpersonal information (and would thus be hindered by an availability heuristic in either recalling three or ten similarities with the target-participant).

In short, we thus hypothesized that participants 1) feel more similar after naming more similarities. Because of the expected greater sense of intimacy, we also predicted that participants 2) feel *warmer* after naming more similarities. On the basis of these predictions, we further suspected that participants 3) should not be hindered by an availability heuristic, given that they were asked to describe themselves extensively prior to the task and were asked to generate relatively easy interpersonal judgments. In order to prevent participants to guessing the target of our study, we split this study in two different parts (with two different samples). We reported the study here jointly due to the high degree of similarity in the two tests. The purpose of these internet experiments (often characterized by greater error variance due to lack of control, see also Birnbaum, 2004) was to test the proposed method for the laboratory.

Method

Participants

In the first part of the study, eighty-three (M_{age} = 27.1, SD_{age} = 9.61; 75.9% female) participants took part in an internet-based study. Fifty-seven were in the few similarities-condition; twenty-six in the many similarities-condition. In the second part of the study, forty-nine (M_{age} = 26.40, SD_{age} = 9.56; 92.2% female) participants took part in an internet-based study. Twenty-six were in the few similarities-condition; twenty-three in the many similarities-condition. In both studies, participants were randomly assigned to conditions. Gift certificates of 25 Euros were raffled off in exchange for participation in both studies.

Procedure

Participants entered the experiment via a link that was distributed by e-mail to an existing participant pool, via a link advertised at http://www.in-mind.org, and via Hyves, a Dutch social networking site. Ostensibly, participants were taking part in an experiment linking intuition to personality. They were first requested to choose one of five Chinese ideograms as an avatar to represent themselves. Afterwards, they were requested to describe themselves in terms of categories, behavior, and personality (supposedly linking their

'personality' to the avatar). Subsequently, they were shown a Chinese ideogram different from the previous five and were told that this ideogram was chosen by a previous participant, who had also described him/herself. In our experimental conditions participants were asked to 'examine the avatar and name three/ten similarities with the other' on the basis of the avatar. Participants were told that this experiment was designed to establish a link between intuition about an image and personality.

In the first part, we asked participants, after a set of unrelated questions, how similar they felt to the target participant (1 [*not similar at all*]-7 [*very similar*]). In the second part, again after a set of unrelated questions, we asked participants to estimate the ambient room temperature (in degrees Celsius) without examining the thermometer and how difficult they found the task (on a scale from 1 [*not difficult at all*]-7 [*very difficult*]).

Results

For the first part of this test, an independent samples t-test revealed that participants who were in the many similarities-condition (M = 4.58, SD = 1.55) felt marginally significantly more similar to the target-participant than participants in the few similarities-condition (M = 3.95, SD = 1.49), $t(82) = -1.76$, $p = .082$, Cohen's $d = -0.41$, confirming our hypothesis that an increase in naming similarities induced a feeling of similarity towards a 'stranger'.

A univariate analysis of variance revealed that participants who were in the many similarities-condition (M = 20.62, SD = 3.92) perceived a marginally significantly higher ambient temperature than participants in the few similarities-condition (M = 18.05, SD = 5.58), $F(1, 48) = 3.95$, $p = .052$, $\eta_p^2 = .069$ (Cohen's $d = 0.53$), suggesting that verbally primed feelings of social proximity literally *feel* warmer. In order to investigate whether task difficulty caused the feelings of warmth rather than similarity feelings, we conducted another univariate analysis of variance with task-difficulty inserted as covariate. This analysis revealed a similar result; participants who were in the many similarities-condition (M = 20.89, SD = 4.15) perceived a marginally significantly higher temperature than participants in the few similarities-condition (M = 18.01, SD = 5.69), $F(1, 47) = 3.25$, $p = .078$, $\eta_p^2 = .066$ (Cohen's $d = 0.58$), supporting our hypothesis that verbally primed feelings of social proximity literally *feels* warmer. Additionally, participants in the many similarities-condition did not find the task more difficult than participants in the few similarities-condition, $F(1, 48) = 1.91$, $p = .173$, confirming our hypothesis that giving person judgments in relation to the

self, after giving an extensive description about the self, is not more difficult for many chunks of information than few chunks of information.

Experiment 3: The Warmth of Similarity, Lab Confirmation

In our internet studies, we found that a verbal manipulation of social closeness led to a perception of higher ambient temperature, while generating similarities was not more difficult in the ten similarities condition than in the three similarities condition. However, internet research in certain type of experiments is characterized by a lack of control over experimental conditions (such as temperature) or the manner in which participants complete the experiment, possibly creating greater error variance (see also Birnbaum, 2004). Differences in room temperatures in people's room could have potentially explained our effect or the marginal character of our effects. In the following experiment, we thus wanted to replicate our marginally significant findings that people perceive a higher temperature when naming ten similarities than when naming three similarities in a laboratory. We conducted a similar experiment, however, now under the guise of a laboratory test (also employed in Experiment 1). Again we predicted that when people name more similarities, they would perceive the ambient temperature to be higher.

Method

Participants

Seventy (M_{age} = 22.10, SD_{age} = 2.00; 67.1% female) Utrecht University students were recruited via leaflets around campus and paid 2 Euros for 15 minutes of participation. Thirty-four were in the few similarities-condition; thirty-six in the many similarities-condition.

Procedure

The procedure was similar to the one used in Experiment 2. Participants were first requested to choose one of five Chinese ideograms as an avatar to represent them. Afterwards, participants were again requested to describe themselves in terms of categories, behavior, and personality (supposedly linking their 'personality' to the avatar). Subsequently, they were shown a Chinese ideogram that was different from the previous five and were told that this ideogram was chosen by a previous participant, who had also described him/herself. In our experimental conditions participants were asked to 'examine the avatar and name three/ten similarities with the other' on the basis of the avatar.

However, instead of asking how similar participants felt to the other, we now asked participants to engage in the ostensibly unrelated laboratory test. We used the same dependent variables as in Experiment 1, asking participants to estimate the ambient temperature (in degrees Celsius). The targeted temperature question was again embedded in a list of questions, in order to hide the purpose of the experiment. After placing the participant in a cubicle, the experimenter (unbeknownst to the participant) read the temperature from a hidden thermometer.

Results

An analysis of variance, with the measured temperature inserted as a covariate[12], revealed that participants in the many similarities-condition (M = 23.06, SD = 2.92) perceived the room to be significantly warmer than participants in the few similarities-condition (M = 22.06, SD = 2.63), $F(1, 68) = 4.53$, $p = .037$, $\eta_p^2 = .064$ (Cohen's d = 0.36), thereby confirming that naming a higher number of similarities literally leads to higher temperature perceptions.

Experiment 4: Chilly Differences

The previous experiment revealed that naming more similarities about a stranger indeed leads to a perception of higher ambient temperature. Given that participants engaged in a longer activity in the many similarities condition, a feasible alternative hypothesis could be based on the idea that participants felt warmer after engaging in a longer and more intense task. Switching to a semantically different task could preclude the hypothesis that the effect of perceptions of higher ambient temperature arises from engaging in a more intense task.

We hypothesized that our results are due to feelings of social proximity. However, in order to further support this argument, we used the same method, but now asked participants for their temperature perception after naming three versus ten *differences* regarding the target-participant, creating a smaller versus larger social distance. As in previous experiments, participants were again asked to pick an avatar under the guise of an investigation of intuition and personality. They then described what they were *not*. Subsequently,

[12]In contrast to Experiment 1 (which was conducted in a different laboratory), inserting measured temperature was necessary, as lab temperatures differed significantly per day on the days that the experiment was conducted, $F(1, 69) = 10.92$, $p < .001$, $\eta^2 = .417$. This temperature did not differ per day in Experiment 4. We therefore did not control for measured temperature in this experiment.

participants were requested to name either three (few) or ten (many) differences about a target-person, prior to engaging in the ostensibly unrelated laboratory test asking them for temperature perception. Here, we now predicted that naming ten differences with a target-participant would lead to lower temperature perceptions than naming three differences.

Method

Participants

Thirty-six (M_{age} = 19.80, SD_{age} = 1.78; 80.6% female) Utrecht University students were recruited via leaflets around campus and paid 2 Euros for 15 minutes participation. Nineteen were in the few differences-condition; seventeen in the many differences-condition.

Procedure

The procedure was similar to the procedure used in the two prior studies. However, participants were now asked to describe what they were *not* and we then asked to name either three (few) or ten (many) *differences*. Again, participants were asked participants to engage in the ostensibly unrelated laboratory test (in which they again estimated ambient temperature). The experimenter (again unbeknownst to the participant) read the temperature from a hidden thermometer.

Results

An independent samples t-test revealed that participants in the many differences-condition (M = 19.76, SD = 1.20) perceived a significantly lower ambient temperature than participants in the few differences-condition (M = 21.74, SD = 2.63), $t(34) = 2.46$, $p = .019$, Cohen's d = 0.97, thereby confirming the hypothesis that inducing feeling different literally leads to lower temperature perceptions.[13]

General Discussion

In this package, we found both physical as well as semantic manipulations to increase social proximity (and distance) lead to perceptions of higher (and lower) temperature. In the first study, we found that physically putting someone close induces a perception of higher

[13]Examining the different temperatures in the different studies shows that estimated temperatures in Experiment 3 were higher than in Experiment 4. The actual temperature in Experiment 3 was 23.27, while in Experiment 4 the mean actual temperature was 19.19 degrees Celsius. The difference in actual temperatures could have played a role in explaining our effect. Inserting temperature as a covariate in our analyses, however, controlled for such a potential confound in our research.

ambient temperature. In Experiments 2 through 4, we found that inducing a more abstract, semantically primed perspective of *feeling* similar (or different) to another, unknown, person can leave participants to literally perceive ambient temperature to be higher (or lower). The current line of research provides support to Zhong and Leonardelli's (2008) implicit suggestion that feelings of social distance induce feelings of coldness and extend their research by finding that social proximity leads to perceptions of warmth. We thus confirm the high accessibility of the link between social proximity and temperature by demonstrating that this effect can be induced through feelings of similarities rather than direct social proximity and by finding the proposed bi-directionality of the warmth and (social) proximity link (see also IJzerman & Semin, 2009; Williams & Bargh, 2008a). Our research questions the assumption that relationships are conceptualized merely in highly abstracted representations. In other words, it seems viable to assume that relationships are embodied first and subsequently abstracted from situated experience in order to reflect and/or communicate. Our findings corroborate prior evidence on relationships and temperature, and locate cognitive interdependence within perspectives of sensorimotor experiences. The question then becomes *how* cognitive interdependence develops as a function of 'internal models' built on very basic building bricks of interpersonal relations (Bowlby, 1969).

One pitfall to our current research is that we were not able to measure whether the feeling of similarity with a target-participant mediated temperature perception. We did not measure similarity and temperature perception in the same experiment, as we suspected that this would raise participants' suspicion towards our experimental procedure. Given that we induced different perceptions of temperature across a range of three different manipulations (physical and two alternative semantic manipulations), we can conclude that our manipulations were successful in altering temperature perceptions as related to social proximity.

There are a couple of important conclusions and questions we would like to draw from our research. First, changing one's physical distance delivers commensurable effects in terms of temperature perceptions as compared to verbal primes. Having participants stand close to two other people induces increases in perceptions of temperature similar to inducing people to feel more similar through verbal manipulations. Our evidence thus further supports Damasio's (1999) suggestion that the body landscape is changed through "as-if body loops" and that mental representations of the physical world are often reused perceptual

representations, guided by what is expressed in language (Boroditsky & Prinz, 2008, p. 112). That is, semantically primed representations of social closeness induced similar perceptions of a physical state as the physical state itself (cf. Zajonc & Markus, 1984). Through learning that a verbal manipulation induces a different temperature perception, we further contribute to the hypothesis that perceptual representations are essential for thinking about social concepts abstractly. Indeed, rather than a dual system of *hard* and *soft* representations, our results suggest that the intensity of the representation in the physical move along a continuum of concrete experiences. Assuming such a continuum adds to the understanding of developing a model for cognitive interdependence.
An important hypothesis that follows from the assumed continuum is the idea that actual bodily temperatures might actually rise as a function of said verbal representations of proximity towards another. Even more so, it seems viable to assume that the social circumstances of the situation alter the bodily state, which is consequently expressed and communicated about in language. Subsequent research should thus focus on whether it is the physical state which actually alters, or whether *only* the perception of the ambient temperature has been altered. This would supply important evidence for or against the hypothesis that relations are grounded in sensorimotor experiences.

More suggestively, Damasio (1999) discusses that the most important alterations in the central nervous system include the induction of certain behaviors, such as bonding and nurturing. Caporael (2007) argues that this occurs through *repeated assemblies* throughout years of evolution. Throughout the ages, bonding experiences for human beings in its practice has remained the same, allowing for these repeated experiences. These types of behaviors, subsumed under the abstract representations tied to *warmth is social proximity* have been regarded as fundamental to human sociality and are perhaps even pre-wired. Social bonding has remained unaltered for human beings throughout evolution, thereby making close, warm contact vital. In other words, the body indeed makes sociality essential (Caporael, 2007). The co-occurrence between psychological warmth, physical warmth, and physical distance has thus developed as a central extension of the human mind throughout evolution through these repeated assemblies (Caporael, 1997). The mental systems inherent to human beings correspond to repeated structures and patterns in multiple levels of selection. On the basis of such “repeated assemblies” and a further developed model of “cognitive interdependence”, one could potentially formulate a more dynamic representational model between abstract concepts and bi-directional feedback models.

Bodily actions (see Cohen, Leung, & IJzerman, 2009; Maass, 2009) activate complex not only representations, but complex representations also activate bodily actions, feeding into an integrated self-reinforcing cycle.

Our findings suggest further possibilities for research on interpersonal relations. The link between temperature and social proximity seems to operate outside of conscious awareness, and can thus be used as a much more subtle measurement of feelings towards another than other measurements which require reflection upon the self-in-relationship (e.g., the IOS). Further, older research on social distance equilibria (Argyle & Dean, 1965) suggested ways in which eye-gaze, physical distance, posture, and smile function in order to maintain an optimal social balance. Do temperature perceptions relate to these different monitoring behaviors of (different) others and self, like seeking distance, gazing at others, et cetera? The suggestion that repeated assemblies have altered the human landscape such that physical proximity and warmth are necessary for human living possibly suggests that their effects penetrate more common elements of human thinking, behavior, and language and could even supply new insights into clinical solutions for problems in the interpersonal sphere. Subsequently, clinical research on the basis of recent reports like ours and Zhong and Leonardelli (2008) could open up potential solutions for questions about Seasonal Affective Disorder or attachment disorders.

Furthermore, it is important to examine the role of culture in physical distance. In line with anthropological evidence (Hall, 1955) we held proximity at a comfortable distance for Dutch (Western) participants. Suggestively, if participants in our first experiment would be placed at a distance too intimate, it might be possible that they would perceive the temperature to be colder or even too hot, in order to maintain perceived social distance equilibria (see also Argyle & Dean, 1965). Further, research from cultural psychology indicates that relationship construals differ across cultures (Uskul, Hynie, & Lalonde, 2004). Can similar questions be posed for temperature perceptions, in that ranges and limitations of relationship construal are determined by the physical experience in one's culture? If this is indeed the case, one might be able to answer difficult empirical questions related to adjustment problems in interpersonal spheres related to migration from warmer to colder climates.

The distinctions between 'cognitive interdependence' and our embodied perspective of interpersonal relations unlock new research questions. For example, some research in social

psychology has examined how computer-mediated communication affects deindividuation and decision making (Spears, Lea, & Lee, 1990). What are the long-term effects of computer-mediated communication in terms of attachment to significant others and in social interactions? Our research suggests that both verbally primed feelings and physical changes in social proximity deliver similar effects; on the basis of our research one could thus argue that no difference exists between the two different interactions. Yet, the actual *physical* component of social interaction seems so vital to processes underlying social relationships that prolonged computer-mediated communication could severely harm norms regulating social behavior.

Our findings have important implications for interpersonal relations and open up new avenues for research. It is possible that prior researched and more abstracted concepts of interpersonal relationships are guided by abstract, amodal representations (see, e.g., Mahon & Caramazza, 2008). Mahon and Caramazza (2008) argue that sensorimotor activation as a function of human thought is not irrelevant, but serves as an 'ornament'. There is however no evidence for this account (see also Zwaan, 2009a). We assume the safe working hypothesis that interpersonal relationships and their representations are grounded in experiences and (partly) simulated when called-upon, though leave open the possibility in contrast to classical theories to ask "how are interpersonal relations embodied?" (see also Zwaan, 2009b). We propose here that even more abstracted and stable conceptions of interpersonal relationships (such as those conceptions measured by pronoun uses or self-descriptions) are grounded within perception and action in the self-in-relation.

Chapter 4:

Grounding Cultural Syndromes: Body Comportment and Posture in Honor and Dignity Cultures

This chapter is based on:

IJzerman, H., & Cohen, D. (submitted). Grounding cultural syndromes: Body comportment and posture in Honor and Dignity cultures.

The integration of culture and mind has been of great interest to psychologists, who often claim that culture and mind "make each other up." This is an important truth, but leaves one important factor out – namely, the body. People carry culture in their beliefs, values, and attitudes, but they carry it also in their physical body. Swaggering walks, deferent postures, stiff comportments and so on embody a certain way of *being* in the world. In this chapter, we examined the bi-directional effects of body comportment and the endorsement or rejection of cultural values in cultures characterized by very different core beliefs.

The importance of the body in representing thought in general has received increasing attention in the past years through Conceptual Metaphor Theory (Lakoff & Johnson, 1999) and research on grounded cognition in psychology (Barsalou, 2008a). Researchers have isolated how very basic affective and cognitive reactions (such as, approach/avoid, amused/ not amused, or, as emphasized in the previous chapters, closeness/distance) are embodied. Yet, how culture, body, and situation interact to play a role in embodied cognition has been relatively unexplored by psychologists.

The perspective taken in this chapter is that body comportment and the expression of cultural values are integrated, with particular meanings conditioned by cultural norms and roles. More concretely, we examined how the embrace or the rejection of values of honor – a syndrome prizing familial loyalty, high social esteem, the chastity of women, and a willingness to defend one's reputation with violence if necessary – is grounded in the bodily comportment of people in different cultures. Thus, we show that a) concerns with honor are embodied by men and women in honor cultures, b) such concerns *can* be embodied by those from nonhonor cultures if they are appropriately primed, but also that c) the *rejection* of honor in nonhonor cultures is embodied in much the same way that the embrace of honor is embodied in honor cultures.

From a *Grounded Culture* perspective, we argue for the larger theoretical points that: 1) A *nonarbitrary* connection exists between bodily comportment and endorsement or rejection of appropriate cultural values. With the connection being nonarbitary, we mean that 2) a causal connection exists that is *bi-directional*. 3) However, the causal connection is not simplistic in the sense that there is a straightforward one-to-one mapping between values and body comportment. In other words, in different cultural contexts the same values are

embodied differently. This means that, 4) instead, the connection between values and body comportment is conditioned upon culture, context, and gender. We will explain how the connection between values and body in different cultures is conditioned below.

Honor and Dignity

We examined embodiments using participants from Nonhonor cultures (Anglos from the United States and native Dutch in The Netherlands) and Honor cultures (Latinos from the U.S. and Arab or Turkish respondents in The Netherlands). The Honor cultures in our experiments all spring from the Mediterranean (though in the case of Latinos in the U.S., the connection is more distant, running through colonialists from the Iberian peninsula). As such, these honor cultures tend to embrace values of female chastity, familial loyalty, high social esteem, and defense of reputation through violence, if necessary (see, for example, Peristiany's [1965]). A man of honor stands up for himself and his family (particularly for the women in his family). A woman of honor adheres to prescriptions of appropriate behavior, including those of deference when it is called for.

In contrast, the dominant cultural ideal for Anglos from the U.S. and for native Dutch may be characterized as one of Dignity (Cohen & Leung, in press; Kim & Cohen, in press; Kim, Cohen, & Au, in press; Rodriguez Mosquera et al., 2002). The central tenet of a Dignity culture is the inalienable worth of the individual. A person with a sense of dignity is a sturdy person, whose inner, imperturbable sense of worth keeps him or her behaving according to internal standards, rather than the whims of the situation. In Ayers' (1984) metaphor, "Dignity might be likened to an internal skeleton, to a hard structure at the center of the self" (p. 20). This hard structure makes a person of dignity invulnerable to affronts by others and gives him or her the fortitude – the backbone – to behave correctly in situations that demand strength or resolve.

Embodiments of Dignity and Honor

Both Dignity and Honor stress right conduct (though differing in definitions of such conduct). Posture is an integral metaphor for being a person of Honor and a person of Dignity (one displays "moral rectitude", "has a backbone", is capable of "holding one's head high", et cetera). Across 3 studies, we examined this integration of cultural values and posture – manipulating (in Experiments 1 and 2) or measuring (Experiment 3) participants' upright, chin-held-high stance, as opposed to less upright postures where eyes are downcast and the

head is held in a hangdog fashion. As such, the postures we used here are similar to what one might expect for expressions of pride or shame (Tracy & Matsumoto, 2008).

Pride and shame are commonly connected to actions, which are by specific moral norms (see, for example, Fiske, 2002; Moll et al., 2002). However, pride and shame outside of context are devoid of intentional content – pride or shame *about what*? – without cultural contexts that define what is right, appropriate, and expected. More importantly, simply equating right conduct with a chin-up posture ignores the way that honor is *gendered* in Honor cultures. Just as some behaviors differ in appropriateness for men and women in cultures of Honor, so too do postures of the honorable man and honorable woman. In particular, showing deference and modesty in appropriate situations is important for women in many honor cultures. Modesty and deference signal, among other things, that one is *capable* of feeling shame (that is, one accepts the power of community norms to sanction one's behavior). This is different than *being* ashamed (an emotion implying one has already behaved badly). In other words, preemptively exhibiting modesty and deference can communicate that one is not *shameless* (Cohen, 2003). As such, one might expect that women in cultures of Honor may sometimes regard a head down posture as an honorable posture for a woman. Thus, not only should "right conduct" differ across Dignity and Honor cultures, but "right bodily comportment" should differ *within* Honor cultures between men and women. The connection between bodily comportment and a given set of values is thus conditioned by culture and, particularly within certain cultures, conditioned by gender (see also Schubert & Koole, 2009).

Overview

In Experiments 1 and 2, we examined how body comportment affected endorsement of honor-related values. We conducted these studies with and without priming concepts related to honor through a word completion task; and we examined the effects both in a culture of Dignity (among Anglo Americans in Experiment 1) and a culture of Honor (among Latinos in Experiment 2). For Anglos, honor is not a chronically salient cultural syndrome, and thus we predicted that posture would have little effect on the endorsement of honor values, in the absence of an honor prime. The comportment should *only* affect the endorsement of honor values when honor has been made temporarily salient after the word completion prime. For Latinos in Experiment 2, however, honor is a salient cultural theme.

Body comportment by itself should be sufficient to make people feel honor's dictates; no conceptual word prime should be necessary.

In Experiment 3, we reversed the causal direction through a different field experiment. After examining in Experiments 1 and 2 whether body comportment influences the endorsement of honor-related values, we examined in Experiment 3 whether the endorsement or rejection of honor-related values affects subsequent body comportment. We examined participants from an honor culture (Arab and Turkish residents of the Netherlands) and those from a dignity culture (native Dutch residents of the Netherlands). The prediction was that endorsement (vs. rejection) of honor-related violence should lead Arab and Turkish residents to straighten up (vs. shrink) in their posture. The reverse was expected for native Dutch, as rejection of honor-related violence is an affirmation of dignity-related values that conceive of individual worth as inherent and inalienable, and thus, impervious to insult or affront.

Experiment 1

In our first experiment we examined bodily comportment and honor-related values in a nonhonor (or dignity) culture. We expected that posture should only affect the endorsement of honor values after a conceptual prime with honor.

Method

Participants

133 Anglos (M_{age} = 19.44, SD_{age} = 1.39; 48.9% female) were approached outside on the University of Illinois campus, allegedly for a study about effects of oxygen intake on vision. Eighty-five participants were in the head high position (42 were primed with control words, 43 with honor words). Forty-eight participants were in the hangdog position (22 were primed with control words, 26 with honor words).

Procedure

We provided participants with a cover story that different body postures improve oxygen intake, which should in turn improve performance on visual acuity tests. Participants were given a board to hold either in front or back of their waist to manipulate shoulder and arm position.[14] They were told, "As you might know, the body does not adapt quickly to changing

[14] As part of the studies' cover story about posture, oxygen intake, and visual acuity, participants were asked to either hold a board in front or behind them. We thought that holding the board behind one's back might

circumstances. In order to be confident that your body has adjusted to this position, you will be in this position for a while, before we will start the experiment." During this waiting period, participants were asked if they would mind answering a few questions for a supposedly unrelated study for another researcher. (All participants agreed to do so).

The key aspect of the posture manipulation actually occurred at this point. To read the questionnaires (positioned just a few feet away from the participant on an easel), participants either had to hold their head high (as questions were pinned to the top of the easel) or hold their head in a hangdog position (as questions were pinned to the bottom of the easel). The questions first involved word completions and then attitude items. The word completion task had two versions: it either increased the salience of honor through items such as r_spect, ins_lt, or d_fend), or it did not do so because all word fragments were neutral in content. The subsequent attitude questions included a number of filler items, and embedded among them were eight key items from an honor scale constructed by Rodriguez et al. (2002). The scale contained items dealing with female chastity (e.g., "I believe that a woman maintains her honor by saving her virginity until she marries"), familial loyalty (e.g., "To maintain my honor, I should be loyal to my family, no matter what the circumstances are"), and social esteem (e.g., "I believe that the honor of a man would be violated if he is humiliated by others"), and comprised the dependent measure of the participant's endorsement of honor-related values.

Four other items of the questionnaire concerned participants' endorsement or rejection of the idea that a person's worth is inherent (vs. must be socially conferred; e.g., "How others treat me is irrelevant to my worth as a person"). These items have shown predictive validity in other research using Anglo participants (Cohen & Leung, in press) and capture one of the core ideas of a Dignity culture.

After the questionnaire, participants were "ready" for the eye test. The easel was moved back to a distance of 5 meters, and participants were asked to read an eye chart. [15] The last

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augment the effects of our main head-high (vs. hangdog) manipulation. Thus, we originally analyzed posture as a 3-level variable (Head-high, board held in back; head-high, board in front; hangdog, board in front). However, the position of the board actually had no effect; we collapsed the posture variable into a 2-level (head-high vs. hangdog posture) variable. (Effects of holding a board in front vs. in back were not significant, all *p*s > .10.)

[15]Only participants who were wearing either glasses or contacts or had no problems with eyesight participated.

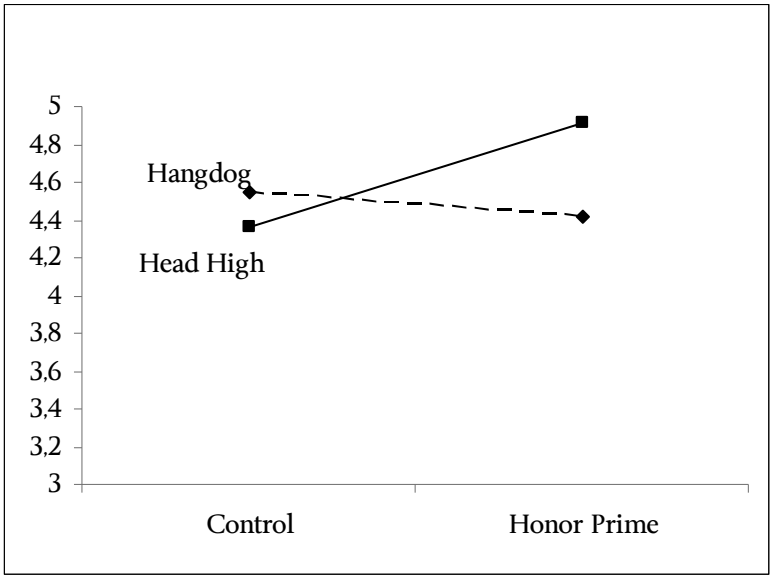

Figure 2. Endorsement of honor-related values among Anglo-Americans as a function of body comportment and whether participants had been primed with the concept of honor.

line, barely readable, was q-k-h-o-n-o-r-z-b, but probably looked more like q-k-HONOR–z-b, if one had been sensitized to honor. The number of letters of "honor" that respondents correctly read from the last line was the dependent measure of participants' sensitization to honor. After completing the eye chart, participants were debriefed.

Results and Discussion

We ran a 2 (Word Prime: honor-related vs. neutral word completion) X 2 (Posture: head high vs. hangdog) X 2 (Sex: male vs. female) Analysis of Variance on the endorsement of honor values. No significant effects of participant's sex or interactions involving participant's sex appeared; so we concentrate below on the predicted, significant Word Prime X Posture interaction, $F(1, 125) = 4.60$, $p = .034$, effect size $f = 0.19$. In the neutral word completion condition, no effect emerged for posture, $t < 1$. However, as seen in Figure 2 above, once honor was made temporarily salient through honor-related Word Primes, the effect of posture emerged; Anglos in the head-high position ($M = 4.91$, $SD = 0.84$) endorsed honor attitudes more than those in the hangdog position ($M = 4.42$, $SD = 1.24$), $t(68) = 2.13$, $p = .040$, Cohen's $d = .52$.

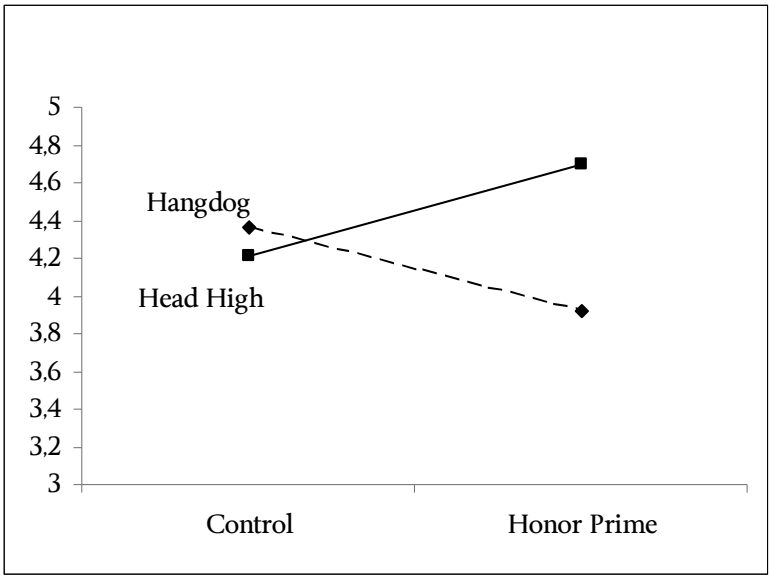

Figure 3. Number of letters of H-O-N-O-R read by Anglo Americans on the "vision test" as a function of body comportment and whether participants had been primed with the concept of honor.

We then analyzed the amount of letters participants read from the eye-chart in a three-way interaction. The same interaction effect between the Word Prime and Posture emerged for how well participants could read "honor" on the eye chart,[16] $F(1, 122) = 5.49$, $p = .021$, effect size $f = .21$ (Figure 3 on the next page). In the neutral word completion condition, no effect of posture appeared (mean letters read = 4.21 vs. 4.36), $t < 1$, thus participants read something like "Ronor" or "Honob," but not honor. However, when participants were primed with honor- related concepts, those holding their heads high ($M = 4.70$, $SD = 0.52$) read more letters than those who were in the hangdog posture ($M = 3.92$, $SD = 1.55$), $t(65) = 2.83$, $p = .004$, Cohen's $d = .70$. Additionally, we analyzed participants' responses to the questions about an individual's inalienable worth. We used this endorsement of ideals of inalienable human worth as an individual differences variable (no effects of condition on the endorsement of inalienable worth appeared). Given that we used a continuous variable as predictor, we analyzed our results in a multiple regression analysis. In a regression with Posture and Prime as independent variables, we found that participants' endorsement of ideals of inalienable worth interacted with our posture manipulation, $t(129) = 2.02$, $p < .05$, $B = 0.17$, $sr = .17$. That is, the head-high versus hangdog posture produced very different

[16]From three participants the data regarding our sensitization to honor was not recorded.

effects on those who endorsed the idea of inalienable worth (part of the ethic of a Dignity culture) versus those who rejected this idea. The heads-up posture made the former relatively more likely to reject notions of honor and the latter relatively more likely to endorse notions of honor. Interestingly, there was no three-way interaction between endorsement/rejection of inalienable worth, Posture and Word Prime, as shown in Figures 4a and 4b on the next page. As seen in Figure 4a, without an honor prime, participants who highly endorsed the idea of internal worth showed greater rejection of honor attitudes when they had their heads high versus heads low (simple slope for posture $t[125] = 1.72$, $p = .09$, $B = 0.45$, $sr = .15$), whereas there was no effect in this direction among those who did not endorse the notion of internal worth (simple slope for posture $t < 1$). As seen in Figure 4b, when honor concerns were primed, the effect of posture mostly flattened among those who believed in inalienable worth (simple slope for posture, $t < 1$), whereas posture effects strongly emerged among those not believing in inalienable worth ($t[125] = -2.05$, $p = .04$, $B = -0.56$, $sr = -.17$).[17] No similar endorsement/rejection of inalienable worth X Posture effect emerged for seeing "honor" on the eye chart ($p > .45$).

Summary

Anglo Americans were overall unaffected by posture. However, after an honor prime, the chin-up posture produced greater endorsement of honor attitudes (as measured by the questionnaire items) and greater sensitization to honor (as measured by the eye test), as compared to the head-down posture.

These effects were shown particularly by those who endorsed the idea that a person's worth must be socially conferred (rather than being inalienable). Those who felt that worth must be socially conferred were the only people for whom the chin-up posture led to the endorsement of honor-related values, with the effect sizeable enough to be significant only when participants had been first primed with honor-related words. In contrast, among those who endorsed inalienable worth and were *not* primed with honor-related words, there was a tendency for the chin-up posture to be associated with the *rejection* of honor-related attitudes. Thus, among Anglo Americans, the chin-up posture can lead to the

[17]Because our inalienable worth measure was a continuous variable, we used regression, creating predicted means by centering its value at +/- 2 SDs from the mean and centering the Word Prime variable at its appropriate values. If one instead performs a median split on the inalienable worth measure, results are similar to those above.

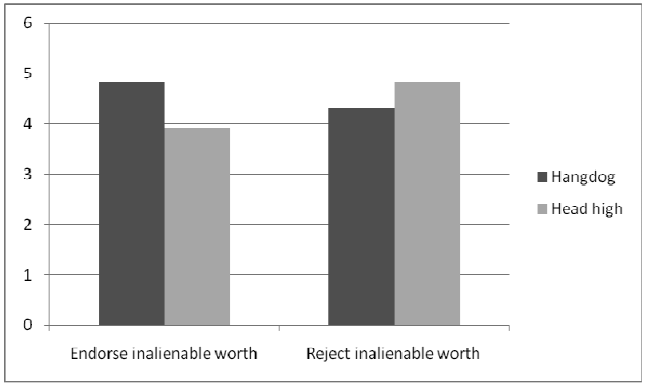

Figure 4a. Endorsement of honor-related values among unprimed Anglo American participants as a function of body comportment and endorsement or rejection of the idea of inalienable personal worth. (Predicted values computed with endorsement / rejection being + / - 2 SDs from the mean).

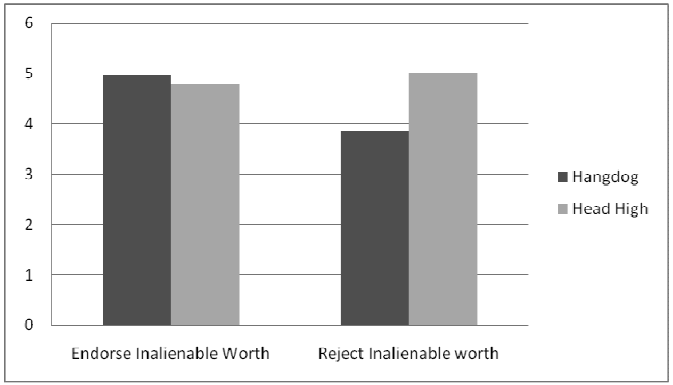

Figure 4b. Endorsement of honor-related values among honor-primed Anglo American participants as a function of body comportment and endorsement or rejection of the idea of inalienable personal worth. (Predicted values computed with endorsement / rejection being + / - 2 SDs from the mean).

endorsement of honor attitudes, but one must first have honor made temporarily salient (through the use of a word prime) and be susceptible to such priming by not holding to the belief that personal worth is inalienable.

Experiment 2

Experiment 2 examined embodiment effects with participants from an honor culture. Predictions about embodiment effects for this population were different in two ways. First, because honor among Latinos is a salient cultural syndrome, we expected that conceptual word priming is not necessary for triggering embodiment effects. The body comportment by itself should be sufficient to produce effects on honor-related attitudes and sensitization. Second, we expected that the embodiment of honor would be gendered, such that males would embody honor effects in a different way than females. Chin-up (vs. head down) should embody upholding (vs. failing to uphold) norms of honor for men. However, for women, this effect should not be found. Instead, to the extent that the head-down posture might be an appropriate embodiment of honor norms for women -- reflecting an attitude of modesty, deference, or even Marianismo (the feminine values exemplified by the Virgin Mary that are often seen as counterpart to, or the superior of, male values of machismo; Stevens, 1973) – one might even observe a reversal among women.

Method

Participants and Procedure

Participants were 57 Latino Americans (M_{age} = 19.58, SD_{age} = 1.82; 57,1% female) at the University of Illinois - with the same procedure as in Experiment 1. Thirty-seven were in the head high position, twenty in the hangdog position. Consistent with our first experiment, we analyzed our results by collapsing over shoulder condition.

Results

We initially analyzed the endorsement of honor in a 2 (Posture: head-high vs. hangdog) X 2 (Sex: male vs. female) X 2 (Word Prime: honor vs. control) analysis of variance. No relevant significant effects appeared for the priming words, so we focus on the other results below. As seen in Figure 5 on the next page, for endorsement of honor attitudes, a main effect of Posture emerged, $F(1, 53) = 7.29$, $p = .009$, Cohen's $d = 0.77$), subsequently qualified by a Sex X Posture interaction, $F(1, 53) = 9.32$, $p = .004$, effect size $f = 0.44$. Latino men in the chin-up position ($M = 5.07$, $SD = 0.80$) endorsed honor to a far greater extent than those in the head-down position ($M = 3.45$, $SD = 0.96$), $t(49) = 3.95$, Cohen's $d = 1.58$, whereas for women,

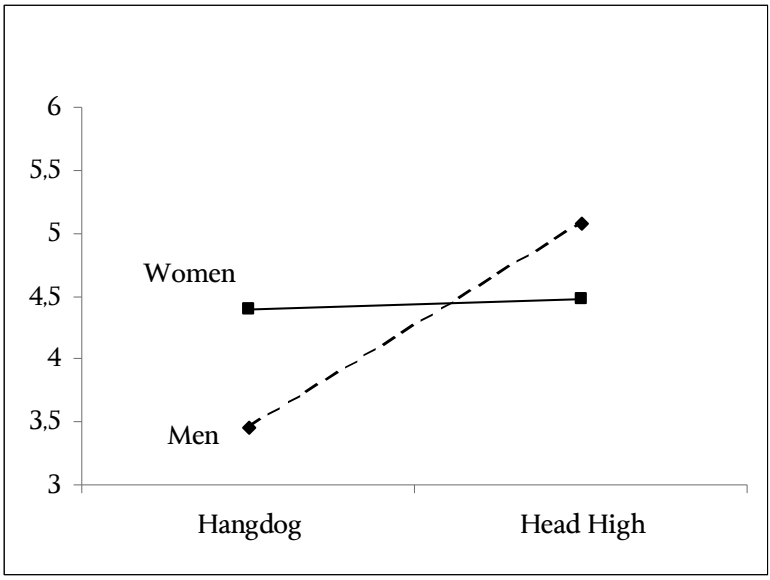

Figure 5. Endorsement of honor-related values among Latino Americans as a function of body comportment and gender of the participant.

posture did not have this effect, $t < 1$. In terms of reading the eye chart, the Sex X Posture pattern again emerged, F (1, 53) = 4.93, $p < .03$, effect size $f = 0.32$. Posture had very different effects on men and women: that is, men were relatively more likely to see "H-O-N-O-R" in the head-high ($M = 4.56$, $SD = 0.70$) versus hangdog position ($M = 3.86$, $SD = 1.21$), $t(53) = 1.67$, $p = .10$, $d = .70$, whereas women were relatively more likely to see "H-O-N-O-R" in the hangdog ($M = 4.11$, $SD = 1.15$) versus head-high position ($M = 4.54$, $SD = 0.66$), although the trend was not significant, $t = -1.26$, $p = .21$, Cohen's $d = -0.46$ (see Figure 6 on the next page).

The honor word prime was unnecessary for producing either the effect on the attitude items or the effect on the vision test (all ps > .12, except for the main effect on honor-related attitudes, such that honor-related word completion led to less endorsement of honor-related attitudes, $p = .03$). The posture alone was enough to make Latino participants feel honor's dictates.

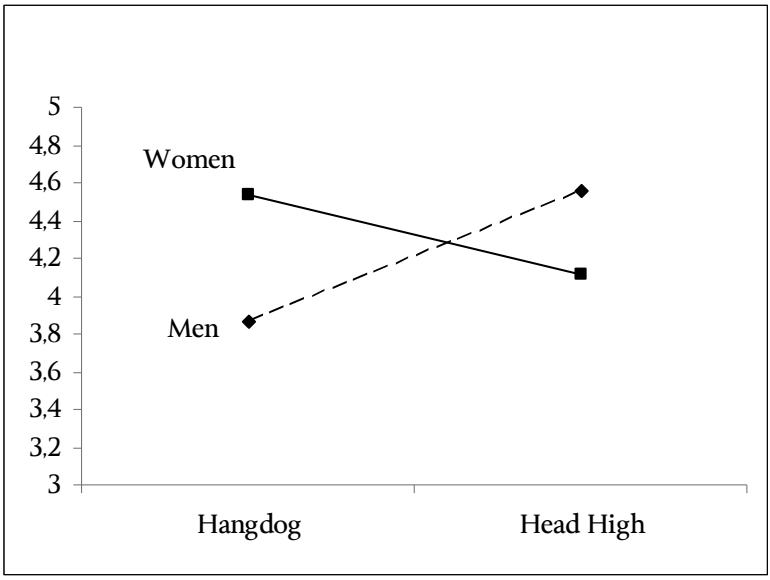

Figure 6. Number of letters of H-O-N-O-R read by Latino Americans on the "vision test" as a function of body comportment and gender of the participant.

Finally, Latino participants' endorsement of inalienable worth was neither effected by posture, nor did it moderate the effects of posture (all *p*s ns). Thus, for Latino participants, unlike for Anglo-American participants in Experiment 1, the posture by itself was sufficient for triggering an honor mindset – conceptual priming was not needed and the effect was not moderated by an individual's beliefs about inherent human worth.

Experiment 3

In Experiments 1 and 2, we explored the causal link from body posture to honor attitudes and salience. In Experiment 3, we reversed the causal direction through a different field experiment. We examined whether endorsement or rejection of honor norms affects how people subsequently comport their bodies – whether it causes people to swell or shrink in the way they carry themselves.

We now examined two different populations – native Dutch participants in the Netherlands, for whom the salient norm is one of Dignity, and Arab/Turkish participants in the Netherlands, for whom Honor is also a salient norm in some circumstances. We expected that Arab/Turkish men would be more likely to swell when embracing norms of honor. However, we expected native Dutch men to swell when *rejecting* norms of honor, because

rejecting the need for violent retribution implies that one has a sturdy sense of dignity, whereas violently "overreacting" in response to insults and affronts would belie this sense. "Sticks and stones may break my bones, but names will never hurt me" is an Anglo American expression capturing this idea; "Schelden doet geen pijn" (literally, "swearing does not hurt") is the Dutch expression capturing it.

Stated conversely, the prediction is that Arab/Turkish participants should be relatively more likely to shrink after not endorsing honor attitudes; native Dutch should be relatively more likely to shrink after not rejecting such attitudes. Again, we expected a gendered effect among the Honor culture participants with these effects shown by men and not shown among the women.

Method

Participants

Sixty-six participants completed the honor survey and 43 completed the control survey (M_{age} = 22, SD_{age} = 4.68, 57 females).

Procedure

A pair of observers went to two train stations in Amsterdam, one with a high concentration of Arab/Turkish clientele and the other with a high concentration of native Dutch clientele[18]. Every 3rd person was approached to fill out a brief questionnaire. One form of the questionnaire contained questions about the participant's attitude toward honor-related violence. The word honor was never used; instead, the six questions asked whether a man named Fred would be justified in using violence if, for example, a person looked over Fred's wife in a suggestive way or called Fred a chicken in front of his friends at the bar, et cetera (Cronbach's α = .77, see also Appendix A). In the second (control) form of the questionnaire, participants were simply asked to rate liking for various Microsoft Word Figures. Which version of the questionnaire a participant received was a randomly assigned, between-

[18]The last item on the questionnaires asked about language(s) the participant spoke. This was used to confirm the participant's ethnic background. In 29 cases, there was ambiguity because participants left the language question blank or filled out the number of languages they spoke rather than listing them. If these 29 cases are included and classified by the observers' guesses about participant ethnicity, results remain quite similar (three-way interaction p = .007). In nine cases there was some conflict between the language variable and observers' guesses. These cases were dropped. Additionally, of the 156 people approached, four declined to participate or only partially completed the survey, two could not speak Dutch and three became lost in the crowd and could not be observed.

participants variable. Observers were instructed to survey respondents who looked between 18 to 40 years old.

Participants were observed on posture for approximately 30 to 60 seconds before they were approached and for 30 to 60 seconds after they completed the questionnaire and went on their way. Three aspects of posture were rated, each on a 5-point scale: head (down to up), shoulders (rolled forward to straight up), and back (slouching to straight back). Observers' ratings were averaged into a scale (α_{before} = .73 & α_{after} = .71). Observers were blind to the hypotheses and to the questionnaire participants received. After filling out the questionnaire, participants put the questionnaire folded into a bag that observers carried. Each observer pair was comprised of a male and a female; each pair had one observer of native Dutch ancestry and one of Middle Eastern ancestry (Turkish or Arab. Examining Turkish and Arab in one condition relative to Dutch natives compares honor versus nonhonor cultures; Schneider, 1971). Aggregate ratings was significantly correlated across teams of raters $p < .05$.

Results

We used a regression analysis with posture score observed after participants had filled out the questionnaire as the dependent variable. In the analyses below, we controlled for posture score observed before participants filled out the questionnaire (though results are similar if one does not control for this variable[19]). Variables were standardized before creating interaction terms. Furthermore, we split the sample, as the postures had different meanings for Arab/Turkish Dutch males versus native Dutch males.

The predicted Sex X Culture X Honor-violence endorsement was significant, $t(54) = -2.67$, $p = .01$, $B = -0.16$, $sr = -.27$.[20] This interaction was characterized by a significant two-way interaction among the men of Culture X Honor-violence endorsement, $t(54) = 3.92$, $p < .001$, $B = 0.27$, $sr = .39$. As predicted, native Dutch males were more likely to walk in an expansive posture after rejecting honor-related violence, $t(54) = -3.04$, $p = .004$, $B = -0.32$, $sr = -.31$, whereas Middle Eastern males were more likely to walk in an expansive posture after

[19]Without controlling for posture before the questionnaire, the predicted 3-way interaction was significant at $t(54) = -2.23$, $p = .03$.

[20]These analyses exclude one Dutch male whose studentized deleted residual score was over 3 SDs from the mean. If the outlier is included, all interactions and simple slopes reported in the text remain significant, all ps < .04.

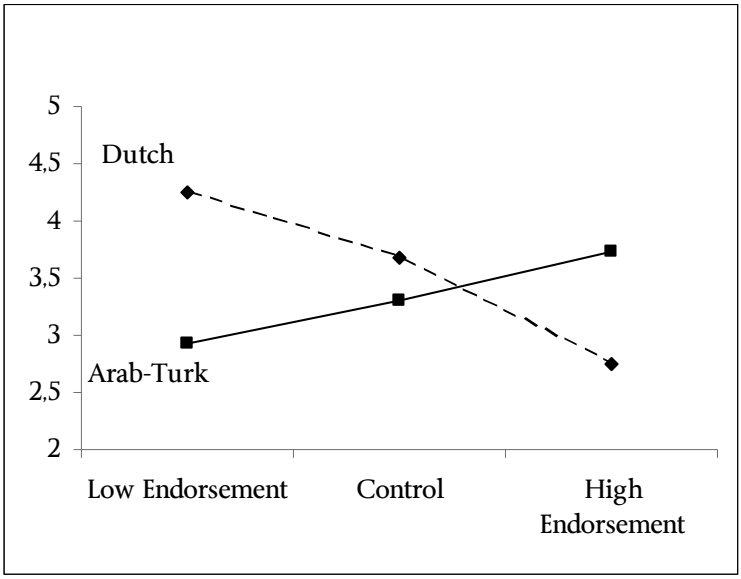

Figure 7. Posture of native Dutch and Arab/Turkish men after endorsing honor-related violence, rejecting honor-related violence, or (in the control condition) not answering any questions related to honor or violence. Higher numbers indicate more head-up, straight-back, straight-shouldered posture. (Predicted values computed with endorsement / rejection being + / - 2 SDs from the mean).

endorsing honor-related violence, $t(54) = 2.55$, $p = .01$, $B = 0.23$, $sr = .26$). This interaction effect was absent for female participants, $t < 1$.[21]

As seen in Figure 7 above, one can also plot posture scores of those given the control questionnaire, who had no chance to accept or reject honor. Doing so supports the notion that native Dutch tended to expand after rejecting honor-related violence and shrink after not rejecting such violence. The reverse occurred for Middle Eastern men, who tended to become more expansive after endorsing honor-related violence and to shrink after not endorsing such violence.

General Discussion

The experiments above demonstrated how cultural values and bodily comportments are integrated. Holding one's body in a certain way can increase the endorsement of and sensitivity to one's cultural ideals, and the endorsement or rejection of cultural ideals can lead to expansion or shrinkage of one's body comportment. For men from Honor cultures, a

[21]The figures for the two-way interaction and the simple slopes were obtained by centering the sex and ethnicity variables at their appropriate values.

head-high, chin-up, straight-back posture is associated with greater endorsement of female chastity, familial loyalty, and concern with reputation (Experiment 2), and greater endorsement of honor-related violence (Experiment 3).

For those from a Dignity culture, a head-high, chin-up straight-back posture is associated with greater rejection of honor-related violence (Experiment 3). Using subtle word primes related to Honor can temporarily make Anglo Americans look like their counterparts from a culture of Honor in terms of embodiment effects. However, without such primes, these embodiment effects did not occur -- and even reversed among those Anglos who were buffered by a strong sense that human worth is inalienable. Among Anglos with a strong belief in inalienable worth, a heads-up posture was associated with a tendency to *reject* honor values (Experiment 1).

The Nature of Asking and Priming

Results converged across two different sets of Dignity and Honor culture populations in showing bi-directional connections between the body and cultural values. There are still some important questions, however. Word priming put Anglo Americans in the honor mindset and prompted some to show embodiment effects similar to their Honor culture counterparts. But why did the honor questions in Experiment 3 also not prime honor? There are two possible answers to this. First, primes can backfire when they are too blatant, because people can correct for them (cf. work on stereotypes by Macrea, Bodenhausen, Milne, & Jetten, 1994). Second, the questions function differently than traditional primes in that participants are free to accept or reject their content (cf. Maio, Pakizeh, Cheung, & Rees, 2009). Whereas word primes in a sentence completion task can sneak “under the radar” and prompt little correction, the attitude items were a) blatant and b) triggered rejection of honor-related violence as much as they triggered acceptance of such violence. Thus, the questions used, in and of themselves, seemed to not prime honor-related values, because such “neutrally” worded *questions* easily allowed acceptance or rejection by participants, according to their own values.

The Angle of Repose

An important caveat also concerns the posture itself. We have argued that, in general, being a man of honor (in an Honor culture) or a person of dignity (in a Dignity culture) is associated with a head-high, straight-back posture. However, context matters. In certain situations for Anglo Americans, dignity is shown less by upright stiffness than by a more relaxed posture or

comportment that shows that one is at home in one's skin. The same is true for people in an honor culture, who can communicate ease through a laconic posture, implying they do not *need* to adopt a stance of bravado. Moreover, particularly for groups that find themselves in an oppositional position with respect to mainstream society, a posture of honor or dignity may be one of defiance. Sometimes this defiance is shown by an upright, head-held-high, "Don't-mess-with-me" posture and sometimes it is shown by a slouch or other postures that display a certain "upward contempt." Such upward contempt is shown when a "subordinate person attempts to assert that he or she is not really powerless or inferior" (Ekman, 2004, p. 188). Sometimes such contempt demands a stiff-necked posture, steely eye gaze, or clench-fisted resolve. Sometimes such contempt entails rejection of propriety, aversion to engagement, and refusal to comply with norms of comportment expected in a given situation. Sometimes it entails both (witness the iconic images of the 1968 African American Olympians who both hung their heads and raised their fists in a Black Power salute).

However, to say that context matters and that different comportments can mean different things in different situations is *not* to say that connections between bodily comportment and certain frames of minds are arbitrary. We do believe that some embodiments are pre-wired in the sense that humans are evolutionarily prepared to associate certain bodily actions and comportments with certain basic affective and cognitive reactions. Such pre-wired embodiments, for example, include the integration of postures and psychological states of dominance or submission, affinity or affection, and so on (Cohen & Leung, 2009; A. P. Fiske, 2004; IJzerman & Semin, 2009; IJzerman & Semin, 2010).

The problem for a simplistic view of embodiment is that predispositions are *not* determinants, and connections between given bodily comportments and certain affective or cognitive states are underspecified. James (1884), for example, noted that running and fear are associated – but so are running and excitement, running and pursuit, and running and simply getting exercise. Additionally, it is often cultural schemas, practices, rules, and so on, that a) in a given context, help people associate a certain bodily comportment with certain basic affective and cognitive responses and b) help elaborate those basic affective and cognitive responses into more complex representations, ideas, and values. In the present case, culture helps guide the connection between bodily comportment and some sense of "doing right;" it does so differently for men and for women in honor cultures; and it defines

what “doing right” means by a relatively complex set of values dealing with female chastity, family loyalty, the importance of reputation, and the legitimacy of using force to defend it.

Conclusion

Psychologists typically focus on culture as “in the head.” But what a psychology from the neck up misses is the way our bodies instantiate, express, and transmit certain ways of being in the world. The experiments above demonstrate the role of culture in integrating the body and a relatively complex, abstract set of values. The emphasis in anthropology on ritual, practice, and what people do with their bodies captures the connection between body and culture in a way that a psychology of the head does not (Bourdieu, 1977).

Further, psychologists who have studied embodiment have typically not paid much attention to cultural issues (for exceptions, see Boroditsky, 2001; Leung & Cohen, 2007; Maass & Russo, 2003); however, understanding what is being embodied often requires understanding the cultural context of the action or posture. What is needed is an integration of what happens in the head, the body, and the social world to understand the way culture, psyche, *and body* make each other up.

Chapter 5:
Closing Chapter

Culture as a Body: Systemic Relationships between Temperature, Language, and Cultural Values

This chapter is based on
IJzerman, H., Semin, G. R., & Gallucci, M. (submitted). Culture as a Body: Systemic Relationships between Temperature, Language, and Cultural Values.

The current chapter is a closing chapter, which integrates findings from previous chapters on grounded cognition to suggest an alternative way to examine an existing data-set from cultural psychology. This reanalysis is designed to reevaluate Kashima and Kashima's (1998, 2003) findings, and highlight the significance of taking systemic relations between environment, language, and cultural values seriously. To this end, we begin by discussing Kashima and Kashima's analyses (1998, 2003) regarding the interdependence between language (in particular personal pronouns) and cultural value structures. Following will be a discussion on recent research on grounded cognition, relating language to environmental influences. Finally, we will show language to be a mediating factor of the effect of temperature on cultural values.

Kashima and Kashima (1998, 2003) suggested the importance of symbolic representations of culture for people's values by showing correlations between personal pronoun use and cultural value structures. They analyzed national data and showed that the possibility of licensing subject pronoun drop (DROP) in a language is correlated with more individualistic value structures. The measurement of individualistic and collectivistic value structures is one of the most prominent distinctions in cultural psychology. Generally, in cultures with individualistic tendencies relationships are not as much stressed as in collectivistic cultures; the latter as a rule are based on more traditional socioeconomic communities and thus are more close-knit (cf. Kashima & Kashima, 2003). By showing a correlation between DROP and cultural dimensions, Kashima and Kashima (1998) supported prior hypotheses that language shapes people's higher order cognitive processes (e.g., Gumperz & Levinson, 1991; Hardin & Banaji, 1993). Kashima and Kashima (1998) suggested that these value structures are rooted and manifested in systematic uses of language: personal pronouns, they point out, drive attention to specific elements of the social context. More specifically, a language that allows personal pronouns to be omitted from utterances in different situations may drive the attention of the speaker to different social cues than a language that does not allow this omission. Portuguese, for example, allows for dropping a pronoun (e.g., *Eu falo*, potentially meaning the same as *Falo*), whereas in Dutch the use of subject pronouns is obligatory (e.g., *Ik spreek* in Dutch -I talk-*,* which never means *Spreek (Talk)*). By revealing a systematic relationship between cultural orientations (from individual centered to relationship centered ones) and systematic differences in the presence or absence of pronoun drop (DROP) Kashima and Kashima (1998, 2003) appear to support Sapir (1970) and Whorf's (1956) hypothesis that habitual usages of different types of words are related to the way people

look at their world. Experimental research that was conducted after Kashima and Kashima's (1998, 2003) cultural analyses confirms such a view; priming participants with different word categories in a laboratory drives their attention to different aspects of reality (see Stapel & Semin, 2007). This converging evidence supports the idea that language is a tool that influences cognition and directs attention to different features of social reality (see also Semin, 1995).

A second element that Kashima and Kashima (2003) have drawn attention to is the importance of the environment. In their more recent work, they suggested that DROP is a *moderating* factor between environmental factors and culture. They found that the effect of temperature on individualistic value structures is reduced in countries whose language does not permit DROP. More specifically, in those countries that permit DROP, temperature has a greater effect on cultural values than those countries that do not.

This latter analysis might miss something important. Findings in the second chapter show that environment and language are not as functionally independent as Kashima and Kashima (2003) might have suggested. Culture and language do not operate in a vacuum; indeed, "culture, psyche, *and body*" make each other up (Cohen, Leung, & IJzerman, 2009). As countries, regions, and professions differ in their physical realities and daily activities, so too do they differ in their actions representations (Maass & Russo, 2003), value structures (Nisbett & Cohen, 1996), and in their dominant cognitive styles (Uskul, Kitayama, & Nisbett, 2008). People's physical realities thus direct the way people structure their world and process their thought (see also Smith & Semin, 2004).

We do not disagree that language influences the cognitive system. However, the way people use language is essentially based on crystallized knowledge of daily experiences of preceding generations (cf. Semin & Fiedler, 1992). Thus, the way people use subject pronouns should depend on the way they have experienced and interpreted different physical conditions. These ideas align with recent developments that assign physical experience a more central role in human functioning. An elaborate line of research supports the idea that physical constraints underlie human thought (see Barsalou, 2008a). Human thought thus maintains a closer tie to action and perception than commonly assumed.

Physical conditions related to human cognitions are interpreted through people's experiences developed from early childhood onwards. Lakoff and Johnson (1999, p. 45 – 60) suggested a primary co-experience between daily physical experiences and abstract representations; people experience warm sensations as they are being held affectionately by their mother. In other words, affection is associated with warmth in one of life's earliest moments. Lakoff and Johnson (1999) suggested that people come to represent affection in concrete experiences; the expression that a friend is a *cold fish* should thus be taken literally, at least in part. This thought inspired researchers to show that warm temperature sensations induce feelings of affection and likeability (Williams & Bargh, 2008), while participants also feel colder when they think of being socially excluded (Zhong & Leonardelli, 2008). My second and third chapters built upon these findings by revealing that warm sensations are not merely associated with affection, but that they ground perceptions of social proximity. The second and third studies in the first chapter revealed that people use a greater amount of concrete predicates in warmer conditions. Concrete predicates are generally associated with greater social proximity (see also Semin, 2007).

The findings on warmth are associated with a long line of research in social psychology, which has argued that warmth and human sociality are central dimensions to human functioning (Asch, 1946; Bowlby, 1969; Caporael, 1997; S. T. Fiske, Cuddy, & Glick, 2007). Indeed, experiences associated with warmth belong to the earliest interactions, as for example bonding and nurturing belong to the most salient interactions between human beings (e.g., Caporael, 1997; A. P. Fiske, 2004). In other words, people come to represent social proximity in terms of temperature. The studies in the first chapter revealed that participants in warmer rooms feel closer, use more verbs, and are more focused on relationships than participants in colder rooms. Physical and thus social warmth have been suggested to be central to human behavior; we suggest here that physical warmth (representing social proximity) should influence and subsequently be expressed in the manner in which people address each other on a day-to-day basis. In line with Kashima and Kashima (2003), we predict that 1) higher temperatures induce lower levels of individualism. In contrast with Kashima and Kashima (2003), we predict that 2) countries with higher average temperatures should have a higher chance to DROP, as increases in temperature induce greater social proximity, which thus extends to usages of language. The critical test then is showing that indeed, 3) language *mediates* the role of temperature in influencing cultural value structures, instead of moderates.

Method

Sample of Countries

Kashima and Kashima's (1998) analysis consisted of 71 countries. They included value measurements on individualism and collectivism, collecting data from multiple authors with different types of measurements. In this chapter, we limited the sample to the 63 countries that served in Hofstede's (1980) cross-cultural sample on value measurements (see also Appendix B), as compared to including countries in Kashima and Kashima's (1998) sample that were assessed by other authors (e.g., Chinese Culture Connection, 1987). This means that we only included values taken from Hofstede's (1980) measurements, in order to keep the analyses consistent. This meant the omission of eight countries from the original list of 71, namely, Bulgaria, China, Czechoslovakia, Hungary, Poland, Romania, and Russia (and inserting East and West Germany as one). Further, As Kashima and Kashima (1998), we treated each country as a "culture," because the country's border often serves as a frontier of a culture.

Variables of Interest

The only cultural value of interest was Hofstede's (1980) individualism. Additionally, we extracted the license for pronoun drop per country from Kashima and Kashima (1998). Pronoun drop (hereinafter DROP) was coded as a dichotomous variable, defining two groups of countries as countries that almost always required a 1PS pronoun in an independent clause (DROP equal to yes) and countries that do not (DROP equal to no). Temperature data were extracted from Canty and Associates LLC (2009), which contains average temperature data for cities in the countries in our sample for (on average) 23.06 years. As capitals often function as cultural centers for countries, we chose their average temperature for our analyses.

Results

The newly created dataset reveals an apparently moderating role of DROP on the relationship between yearly average temperature for each country and the level of individualism. The estimated interaction term of the regression of individualism as dependent variable and DROP and temperature as predictors was significant, $t(59) = 2.51$, $p = .015$, $B = -1.721$. We believe, however, that this significant interaction is a spurious result only due to the effect of two particular countries (Ghana and Nigeria), both representing multivariate outliers and heavy influential points in the distribution of the three variables in the analysis.

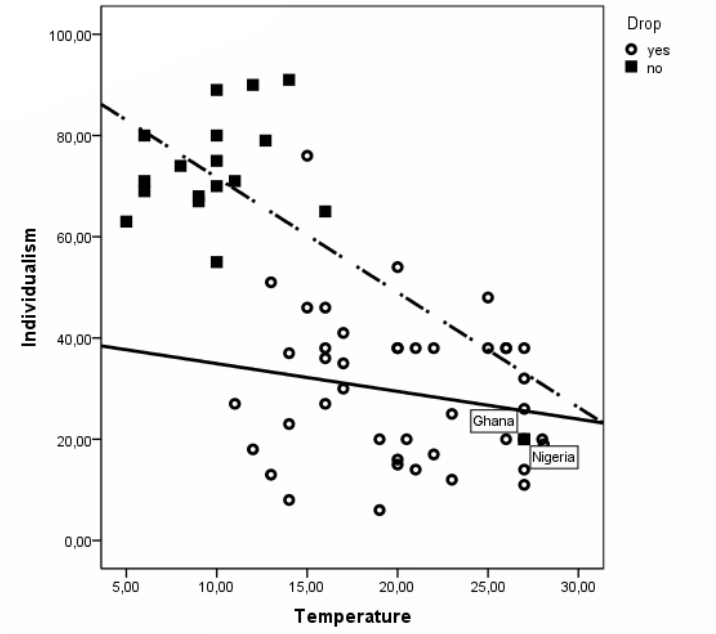

Figure 9. Endorsement of individualistic values as a function of average temperature over 23.06 years in 63 countries.

Several arguments can be brought about in support of this view: Figure 9 above shows the scatter-plot of individualism scores of each country as a function of temperature and DROP, along with the predicted simple slopes (Aiken & West, 1991) resulting from the moderated regression. It is clear that Ghana and Nigeria, belonging to the group of countries that do not drop the pronoun, show an individualism score remarkably different from the rest of the countries in their group, whereas the individualism scores of those two countries are smoothly in line with the expected scores based on the yearly average temperature. To support this statement, we estimated how influential these two countries are on the interaction term and the simple slopes by computing the DFBETAS coefficients (Cohen, Cohen, West, & Aiken, 2003, p. 405.). As expected, removing Ghana and Nigeria resulted in a drastic change in the interaction term corresponding to a DFBETAS = -2.719. This value greater than the reference value of 1 suggests a plausible cutoff identifying influential points (Cohen et al., 2003, p. 405.). Moreover, this change led the interaction term to be not significant, $t(57) = 1.26$, $p = .214$, $B = 1.408$. In other words, without the two influential points represented by Ghana and Nigeria, the interaction term went from negative and significant to positive and nonsignificant. Furthermore, the simple slope of temperature predicting individualism for the group of countries that drop the pronoun also changed from

negative and significant (t[59] = -4.18, p < .001, B =-2.269) to positive and nonsignificant (t[57] = 0.840, p =.405, B = 0.933), corresponding to a DFBETAS of -2.88. That is, when Ghana and Nigeria are excluded from the analyses, temperature does not have an effect on individualism when evaluated within the group with DROP (no other country showed comparable influence on the estimation of the interaction term or on the simple slopes).[22]

The role of DROP as mediator[23]

Based on the available evidence, we believe that the data do not support the role of DROP as a moderator of the relationship between temperature and individualism. Based on the theoretical argument from a grounded cognition perspective, the current thesis is that DROP plays a role as mediator in the relationship between the two variables. Mediation can be established by showing that the temperature has an effect on the mediator DROP, and that DROP has an effect on individualism over and beyond the effect of temperature (Baron & Kenny, 1984). Because of the dichotomous nature of DROP, one can compute the mediating effect of DROP as the difference between the regression coefficient linking temperature and individualism without DROP in the equation (i.e., the overall effect) minus the regression coefficient between temperature and individualism with DROP in the equation (i.e., the direct effect) (cf. Li, Schneider, & Bennett, 2007). The mediation effect so computed can be tested for significance with the Schluchter (2008) approach, which applies to a variety of mediational models, including the type tested here.[24]

When examining the overall effect of temperature on individualism, the analyses revealed a significant effect, t(61) = -7.02, p < .001, B = -2.359. Temperature had a strong effect also on DROP, both if estimated as a simple correlation (r = -.535, p <.001) or with the more appropriate logistic regression, Wald Z = 9.736, p= .001, exp(B) = 0.449. When individualism was regressed on temperature and DROP, DROP showed a strong relation with the dependent variable, t(60) = 5.581, p < .001, B = 28.43. The effect of temperature was

[22]Similar to Kashima and Kashima (2003), one can also appreciate the instability of the moderating effect of DROP by using country latitude as predictor of individualism. In the new dataset composed by 63 countries, no interaction was present between DROP and latitude when predicting individualism, t(59)= -0.528, p = .599, B = -0.124.

[23]The mediational role of DROP does not seem to be related to other socio-economic variables, such as Gross National Income (GNI) or population size of the capital city. GNI was assessed in 1975, similar to Kashima and Kashima (2003). In particular, the mediational model is confirmed also when covariating GNI, (ME = .751, z = 2.14) or population size (ME =1.125, z = 2.50, p = .012).

[24]Results converged with other tests available (Freedman & Schatzkin, 1992; cf. MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

reduced, although it remained significantly different from zero, $t(60) = 3.439$, $p = .001$, $B = -1.189$. Consequently, the effect of temperature on individualism mediated by DROP (ME) was ME = 1.701, which was significantly different from zero ($Z = 2.72$, $p = .006$). Thus, around 50% of the effect of temperature on individualism was accounted for by the intervening effect of DROP.[25]

General Discussion

In this closing chapter, we reexamined Kashima and Kashima's (1998) analysis, which has shown that pronoun drop in different cultures is related to cultural values. We demonstrated here that an analysis of the mediating role of DROP is a more accurate depiction of the relationship between temperature and individualism than an analysis of DROP fitted as a moderating factor. In the current chapter, we suggested that differences in temperature play a significant role in whether cultures license pronoun drop and subsequently determine cultural values. One alternative explanation is that warmer climates induce different types of social behavior due to differences in life style (see also Uskul et al., 2008). We were not able to critically test for this with the current data. The current data combined with the first two empirical chapters do suggest that temperature differences influence human functioning in an important way, as human sociality is often conceptualized through temperature 'representations'.

The data on individualism in the last chapter should be approached with some caution for several reasons. First, it is sometimes difficult to interpret how individually-measured values relate to a general sense of national 'culture'. Second, an important caveat is that what is often seen as national culture (measured by individualism and collectivism) does not necessarily possess a one-to-one relationship with interpersonal dimensions related to social proximity. The ways in which social relations are expressed in interpersonal interactions

[25]To obtain a fair comparison between the proposed mediational model and the moderation model advocated by Kashima and Kashima (2003), we evaluated the mediational analysis also after excluding Nigeria and Ghana. The overall relation of temperature with individualism was confirmed, $t(59) = 6.705$, $p < .001$, $B = -2.365$. Furthermore, the relationship between temperature and pronoun drop was again significant when conducting a simple correlational analysis, $r = -.639$, $p < .001$, as well as a logistic regression, Wald $Z = 11.984$, $p < .001$, $\exp(B) = .644$,. When individualism was regressed on temperature and DROP, DROP again showed a strong relation with the dependent variable, $t(58) = 7.374$, $p < .001$, $B = 40.59$. In this case, however, the effect of temperature was no longer significant, $t(58) = -1.039$, $p = .303$, $B = -.385$. The mediating effect was even stronger than in the previous analysis, $Z = 5.61$, $p < .001$, ME = 1.97, representing 83% of the overall effect. In other words, by excluding Ghana and Nigeria, the mediational model is confirmed and fits the data even better than in the entire sample.

differ from countries which are very similar in terms of cultural values. Elements of consubstantial assimilation (actions emphasizing people's common essence, such as feelings of warmth and acts of touch; see A. P. Fiske, 2004) are likely to differ between Asians and Latin Americans (in particular for touch), who share a great deal of similarity in terms of cultural values (Hofstede, 1980).

Final Comments

Finally, in the introductory chapter I referred to the different levels of meaning associated with understanding social relations. Ideas on metaphorical structuring might focus on the presence (e.g., Indo-European languages) or absence (e.g., Uralic languages) of the warmth-coldness of different temperature metaphors in different language families. In Chapter 4 I discussed how different cultures embody cultural syndromes differently. Culture thus plays an important role in the interaction between environment and people. One could hypothesize that in, for example, Uralic languages, temperature historically plays a greater role in issues related to survival (i.e. cold climates in Finland) than social structures. It is thus possible that in cultures that lack such metaphors people have started to use other proxies like synchrony to sense 'communalness'. The extend to which these proxies are used remains an empirical question. How would Finnish people for example differ with Dutch people in terms of synchronous movement as compared to physical warmth to sense social relations? It is further possible that countries with different average temperatures have a preference for different metaphors related to temperature. In other word, the context matters when using referential metaphors. For example, warmer climates have also been related to higher levels of aggression (cf. Anderson, Deuser, & DeNeve, 1995). How heat-aggression and warmth-social proximity are interrelated is also important in future investigations.

In closing, I would like to point out the importance of the physical environment and its interplay with culture, language, and cognition. While in the current chapter we showed a relatively simple relationship between temperature, language, and cultural values, the dynamics are of course much more complex. It is thus essential to research how such cultural values persist as a function of interaction within populations, in relation to the environment and language (cf. Richerson & Boyd, 2005). In such a dynamic system, one can also examine how the function of language would differ, as it often serves as a tool for communicating the values we discussed. More specifically, dropping a pronoun in one

context might point to more contextualized (less referential) descriptions, whereas in other languages it might point to a greater amount of relations between people (for a similar idea on language, see Gentner 1978). This approach requires a more detailed look at how physical warmth might influence language and culture in different contexts.

In the last chapter, we have examined the role of physical warmth with relatively little context. However, important questions remain. How does warmth influence thinking relationally or referentially? When does warmth induce one to thinking about relationships versus aggression, or simply drinking a cold glass of beer? What kind of biological processes are responsible for each of these different environmental stimuli? One can probably induce all three outcomes quite easily through simply heating the room. But, as I indicated in Chapter 4, it is context that matters. But not just any context – context associated with the different meaning accounts suggested in Chapter 1. When does which model become activated? And at what level does action become represented in the Referential Meaning account?

Regardless of named questions, I suggest here that temperature, because of its relevance in representing social proximity and thus because of its central role in cognizing about human sociality, takes a great importance in developing language and cultural norms. The architecture of the body through its interaction with its social and physical environment is the fundamental source for creating knowledge and therefore contributes to the shape of knowledge in general. However, examining rite, ritual, and temporal and spatial dynamics in pursuit of a radically embedded, embodied cultural psychology seems a fruitful departure point to examine how emergent meaning arises from the dynamical, organizing principles between body, psyche, and culture (q.v. Cohen et al. 2009; Marsh et al., 2009).

References

References

Abel, T. M., & Hsu, F. L. K. (1949). Some aspects of personality of Chinese as revealed by the Rorschach test. *Rorschach Research Exchange Journal and Journal of Projective Technique, 13,* 285 – 301.

Aiken, L. S., & Stephen, G. West (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.

Ainsworth, M. D., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment.* Hillsdale, NJ: Erlbaum.

Agnew, C. R., & Etcheverry, P. E. (2004). Cognitive interdependence: Considering self-in-relationship. In K. D. Vohs & E. J. Finkel (Eds.), *Self and relationships* (pp. 274 – 293). New York: Guilford Press.

Agnew, C. R., Van Lange, P. A. M., Rusbult, C. E., & Langston, C. A. (1998). Cognitive interdependence: Commitment and the mental representation of close relationships. *Journal of Personality and Social Psychology, 74,* 939 – 954.

Anderson, C. A., Deuser, W. E., & DeNeve, K. M. (1995). Hot temperatures, hostile affect, hostile cognition, and arousal: Tests of a general model of affective aggression. *Personality and Social Psychology Bulletin, 21,* 434 – 448.

Anderson, M. L. (in press). Neural re-use as a fundamental organizational principle of the brain. Accepted for publication in *Behavioral and Brain Sciences.*

Argyle, M., & Dean, J. (1965). Eye-contact, distance, and affiliation. *Sociometry, 28,* 289 – 304.

Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of other in the self scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology, 63*, 596 – 612.

Aron, A., Aron, E. N., Tudor, M., & Nelson, G. (1991). Close relationships as including other in the self. *Journal of Personality and Social Psychology, 60,* 241 – 253.

Asch, S. E. (1946). Forming impressions of personality. *Journal of Abnormal and Social Psychology, 41,* 258 – 290.

Ayers, E. (1984). *Vengeance and justice*. New York: Oxford University Press.

Bargh, J. A., & Chartrand, T. L. (2000). The mind in the middle: A practical guide to priming and automaticity research. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 253 – 285). New York: Cambridge University Press.

Baron, R., & Kenny, D. A. (1986). The moderator-mediator distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173 – 1182.

Barsalou, L. W. (1999). Perceptual symbol systems. *Behavioral and Brain Sciences, 22,* 577 - 609.

Barsalou, L. W. (2008a). Grounded cognition. *Annual Review of Psychology, 59,* 617 – 645.

Barsalou, L. W. (2008b). Cognitive and neural contributions to understanding the conceptual system. *Current Directions in Psychological Science, 17,* 91 – 95.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117,* 497 – 529.

Beck, L. R., Flowers, C. E., & Blair, W. D. (1979). The effect of oxytocin on fetal scalp temperature. *Obstetrics and Gynaecology, 53,* 200 – 202.

Beukeboom, C. J., & Semin, G. R. (2006). How mood turns on language. *Journal of Experimental Social Psychology, 42,* 553 – 566.

Birnbaum, M. H. (2004). Methodological and ethical issues in conducting social psychology research via the Internet. In C. Sansone, C. C. Morf, & A. T. Panter (Eds.), *The Sage handbook of methods in social psychology.* London: Sage Publications.

Blake, W., Erdman, D. V., & Bloom, H. (1965). *The Complete Poetry and Prose of William Blake.* New York: Random House.

Boroditsky, L. (2001). Does language shape thought?: Mandarin and English speakers conceptions of time. *Cognitive Psychology, 43,* 1 – 22.

Boroditsky, L., & Prinz, J. (2008). What thoughts are made of. In G. R. Semin & E. R. Smith (Eds.), *Embodied grounding: Social, cognitive, affective, and neuroscientific approaches* (pp. 98 – 115). Cambridge University Press, UK.

Boroditsky, L., & Ramscar, M. (2002). The role of body and mind in abstract thought. *Psychological Science, 13,* 185 – 188.

Bourdieu, P. (1977). *Outline of a Theory of Practice*. Cambridge University Press, UK.

Bowlby, J. (1969). *Attachment and Loss.* London: Hogarth Press.

Cacioppo, J. T., Priester, J. R., & Berntson, G. G. (1993). Rudimentary determinants of attitudes. II: Arm flexion and extension have differential effects on attitudes. *Journal of Personality and Social Psychology, 65,* 5 – 17.

Canty and Associates LLC (2009). *Online Weatherbase*, retrieved March 2009 from http://www.weatherbase.com.

Caporael, L. R. (1997). The evolution of truly social cognition: The core configurations model. *Personality and Social Psychology Review, 4,* 276 – 298.

Caporael, L. R. (2007). Evolutionary theory for social and cultural psychology. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social Psychology: Handbook of basic principles* (2nd edn, pp. 3 – 18). New York, NY: Guilford Press.

Casasanto, D., & Boroditsky, L. (2008). Time in the mind: Using space to think about time. *Cognition, 106,* 579 - 593.

Chandler, J. & Schwarz, N., (2009). How extending your middle finger affects your perception of others: Learned movements influences concept accessibility. *Journal of Experimental Social Psychology, 45,* 123 – 128.

Coenen, L. H. M., Hedebouw, L., & Semin, G. R. (2006). *Measuring linguistic abstraction: The Linguistic Category Model (LCM).* Retrieved from http://www.cratylus.org/Text/1111548454250-3815/pC/1111473983125-6408/uploadedFiles/1151434261594-8567.pdf.

Cohen, D. (2003). The American national conversation about (everything but) shame. *Social Research, 70*, 1075 – 1108.

Cohen, D., & Leung, A. K.-y. (2009). The hard embodiment of culture. *European Journal of Social Psychology, 39,* 1278 – 1289.

Cohen, D., & Leung, A. K.-y. (in press). A CuPS (Culture X Person X Situation) perspective on violence and character. To appear in M. Mikulincer & P. Shaver (Eds.), *Understanding and reducing aggression, violence, and their consequences.* Washington: APA.

Cohen, D., Leung, A. K.-y., & IJzerman, H. (2009). Culture, psyche, and body make each other up. *European Journal of Social Psychology, 39,* 1298 – 1299.

Cohen, J., Cohen., P. West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences.* Mahwah, NJ: Lawrence Erlbaum Associates.

Cross, S. E., & Morris, M. L. (2003). Getting to know you: The relational self-construal, relational cognition, and well-being. *Personality and Social Psychology Bulletin, 29,* 512 – 523.

Cross, S. E., Gore, J. S., & Morris, M. L. (2002). The relational-interdependent self-construal, self-concept consistency, and well-being. *Journal of Personality and Social Psychology, 85,* 933 – 944.

Damasio, A. (1999). *The feeling of what happens: Body and emotion in the making of consciousness.* Fort Washington, PA: Harvest Books.

Daum, M. M., Prinz, W., & Aschersleben, G. (2008). Encoding the goal of an object-directed but uncompleted reaching action in 6- and 9-month-old infants. *Developmental Science, 11*, 607 – 619.

Daum, M. M., Sommerville, J., & Prinz, W. (2009). Becoming a social agent: Developmental foundations of an embodied social psychology. *European Journal of Social Psychology, 39*, 1196 – 1206.

Decety, J., & Grèzes, J. (2006). The power of simulation: Imagining one's own and other's behavior. *Brain Research, 1079,* 4 – 14.

Decety, J., Grezes, J., Costes, N., Perani, D., Jeannerod, M., Procyk, E., et al. (1997). Brain activity during observation of actions. Influence of action content and subject's strategy. *Brain, 120*, 1763 – 77.

Diamond, J. (1997). *Guns, Germs, and Steel: The Fates of Human Societies.* New York: W. W. Norton & Company.

Ekman, P. (2004). *Emotions Revealed*. New York: Macmillan.

Finkel, E. J., & Campbell, W. K. (2001). Self-control and accommodation in close relationships: An interdependence analysis. *Journal of Personality and Social Psychology, 81,* 263 – 277.

Fiske, A. P. (1992). The four elementary forms of sociality: Framework for a unified theory of social relations. *Psychological Review*, *99,* 689 – 723.

Fiske, A. P. (2002). Socio-moral emotions motivate action to sustain relationships. *Self and Identity, 1,* 169 – 175.

Fiske, A. P. (2004a). Four modes of constituting relationships: Consubstantial assimilation; Space, magnitude, time, and force; Concrete Procedures; Abstract Symbolism. In N. Haslam (Ed.). *Relational models theory: A contemporary overview* (pp. 61 – 146). London: Lawrence Erlbaum Publishers.

Fiske, A. P. (2004b). Relational models theory 2.0. In N. Haslam (Ed.). *Relational models theory: A contemporary overview* (pp. 3 – 25). London: Lawrence Erlbaum Publishers.

Fiske, A. P. (2010). Foundations of social relations: Endogenous relational psychology and cultural transmission. *Unpulished Manuscript, University of California at Los Angeles.*

Fiske, S. T., Cuddy, A. J. C., & Glick, P. (2007). Universal dimensions of social cognition: Warmth and competence. *Trends in Cognitive Science, 11,* 77 – 83.

Fodor, J. A. (1975). *The modularity of mind.* Cambridge, MA: MIT Press.

Fodor, J. A. (1985). Précis of the modularity of mind. *Behavioral and Brain Sciences*, *8*, 1 – 42.

Fransson, A. L., Karlsson, H., & Nilsson, K. (2005). Temperature variation in newborn babies: Importance of physical contact with the mother. *Archives of Disease in Childhood – Fetal Neonatal, 90,* 500 – 504.

Freedman, L. S., & Schatzkin, A. (1992). Sample size for studying intermediate endpoints within intervention trials or observational studies. *American Journal of Epidemiology*, *136*, 1148 – 1159.

Gallese, V., & Lakoff, G. (2005). The brain's concepts: The role of the sensory-motor system in conceptual knowledge. *Cognitive Neuropsychology, 22,* 455 – 479.

Gentner, D. (1978). On relational meaning: The acquisition of verb meaning. *Child Development, 49,* 988 – 998.

Giessner, S. R., & Schubert, T. W. (2007). High in the hierarchy: How vertical location and judgments of leaders' power are interrelated. *Organizational Behavior and Human Decision Processes, 104,* 30 – 44.

Glenberg, A. M. (1997). What memory is for. *Behavioral and Brain Sciences, 20,* 1 – 55.

Glenberg, A. M., & Kaschak, M. P. (2002). Grounding language in action. *Psychonomic Bulletin and Review, 9,* 558 - 565.

Greenwald, A. G., Banaji, M. R., Rudman, L. A., Farnham, S. D., Nosek, B. A., & Mellott, D. S. (2002). A unified theory of implicit attitudes, stereotypes, self-esteem, and self-concept. *Psychological Review*, *109*, 3 – 25.

Gumperz, J. J., & Levinson, S. C. (1991). Rethinking linguistic relativity. *Current Anthropology, 32,* 613 – 623.

Häfner, M., & IJzerman, H. (2010). The face of love: Spontaneous facial muscle activity in response to partners' or strangers' happy and angry faces. Unpublished manuscript, Utrecht University.

Hall, E. T. (1955). The anthropology of manners. *Scientific American, 192,* 84 – 90.

Hardin, C., & Banaji, M. R. (1993). The influence of language on thought. *Social Cognition, 11,* 277 – 308.

Hargreaves, G. A., Hunt, G. E., Cornish, J. L., & McGregor, I. S. (2007). High ambient temperature increases 3,4-methylenedioxymethamphetamine ('Ecstasy')-induced Fos express. *Neuroscience*, *145,* 764 – 774.

Harlow, H. (1958). The nature of love. *American Psychologist, 13,* 673 – 685.

Harnad, S. (1990). The Symbol Grounding Problem. *Physica D: Nonlinear Phenomena*, *42*, 335 – 346.

Hauk, O., Johnsrude, I., & Pulvermuller, F. (2004). Somatotopic representation of action words in human motor and premotor cortex. *Neuron, 41,* 301 – 307.

Heider, F. (1958). *The psychology of interpersonal relations.* New York: Wiley.

Henrich, J., Heine, S. J., & Norenzayan, A. (in press). The weirdest people in the world. Accepted for publication in *Behavioral and Brain Sciences.*

Hofstede, G. (1984). *Culture's consequences.* Thousands Oaks, CA: Sage.

Holmes, J. G. (2002). Interpersonal expectations as the building blocks of social cognition: An interdependence theory perspective. *Personal Relations, 9,* 1 – 26.

Hove, M. J., & Risen, J. L. (2009). It's all in the timing: Interpersonal synchrony increases affiliation. *Social Cognition, 27*, 949 – 961.

IJzerman, H., & Cohen, D. (submitted). Grounding cultural syndromes: Body comportment and posture in Honor and Dignity cultures. *Unpublished Manuscript, Utrecht University.*

IJzerman, H., & Semin, G. R. (2009). The thermometer of social relations: Mapping social proximity on temperature. *Psychological Science, 20,* 1214 – 1220.

IJzerman, H. & Semin, G. R. (submitted). Temperature as a ground for social proximity. *Unpublished Manuscript, Utrecht University.*

IJzerman, H., Semin, G. R., & Gallucci, M. (submitted). Culture as a body: Systemic relationships between temperature, language, and cultural values. *Unpublished Manuscript, Utrecht University.*

IJzerman, H., Van Dijk, W. W., & Gallucci, M. (2007). A bumpy train ride: A field experiment on insult, honor, and emotional reactions. *Emotion, 7,* 869 – 875.

Isen, A. M. (1987). Positive affect, cognitive processes, and social behaviors. *Advances in Experimental Social Psychology, 20,* 203 – 253.

James, W. (1884). What is an emotion? *Mind, 9,* 188 – 205.

Jansen, W. (1990). Vrouwen die als mannen staan: Lichaamstaal en sociale hiërarchie in Noord-Afrika [Women who stand like men: Body language and social hierarchy in Northern Africa]. In J. Verrips & K. Verrips (Eds.). Ruimtegebruik en lichaamstaal [Space and body language] (pp. 9 – 26). Amsterdam: Het Spinhuis.

Jeannerod, M. (1994). The representing brain: Neural correlates of motor intention and imagery. *Behavioral Brain Science*, *17*, 187 – 245.

Ji, L.-J., Peng, K., & Nisbett, R. E. (2000). Culture, control, and perception of relationships in the environment. *Journal of Personality and Social Psychology, 78,* 943 – 955.

Kasahara, Y., Takayanagi, Y., Kawada, T., Itoi, K., & Nishimori, K. (2007). Impaired thermoregulatory ability of oxytocin-deficient mice during cold-exposure. *Bioscience, Biotechnology, and Biochemistry, 71,* 3122 – 3126.

Kashima, E. S., & Kashima, Y. (1998). Culture and language: The case of cultural dimensions and personal pronoun use. *Journal of Cross-Cultural Psychology, 29,* 461 – 468.

Kashima, Y., & Kashima, E. S. (2003). Individualism, GNP, climate, and pronoun drop: Is individualism determined by affluence and climate, or does language use play a role? *Journal of Cross-Cultural Psychology, 34,* 125 - 134.

Kelley, H. H., Holmes, J. G., Kerr, N. L., Reis, H. T., Rusbult, C. E., & Van Lange, P. A. M. (2002). *An atlas of interpersonal situations.* New York: Cambridge University Press.

Kim, Y. H., & Cohen, D. (in press). Information, perspective, and judgments about the self in Face and Dignity cultures. Accepted for publication in *Personality and Social Psychology Bulletin.*

Kim, Y. H., Cohen, D., & Au, W. T. (in press). The jury and abjury of my peers: The self in Face and Dignity cultures. *Accepted for publication in Journal of Personality and Social Psychology.*

Kimchi, R., & Palmer, S. E. (1982). Form and texture in hierarchically constructed patterns. *Journal of Experimental Psychology: Human Perception and Performance, 8,* 521 – 535.

Lakoff, G. & Johnson, M. (1980). *Metaphors we live by.* The University of Chicago Press.

Lakoff, G., & Johnson, M. (1999). *Philosophy in the flesh: The embodied mind and its challenge to Western thought.* New York: HarperCollins Publishers.

Leung, A. K.-y., & Cohen, D. (2007). The soft embodiment of culture: Camera angles and motion through time and space. *Psychological Science, 9,* 824 – 830.

Lewin, K. (1936). Principles of topological psychology. New York: McGraw-Hill.

Li, Y., Schneider, J. A., & Bennett, D. A. (2007). Estimation of the mediation effect with a binary mediator. *Statistics in Medicine*, *26*, 3398 – 3414.

Liberman, N., Trope, Y., & Stephan, E. (2007). Psychological distance. In A. W. Kruglansky & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (Vol. 2, pp. 353 – 383). New York: Guilford Press.

Louwerse, M., & Jeuniaux, P. (2008). Language comprehension is both embodied and symbolic. In M. de Vega, A. M. Glenberg, & A. C. Graesser (Eds.), *Symbols, embodiment, and meaning* (pp. 309 – 326). Oxford University Press, UK.

Louwerse, M., & Jeuniaux, P. (2010). The linguistic and embodied nature of conceptual processing. *Cognition, 114,* 96 – 104.

Maass, A. (2009). Culture's two routes to embodiment. *European Journal of Social Psychology, 39,* 1290 – 1293.

Maass, A., & Russo, A. (2003). Directional bias in the mental representation of events: Nature or culture? *Psychological Science, 14,* 296 – 301.

Maass, A., Karasawa, M., Politi, F., & Suga, S. (2006). Do verbs and adjectives play different roles in different cultures? A cross-linguistic analysis of person representation. *Journal of Personality and Social Psychology, 90,* 734 – 750.

Maass, A., Salvi, C., Arcuri, L., & Semin, G. R. (1989). Language use in intergroup contexts: The linguistic intergroup bias. *Journal of Personality and Social Psychology, 57,* 981 – 993.

MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, *7*, 83 – 104.

Macrea, C. N., Bodenhausen, G. V., Milne, A. B., & Jetten, J. (1994). Out of mind but back in sight: Stereotypes in the rebound. *Journal of Personality and Social Psychology, 67,* 808 – 817.

Mahon, B. Z., & Caramazza, A. (2008). A critical look at the embodied cognition hypothesis and a new proposal for grounding conceptual content. *Journal of Physiology – Paris, 102,* 59 – 70.

Maio, G. R., Pakizeh, A., Cheung, W.-Y., & Rees, K. J. (2009). Changing, priming, and acting on values: Effects via motivational relations in a circular model. *Journal of Personality and Social Psychology, 97,* 699 – 715.

Martin, L. L., & Clore, G. L. (2001). *Theories of mood and cognition: A users handbook.* Mahwah, NJ: Lawrence Erlbaum Associates.

Masuda, T., & Nisbett, R. E. (2001). Attending holistically vs. analytically: Comparing the context sensitivity of Japanese and Americans. *Journal of Personality and Social Psychology, 81,* 922 – 934.

Mauss, M. (1979). *Sociology and psychology: Essays*. London: Routledge.

McCullough, M. E., et al. (1998). Interpersonal forgiving in close relationships II: Theoretical elaboration and measurement. *Journal of Personality and Social Psychology, 75,* 1586 – 1603.

Meier, B. P., & Robinson, M. D. (2004). Why the sunny side is up: Associations between affect and vertical position. *Psychological Science, 15,* 243 – 247.

Morris, M. W., & Peng, K. (1994). Culture and cause: American and Chinese attributions for social and physical events. *Journal of Personality and Social Psychology, 67*, 949 – 971.

Niedenthal, P. M., Barsalou, L. W., Winkielman, P., Krauth-Gruber, S., & Ric, F. (2005). Embodiment in attitudes, social perception, and emotion. *Personality and Social Psychology Bulletin, 9,* 184 – 211.

Nisbett, R. E., & Cohen, D. (1996). *Culture of honor: The psychology of violence in the South.* Boulder, CO: Westview Press.

Nisbett, R. E., & Miyamoto, Y. (2005). The influence of culture: holistic versus analytic perception. *Trends in Cognitive Sciences, 9,* 467 – 473.

Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review,* 7, 231 – 259.

Over, H., & Carpenter, M. (2009). Eighteen-month-old infants show increased helping following priming with affiliation. *Psychological Science*, *20*, 1189 – 1193.

Paladino, M.-P., Mazzurega, M., Pavani, F., & Schubert, T. W. (2010). Synchronous multisensory stimulation blurs self-other boundaries. *Psychological Science, 21,* 1 – 6.

Peristiany, J. G. (1965). *Honor and shame: The values of Mediterranean society.* The University of Chicago Press.

Pickering, M. J., & Garrod, S. (2009). Prediction and embodiment in dialogue. *European Journal of Social Psychology, 39,* 1162 – 1168.

Preuschooft, S., & Van Hooff, J. A. R. A. M. (1997). The social function of “smile” and “laughter”: Variations across primate species and societies. In U. Segerstrîle & P. Molnar (Eds.). *Where nature meets culture* (pp. 171 – 190). Mahwah, NJ: Lawrence Erlbaum Associates.

Pylyshyn, Z. W. (1984). *Computation and cognition: Toward a fFoundation for cognitive science.* Cambridge, MA: MIT Press.

Reis, H. T. & Shaver, P. (1988). Intimacy as interpersonal process. In S. Duck (Ed.). *Handbook of personal relationships: Theory, research, and interventions* (pp. 367-389). New York: Wiley.

Richerson, P. J., & Boyd, R. (2006). *Not by genes alone: How culture transformed human evolution.* The University of Chicago Press.

Rizzolatti, G., Fogassi, L., & Gallese, V. (2001). Neurophysiological mechanisms underlying the understanding and imitation of action. *Nature Reviews Neuroscience, 2,* 661 – 670.

Rodriguez Mosquera, P. M., Manstead, A. S. R., & Fischer, A. H. (2002). The role of honour concerns in emotional reactions to offences. *Cognition and Emotion, 16,* 143 – 163.

Rusbult, C. E., & Van Lange, P. A. M. (2003). Interdependence, interaction, and relationships. *Annual Review of Psychology, 54,* 351 – 375.

Ruscher, J. B., Santuzzi, A. M., & Hammer, E. Y. (2003). Shared impression formation in the cognitively interdependent dyad. *British Journal of Social Psychology, 42,* 411 – 425.

Safire, W. (2005) Swagger. Retrieved online from http://www.nytimes.com/2005/11/13/magazine/13safire.html on January 12, 2008.

Santiago, J., Román, A., & Ouellet, M. (2010). Flexible foundations of abstract thought. In A. Maass & T. W. Schubert (Eds.), *Spatial dimensions of social thought* (pp. 40 – 118). Submitted for publication.

Sapir, E. (1970). Language. In D. G. Mandelbaum (Ed.), *Culture, language, and personality: Selected essays* (pp. 1-44). Berkeley: University of California Press.

Schluchter, M. D. (2008). Flexible approaches to computing mediated effects in generalized linear models: Generalized estimating equations and bootstrapping. *Multivariate Behavioral Research*, *43*, 268 – 288.

Schneider, J. (1971). Of vigilance and virgins: Honor, shame, and access to resources in Mediterranean societies. *Ethnology, 10,* 1 – 24.

Schubert, T. W. (2005). Your highness: Vertical positions as perceptual symbols of power. *Journal of Personality and Social Psychology, 89,* 1 – 21.

Schubert, T. W., & Koole, S. L. (2009). The embodied self: Making a fist enhances men's power-related self-conceptions. *Journal of Experimental Social Psychology, 45,* 828 – 834.

Schubert, T. W., Waldzus, S., & Seibt, B. (2010). More than a metaphor: How the understanding of power is grounded in experience. In A. Maass & T. W. Schubert (Eds.), *Spatial Dimensions of Social Thought* (pp. 167 – 203). Submitted for publication.

Schwarz, N. (1998). Accessible content and accessibility experiences: The interplay of declarative and experiential information in judgment. *Personality and Social Psychology Review, 2,* 87 – 99.

Schwarz, N., & Clore, G. L. (1996). Feelings and phenomenal experiences. In E. T. Higgins & A. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 433 – 465). New York: Guilford.

Semin, G. R. (1989). Impressions of personality revisited: The contribution of linguistic factors to attribute inferences. *European Journal of Social Psychology, 19,* 85-101.

Semin, G. R. (1995). Language. In A. S. R. Manstead & M. Hewstone (Eds.). *The Blackwell dictionary of social psychology* (pp. 347 – 352). West Sussex, England: Blackwell.

Semin, G. R. (2007). Implicit indicators of social distance and proximity. In K. Fiedler (Ed.), *Social communication: Frontiers of social psychology* (pp. 389 – 409). New York: Psychology Press.

Semin, G. R., & Fiedler, K. (1988). The cognitive functions of linguistic categories in describing persons: Social cognition and language. *Journal of Personality and Social Psychology, 54,* 558 – 568.

Semin, G. R., & Fiedler, K. (1992). *Language, interaction, and social cognition.* London: Sage.

Semin, G. R., & Smith, E. R. (2008). *Embodied grounding: Social, cognitive, affective, and neuroscientific approaches.* Cambridge University Press, UK.

Semin, G. R., Görts, C. A., Nandram, S., & Semin-Goossens, A. (2002). Cultural perspectives on the linguistic representation of emotion and emotion events. *Cognition and Emotion, 16*, 11 – 28.

Sheets-Johnstone, M. (2009). *The corporael turn: An interdisciplinary reader.* Charlottesville, VA: Imprint Academic.

Silk, J. B. (2006). Who are more helpful, humans or chimpanzees? *Science, 3,* 1248 – 1249.

Simpson, J. A., Rholes, W. S., & Philips, D. (1996). Conflict in close relationships: An attachment perspective. *Journal of Personality and Social Psychology, 71,* 899 – 914.

Smith, E. R., & Semin, G. R. (2004). Socially situated cognition: Cognition in its social context. *Advances in Experimental Social Psychology, 36*, 53 –117

Spears, R., Lea, M., & Lee, S. (1990). De-individuation and group polarization in computer-mediated communication. *British Journal of Social Psychology, 29,* 121 – 134.

Stapel, D. A., & Semin, G. R. (2007). The magic spell of language: Linguistic categories and their perceptual consequences. *Journal of Personality and Social Psychology, 93,* 23 – 33.

Strack, F., Martin, L. L., & Stepper, S. (1988). Inhibiting and facilitating conditions of the human smile: A nonobtrusive test of the facial feedback hypothesis. *Journal of Personality and Social Psychology, 54,* 768 – 777.

Stepper, S., & Strack, F. (1993). Proprioceptive determinants of emotional and nonemotional feelings. *Journal of Personality and Social Psychology, 64,* 211 – 220.

Stevens, E. P. (1973). Machismo and marianismo. *Society, 10,* 57 – 63.

Thomsen, L., Frankenhuis, W. E., & Carey, S. (2010). Big and mighty: Preverbal infants represent social dominance. *Conference presentation at the annual meeting of the Society for Personality and Social Psychology, Las Vegas.*

Tiedens, L. Z., & Fragale, A. R. (2003). Power moves: Complementarity in dominant and submissive nonverbal behavior. *Journal of Personality and Social Psychology, 84,* 558 – 568.

Tracy, J. L., & Matsumoto, D. (2008). The spontaneous display of pride and shame: Evidence for biologically innate nonverbal displays. *Proceedings of the National Academy of Sciences of the United States of America, 105*, 11655 – 11660.10.1073/pnas.0802686105.

Tropp, L. R., & Wright, S. C. (2001). Ingroup identification as the inclusion of ingroup in the self. *Personality and Social Psychology Bulletin, 27,* 585 – 600.

Uskul, A. K., Hynie, M., & Lalonde, R. N. (2004). Interdependence as a mediator between culture and interpersonal closeness for Euro-Canadians and Turks. *Journal of Cross-Cultural Psychology, 35,* 174 – 191.

Uskul, A. K., Kitayama, S., & Nisbett, R. E. (2008). Ecocultural basis of cognition: Farmers and fishermen are more holistic than herders. *Proceedings of the National Academy of Sciences of the United States of America, 105,* 8552-8556.10.1073 /pnas.0803874105.

Uvnäs-Moberg, K. (1998). Oxytocin may mediate the benefits of positive social interaction and emotions. *Psychoneuroendocrinology, 23,* 819 – 835.

Van Ooijen, A. M. J., Van Marken Lichtenbelt, W. D., Van Steenhoven, A. A., & Westerterp, K. R. (2004). Seasonal changes in metabolic and temperature responses to cold air in humans. *Physiology & Behavior, 82,* 545 – 553.

Vohs, K. D., & Finkel, E. J. (2006). *Self and relationships: Connecting intrapersonal and interpersonal processes.* New York: Guilford.

Warburton, W. A., Williams, K. D., & Cairns, D. R. (2005). When ostracism leads to aggression: The moderating effects of control deprivation. *Journal of Experimental Social Psychology, 42,* 213 – 220.

Warneken, F., & Tomasello, M. (2006). Altruistic helping in human infants and young chimpanzees. *Science, 3,* 1301 – 1303.

Wells, G. L., & Petty, R. E. (1980). The effects of head movement on persuasion: Compatibility and incompatibility of responses. *Basic and Applied Social Psychology, 1,* 219 – 230.

Whorf, B. L. (1956). *Language, thought, and reality.* Cambridge, MA: MIT Press.

Wieselquist, J., Rusbult, C. E., Foster, C. A., & Agnew, C. R. (1999). Commitment, pro-relationship behavior, and trust in close relationships. *Journal of Personality and Social Psychology, 77,* 942 – 966.

Williams, L. E., & Bargh, J. A. (2008a). Experiencing physical warmth promotes interpersonal warmth. *Science, 322,* 606 – 607.

Williams, L. E., & Bargh, J. A. (2008b). Keeping one's distance: The influence of spatial distance cues on affect and evaluation. *Psychological Science, 19,* 302 – 308.

Winkielman, P., Schwarz, N., & Belli, R. F. (1998). The role of ease of retrieval and attribution in memory judgments: Judging your memory as worse despite recalling more events. *Psychological Science, 9,* 46 – 48.

Wojciszke, B., Bazinska, R., & Jaworski, M. (1998). On the dominance of moral categories in impression formation. *Personality and Social Psychology Bulletin, 24,* 1245 – 1257.

Zajonc, R. & Markus, H. R. (1984). Affect and cognition: The hard interface. In C. Izard, J. Kagan, & R. Zajonc (Eds.), *Emotions, cognitions, and behavior* (pp. 73 – 102). Cambridge University Press, UK.

Zhong, C. B., & Leonardelli, G. J. (2008). Cold and lonely: Does social exclusion literally feel cold? *Psychological Science, 19,* 838 – 842.

Zwaan, R. A. (2009a). Mental simulation in language comprehension and social cognition. *European Journal of Social Psychology, 39,* 1142 – 1150.

Zwaan, R. A. (2009b). Theory development in embodiment research: Getting the timing right. *European Journal of Social Psychology, 39,* 1160 – 1161.

Appendices

Appendix A

Honor questionnaire used in Chapter 4: *Grounding Cultural Syndroms.*

We zijn een korte vragenlijst over opinies aan het houden. Soms gaan mensen met elkaar op de vuist. Door een schaal van 1 (ik ben het er NIET mee eens dat Fred vecht) tot 7 (ik ben het er helemaal mee eens dat Fred vecht) te gebruiken, geef alsjeblieft aan in hoeverre je het eens bent als een 25 jarige man, Fred, heeft gevochten met iemand als die persoon…

….Naar Fred zijn vrouw op een suggestieve manier heeft gekeken

….Fred zijn familie diep heeft beledigd terwijl Fred met zijn vrouw en kinderen aan het wandelen zijn

…..tegen Fred aan is gelopen op straat en hem een “eikel” heeft genoemd

…..express bier over Fred heeft gemorst in het café en er hard om zou lachen

…..een gevecht heeft uitgelokt met Fred en hem een mietje noemen in het café waar al zijn vrienden bij staan

…..fysiek iemand pijn heeft gedaan in Fred zijn familie

Leeftijd:
Talen die je spreekt:

Appendix B

List of Countries in Chapter 5: Culture as a Body; including variables DROP (1 = Yes, 2 = No), Average Yearly Temperature for Capital City, and Individualism Score (Hofstede, 1980).

Country	***Drop***	***Avg. Temperature***	***Individualism***
Argentina	1,00	16,00	46,00
Australia	2,00	12,00	90,00
Austria	2,00	10,00	55,00
Belgium	2,00	10,00	75,00
Brazil	1,00	25,00	38,00
Burkina Faso	1,00	27,00	20,00
Canada	2,00	6,00	80,00
Chile	1,00	14,00	23,00
Colombia	1,00	13,00	13,00
Costa Rica	1,00	20,00	15,00
Croatia	1,00	11,00	27,00
Denmark	2,00	8,00	74,00
Ecuador	1,00	14,00	8,00
Egypt	1,00	21,00	38,00
El Salvador	1,00	28,08	19,00
Ethiopia	1,00	16,00	38,00
Finland	2,00	5,00	63,00
France	2,00	11,00	71,00
Germany	2,00	9,00	67,00
Ghana	2,00	27,00	20,00
Greece	1,00	17,00	35,00
Guatemala	1,00	19,00	6,00
Hong Kong	1,00	23,00	25,00
India	1,00	25,00	48,00
Indonesia	1,00	27,00	14,00
Iran	1,00	17,00	41,00
Iraq	1,00	22,00	38,00
Ireland	2,00	10,00	70,00
Israel	1,00	20,00	54,00
Italy	1,00	15,00	76,00
Japan	1,00	15,00	46,00
Kenya	1,00	19,00	20,00
Kuwait	1,00	26,00	38,00
Lebanon	1,00	20,00	38,00
Libya	1,00	20,00	38,00
Malaysia	1,00	27,00	26,00
Mexico	1,00	17,00	30,00
Netherlands	2,00	10,00	80,00
New Zealand	2,00	12,70	79,00
Nigeria	2,00	27,00	20,00
Norway	2,00	6,00	69,00
Pakistan	1,00	21,00	14,00

Appendix B (*cont.*)

List of Countries in Chapter 5: Culture as a Body; including variables DROP (1 = Yes, 2 = No), Average Yearly Temperature for Capital City, and Individualism Score (Hofstede, 1980).

Country	***Drop***	***Avg. Temperature***	***Individualism***
Panama	1,00	27,00	11,00
Peru	1,00	20,00	16,00
Philippines	1,00	27,00	32,00
Portugal	1,00	16,00	27,00
Saudi Arabia	1,00	26,00	38,00
Singapore	1,00	27,00	20,00
South Africa	2,00	16,00	65,00
South Korea	1,00	12,00	18,00
Spain	1,00	13,00	51,00
Sweden	2,00	6,00	71,00
Switzerland	2,00	9,00	68,00
Taiwan	1,00	22,00	17,00
Tanzania	1,00	26,00	20,00
Thailand	1,00	28,00	20,00
Turkey	1,00	14,00	37,00
United Arab Emirates	1,00	27,00	38,00
United Kingdom	2,00	10,00	89,00
United States	2,00	14,00	91,00
Uruguay	1,00	16,00	36,00
Venezuela	1,00	23,00	12,00
Zambia	1,00	20,50	20,00

Nederlandse Samenvatting

Warme gevoelens voor iemand hebben, of je krijgt de koude rillingen van iemand. Deze metaforen worden gebruikt om aan te duiden hoe je inter-persoonlijke gevoelens zijn ten opzichte van anderen. Maar zijn deze metaforen niet meer dan alleen simpele uitdrukkingen die aangeven hoe je je over anderen voelt? Deze vraag speelde een grote rol in mijn verkenning in dit proefschrift. Specifiek richtte ik me als eerste op de rol van concrete, fysieke informatie, zoals fysieke warmte, in het nadenken van mensen over relaties en cultuur. Daarnaast richtte ik me ook op het proces waarop zulke effecten eigenlijk verklaard kunnen worden.

De afgelopen dertig jaar zijn onderzoekers steeds meer geïnteresseerd geraakt in de effecten van het lichaam op hoe mensen zich gedragen, wat zij denken, en wat ze voelen. Deze interesse is te verklaren vanuit nieuwe theorieën binnen de sociale cognitie, die zich richten op de rol van het lichaam in het nadenken over concepten. De grote interesse in het lichaam als basis voor concepten is gedeeltelijk opgekomen als tegenbeweging tegen eerdere theorieën, die veronderstelden dat concepten gerepresenteerd worden in amodale (en redelijk arbitraire) symbolen. Vanuit het idee dat mensen het lichaam gebruiken om na te denken over concepten, heeft men opgemaakt dat concepten niet bestaat uit amodale, arbitraire symbolen, maar uit modaliteitspecifieke informatie (zoals visueel, auditief, et cetera). Bijvoorbeeld, men representeert slecht als zwart of machtig als boven.

De interesse in het lichaam is gedeeltelijk geïnspireerd door de conceptuele metaforen theorie van Lakoff en Johnson (1999). Zij stelden dat mensen abstracte informatie begrijpen door middel van hele concrete, fysieke ervaringen. Informatie van een fysieke ervaring wordt dus zo gebruikt om abstracte concepten te begrijpen. Men kan de liefde bijvoorbeeld zien als een reis. De specifieke elementen van de voortgang van een reis kunnen dan gebruik worden om een onderdeel van een abstracter concept als liefde te begrijpen.

Volgens Lakoff en Johnson (1999) leren mensen zulke co-relaties tussen abstracte informatie en concrete ervaringen door een proces van ‘conflatie’: Abstracte informatie wordt opgeslagen samen met een concrete ervaring die gezamenlijk wordt ervaren. Bijvoorbeeld, mensen leren in hun jonge jaren fysieke warmte met affectie te associëren. De aanraking van een moeder (of vader) leert het kind om warmte en affectie met elkaar te representeren.

Het eerste hoofdstuk bespreekt de theorievorming ten opzichte van fysieke warmte en cultuur en geeft de achterliggende gedachten die betrekking hebben op de empirische hoofdstukken die volgen. De vier empirische hoofdstukken richten zich op twee verschillende onderwerpen: sociale relaties en cultuur. Het doel van hoofdstuk 2 is om inzicht te geven in de conceptuele metaforen theorie. Gebaseerd op het idee dat mensen warmte en affectie samen leren, lieten wij zien dat deelnemers in een fysiek warme conditie zich psychologisch naderbij voelen tot anderen, meer taal gebruiken die geënt is op relaties en daarnaast zich perceptueel meer richten op relaties in hun omgeving. Het is in dit hoofdstuk dan ook heel duidelijk wat de concrete ervaring (warmte) en wat de abstracte informatie was (affectie).

In Hoofdstuk 3 richtten wij ons op de beperkingen van conceptuele metaforen theorie. Een centraal punt binnen deze theorie is dat mensen abstracte informatie bouwen op concrete

ervaringen. Als men warmte activeert, zou men zich psychologisch nader voelen tot anderen. Immers, de concrete ervaring wordt geactiveerd en de abstracte informatie vervolgens aangepast. Wat echter volgt uit de voorspelling is dat het omgekeerde effect niet plaats zou moeten vinden. Als men zich psychologisch nader zou voelen tot anderen zou men zich niet warmer moeten voelen. Men kan inderdaad over affectie nadenken zonder zich fysiek warm te voelen. Hoofdstuk 3 laat zien dat dit niet het geval is. In Hoofdstuk 3 lieten we deelnemers zich psychologisch of fysiek nader voelen tot anderen; de omgevingstemperatuur werd vervolgens als hoger geschat. Deze effecten laten zien dat de relatie tussen warmte en psychologische nabijheid meer dan alleen een conceptuele link is tussen twee verschillende concepten.

Hoofdstuk 4 gaat in op de relatie tussen cultuur en het lichaam. Niet alleen relatief simpele concepten als warmte zijn gegrond in het lichaam; zelfs abstractere, culturele informatie gebruikt het lichaam. Een voorbeeld uit dit hoofdstuk is dat Latino mannen meer waarde hechtten aan de puurheid van een vrouw, de reputatie van een man, of aan de familie, als zij in een rechte houding stonden (tegenover een voorovergebogen houding). Een omgekeerde trend was bij Latino vrouwen te zien. Ten slotte in Hoofdstuk 5 lieten we zien dat de effecten van fysieke warmte ook een rol spelen op landelijk niveau. We lieten daar zien dat fysieke warmte een sterke relatie heeft met het taalgebruik in verschillende landen. Landen die een gemiddelde temperatuur hebben die hoger is zijn meer geneigd om persoonlijke voornaamwoorden in hun taal te laten vallen. De mogelijkheid om persoonlijke voornaamwoorden in een taal te laten vallen duidt over het algemeen op een hogere sociale nabijheid.

Deze hoofdstukken laten gezamenlijk twee belangrijke punten zien. Ten eerste worden relaties en culturele informatie gegrond in perceptuele informatie. Ten tweede zijn de effecten die gaan over warmte en sociale relaties verder dan een conceptueel-metaforische link tussen warmte en affectie alleen. Verder onderzoek zou zich kunnen richten op wat de ontogenetische en evolutionaire basis is voor deze effecten. Is warmte een basis waardoor mensen affectie leren begrijpen? Veel sociaalpsychologen zullen het er mee eens zijn dat sociale relaties centraal staan het menselijk functioneren. Een procesmatige benadering vanuit de belichamingstheorieën geven dan ook belangrijke inzichten in hoe mensen relaties begrijpen, verwerken en uitten.

Dankwoord

Eigenlijk zijn dit de belangrijkste woorden van het proefschrift, en niet alleen omdat dit de enige pagina's zijn die veel mensen lezen. Ik ben veel mensen heel erg veel dank verschuldigd, die laten zien dat wetenschap bedrijven eigenlijk helemaal geen eenzaam proces is. Het risico van een dankwoord schrijven is echter dat je mensen eruit laat die de dankbaarheid het meeste verdienen. Vaak zijn de dagelijkse dingen het belangrijkste in het afmaken van het werkje dat nu voor je ligt. Het spijt me als ik je vergeet – dit zegt niets over mijn (on)dankbaarheid, maar des te meer over mijn vergeetachtigheid. Niettemin zal ik toch proberen om dit moeilijkste onderdeel van het proefschrift er nog uit te persen.

First of all I would like to thank my supervisors, Gün and Dov. Gün, thank you very much for giving me the opportunity to work on this project. The options you have provided me with were truly amazing. You have allowed me to grow as an independent researcher within this project. It was a fun project and I truly enjoyed the research. Dov, thank you for the inspiration that you have given me. Your research is always extremely creative and has served and will continue to serve as a great inspiration to me. I have enjoyed our meetings in Illinois and over Skype on research and on our writing. Daarnaast, Kees en Henk – ik ben erg blij dat wij als outsiders de kans hebben gekregen om in Utrecht te komen werken. De omgeving die er, mede door jullie, gecreëerd was, was inspirerend.

Some other very important people I am grateful to are Edward Grinder, John Bleyer, Doreen Blandino, and Mark Rivardo. These are the people who have actually first inspired me to even think about an academic career. Bro. Ed, thank you for your continuous support and friendship. You are someone I know I can always rely on. John, thank you for providing me with much inspiration and showing me the value of education. Doreen, you have always been a truly wonderful support throughout a very important educational period. Mark, the reason why I am conducting experiments to this day is because you have shown me the pleasures of experimental research.

Twee anderen aan wie ik veel dank ben verschuldigd zijn Wilco van Dijk en Carla Heldens. Wilco, ook al ben je voor dat andere clubje, zonder jouw onvoorwaardelijke steun aan de research master was ik niet hier gekomen. En volgend jaar spelen we toch tegen Telstar.

Daarnaast zijn er natuurlijk ook veel andere mensen die er tijdens mijn wetenschappelijke carrière er ergens doorheen zijn gekomen en waarvan ik hoop dat onze vriendschap ook ver na dit project doorgaan. Mijn kamergenoot, Daniël, volgens mij werd je soms helemaal gek van mijn slappe geouwehoer – dank je wel voor het aanhoren daarvan. In ieder geval kreeg je er goede koffie voor terug. Erik, wellicht dat die ministerpost er ooit komt, maar naast dat ik altijd erg om je moet lachen waardeer ik je altijd bijzonder scherpe opmerkingen. Ronnie B. (aka Frits Bom) – de momenten in Opatija maakten een mooie eerste buitenlandse conferentie (en leve René!). Kaska, I just read your dankwoord – very much likewise☺. Maarten, ik hoop dat je me kunt vergeven dat je niet meer de langste bent. Egypte, alle conferentiereizen – hoop dat er nog veel volgen. Tila Tequila – volgens mij ken ik niemand met meer energie dan jij. Ook jij bedankt voor het aanhoren van mijn slappe gezeik. Ook ben ik uiteraard veel dank verschuldigd aan de fantastische dames van de Guttenberg, Nicole en Berber. There are many more who I am bound to forget from this scientific journey, at conferences, or just at a very important scientific location called 'bar', but thank you Cate, Mara, Joel, Nina, Annemarie, Aukje, Sylvie, Esther, Lotte van D., Laura, Micha, Remco,

Marcello, Ron D. (Apple Sucks), Suzanne, Angela, Luis, Brian, Francesco, Francesca, and Marleen.

Thomas, I also owe much gratitude to you. I am very grateful for our continued scientific conversations and your support (in many respects). Alan and Lotte T., I hope we have many intellectually and socially fulfilling endeavors ahead of us. I am further much indebted to my 'new' department, the Social & Organizational Department at the VU. I am happy to say that I still had the time to write part of this while at the VU. Dank je Paul en Mark hiervoor en het vertrouwen, maar ook zeker Catrin en Jan-Willem voor jullie steun in de aanpassing in mijn nieuwe functie. Ik hoop dat er nog veel productieve en leuke jaren komen. The first year of students that I was allowed to supervise at the VU: thank you for your patience of bearing with me during this adjustment period. And thank you Kati, Marina, and Justin for patiently reading through some of the work that I and others have been doing.

Daarnaast is het altijd fantastisch geweest om deel te nemen aan de activiteiten die georganiseerd worden door het ASPO en het KLI. De collega's die de activiteiten organiseren en hier aan deelnemen hebben voor veel leuke en leerzame momenten gezorgd.

Er zijn veel meer leuke collega's geweest die ik ongetwijfeld vergeet te vermelden – niettemin bestaat er echt nog wel een wereld buiten de wetenschap. De mannen van OG – al werd er niet altijd gewonnen, gezellig was het wel. Dan zijn er mensen die om de één of andere reden me al jaren kunnen uitstaan. Frenk, Dave, Guido, Sander, Karel, Paul, Irma, Agamenon, Nuno, Dorien - ik ben erg blij dat de vriendschap die we hebben tot deze dag bestaat. Met veel woorden zou ik jullie kunnen bedanken, maar ik hoop gewoon dat we nog lang op deze voet doorgaan. Felipe, Joyce, Iris, Ricardo, e Valéria: obrigado pela sua amizade. Vocês são marevilhosas. Sjoerd, toffe gast – dank voor het helpen bij de opmaak van het proefschrift en een goede buur is blijkbaar ook een goede vriend.

Dan zijn er natuurlijk nog mensen wie toch net een beetje meer dank krijgen dan anderen – puur en alleen omdat ik daar al gelijk warme gevoelens van krijg. Het proefschrift gaat gedeeltelijke over communale relaties – relaties waarin mensen zich richten op de behoefte van anderen. En wie anders dan familie doen dit? Ik kan me niet eens voorstellen hoeveel dank ik verschuldigd ben aan mijn vader, mijn moeder en mijn broer (in willekeurige volgorde), die er altijd voor me geweest zijn en altijd voor me zijn, wat de omstandigheden ook zijn. Het kan kort, het kan lang, maar het enige waar ik mee kan afsluiten voor deze hele speciale mensen: Bedankt.

Curriculum Vitae

Hans IJzerman was born in Rotterdam and raised in ‘s-Gravendeel. He studied psychology at Saint Vincent College in Latrobe, PA, USA. After obtaining this degree, he taught English for some time in Santos, Brazil. Hans then went on to studying social psychology, and received a research master’s degree from VU University, Amsterdam in 2006. After obtaining this degree, he worked as a junior psychologist with Stichting NOA and as a research assistant and lecturer at VU. He then started pursuing a Ph. D. in Social Psychology under the supervision of Gün Semin and Dov Cohen at Utrecht University in January 2008. Since September 2009, Hans works as an assistant professor at VU University in Amsterdam.

Photography by Irma Oldenburg