RELATIONSHIP OF BODILY COMMUNICATION
WITH COGNITIVE AND PERSONALITY VARIABLES

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ABSTRACT

RELATIONSHIP OF BODILY COMMUNICATION

WITH COGNITIVE AND PERSONALITY VARIABLES

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Why are there individual differences in people's bodily communication performance success? Which variables may be responsible for the variation in the performance success? Which analogies would appear to dominate in bodily communication, and in what ways would the metaphorization and metonymization processes operate? In this study, the relationship of bodily communication performance with cognitive and personality variables was investigated. 218 students participated to the first phase of the study while 88 of them participated to the second phase of it. In the first phase, a set of tests was

given successively to determine the levels of certain cognitive and personality variables. In the experimental setting, the participants were instructed to communicate certain words one by one nonverbally just as in the 'Silent Movie' game. The stability of bodily communication expectancy ratings, the factor structure of bodily communication performance and the frequency of the ways of representation for each word were analyzed. Interrater reliability analysis, third eye analysis and case studies were conducted; the unsuccessful representations were described and finally, structural equation modeling results were presented. The theories and research on personality and cognition, metaphors, metonymies, analogies, bodily representations, mind-reading, pragmatics and the notion of relevance were reviewed in the dissertation and after the exposition of the strategies, schemata and scripts employed in the experiments, a model of bodily communication was proposed aiming to integrate the manifold aspects of bodily communication.

Keywords: Bodily communication, metaphors, metonymies, mind-reading, inference.

ÖZ

BEDENSEL İLETİŞİMLE BİLİŞSEL DEĞİŞKENLER

VE KİŞİLİK DEĞİŞKENLERİ ARASINDAKİ İLİŞKİ

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Doktora, Bilişsel Bilimler Bölümü

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Neden insanların bedensel iletişim performans başarılarında bireysel farklar var? Performanstaki çeşitlemelerden hangi değişkenler sorumludur? Bedensel iletişimde hangi benzetimler başat görünüyor ve eğretileme ve ad aktarımı süreçleri hangi biçimlerde işliyor? Bu çalışmada, bedensel iletişim performansıyla bilişsel değişkenler ve kişilik değişkenleri arasındaki ilişki incelendi. Çalışmanın ilk evresine 218 öğrenci katılırken, ikinci evresine bunlardan 88'i katıldı. İlk evrede, kimi bilişsel değişkenlerin ve kişilik değişkenlerinin düzeylerini belirlemek için, sırayla, bir dizi soru demeti verildi. Deneysel ortamda, katılımcılardan, tek tek 30 sözcüğü, 'Sessiz Sinema' oyununda olduğu gibi, sözel

olmayan bir biçimde iletmeleri istendi. Bedensel iletişim beklentileri değerlemelerinin durağanlığı, bedensel iletişim performansının etmen yapısı ve ulamlara karşılık gelen her bir sözcüğün sıklığı çözümlendi. Değerlemeciler-arası güvenirlik çözümlemesi, üçüncü göz çözümlemesi ve örnek-olay çalışmaları gerçekleştirildi; başarısız temsiller betimlendi ve son olarak, yapısal denklem kipçikleme sonuçları sunuldu. Çalışmada, kişilik ve biliş, eğretilemeler, ad aktarımları, benzetimler, bedensel temsiller, zihin okuma, kullanımbilim ve bağıntı kavramı üstüne kuramlar ve araştırmalar tarandı ve deneyde işe koşulan stratejilerin, çizemlerin ve yazıntıların sunumundan sonra, bedensel iletişimin çeşitli özelliklerini bütünleştirmeyi hedefleyen bir bedensel temsil kipçiği öne sürüldü.

Anahtar Kelimeler: Bedensel temsil, eğretilemeler, ad aktarımları, zihin okuma, çıkarsama.

ACKNOWLEDGMENTS

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CHAPTER 1

INTRODUCTION

One of the less studied areas of cognitive science is bodily representations and bodily communication. Just as gesture signing seems to be sculpture by a different medium (McNeill, 1992), metaphorical bodily performance may be just another mode of representation by different tools. The cognitive notion of selection is involved in bodily representation. To quote Hawkins (1997):

> Selection is the cognitive process of accessing particular conceptual tools to construct textual images which re-present experiences in a digitalized form (…) recognizable to interlocutors. One useful way to introduce the cognitive process of selection is through metaphor, which is, itself among the conceptual tools of selection. In a very real sense, we become artists whenever we confront the problem of communicating meaningful messages to another person. In the same way that a sculptor begins with raw material in the form of a block of stone or a lump of clay, we approach any expressive task with the raw material of experience. The sculptor uses some set of tools to cut away unwanted portions of stone or a lump of clay and eventually to reshape it into a particular image. Similarly, we make strategic use of sets of conceptual tools to form particular textual images. Where sculpting is the artistic process of working a block of stone or mass of clay into some chosen visual form using specially-designed sculpting instruments, selection is the cognitive process of working experience into carefully structured (digitalized) mental images using certain conceptual tools (Hawkins, 1997, p. 26).

On various occasions such as silent communication due to noise or distance and 'the Silent Movie' game, it is observed that people use their body parts or their whole body for representing entities and these bodily performances are metaphorical in the sense that they relate a given conceptual structure with bodily performance. For example, they may move their fingers to communicate 'send me e-mail' or use their fingers in a certain position and raise them to their mouth and ear to communicate 'call me'.

In her article asking the question "What is the body schema?" Reed (2003) states that "[o]ur sense of body not only includes its current configuration, but also knowledge of the relative locations of its parts and what actions it can perform" (p. 233).

Reed (2003) defines 'body schema' as the "long-term, organized knowledge about the spatial characteristics of human bodies. Reed continues "[body schema] stores information about the spatial relations among body parts, the degrees of freedom for movement at joints, and knowledge of body function. It is also supramodal in that it exists independent of modality-specific processing. Since it contains information relevant to all bodies, the body schema is used to represent others as well as the self" (p. 233).

Thus, according to Reed (2003), bodily representation constitutes a supramodal kind of representation. To support this position, Reed (2003) refers to neurological studies –the most prominent being Goldenberg (1997)- that describe neurological patients who exhibit differential impairments: in cases such as autotopagnosia or somatotopagnosia, the spatial abilities are kept intact, but differential problems in identifying or using body parts are observed. More

remarkably, patients suffering from ideomotor apraxia that is usually associated with left parietal damage "have difficulty translating a meaningful gesture's visual appearance in terms of the human body and make errors creating correspondences between the demonstrated gesture and their own motor output" (p. 235).[1] Reed (2003), based on the neurological evidence, proposes that bodily representations constitute a different kind of representation transcending single sensory modes.

Tversky, Bauer Morrison and Zacks (2003) converges with Reed (2003) by ascribing a privileged status to body:

> In some ways, bodies are like other kinds of objects, especially those that move. But unlike other objects, which can only be experienced from the outside, bodies are experienced from the inside. We know what it feels like to move or be pushed, to have pleasure or pain, to feel cold or hot, to be sluggish or energetic. The privileged status of bodies may give them privileged cognition (Tversky, Bauer Morrison and Zacks, 2003, p. 224).

While the researchers above consider bodily representation distinctly as a cognitive commonality, it is claimed in this dissertation that there are individual differences in bodily communication performance as well. This dissertation investigates the ability of individuals to represent concepts –hence this dissertation looks into a specific aspect of communication: the ability to represent concepts and convey these concepts to others. In this study, after given a set of cognitive tests and personality tests successively, participants were instructed to play the 'Silent Movie' game with the words selected in a former pilot study by the researcher. Participants to the study were randomly assigned to either representer or inferer roles. After the test (questionnaire) data and the experimental data had been obtained, certain cognitive variables and personality

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[1] These gestures are not accompanied with verbal communication. In that sense they can be considered as bodily communication performances.

variables were statistically analysed, in-depth case studies focusing on the common bodily representations for the words used in the experiment were conducted and bodily representations that were not able to convey the concepts to the inferer were described.

1.1. Questions[2]

Why are there individual differences in people's bodily communication performance success? Why are some people good at bodily communication performance while others are worse at that? Which variables may be responsible for the variation in the bodily communication performance? Supposing that bodily communication is a kind of analogy making, what is the relationship between analogical reasoning and bodily communication performance? Which analogies would appear to dominate in bodily communication, and in what ways would the metaphorization and metonymization processes operate? Keeping in mind that bodily communication is a kind of expressivity, can the variables responsible for the individual differences in performance be introversion-extraversion and self-esteem? What is the relationship between the bodily communication performance and bodily communication expectancy? In this study, these questions are posed and an attempt to answer them is undertaken. Actually, this dissertation does not intend to draw on linguistics and psychology, but cognitive science. The term 'body language' or alike is deliberately avoided in this dissertation. The dissertation does not claim that bodily communication is a language on its own nor that bodily communication is 'so central' to human communication or

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[2] See Section 2.8 for elaborations and further specifications of these research questions as hypotheses.

cognitive processes. Nevertheless, a study of bodily representations can contribute to cognitive science studies by showing how and which cognitive processes underly the bodily communication and providing the particularities of bodily communication as pointed out by Reed (2003), and Tversky, Bauer Morrison and Zacks (2003).

1.2. Significance of the Study

The significance of this study can be put in four points: firstly, the variables responsible for the individual differences in bodily representation performance success are investigated. Secondly, the commonalities among the ways of bodily representations are investigated. Thirdly, a cognitive perspective is endorsed that relates the bodily communication to schema theory, metaphorical and analogical processes and metonymization processes; semantic considerations are discussed and accordingly constructing a bridge between bodily representations and cognitive processes is aimed. Fourthly, this study aims to propose a unifying account of bodily communication, expand the existing knowledge on bodily communication, drawing its theoretical resources from the inferentialism position, the notion of mind-reading and relevance theory, and develops a model of bodily communication that may be empirically testable in further studies with predictions for neurological cases such as autistics, somatotopagnosiacs, people with prefrontal lesions and people with formal thought disorder (FTD).[3] Before

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[3] The understanding of 'models' in this dissertation is also shared by Figure 1 of Kennedy et al. (2004) which is an indication of the links between the personality structure and stages of dissociations and Figure 2 of Meck (1996) which describes neuronal connections among the cortex, basal ganglia and thalamus. One can also check Glymour (2001) for the methods for

moving on to the purpose of the study, a clarification is due here on the understanding of model. Neither a computational model nor a cognitive model in the cognitive modeling sense is proposed in this dissertation. Greco (1994) points to a particular ambiguity in using the term 'model':

> [i]n cognitive psychology, the concept of model oscillates between a psychological sense (a knowledge-representation system) and an epistemological sense (a set of hypotheses, often limited in some aspect). However, these senses can be intermixed, since hypotheses may turn out to be a particular kind of representation or may, themselves, use some kind of representation (Greco, 1994, 25).

Let us make a long quotation to make the understanding of models in this dissertation clearer:

> We shall focus particularly on two senses of the concept.
> 1) A representation system is sometimes defined as a "model" when treating complex or entangled processes: we have memory models (in general or concerning particular kinds of memory), we find models of linguistic comprehension, and so on.
> In this sense, which we shall call *psychological*, the model's peculiarity (as compared with theories (…)) is that it is aimed at representing complex things more clearly, leaving out what is not essential or modifying some aspect of what is represented in order to improve our comprehension of it.
> 2) The other principal case in which the term "model" is commonly used is as an account of psychological aspects, like a "theory", but where this account is not robust, consistent, nor reliable enough to be considered a full theory. In other words, in this sense, which we call *epistemological*, a model *expresses a set of provisional or limited hypotheses*.
> The distinction between these two meanings of "model" is important here because we are actually dealing with different kinds of models, which have different scientific goals. Indeed, apart from the general and shared goal of improving knowledge and understanding, in both cases the relevant specific purposes are to *represent* (describe) a phenomenon on the one hand and to *explain* a phenomenon (give reasons why, establish connections with other phenomena) on the other.
> (…)
> We have also stated that in the sense 2 (*epistemological*) a model can be a kind of hypothesis or a set of hypotheses about a psychological phenomenon (and its goal is to explain). As we have outlined, in this sense "model" is similar to

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developing psychological models based on individual case studies, especially Chapter 11 entitled 'inferences to cognitive architecture from individual case studies.

"theory" but sometimes contrasted with it because these hypotheses are "limited" in some aspect. In particular, they can be:

(a) a set of tentative, heuristic hypotheses (which typically originate from a still weak empirical support); or

(b) a set of hypotheses about a narrow domain (e.g., the case of "micromodels" in the cognitivist paradigm); or

(c) simply a set of hypotheses or theories from some particular point of view (in this sense "behaviorist model" is simply synonymous with "behaviorist approach") (Greco, 1994, p 27).

Of course, the 'unifying' account proposed in this dissertation for bodily communication performance has its own limits as it is a 'model' in the second sense of the term above. It offers "a set of tentative, heuristic hypotheses" with a moderate sample size.

The nearest experimental work to this dissertation is Ricci Bitti and Poggi (1991). The significance of this dissertation compared with Ricci Bitti and Poggi corresponds to four points: Firstly, both commonalities and individual differences in bodily communication are analyzed in this dissertation. Secondly, bodily communication is articulated with metaphors, metonymies and analogy making in this dissertation. Thirdly, the processes underlying bodily communication along with bodily communication performance itself are investigated in this dissertation. Finally, deliberately avoiding a focus on cross-cultural differences among bodily representations, an explicitly cognitive orientation is endorsed in this dissertation.

1.3. Purpose of the Study

The purpose of this study is to investigate bodily representations throughout the eyes of cognitive science. Bodily representations are conceptualized within the intersection of personality studies and cognitive research. Secondly, by studying a medium of communication other than verbal

language, this study aims to contribute to the attempts for applying cognitive linguistic approaches on communication and semantics/pragmatics to nontraditional areas of human communication such as bodily communication.

1.4. Limitations of the Study

The limitations of the psychometrics is a major limitation of this study. The measurements for personality variables are indirect since they are self-report measurements. Unfortunately, there are no more reliable methods of measurement. Secondly, the study could not be conducted in cross-cultural settings. In further studies, it is necessary to obtain cross-cultural comparative data. Related to this limitation, cultural explanations are deliberately avoided as much as possible in this dissertation. This is due to the fact that studying the links between culture and cognition has its own problems for the time being and since culture and cognition studies are not in a fully fledged state, it would have been an overload for this dissertation to go into the problems of culture and cognition studies.[4]

Thirdly, since there is no standardized and reliable test of analogy adapted for Turkish setting other than Raven's Standard Progressive Matrices Test, the measurement of the individual differences in analogy making was constrained by the limits drawn by this test. Raven's Standard Progressive Matrices Test that employs figural relations questions for measurement is not comprehensive enough to contain other shades of human analogy making capacity. Fourthly, the literature review elaborating on the relations between bodily representations and cognition

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[4] cf. However, Kövecses (2005), and Strauss et al. (1998) for studies on culture and cognition.

is at times tenuous, since relevant studies are particularly sparse. Finally, the experience of the participants in 'Silent Movie' game was not asked in advance and this may be an intervening variable not considered in advance.

CHAPTER 2

LITERATURE REVIEW

2.1. Personality and Cognition

Albeit the number of studies investigating the links between personality and cognition is few, almost all theories of personality textbooks (e.g. Pervin, 1993; Ryckman, 1978; Schultz, 1976) devote a whole chapter to to George Kelly's theory of personality that introduced a cognitive approach to personality. According to Kelly, the basic unit of study in personality research is the notion of construct. That is why his theory is also known as the construct theory. Construct in the Kellyian sense is defined as 'a way of construing, or interpreting the world; (…) a concept that the individual uses to categorize events and to chart a course of behavior" (Pervin, 1993, p. 230).

One of the central tenets of Kelly's approach is that people act like scientists: they always hold theories about life events, self and others (Kelly, 1955a). They test hypotheses in everyday life although in a primitive and deficient way. The self-expectations are particularly influential in channeling and guiding people's

everyday life. The fundamental postulate of Kelly's theory is that "a person's processes are psychologically channelized by the ways in which he anticipates events" (Kelly, 1955a, p. 46). Besides Kelly's theory,[5] the cognitive reconceptualization of the psychoanalytic theory has been observed sporadically throughout the last half-century of the history of psychology (Bornstein, 1998; Bucci, 2000). By 1980s, an area of research under the name of 'cognitive personology' emerged though its influence was not long-lasting (McAdams, 1994). As the name implies, cognitive personology investigates the relationship between cognition and personality. Though this endeavor turns into a cognitivist reconceptualization of the existing personality theories at times, most of the time, it involves the role of cognitive processes in the structure of personality. Within these perspectives, cognitive commonalities as well as individual differences in cognition have been investigated.

The most influential line of research in this vein situates the concept of social intelligence in the center of the personality structure. The social intelligence approach to personality defines self as "a person's own representation of his or her own personality –what an individual's characteristic traits, motives, beliefs, attitudes, and values are" (Kihlstrom, Marchese-Foster and Klein, 1997, p. 154). Table 2.1 presents the concepts in this regard and their taxonomy in that line of research.

Declarative-semantic knowledge is "the abstract and categorical information that the person has gleaned over time concerning various social events and phenomena" including scripts which are defined as "the encoded

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[5] Cf. Green (2004) on other aspects of Kelly's personal construct psychology.

Table 2.1. A taxonomy of social intelligence (reprinted from McAdams, 1994, p. 489).

Declarative-Semantic *(Concepts)*	*Declarative-Episodic* *(Episodes)*	*Procedural* *(Rules)*
Implicit Personality Theory	Person Memory	
Social Categories Self Other persons Social behaviors Situations	Autobiographical Memory	Causal Attribution Judgmental Heuristics Hypothesis Testing Encoding-Retrieval
Scripts		

knowledge of stereotypic event sequences" (McAdams, 1994, p. 490) or as "a set of expectations about what will happen next in a well-understood situation" (Schank, 1995, p. 7). Schank (1995) adds that scripts "make clear what is supposed to happen and what various acts on the part of others are supposed to indicate. They make mental processing easier by allowing us to think less, in essence" (Schank, 1995, p. 7).

Under the heading of declarative-semantic knowledge, the conceptions of self and other are especially important. Each individual holds implicit personality theories applying both for himself/ herself and others. Personality variables such as self-expectancies, self-esteem, introversion-extraversion and anxiety are relevant for this component. They are especially relevant to encoding-retrieval

component since these personality variables are directly linked to scripts and schemata which are represented pieces of information at the time of production and retrieved pieces of information at the time of comprehension.

Declarative-episodic knowledge includes memory processes involving the self (autobiographical memory) and others (person memory). Procedural knowledge comprises causal attribution, judgmental heuristics, hypothesis testing and encoding-retrieval. People always resort to causal attribution in explaining everyday life events. As organisms with limited capacity of memory, they employ heuristics while making judgments. Consistent with Kelly's theory, they always test hypotheses in everyday life.

In concordance with the taxonomy of social intelligence presented above, a central concept in cognitive personology is the notion of schema. In fact, it is surprising that the notion of schema is lacking in the taxonomy of social intelligence presented in Table 2.1. A schema is a general representational structure that economizes the size of information when it is overwhelmingly excessive and fills in the gaps when the information is insufficient or missing.[6] It is a simplified model of the portions of the world (Keller, 1992). The relationship of schemata with expectations is clear: "[o]nce acquired, schemata in turn guide people by setting up their expectations for what usually will happen and helping them interpret what does happen and remember what in fact did happen on particular occasions, both typical and unusual" (McCabe, 1998, p. 281).

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[6] Though the boundaries between schemata and scripts are usually drawn in a clear-cut manner, there may be fuzzy boundaries. For instance, certain schemata can have scriptual components and certain scripts can have schematic components (see Subsection 5.2.6.2 for a case study).

Furthermore, since human mind has a limited cognitive capacity, it most of the time employs schemata in developing cognitions about both self and others.

After Kant's (1781/1978) introduction of the concept of schema as the mediator of perception and conception in philosophical discourse (Johnson, 1987; Nerlich and Clarke, 2000), the notion of schema had re-emerged 75 years ago within the context of text comprehension and summarization (Williams et al., 1997). In fact, that notion of schema emerged from the concept of body schema, proposed by the neurologist Henry Head to explain how human organism remembers the spatial relations of the body and external objects. Head had been given explicit credit by Bartlett who has been known as the introducer of the notion of schema to cognitive scientific studies by the 1930s (cf. Brewer, 2000).

A more recent approach endorses a social cognitive approach to personality where self is considered in terms of two metaphors: self as the central processing unit (CPU) metaphor and self as a parallelly distributed process (PDP) (Foddy and Kashima, 2002). By the CPU metaphor, human mind is conceived as a serial computer with a cybernetic theory of self-regulation. However the CPU metaphor extends beyond classical information processing approaches to human mind: firstly, it recognizes the self-awareness capacity of the human mind and secondly, affect and motivation that were excluded in the older information processing models are incorporated to the model as an integral part of cognition (Foddy and Kashima, 2002). According to this approach, the cognitive processes are universal but the content of cognition can cross-culturally vary.

According to Humphreys and Kashima (2002), when self is considered as a parallelly distributed process, multiple aspects of selfhood, ambiguity of its

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characteristics and boundaries and its embodiment are emphasized. The self is seen as a processing system satisfying multiple simultaneous constraints when activated (Mischel and Morf, 2003). In this study, multiple aspects of selfhood are put under focus as an explanation for a newly introduced variable: bodily communication expectancy. Before all, one has to keep in mind that the CPU and PDP metaphors of self are metaphors only employed in a number personality and self studies (Foddy and Kashima, 2002; Humphreys and Kashima, 2002; Mischel and Morf, 2003). They do not make any ontological claims about self nor do they have in mind the usual computational or neurological senses of CPU and PDP. These studies are relevant to this dissertation because they are going to serve as explanations for bodily communication expectancy finding along with Jopling (1997) and Simon (2004) in Subsection 5.1.4.

Under this section, the studies on personality and cognition were reviewed, Kelly's personal construct psychology, the social intelligence view, the notion of schemata and scripts and finally a few articles discussing CPU and PDP metaphors of self were introduced. In this dissertation 'the social intelligence' view will not be endorsed since before all, the term 'intelligence' is problematic (see footnote 9 below). Kelly's personal construct psychology will not be utilized directly since it is a rather old theory that needs to be integrated with the recent developments in cognitive psychology and cognitive science in general. Since such an integration is a huge task to be undertaken in a dissertation on bodily communication, the inspirations of Kelly's personal construct psychology will rarely be employed in this dissertation. On the other hand, the notion of schemata and scripts will be a central notion in conceptual discussions of the cases in

Chapter 5. Finally, as afore-mentioned above, PDP metaphor of self will be utilized as an explanation for bodily communication expectancy finding.

2.2. Metaphors, Analogies and Metaphorical Representations

A vast number of pages have been devoted to metaphor research in the relevant literature. The review below is narrowed down to those particularly relevant to bodily representations. The most general definition of metaphor seems to be a mapping between two cognitive entities on the basis of the similarities in the properties (Croft and Cruse, 2005, p. 55; Gentner, 1988, p. 48; Kimmel, 2002, p. 10). Another definition is quite simple: "the means by which one thing is described in terms of something else" (Long and Richards, 1999, p. x). The two systems involved in metaphors are called 'Topic' or 'Tenor' and 'Vehicle' respectively (Kittay, 1989, p. 16). Another designation is primary vs. secondary subject (Cameron, 1999, p. 13).[7]

When the last 30 years in which research on metaphors has flourished are considered, it is observed that there is a lot of confusion about what metaphor is as well as what it is not, which renders almost all attempts to demarcate the territory of metaphors in the cognitive linguistic universe impossible (Cohen, 1999, p. 399).

One idea in the background of this dissertation is the Aristotelian contention that metaphor coinage in contrast to metaphor usage is a matter of intelligence (Aristotle, 350 B.C./1991; Mahon, 1999). There are individual differences in metaphor coinage performance. Some individuals are quite

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[7] There are researchers employing the terms 'source' and 'target' as well (Forceville, 2002; Gust, Kühnberger and Schmid, 2006; Schäffner, 2004; Shen, 1999).

successful in metaphor coinage, while others are not. It is not only culture imposing conceptual metaphors on individuals; individuals create metaphors too. However, Mahon (1999) proposes the reverse. He claims that successful individuals in metaphor coinage do not invent metaphors on their own. They just unfold the latent mappings of a culture's implicitly accepted conceptual metaphors. For example, -he continues- in Emily Dickinson's poem 'I Taste a Liquor Never Brewed', the metaphors in the poem do not emerge out of nowhere; they refer to the conceptual metaphor LOVE IS A NUTRIENT (Mahon, 1999, pp. 79-80). This position ignores the creative capacity of individuals.[8] This is especially seen in bodily communication: Conveying concepts to others by using body necessitates creativity since the problem space is not defined beforehand.

2.2.1. Analogical Reasoning

Along with metaphor research, studies on analogical reasoning is particularly relevant for a dissertation on bodily representation since it is a potential candidate for the mechanism underlying bodily representations. The literature on analogical reasoning pertaining to bodily representation is therefore reviewed below.

The oldest meaning of the term 'analogy' dates back to the Ancient Greek mathematics in the sense of "proportion or the due ratio among number in a set"

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[8] However, one has to be cautious: there are multiple definitions of creativity (cf. Boden, 1998; Carruthers, 2002; Costello and Keane, 2000; Liu, 1998; Reuter et al, 2006; Simonton, 2000). This issue can also be subsumed under intelligence in that only people with high levels of intelligence can perceive and unfold the latent mappings. On the other hand, the term 'intelligence' also has various definitions (cf. Conte, 1999; Pomerol, 1997; Silvera, Martinussen and Dahl, 2001; Steels, 1995; Sternberg, 1997; Suzuki and Aronson, 2005; Szuba, 2001; Weinberg, 1989; White, 2000). Some of the researchers (e.g. Bates and Shieles, 2003; Colonia-Willner, 1998) consider Raven's Standard Progressive Matrices Test as an intelligence test. This consideration is not endorsed in this dissertation due to the ambiguity of the term 'intelligence'. Rather, Raven's Test is employed to determine the levels of analogical reasoning in this dissertation, converging with other researchers (e.g. Antonietti and Gioletta, 1995; van der Ven and Ellis, 2000).

and later on the notion of analogy had been applied to nonmathematical fields such as justice, poetry and virtue (Stafford, 1999). Hofstadter (2001) argues against approaches considering analogical thinking as a type of thinking among others. He asserts that analogical thinking is ubiquitous in all cognitive activities. It is the core of cognition (Hofstadter, 2001, p. 499; Holyoak, Gentner and Kokinov, 2001, p. 7; Mitchell, 1993, p. 1). Goswami (2001) adds that it is "the basis of much of our everyday problem solving" (p. 437) in the sense that many of the everyday life problems are solved based on previous examples.

The relationship between analogy and metaphor is far from clear. One of the views is that they are either one and the same thing or metaphors along with similes are the derivatives of the general analogical reasoning (Walsh, 1990, p. 237). Likewise, Hofstadter (2001) claims that metaphor and analogy are one and the same thing (p. 526).

Contrary to Walsh (1990) and Hofstadter (2001), Gentner et al. (2001) states that not all metaphors are analogies but the reverse is true: metaphors can be based on either relational commonalities i.e. analogies or single common object attributes (pp. 199-200). Secondly, since analogies are more structurally-dependent (i.e. more than one point map to the other points simultaneously), metaphors can be more variable in mapping (Gentner et al., 2001, p. 240). Keane and Costello (2001) further contrast analogies with conceptual combinations. Keane and Costello (2001) draw on the fact that conceptual combinations (e.g. 'jail job') are not analogical (compare this with 'my job is a jail.').[9] Likewise, bodily communication is not simply putting two concepts side by side. It involves

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[9] This idea is elaborated in Section 5.2.

domain mappings. However, since some of the conceptual combinations are analogical, Keane and Costello (2001) endorse the schema in Figure 2.1.
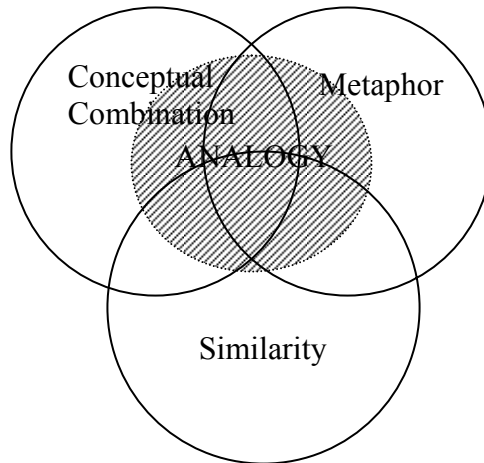
Figure 2.1. The relationship between concept combination, metaphor, similarity and analogy (Keane and Costello, 2001, Figure 1, p. 288).

The terminological confusion extends to the distinction between metaphors and similes. Similes are comparisons having 'like' construction whereas metaphors are not. However the researchers are not unanimous in drawing this distinction. Some of the researchers propose that the broad use of the term 'metaphors' includes 'similes' (Croft and Cruse, 2005, p. 212; Gentner et al., 2001, p. 243).

One influential theory, literal base theory, supported by empirical findings considers similes as referents of novel metaphors (e.g. "A mind is like a computer"), while metaphors are considered as referents of conventional metaphors (e.g. "A mind is a computer") (Chiappe and Kennedy, 2001). In the

historical process, some of the novel metaphors are conventionalized and categorized in the language –losing their simile form i.e. 'like' term. Experiments conducted by Gentner et al. (2001) demonstrate that novel metaphors take less time to process in simile form compared to metaphor form, while the reverse holds for conventional metaphors (Gentner et al., 2001, pp. 230-231). Furthermore, it is found that people view novel metaphors more metaphorical than conventional metaphors, and simile forms more metaphorical than metaphorical forms. Thus, in bodily communication, it is possible that less easily accessible ways of representations can be considered as novel metaphors in one sense and naturally can be thought to be more metaphorical by inferers. By implication, less easily accessible metaphors either take more time to infer or are unsuccessful attempts in terms of representation.

2.2.2. Metonymies

Antonio Barcelona, the chief proponent of the cognitive theory of metaphor and metonymy, which considers metaphors and metonymy as the two sides of the same coin, defines metonymy as "a conceptual projection whereby one experiential domain (the target) is partially understood in terms of another experiential domain (the source) included *in the same common experiential domain*" (Barcelona, 2000a, p. 4) though he adds that there is no agreed definition of metonymy among cognitive linguists. Some cognitive linguists' classification of metonymies is quite narrow (e.g. Lakoff, 1987; Ruiz de Mendoza Ibáñez and Pérez Hernández, 2001) while some others (e.g. Radden and Kövecses) provide definitions of metonymy that has fuzzy boundaries with the definitions of

metaphors. Barcelona (2000a) states that metaphors and metonymies can be instantiated either by linguistic units such as words, phrases, sentences and texts or by nonverbal ways such as bodily communication. Advocating a cognitive view of metonymy converging with Barcelona (2000a, 2000b), Radden and Kövecses (1999) warn against naïve views on metonymy considering it to be merely a linguistic phenomenon and proposes that it is a conceptual phenomenon and involves cognitive processes. This view of metonymy as a cognitive process is shared also by Langacker (1993).

Radden and Kövecses (1999) present 49 types of metonymies. They are tabulated in Table 2.2.[10]

Table 2.2. Types of Metonymy and Examples(*)

	Type of Metonymy	Example by Radden & Kövecses (1999)
1	FORM FOR CONCEPT	*dollar* for 'money'
2	FORM-CONCEPT FOR THING/ EVENT	Word *cow* for a real cow
3	CONCEPT FOR THING/ EVENT	concept 'cow' for a real cow
4	FORM FOR THING/ EVENT	Word form *cow* for a real cow
5	FORM$_A$-CONCEPT$_A$ FOR FORM$_B$-CONCEPT$_B$	*Bus*-'bus' for *bus drivers*-'bus drivers'
6	FORM-CONCEPT$_A$ FOR CONCEPT$_B$	*mother*-'mother' for 'housewife-mother'
7	FORM$_A$-CONCEPT$_A$ FOR FORM$_A$-CONCEPT$_B$	*White House*-'place' for *White House*-'institution'
8	FORM$_A$-CONCEPT$_A$ FOR FORM$_B$-CONCEPT$_A$	*UN* for *United Nations*
9a.	WHOLE THING FOR A PART OF THE THING	*America* for 'United States'
9b.	PART OF A THING FOR THE WHOLE THING	*England* for 'Great Britain'

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[10] As will be seen in Chapters 4 and 5, only some of these types of metonymy are relevant to this dissertation.

Table 2.2 (continued).

10a.	WHOLE SCALE FOR THE UPPER END OF THE SCALE	*You're speeding again.* for 'You are going too fast'
10b.	UPPER END OF A SCALE FOR THE WHOLE SCALE	*How old are you?* for 'What is your age?'
11a.	OBJECT FOR MATERIAL CONSTITUTING THE OBJECT	*I smell skunk.* for 'smell produced by a skunk'
11b.	MATERIAL CONSTITUTING AN OBJECT FOR THE OBJECT	*wood* for 'forest'
12a.	WHOLE EVENT FOR SUBEVENT	*Bill smoked marijuana.*
12b.	SUBEVENT FOR WHOLE EVENT	*Mary speaks English.*
13	PRESENT FOR HABITUAL	*Mary speaks English.*
14	PRESENT FOR FUTURE	*I am off.* For 'I will be off'
15a.	ACTUAL FOR POTENTIAL	*He is an angry person.* for 'he can be angry'
15b.	POTENTIAL FOR ACTUAL	*I can see your point.* for 'I see your point'
16a.	CATEGORY FOR A MEMBER OF THE CATEGORY	*The pill* for 'birth control pill'
16b.	MEMBER OF A CATEGORY FOR THE CATEGORY	*aspirin* for 'any pain-relieving tablet'
17a.	GENERIC FOR SPECIFIC	*Boys don't cry.*
17b.	SPECIFIC FOR GENERIC	*A spider has eight legs.*
18a.	CATEGORY FOR DEFINING PROPERTY	*jerk* for 'stupidity'
18b.	DEFINING PROPERTY FOR CATEGORY	*blacks* for 'black people'
19a.	CATEGORY FOR SALIENT PROPERTY	*Boys will be boys.* for 'unruly'
19b.	SALIENT PROPERTY FOR CATEGORY	*How do I find Mr. Right?*
20	PART OF A FORM FOR THE WHOLE FORM	*crude* for *crude oil*
21a.	AGENT FOR ACTION	To *author* a book; to *butcher* a cow
21b.	ACTION FOR AGENT	*writer*; *driver*
22a.	INSTRUMENT FOR ACTION	To *ski*; to *hammer*
22b.	ACTION FOR INSTRUMENT	pencil *sharpener*; *screwdriver*
23a.	OBJECT FOR ACTION	To *blanket* a bed; to *dust* the room
24a.	RESULT FOR ACTION	To *landscape* the garden
24b.	ACTION FOR RESULT	The *production*, the *product*
25	MANNER FOR ACTION	To *tiptoe* into the room

Table 2.2 (continued).

26	MEANS FOR ACTION	he *sneezed* the tissue off the table
27	TIME FOR ACTION	To *summer* in Paris
28	DESTINATION FOR MOTION	To *porch* the newspaper
29	INSTRUMENT FOR AGENT	The *pen* for 'writer'
30a.	THING PERCEIVED FOR PERCEPTION	*There goes my knee.* For 'there goes the pain in my knee'
30b.	PERCEPTION FOR THING PERCEIVED	*sight* for 'thing seen'
31a.	CAUSE FOR EFFECT	*healthy complexion* for 'the good state of health bringing about the effect of healthy complexion'
31b.	EFFECT FOR CAUSE	*slow road* for 'slow traffic resulting from the poor state of the road'
32	STATE/EVENT FOR THING/PERSON/STATE CAUSING IT	*She was my ruin.*
33	EMOTION FOR CAUSE OF EMOTION	*She is my joy.* for 'she makes me be happy'
34	MENTAL/PHYSICAL STATE FOR OBJECT/PERSON CAUSING IT	*You are a pain in the neck.* for 'you give me pain'
35	PHYSICAL/BEHAVIORAL EFFECT FOR EMOTION CAUSING IT	*She was upset.* for 'something made her upset'
36	SOUND FOR EVENT CAUSING IT	*The car screeched to a halt.*
37a	SEEING SOMETHING DONE FOR MAKING SURE THAT IT IS DONE	*See that he gets his money.*
37b.	ACT OF FORMING A PERCEPT FOR PERCEPT	*to take a look*
38	PRODUCER FOR PRODUCT	*I've got a Ford.* for 'car'
39a.	INSTRUMENT FOR PRODUCT	Did you hear *the whistle*? for 'sound of the whistle'
39b.	PRODUCT FOR INSTRUMENT	To turn up *the heat* for 'the radiator'
40	PLACE FOR PRODUCT MADE THERE	*china, mocha, camembert*
41a.	CONTROLLER FOR CONTROLLED	*Schwartzkopf* defeated Iraq.
41b.	CONTROLLED FOR CONTROLLER	*The Mercedes* has arrived.
42a.	POSSESSOR FOR POSSESSED	*That's me* for 'my bus'.

Table 2.2 (continued).

42b.	POSSESSED FOR POSSESSOR	*He married money.* for 'person with money'
43a.	CONTAINER FOR CONTENTS	*The bottle is sour.* for 'milk'
43b.	CONTENTS FOR CONTAINERS	*The milk tipped over.* for 'the milk container'
44a.	PLACE FOR INHABITANTS	*The whole town showed up.* for 'the people'
44b.	INHABITANTS FOR PLACE	*The French hosted the World Cup Soccer Games.* For 'France'
45a.	PLACE FOR INSTITUTION	*Oxford won't publish the book.* For 'Oxford University Press'
45b.	INSTITUTION FOR PLACE	*I live close to the University.*
46a.	PLACE FOR EVENT	*Waterloo* for 'battle fought at Waterloo'
46b.	EVENT FOR PLACE	*Battle* name of the village in East Sussex where the Battle of Hastings was fought
47	WORDS FOR THE CONCEPTS THEY EXPRESS	*A self-contradictory utterance*
48	MODIFIED FORM FOR ORIGINAL FORM	*effing* for *fucking*
49	SUBSTITUTE FORM FOR ORIGINAL FORM	Do you still love me? – Yes I *do*.

(*) The examples are from Radden and Kövecses (1999).

Barcelona (2000b) proposes that "every metaphorical mapping presupposes a conceptually prior metonymic mapping, or to put it differently, that the seeds for *any* metaphorical transfer are to be found in a metonymic projection" (p. 31). In that sense, metaphors in bodily communication may also involve metonymic projection, where representers use their body parts to represent salient properties of concepts rather than the concept as a whole. For instance, if the word to be represented is bird, people represent its wings rather than beaks, feathers, crest etc.

On the other hand, upon schematization, i.e. upon the "process that involves the systematic selection of certain aspects of a referent scene to represent the whole, while disregarding the remaining aspects" (Talmy, 2000a, p. 177) not all parts of a concept can be communicable when metonymized. Computational metonymy researchers Markert and Hahn (2002) propose that "[m]etonymic interpretations that conform to a schema are preferred over metonymic ones that do not" (p. 154). Back to the example of bird, to be communicable, the metonymic performance should be consistent with the schemata of inferers: wings may be more consistent with bird schemata. Furthermore, the property performed should be sufficiently salient to communicate the word. Convergingly, the definition of metonymy by experimental psychologists Frisson and Pickering (1999) emphasizes the notion of salience: "[i]n a metonymic construction, one salient aspect of an entity is used to refer to the entity as a whole or to some other part of the entity" (pp. 1366-1367).

The terms 'salience' and 'distinctiveness' will be interchangeably in this dissertation consistent with Radden and Kövecses (1999). Salience is considered to be perceptual while distinctiveness is considered to be conceptual. This perception/conception distinction melts down in the case of bodily communication where salience of bodily communication performance is intertwined with distinctiveness of concepts bodily represented.

Mentioning the central significance of salience in metonymy, Radden and Kövecses (1999) emphasize also the notion of distinctiveness: "The more distinct vehicle and target are, the better is their relationship suited to be exploited metonymically" (Radden and Kövecses, 1999). Langacker (1993) further adds

that selection of vehicles and targets in metonymic processes is not arbitrary, but governed by cognitive principles:

> Metonymy allows an efficient reconciliation of two conflicting factors: the need to be accurate, i.e., of being sure that the addressee's attention is directed to the intended target, and our natural inclination to think and talk explicitly about those entities that have the greatest cognitive salience for us (Langacker, 1993, p. 30).

Commenting on Langacker (1993), Radden and Kövecses (1999) classify the first factor as the communicative concern and the second factor as the cognitive concern. The communicative aspect consists of clarity and relevance according to Radden and Kövecses (1999), and the cognitive aspect involves various figure-ground relations that are conceptually conventionalized such as rare over less rare, common over less common, important over less important, basic over non-basic. Radden and Kövecses (1999) state that "[t]he communicative principle that ensures maximal ease of accessing the intended target via a metonymic vehicle may be stated in preferential terms as clear over obscure".

In her investigation on the use of metaphors in American Sign Language, Taub (2000) assumes a central role to the process of schematization for a given concept on the basis of the image selected along with the significant properties. Taub (2000) suggests a model of iconicity in ASL. This dissertation concerns only with the notion of iconicity among the points she makes about ASL (cf. Subsection 5.2.8 to see a more detailed treatment of Taub, 2000).

The schematized concept is accordingly implemented by the communicative tools provided by signing space, i.e. hands, fingers, face, torso etc. In Taub's

understanding of American Sign Language, the concepts are schematized to be communicable by nonverbal means.[11]

2.2.3. Models of Analogy

Apart from these models and explanations, there are computational theories proposing other models: while developing a parallel distributed model of analogical reasoning, Holyoak and Thagard (1995; 1990) propose that there are three simultaneous constraints in the system:

1) Structural Consistency: There has to be an isomorphism between source and target in the sense that the components of the source should map those of the target (p. 209).

2) Semantic Similarity: The target and the source should be similar in meaning (p. 209). Even a cursory investigation of structural similarity shows that structural similarity alone is not enough for analogical mapping. The two propositions may be syntactically isomorphic but completely different in meaning (Stevenson, 1993, p. 225). For instance, "this knife is better than that knife" and "this person is better than that person" have the same syntactic structure, but an analogy based solely on their structural similarity would be misleading.

3) Pragmatic Centrality: The purpose of the analogical reasoners is central both for producing the analogy and comprehension (Holyoak and Thagard,

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[11] A detailed review of studies on sign language is not presented here as; 1) The linguistic units in sign languages are explicitly conventionalized whereas in bodily communication, conventionalization is not so much observed.
2) Not all the communication in sign languages are iconic; resort to phonetic features exist as well, while phonetics is not employed in bodily communication.

1990, p. 210). The exposition of the outputs of ACME (Analogical Constraint Mapping Engine) shows how important the pragmatic information is for processing of analogies. Without the pragmatic information such as the intention of analogy making, the program maps the components of the source and target wrongly (Holyoak and Thagard, 1990, p. 215).

On the other hand, incremental analogy theory lists another set of constraints on analogical reasoning (Keane, 1990b, p. 223):

1) Working Memory Constraint: The working memory constraint involves the working memory capacity.

2) Control Constraint: Analogical reasoning is realized in a step-by-step way.

3) Verification Constraint: Analogical reasoning involves a process of verification by which the preferred mapping between the source and the target is evaluated.

4) Similarity Constraints: Similarity constraints mainly involve semantical similarities.

5) Pragmatic Constraints: The purpose of the analogizer is critical as proposed by Holyoak and Thagard (1990).

6) Structural Constraints: Structural constraints refer to the mapping of the components of the source and those of the target in the same way, Holyoak and Thagard (1990) proposes.

The first three constraints distinguish the incremental analogy theory among other relevant theories. Keane (1990b) states that analogy theories without

the working memory constraint are problematic since they do not set a maximum point of cognitive capacity in analogical reasoning. Therefore they do not focus on performance and henceforth are unable to explain failures in analogical reasoning (p. 223).

Reconsidering the theories of analogical reasoning, Holyoak and Thagard's (1990) and Keane's (1990b) approach to analogical reasoning is purely propositional while Walsh's (1990) experiments show that imagery effects operate at least in some of the domains of analogical reasoning (Keane, 1990a). Walsh (1990) found that forming the imagery for the analogy improves the metaphorical comprehension performance by time. Participants who had been instructed to form images were quicker at comprehending the metaphor at hand in contrast to those instructed to form mental comparisons (Walsh, 1990, p. 243). This dissertation goes one point further from Walsh's approach and investigates analogy making by body that cannot be explained solely in terms of propositions or static images. A particular representation of a sequence of events in a specified way can also be metaphorical (Forceville, 2005; 2002).

An overlooked property of everyday life metaphors is that most of the time, the underlying structure is incomplete in the sense that at least one of the components of the two systems that maps onto each other is not clear. Walsh (1990) considers 'analogical completeness' as the central variable in understanding and producing metaphors (pp. 239-240). He gives the example: "The car is a lame horse." The underlying analogy is: "Horse: Lame::Car:?" (p. 240). Although most of the everyday life analogies are incomplete, we can understand the metaphors based on them. The incompleteness of the analogy

behind a metaphor reflects itself in the times for comprehending the metaphor (Walsh, 1990, p. 240). This implies that bodily communication performance based on incomplete analogies would be harder to process.

The notion of 'analogical completeness' is further complicated by the notion of 'analogical paradox' proposed by Dunbar (2001):

> [s]ubjects in many psychology experiments tend to focus on superficial features when using analogy, whereas people in nonexperimental contexts, such as politicians and scientists frequently use deeper more structural features (Dunbar, 2001, p. 313).

Dunbar (2001) proposes that the reason for this paradox is that analogy generation involves the retrieval of structural properties from the memory while analogy comprehension involves detection of superficial aspects (Dunbar, 2001, p. 314; Wilson et al., 2001, p. 126). In other words, the paradox is based on the 'encoding-decoding' asymmetry. In further experimental studies, Dunbar (2001) discarded other possible explanations such as that analogy generators are experts in the topic and that is why they are focused on structural relations (pp. 323-324). However, the pronunciation of 'encoding-decoding' asymmetry does not solve the riddle: This asymmetry implies that not all the analogies in everyday life are comprehended fully or they are not comprehended at all (p. 331). It is possible that this analogical paradox exists in bodily representations too. It may be that representing and inferring bodily representations may involve different cognitive processes much in the sense of the 'encoding-decoding' asymmetry above. In other words, bodily communication performance and inference may have different underlying processes (see Figure 5.4).

In brief, regardless of what kind of a relationship exists between analogies and metaphorical representations, one of the proposals of this dissertation is that

analogical and metaphorical processes underly bodily communication and this dissertation will subscribe to the cognitive theory of metaphor and metonymy as presented in Subsection 2.2.2 in explaining bodily communication (see Section 2.8 for hypotheses and Section 5.2 for metonymization processes).

2.3. The Embodied Cognition View

Obviously, a review of metaphor that does not elaborate on the embodied cognition view pioneered and developed by Lakoff (1987) and Lakoff and Johnson (1999; 1980a; 1980b) would be incomplete. As this view is a reaction to what they call 'the traditional view of cognition and metaphor', it is better to see how Lakoff and Johnson (1999) characterizes the so-called 'traditional view':

> 1. Metaphor is a matter of words, not thought. Metaphor occurs when a word is applied not to what it normally designates, but to something else.
> 2. Metaphorical language is not part of ordinary conventional language. Instead, it is novel and typically arises in poetry, rhetorical attempts at persuasion, and scientific discovery.
> 3. Metaphorical language is deviant. In metaphor, words are not used in their proper senses.
> 4. Conventional metaphorical expressions in ordinary everyday language are "dead metaphors," that is, expressions that once were metaphorical, but have become frozen into literal expressions.
> 5. Metaphors express similarities. That is, there are preexisting similarities between what words normally designate and what they designate when they are used metaphorically (Lakoff and Johnson, 1999, p. 119).

Against the 'traditional view', Lakoff and Johnson propose that "metaphor is pervasive in everyday life, not just in language but in thought and action. Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature" (Lakoff and Johnson, 1980a, p. 3) and that "[m]etaphor is primarily a matter of thought and action and only derivatively a matter of language" (Lakoff and Johnson, 1980a, p. 153).

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The embodied cognition proposal has been pronounced many times in Lakoff and Johnson's works: "the peculiar nature of our bodies shapes our very possibilities for conceptualization and categorization" (Lakoff and Johnson, 1999, p. 19); "the body is not merely somehow involved in conceptualization but is shaping its very nature" (Lakoff and Johnson, 1999, p. 37); "[t]he embodied mind hypothesis therefore radically undercuts the *per*ception/*con*ception distinction. In an embodied mind, it is conceivable that the same neural system engaged in *per*ception (or in bodily movement) plays a central role in *con*ception. That is, the very mechanisms responsible for perception, movements, and object manipulation could be responsible for conceptualization and reasoning" (Lakoff and Johnson, 1999, pp. 37-38); "[r]eason and conceptual structure are shaped by our bodies, brains, and modes of functioning in the world. Reasons and concepts are therefore not transcendent, that is, not utterly independent of the body" (Lakoff and Johnson, 1999, p. 128).

Basically, Lakoff and Johnson propose that perceptual and motor systems ground and shape the conceptual systems. Body is the only means to form concepts. Since concepts are shaped by limitations and potentials provided by the anatomy of human body, all knowledge that human beings possess are framed by bodily experiences. Lakoff and Johnson endorse a non-Cartesian view where the study of human mind without considering human body is discarded.

Gibbs (2001) after summarizing the embodied cognition view as "people create embodied, metaphorical representations from their phenomenological experiences of the body and their sensori-motor interactions with the physical world. People's metaphorical understanding of certain abstract concepts is

intimately tied to image schemas that partly arise from recurring bodily experiences" (p. 152) criticizes the embodied cognition approach by two points: first, Gibbs (2001) adheres to the weak view of embodied cognition which states that people along with metaphorical concepts harbor nonmetaphorical concepts that can be independent of metaphorical concepts and can be linked to metaphorical concepts by conceptual structures as well. In contrast, the strong view claims that all human concepts are metaphorical and there are no independent, nonmetaphorical representations (cf. also Haser, 2005, pp. 197-198).

The second objection by Gibbs (2001) pertains to the particular difficulty this dissertation has met in reviewing the previous studies and while attempting to integrate them in a single, unified framework: the embodied cognition approach[12] is extremely individualistic in terms of explanatory granularity and it considers cognition solely 'in the head'.Gibbs (2001) points out that

> [t]he inseparability of mind, body, and world, and of cognitive and cultural models, points to the important idea that metaphor is an emergent property of body-world interactions, rather than arising purely from the heads of individual people. We need not talk of metaphor as only part of our mental representations for concepts (e.g. anger), or as expressed by language (*e.g., She bursted with anger*). Metaphor is a kind of tool that arises from body-world interactions which we can "re-experience" in an embodied way, and is not simply accessed from long-term memory, in different ways in different real-world situations (Gibbs, 2001, p. 156).

It can also be added that most of the studies on embodied metaphors are unevenly distributed towards metaphor production,[13] in that sense, the studies are

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[12] One can ask at this point whether embodied cognitions are identical to embodied metaphors. As stated above, the strong view suggests that they are identical while the weak view suggests that embodied metaphors constitute a subset of embodied cognitions only.

[13] Metaphor usage and metaphor coinage are not identical. Metaphor coinage involves the use of nonconventional metaphors; in that sense, metaphor coinage is a subset of metaphor usage.

lopsided. Metaphor comprehension is a highly neglected area and Lakoff and Johnson's works while aiming at constructing a theory of metaphor does not provide a model of metaphor comprehension.

Gibbs (2001), as an alternative, suggests that theories of cognition "should acknowledge that they [cognitive structures] are dynamic systems of "structural couplings" which model how people interact with the world, including different linguistic environment" (p. 152), and "(…) that embodied metaphor arises not from within the body alone, and then represented in the minds of individuals, but emerges from bodily interactions that are to a large extent defined by the cultural world" (p. 155), and proposes that metaphor "(…) is not simply accessed from long-term memory (…)", it "is an emergent property of body-world interactions, rather than arising purely from the heads of individual people" (p. 156). One can add to Gibbs (2001)'s position that contrary to isolated examples in Lakoff and Johnson's works, communication is a dynamic process "that cannot be accounted for entirely in terms of general knowledge structures. Rather, the participants have knowledge, awareness, and a focus that are particular to that moment" (Dray and McNeill, 1992, p. 465). Communication is, by definition, online and interactive and this central aspect of communication is especially pronounced in bodily communication where bodily representations are constructed by the interaction of the communicators.

Steen (2001), another critique of Lakoff and Johnson's works, points out a particular difficulty or deficiency that he attempts to circumvent: Lakoff and Johnson's rhetoric aims to be persuasive and accordingly provides a long inventory of conceptual metaphors. However, the works do not include any

procedure to move from linguistic metaphors to conceptual metaphors,[14] leaving aside the more fundamental issue of identification of conceptual metaphors in a corpus. To solve this problem, Steen (2001) proposes a five step procedure that consists of (1) metaphor focus identification, (2) metaphorical idea identification, (3) nonliteral comparison identification, (4) nonliteral analogy identification, (5) nonliteral mapping identification.

Naturally, Lakoff and Johnson's works (i.e. Johnson, 1987, and Lakoff and Johnson, 1999; 1987; 1980a; 1980b) are not exempted from harsher or bitter criticisms. In Haser (2005), the most comprehensive and telling criticism of Lakoff and Johnson's works, both the content and the polemical rhetoric of those works are closely criticized by direct quotations; and their particular deficiencies and the reasons for the negligence of them in philosophical circles are exposed.[15] Haser (2005)'s basic claims are that they do not solve the basic problems in metaphor research such as the demarcation between metaphor and metonymy; they evade the issues in cognitive linguistics; they do not have strong empirical support; they do not refer to their critiques fully (actually, this is Grady (2002)'s complaint in his otherwise positive review of Lakoff and Johnson (1999)) and when they do, they present them as straw men to be easily knocked down (this is Weld (1988)'s disillusionment in his otherwise positive review of Lakoff and Johnson (1987)), and finally, converging with Jäkel (2001) that their works are

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[14] In a recent book, Littlemore and Low (2006) make the difference clear: Conceptual metaphors "are not linguistic expressions, but rather relationships like PEOPLE ARE PLANTS that underlie expressions, such as 'she's blooming' or 'he's a budding journalist'' (Littlemore and Low, 2006, p. 12).

[15] Here are Haser's philosophical objections: those works' philosophical references are loose; they treat the so-called 'Western philosophy' as a uniform entity ignoring its heterogeneity; they are philosophically vague, self-contradictory and blatantly false to the scandalous degree to classify Husserl, the phenomenologist who coined the term 'objectivist' in his critique of the philosophy of his times, and Kant under one and the same category of 'objectivists'.

not original and they have precursors in history of philosophy, psychology and linguistics that they do not refer in their works. For instance, the idea that metaphors are omnipresent in everyday language can be traced back as far as to even Aristotle, who is portrayed in Lakoff and Johnson (1999) as the proponent of the traditional view of metaphor (Haser, 2005, p. 76). Even the idea of conceptual metaphors have been proposed a number of times by various philosophers and psychologists prior to Lakoff and Johnson. Furthermore, Haser's critique continues, Lakoff and Johnson's works do not provide criteria for negative evidence, i.e. they do not allow testability, and Lakoff and Johnson do not revise their views by the recent empirical works contrary to their position.[16]

Anyway, it is obvious that Lakoff and Johnson's works can be considered as relevant for bodily communication by two points: First, the notion of conceptual metaphors can be utilized to explain bodily communication. However, this dissertation is not about whether human mind works metaphorically or not, and thus does not work on for instance body part metaphors, such as metaphors of eyes or heart though they are metonymical.

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[16] For instance, Lakoff and Johnson do not address Keysar et al.'s (2000) experimental findings. Keysal et al.'s findings cast doubt on central assumptions of the conceptual metaphor theory.
Haser (2005)'s proposals are significant for cognitive science. So let us see where she goes into after criticizing Lakoff and Johnson's works: according to Haser (2005), metaphorical expressions can be adequately explained without postulating the existence of conceptual metaphors. She rejects the view that "we can specify a number of conceptual metaphors which are prestored in our conceptual system" (p. 208). Reviewing other criticisms of Lakoff and Johnson's works, she calls their view of metaphor as 'the maximalist view of metaphor' since that view claims that conceptual metaphors are stored in the mind. In contrast, the minimalist view, asserting that the maximalist view would ascribe a huge cognitive burden to mind that has a limited processing and memory capacity, proposes that knowledge of the source and target domains and the properties that can be transferred onto one another triggered by particular context is sufficient to produce and comprehend metaphors. Keysar et al. (2000) found that people do not need to rely on conceptual metaphors in ordinary conversation. Finally, referring to various psychological studies, Haser (2005) suggests that minimalist view is more empirically supported.

Second, the search for components other than similarity to unravel the mechanisms underlying metaphors is a valuable insight to explain bodily communication. On the other hand, contrary to cursory looks at Lakoff and Johnson's works, the notion of embodied cognition is not relevant to the study of bodily communication albeit the nominal connection. As afore-mentioned, embodied cognition view claims that cognition is grounded by bodily experiences, but it is not a theory specifically constructed to explain communication by body. Of course, this does not mean that embodied cognitions do not affect bodily communication (see for instance, Roth and Lawless, 2002), but it is clear that the framework offered by Lakoff and Johnson provides only a particularly limited set of theoretical tools in explaining bodily communication. As afore-mentioned above, this dissertation follows Gibbs (2001)'s and Radden and Kövecses (1999)'s understanding of metaphoric and metonymic processes.

2.4. Personality Variables

2.4.1. Introversion-Extraversion

Eysenck depicts a typical extravert as a person who "is sociable, likes parties, has many friends, craves excitement, acts on the spur of the moment, and is impulsive" while a typical introvert as a person who "tends to be quiet, introspective, reserved, reflective, distrustful of impulsive decisions, and prefers a well-ordered life to one filled with chance and risk" (Pervin, 1993, p. 283).

What makes the introversion-extraversion relevant for an investigation of bodily representation performance is the fact that introverts are considered to be physically less expressive while extraverts are expected to exhibit the reverse

trend (Opt and Loffredo, 2003, p. 566). However, linking introversion-extraversion with bodily representation performance casts particular difficulties: when personality research on the one hand and the cognitive scientific studies on the other are considered, it is observed that cross-references are rare. They have developed almost independently save a limited number of studies. Endler (2000) thinks that this is because of methodological differences (p. 377): Personality research relies on questionnaire data and clinical observations while adjacent cognitive scientific studies employ either an experimental methodology or long intelligence tests such as Wechsler Adult Intelligence Scale-Revised (WISC-R). Endler (2000) adds that the possibility of interdisciplinary connections between the two areas are further reduced due to the fact that personality researchers are interested in the typical performance (i.e. average performance rather than extreme performances) while cognitive scientists have considered the maximum performance of the individuals (p. 386).[17] When the two areas meet in the hands of personality theorists, most of the time, the categories for interpreting other people's behaviors and the inferential mechanisms are emphasized (Endler, 2000, p. 383; Langston and Sykes, 1997, 141-165). As stated in Chapter 1, the most remarkable theory within this tradition is obviously Kelly (1955a, 1995b). Kelly (1955a, 1995b) considered individuals as naïve scientists making inferences in a continuous way throughout their interaction with others.

In this vein, a remarkable juncture has been pointed out by Cantor (1990) who considered the classical domains of personality theories as the cases for individuals' problem solving abilities. According to her, only such an approach

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[17] Actually the claim that cognitive scientists always work on the maximum performance is controversial.

would capture the potential inventiveness of individuals. That is, the postulation of a cognitively richer structure is a must to capture the range of creative solutions provided by the individuals (Cantor, 1990, p. 737). It seems that this is in accord with Fodor and Pylyshyn's (1988) objections to PDP approaches to the effect that a satisfactory theory should provide an adequate characterization of the generative capacity of the human beings and the richness of their cognitive structure.

Another way to combine the personality theories and cognitive scientific approaches is via the notion of self-schema whereby the individuals construct their self image vis-à-vis other individuals. For instance, the self-schema of shyness activates the past failures of the shy individuals at social settings and perpetuates itself (Cantor, 1990, p. 738).

After considering the intersections of the personality research and cognitive scientific studies, a more detailed exposition of the variable introversion-extraversion is due: In the most general sense, introverts are focused on their inner experiences while extraverts' attention is directed towards the environment and the outer entities (Opt and Loffredo, 2003, 566). Opt and Loffredo (2003) calls introverts as 'socially disadvantaged' individuals since they have found that introverts have perceived themselves as individuals poor in communication (p.567).

Riggio and Friedman's (1986) study in which nonverbal skills are measured by the Affective Communication Scale that is based on tallying of the occurrence of nonverbal features such as eye contact and head movements adds more to the relevance of introversion-extraversion to bodily representations. They have found that

[m]ale subjects who were nonverbally skilled and extraverted tended to display more outwardly focused and fluid expressive behaviors, and made more favorable impressions on judges, than did males who scored low on the measures of nonverbal skills and extraversion. Females who were nonverbally skilled displayed more facial expressiveness, which led to more favorable initial impressions (Riggio and Friedman, 1986, p. 421).

However, one should be cautious in interpreting these results: Riggio and Friedman (1986) investigate nonverbal behavior accompanying speech. Thus it may be unwarranted to extrapolate these findings to bodily representation performance. Furthermore, it would be misleading to investigate bodily representation performance on the basis of the frequency of nonverbal features such as the number of nodding while talking or the number of one's nonvolutional grasping of his/her chin while talking about philosophy.

Though the studies above implicate a relationship between extraversion and nonverbal communication, studies to the contrary are not nonexistent: Lieberman and Rosenthal (2001) found that introverts are poorer in nonverbal 'coding' but only when nonverbal 'coding' is given as a secondary task. Although this finding seems to be confusing at first blush, it can be considered to be due to attentional resources. Introverts may have or employ more attentional resources to nonverbal 'coding' while for extraverts, it is almost automatic and thus exhausts less attentional resource. Besides, Lieberman and Rosenthal (2001)'s explanation is that the difference between extraverts and introverts in nonverbal 'coding' is not due to nonverbal 'coding' ability per se but the difference in working memory efficiency. The working memory of extraverts operates more efficiently (Lieberman and Rosenthal, 2001, p. 294). Thus, they argue, the difference between the extraverts and introverts are due to the central executive component

of Baddeley's (1998; 1986) model of working memory.[18] To sum up, Lieberman and Rosenthal's prediction for the bodily representation performance would be that introverts and extraverts would not differ since they do not differ in one-task conditions.

2.4.2. State-Trait Anxiety

Kelly defines anxiety as "the recognition that the events with which one is confronted lie outside the range of convenience of one's construct system".[19] According to Kelly, anxiety "is seen as a structural limitation within a person's construct system" (Bannister and Mair, 1968, p. 32). One is anxious when one is without constructs, when one has "lost his structural grip on events," when one is "caught with his constructs down" (Pervin, 1993, p. 242). The reason behind anxiety is likewise elaborated by Kelly in cognitive terms: "anxiety occurs when the person recognizes that his or her construct system does not apply to the events being perceived" (Pervin, 1993, p. 248).

State anxiety is the temporary anxiety characterized by a corresponding emotional response while trait anxiety is the permanent anxiety more in the sense of being a personality variable (Endler et al., 1992, p. 833; Endler et al., 1991). State anxiety is normally higher when there is a stress-inducing environment such as an experiment (Hishinuma et al., 2000).

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[18] Lieberman and Rosenthal (2001)'s conclusion on the relationship between extraversion and central executive component is based on their experimental work (Study 4) in which they employed N-back task and digit span task.
[19] As stated in Section 2.1, a construct is "a way of construing, or interpreting the world; (…) a concept that the individual uses to categorize events and to chart a course of behavior" (Pervin, 1993, p. 230).

It has been found that trait anxiety and self-esteem are inversely related (Pastore, Fisher and Friedman, 1996). Converging with this finding, Greenberg et al. (1992) proposes that self-esteem functions as a buffer to anxiety. To test this proposal, three consecutive experiments were conducted. In the first one, the participants who were provided positive personality feedback exhibited lower levels of anxiety due to the heightened levels of self-esteem. In the subsequent experiments, it is shown that increased self-esteem reduced the levels of anxiety for an anticipated painful shock (Greenberg et al, 1992). However, one should be cautious in interpreting these results: in those experiments, state anxiety is investigated and not trait anxiety.

2.4.3. Self-Esteem

Self-esteem is the "favorable or unfavorable attitude toward oneself" (Rosenberg, 1962, p.135). It is strongly correlated with extraversion. Higher levels of self-esteem are associated with higher levels of extraversion (Francis and James, 1996; Pullman and Allik, 2000). This is accounted by the possibility that extraverts are more positively regarded in the society and this leads to higher levels of self-esteem (Francis and James, 1996).

Based on the empirical finding indicating the inverse relation between trait anxiety and self-esteem, Rosenberg (1962) proposes that the direction of the relation is from self-esteem to trait anxiety rather than the reverse: Low self-esteem leads to anxiety (Rosenberg, 1962, p. 140). He has found that people with low self-esteem are more likely to have unstable self-pictures. Thus, it is a theoretically as well as empirically established fact that people who are less

certain what they are like are likely to experience higher levels of anxiety (Rosenberg, 1962, p. 141). That is the main reason for the relevance of self-esteem for any study of bodily representation performance: people with lower self-esteem are less likely to expect themselves to be able to communicate certain concepts non-verbally, i.e. by body. Thus, it is possible that the levels of self-esteem predict bodily communication expectancy levels.

In contrast, if the bodily communication capacities are implicit both for people with low and high self-esteem in the sense of being unaware of their capacities, then the levels of self-esteem would not predict the bodily communication expectancy levels.

Finally, an equally plausible possibility comes from B. Simon's Self-Aspect Model of Identity (SAMI). Contrary to the two possibilities mentioned above, SAMI considers self as a multiple, heterogeneous and flexible entity. Self consists of multiple self-aspects and the self-aspects are constructed throughout interaction with others. Thus, according to SAMI, self is not an hard-wired entity, it is flexible. Self-aspects are shaped and constructed by social and ecological relational structures (Simon, 2004). Thus, SAMI does not preclude the possibility of a negative relationship between self-esteem and bodily communication expectancy.[20]

2.5. Bodily Representations

Of the numerous references that can be cited in this proposal, Ricci Bitti and Poggi (1991) who suggested that there may be at least 6 strategies for bodily

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[20] See Subsection 5.1.4 for more on SAMI and its relation to bodily communication expectancy.

representations is of central importance. They instructed the participants to communicate certain words by using their body only –like in the game 'Silent Movie'. They observed that there are six strategies for bodily communication:

1) Form: Some concrete objects can be communicated by their forms. The participants can outline their contours in a communicative way. The typical example is a ball.

2) Referent's typical actions: Persons, animals or moving things can be communicated by their typical actions. Examples are teacher, dog, bird, singer, and football player.

3) Representer's typical actions: In this category, it is not the referent that is imitated but how a person would act with the object that the keyword corresponds. For instance, salt, telephone, cigarette, pencil.[21]

4) Perceivable effects: If the referent is not directly observable, one can resort to its effect(s). Wind would be the typical example. A flying hat would communicate it.

5) Negating the opposite concept: In some cases, while the base object is not feasible for bodily communication, its antonym can work. Democracy is the typical example. People have communicated it by a Hitler or a Mussolini greeting and then negating it.

6) Cultural Representations: Those are specific to cultures and accordingly less relevant to cognitive science. The example for the Italian culture is that one

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[21] Actually, Ricci Bitti and Poggi used the term 'speaker's typical actions', but it seems that this is a misnomer. Bodily communicators do not literally speak. Furthermore, the examples for the category i.e. salt, cigarette and pencil except telephone do not involve speaking. Thus the term has been revised to fit the bodily communication model elaborated in this dissertation.

participant had communicated 'lie' by mimicking Pinocchio's long nose (Ricci Bitti and Poggi, 1991, pp. 447-450).

What Ricci Bitti and Poggi (1991) did not seem to consider was that the first five categories were clearly cognitive operations transcending individual tokens. There is a problem. That is how to communicate a concept by body. The problem space is the body itself and the goal state is the accomplishment of communication of the entity by body. That is why these five categories are worth further enquiry. As Talmy (2000b) puts it: "[t]he production of a particular communication at any given moment is seen as the "vector resultant" of a set of simultaneous conditions within the producer: her communicative goals in correlation with the availability of suitable expressive means" (Talmy, 2000b, p. 337).

The possibility of the existence of underlying cognitive structures behind bodily communication is implicated by the most anthropologically oriented work cited in this dissertation: Although he does not work on the idea and just passes to another topic in haste, Kendon (1993) claims that

> There is some evidence that different speakers may use similar gesticulatory forms when speaking about the same material (…) but these similarities appear to arise because of commonalities in strategies of graphic and pantomimic expression rather than from shared conventions (p. 50).

Granted communication and therefore meaning is public, the notion of Theory of Mind (ToM) investigated especially by developmental psychologists is central to bodily communication and the meaning emanating from it. ToM is the ability of attributing thoughts and goals to others (Leslie, Friedman and German, 2004). ToM is consistent with Kelly's personality theory since they both propose

that people always cast hypotheses and test them in everyday life about other people. ToM theories add developmental flavor to this 'human-as-scientist' model by experimentally showing that these cognitive tendencies can be traced back to infancy. Explaining and predicting the thoughts, feelings and causal mechanisms of others is central to the survival of the human species.

Along with the function of explanation and prediction, ToM serves as the demarcatory line between one's cognitions and other's cognitions (Keysar, Linn and Barr, 2003; Symons, 2004). The individual cogitator continually measures the similarities and differences between his/her cognitive processes and cognitions, and others'. Accepting there may be differences between self and other, ToM is based on a demarcation between one's cognitions and other's cognitions and it is a widely known fact that autistic children lack ToM. The autistic children's communicative failures are attributed to their lack of ToM (Sodian, Hülsken and Thoermer, 2003). A recent experimental study showed that the communicative failures indicative of lack of ToM or its insufficiency were peculiar neither to autistic children nor children in general: adults too exhibited individual differences in their ToM with some of them almost always successful in predicting others' cognitive processes and cognitions, and some others less proficient in prediction (Keysar, Linn and Barr, 2003). Since bodily communication as a type of communication is a bidirectional process, the meaning emerging from the bodily performances will be influenced by ToM.

The notion of mind-reading is associated with ToM in the relevant literature (Breheny, 2002; Carston, Guttenplan and Wilson, 2002; El Kaliouby and Robinson, 2005; Gallese and Goldman, 1998; Langdon, Davies and Coltheart,

2002; Sperber and Wilson, 2002). In bodily communication, the inferers try to read the mind of the performer to get the concept represented by the bodily performance. Thus, mind-reading is central to an understanding of inference processes in bodily communication.

Some researchers use the terms 'theory of mind' and 'mind-reading' interchangeably and define them as "the ability to attribute mental states to others by observing their behavior" (El Kaliouby and Robinson, 2005, p. 582), while some others provide slightly different definitions: Theory of Mind "is the activity of representing specific mental states of others, for example, their perceptions, goals, beliefs, expectations, and the like" (Gallese and Goldman, 1998, p. 495). For the purposes of this dissertation it does not make any difference to define 'mind-reading' identical to 'theory of mind' or not, but it does make a difference to see how mind-reading is related to certain theories of pragmatics as elaborated in the next section.

2. 6. Mind-Reading and Pragmatics

In a special issue of *Mind and Language*, Langdon, Davies and Coltheart define pragmatics and elaborate the epistemic ground of pragmatics as a theory of performance:

> Pragmatics is that part of the theory of performance that focuses on the way in which language users draw on non-linguistic knowledge or assumptions, and engage in inference, in order to perpetrate and interpret utterances that convey messages that are not exhausted by encoded literal linguistic meaning (Langdon, Davies and Coltheart, 2002, p. 69).

In this context, Wilson (2000), one of the major figures in pragmatics research considers mind-reading in verbal communication as a part of ToM. In the

abstract of Sperber and Wilson (2002), the relevance theorists outline the

modularity of mind-reading proposals in pragmatics for verbal communication:

> The central problem for pragmatics is that sentence meaning vastly underdetermines speaker's meaning. The goal of pragmatics is to explain how the gap between sentence meaning and speaker's meaning is bridged. This paper defends the broadly Gricean view that pragmatic interpretation is ultimately an exercise in mind-reading, involving the inferential attribution of intentions. We argue, however, that the interpretation process does not simply consist in applying general mind-reading abilities to a particular (communicative) domain. Rather, it involves a dedicated comprehension module, with its own special principles and mechanisms. We show how such a metacommunicative module might have evolved, and what principles and mechanisms it might contain (Sperber and Wilson, 2002, p 3).

They propose that verbal communication cannot be explained solely on the

basis of 'encoding' and 'decoding' of messages. Apparently there is no sufficient

input for a 'code' to be 'decoded' in a particular way (Carston, Guttenplan and

Wilson, 2002). The receiver of the message interprets the message per se as well

as its contextual extensions such as the representer's intentions, implications etc.

In that sense, human communication depends on metacommunicative devices

such as mind-reading (Sperber and Wilson, 2002). A semantic gap inherently

exists in bodily communication too. This dissertation shares Sperber and Wilson's

views or let us say their solution to the problem of underspecification in human

communication. Therefore the terms 'encoder' and 'decoder' will be deliberately

avoided, and the word-pair 'expresser' and 'inferer' will be preferred and the

terms 'encoder' and 'decoder' will be put in quotation marks when their use is

somehow unavoidable.

In a recent paper, Wilson (2005) refines the relevance theoretic framework

and "outlines an alternative, relevance theoretic account on which mind-reading is

a dedicated inferential module, and pragmatics is a sub-module of the mind-

reading module, with its own special-purpose principles and mechanisms" (p. 1129). Wilson (2005) draws attention to the observation that not only implicit communication, but also explicit communication involves inferential intention recognition.

Wilson (2005) adds that "[t]he inferential approach to pragmatics treats understanding an utterance as a special case of understanding intentional behaviour: the hearer explains the speaker's communicative behaviour by identifying the intention behind it" (p. 1132).

According to relevance theory, the two principles of relevance are the Cognitive Principle of Relevance which is that "[h]uman cognition tends to be geared to the maximization of relevance" (Wilson, 2005, p. 1139) and the Communicative Principle of Relevance which is that "[e]very utterance (or other act of overt communication) communicates a presumption of its own optimal relevance" (Wilson, 2005, p. 1139). Accordingly, both an informative and a communicative intention are involved in overt communication. The informative intention is "[t]he intention to inform an audience of something" (Wilson, 2005, p. 1139) and the communicative intention is "[t]he intention to inform the audience of one's informative intention" (Wilson, 2005, p. 1139).

Sperber and Wilson (2002) propose that the nature of non-verbal communication is different from verbal communication: verbal communication involves a mixture of inference and coding, while non-verbal communication most of the time is purely inferential. Sperber and Wilson (2002) provide the following example that would completely fit cases of bodily representations:

> For example, when I point to the clouds to indicate that I was right to predict that it would rain, or hold up my full glass to indicate that you need not open a new

bottle on my account, there is no way for you to decode my behaviour, and no need for you to do so. You could work out what I intend to convey by a straightforward exercise in mind-reading, by attributing to me the intention that would best explain my behaviour in the situation (…).Thus, metapsychological inference plays a central role in human communication, both verbal and non-verbal (Sperber and Wilson, 2002, p. 7).

In another work, the relevance theorists state converging ideas:

In many non-verbal cases (e.g. pointing to one's empty glass, failing to respond to a question), use of an ostensive stimulus merely adds an extra layer of intention recognition to a basic layer of information that the audience might have picked up anyway. In other cases (e.g. inviting someone out to a drink by pretending to raise a glass to one's lips), the communicator's behaviour provides no direct evidence for the intended conclusion, and it is only the presumption of relevance conveyed by the ostensive stimulus which encourages the audience to devote the necessary processing resources to discovering her meaning. Either way, the range of meanings that can be non-verbally conveyed is necessarily limited by the range of concepts the communicator can evoke in her audience by drawing attention to observable features of the environment (whether preexisting or produced specifically for this purpose) (Wilson and Sperber, 2002, p. 260).

Recanati (2002) does not converge with the inferentialism position presented above. He claims that most of the human communication can be explained comprehensively without recourse to the notion of inference. Recanati's position fails due to two related points: First, it presupposes a serial processing position, i.e. either pragmatics or semantics *comes first*. The processes may well be parallel; pragmatic and semantic processes may be substantiated simultaneously. Actually, relevance theorists do not postulate a serial position (Breheny, 2002, p. 179; Carston, 2002, p. 143; especially Wilson and Sperber, 2002, pp. 261-262, p. 264). Secondly, Recanati presumes that semantics and pragmatics as areas of cognitive studies are categorically distinct. This has been falsified by a number of works which show that semantic and pragmatic phenomena are indistinguishable (Canale and Tuzet, 2005; Gross, 2005; Korta and Perry, 2006; Manor, 2001).

This indistinguishability particularly applies for bodily communication: the representations of meaning and the representations of representer's representations i.e. metarepresentations are enmeshed. As Gross (2005) states, no clear-cut distinction between processing of meaning and of intention can be made.

There are two main reasons for why bodily communication is thought to be a topic of pragmatics in this dissertation. Firstly, in the experiments conducted in this dissertation, which are going to be described in Chapter 3 and Chapter 4, all the trials of bodily communication, i.e. 1320 trials show that the performers either calibrate their representations or move on to new ways of representations whenever the inferers cannot get the concepts bodily represented. This means communication goes on here and not simply signing words (see Section 5.2 for details). Secondly, Breheny (2002) offers a reconceptualization of pragmatics to better comport with cognitive science by focusing on cognitive processes such as inference, mind-reading, theory of mind etc. A more recent article, Breheny (2006), is a further step in such a cognitive reconceptualization: it offers an attempt to integrate pragmatics and the notion of folk psychology. Actually, the special issue of *Mind and Language* which is discussed under this section is dedicated to the links between pragmatics and cognitive science to offer a cognitive account extending the pragmatic approaches that view pragmatics as an area more or less related with verbal communication only (Carston, Guttenplan and Wilson, 2002).

Finally, since both the expresser and the inferer is aware of the limitations of body as a communicative tool, it can be firmly stated that bodily communication involves rational inference. Bodily communication inherently

involves rational inference because the inferer does not take the representer's performance as it is; rather, s/he is aware of the fact that the performance is a way to communicate the concepts within the limitations of body as a medium of communication.

Escandell-Vidal (2004), intending to construct a comprehensive pragmatic approach comprising both cognitive and socio-cultural frameworks of pragmatics, considers inference as the central process in human communication. As a response to the endeavors to reduce socio-cultural pragmatics to cognitive pragmatics and vice versa, Escandell-Vidal (2004) objects that they are irreducible to each other but can be treated as different sub-areas within a single pragmatics framework. Accordingly, she offers a modular account of pragmatic processes based on three postulated sub-systems, inferential system, social system and grammatical system, and concentrates on first two of these three systems. In her model, inference closes the gap between 'encoded' meaning and linguistic interpretation within the contextual background. The inferential system is a processing device as a computational system processing representations in Escandell-Vidal's model.[22] Within the inferential system, the notion of accessibility is central to inference processes:

> From the whole set of internalised assumptions of an individual only a few are accessible at a given time: those stored in working memory. A piece of information can be made accesible, or more accessible, through linguistic decoding and situational activation: put in other words, accessibility is a function of linguistic and situational information over working memory. Only more salient, activated assumptions are allowed into the inferential system. Thus,

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[22] Escandell-Vidal (2004) justifies her model by theoretical arguments in pragmatics and communication science. She does not ground her model on experimental works of mili-seconds or seconds level. However, she accepts in advance that her model is just a sketchy proposal, not a fully grounded characterization (see Section 1.2 for two senses of the term 'model'). Her model has heuristic value.

accessibility involves both a restriction of the search space and a hierarchical organisation of the available information (Escandell-Vidal, 2004).

Escandell-Vidal (2004) outlines the inferential system as in Figure 2.2.
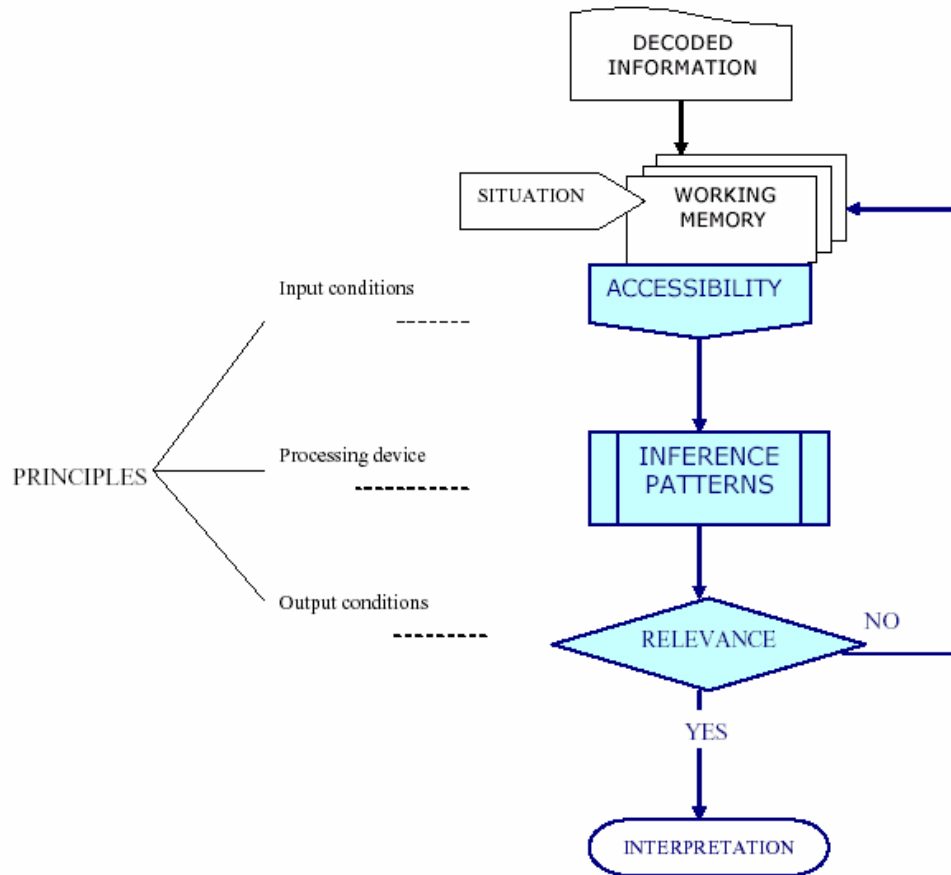
Figure 2.2. The inferential system in Escandell-Vidal's model (from Escandell-Vidal, 2004).[23]

As shown in Figure 2.2, Working Memory comprising 'decoded' information works on the situation. Accessibility as an input condition directly affects the inference patterns. The inference mechanism checks the relevance of the output. If the inference is not relevant, the Working Memory works on the

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[23] The flowchart notation may be misleading: There is no indication in Escandell-Vidal (2004) to the effect that the use of different boxes in Figure 2.2-Figure 2.4 refers to formal computational distinctions.

situation again. If the inference is relevant, an interpretation is composed as an output.

The second subsystem i.e. social system that Escandell-Vidal (2004) elaborates on consists of both long-term and short-term components:

> The short-term, on-line task is that of analysing and categorising incoming pieces of behaviour. The way in which each extralinguistics situation is characterised (according to variables such as setting, relationship to the partner, purpose, etc.) is crucial to the readjustment of communicative activity: if a situation is understood as one of, say, requesting, the sequence of actions will tend to adjust to the internalised corresponding schema; otherwise, it will receive a negative evaluation (Escandell-Vidal, 2004).

Escandell-Vidal (2004) outlines the social system as in Figure 2.3.
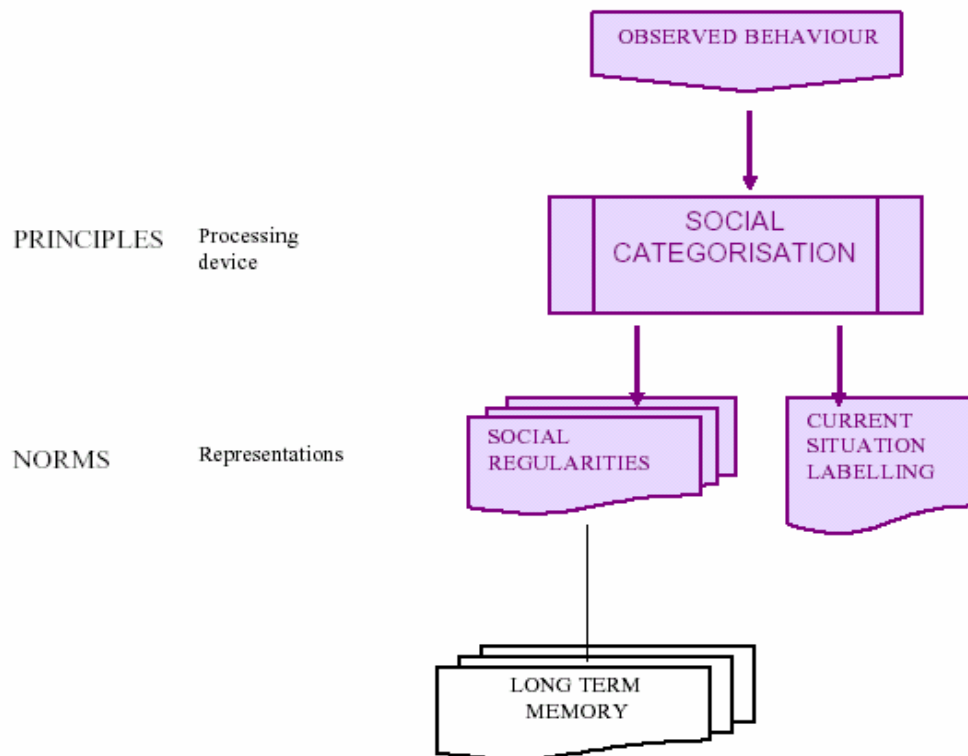
Figure 2.3. The social system in Escandell-Vidal's model (reprinted from Escandell-Vidal, 2004).

As shown in Figure 2.3, the observed behaviour is first of all socially categorized. The social regularities are represented by dint of long term memory, and the current situation is labelled.

Escandell-Vidal's proposal can be viewed as an example for Talmy's notion of overlapping systems (Talmy, 2000a; 2000b): The inferential and social systems as mechanisms share certain features beside their differences. For a unified model of pragmatics, Escandell-Vidal (2004) combines the inferential and social models as in Figure 2.4.

Although Vidal (2004)'s model seems to be completely irrelevant to Taub (2000)'s model, they hold a Janus-like complementarity: albeit this is not stated by the two researchers mentioned, the former concentrates on the inference side of non-verbal communication, while the latter explains the expression side of it. Postponing a fuller elaboration of these two models they deserve until the discussion chapter, it should be stated in advance that these models are not blindly approved in this dissertation. An integrative attempt will take place in Chapter 5.

2.7. Summary of the Literature Review

To sum up, there are various approaches that try to link personality research and cognitive studies. This endeavour provides an interesting interdisciplinary expansion on the one hand, but poses its own peculiar difficulties as well, as reviewed in Section 2.1 and Subsection 2.4.1. In this dissertation, the notion of schemata and scripts are going to be a central notion in the conceptual analyses in Chapter 4 and Chapter 5, and certain studies on self and personality (Foddy and Kashima, 2002; Humphreys and Kashima, 2002; Mischel and Morf,

2003; Simon, 2004) are going to be employed to provide an account of some of the statistical data in Section 5.1.

Secondly, various models and theories that have been developed about metaphors, analogies and metonymies were surveyed and reviewed in Section 2.2. Such a review would have been incomplete without a survey of the recent view, the embodied cognition view and thus, Section 2.3 has been devoted to the presentation and discussion of this view. This dissertation situates itself in similar lines with Gibbs (2001)'s approach to metaphorical processes and Barcelona (2000a; 2000b), and Radden and Kövecses (1999)'s cognitive theory of metonymy.

Fourthly, personality variables that have been investigated in this dissertation, viz. introversion-extraversion, state-trait anxiety, and self-esteem are presented in Section 2.4. Consistent with the most prominent precursor of the cognitive theories of personality, Kelly (1955a; 1955b) and converging with the pioneer of self-esteem research, Rosenberg (1962), a cognitive understanding of the personality variables above is endorsed in this dissertation, but such a cognitive understanding does not mean that these personality variables are no longer personality variables but cognitive variables when conceptualized cognitively. A vast number of studies exists that consider personality variables from a psychoanalytic (cf. Blatt and Auerbach, 2000; Shapiro, 1989; Mullen et al., 1999; Yeomans and Levy, 2002), neurological (cf. Aitken, Simpson and Burns, 1999; Di Piero et al., 1997; León-Carrión, 1998; Ratti et al., 1999) and social (Asendorpf and Wilpers, 1998; Barenbaum, 2000; Helson and Soto, 2005; Helson et al., 2002; Neyer and Voigt, 2004; Winter, 2005) point of view.
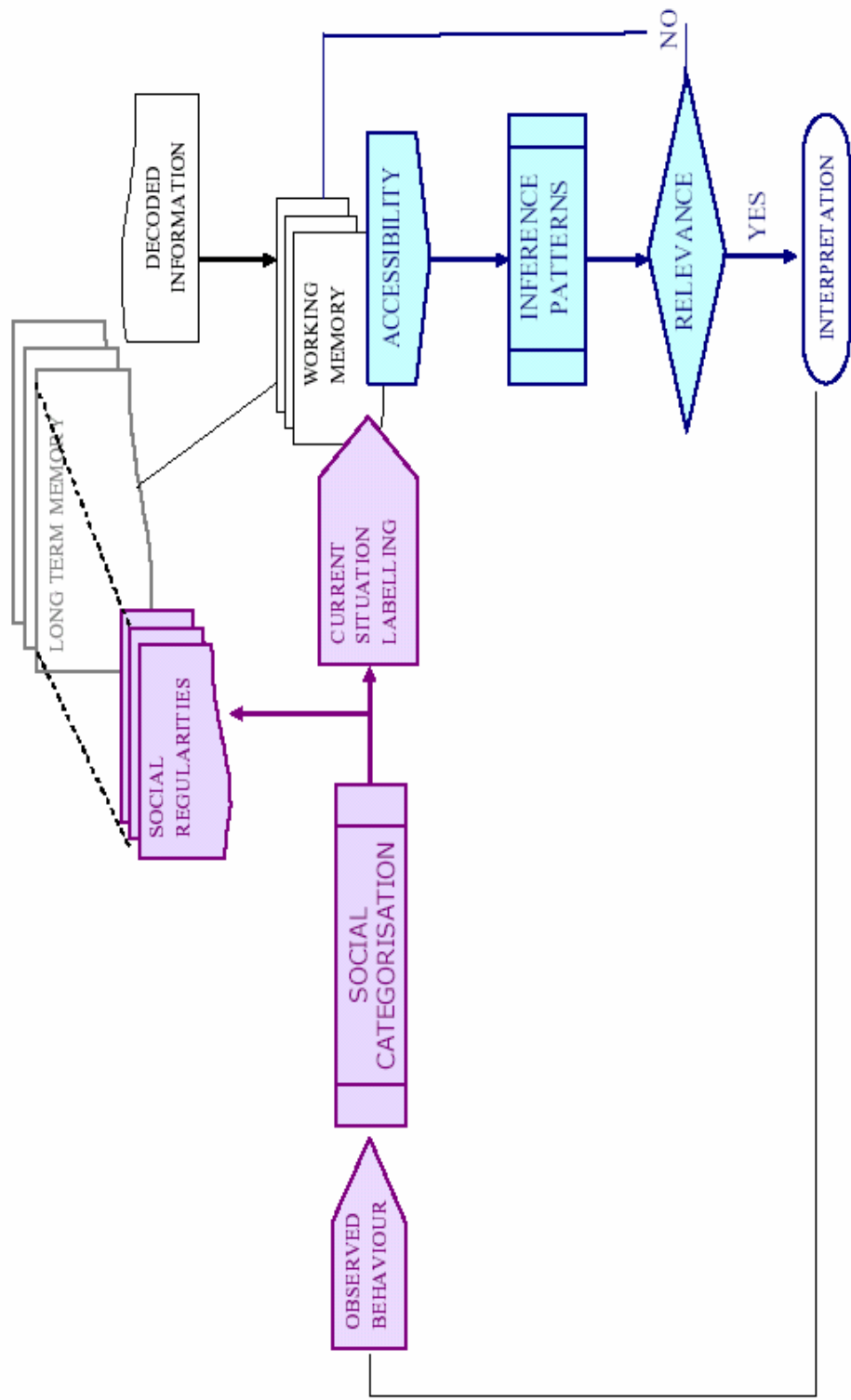
Figure 2.4. The architecture of an integrated pragmatic theory (reprinted from Escandell-Vidal, 2004).

In Section 2.5, the main topic of this dissertation, i.e. bodily representations are presented and reviewed. Six strategies for bodily communication were exposed and exemplified. Ricci Bitti and Poggi's study which is the nearest academic neighbour of this dissertation is discussed, since the six strategies they proposed are going to be central in the analyses and discussions of Chapter 4 and Chapter 5.

Finally, in the preceding section, the notion of mind-reading in pragmatics along with Theory of Mind is elaborated and discussed especially on the basis of the special issue of Mind and Language, dedicated to the link between pragmatics and cognitive science. This is succeeded by the introduction of Escandell-Vidal (2004)'s model and an evaluation of her heuristic model of pragmatics is left for Chapter 5. Thus, it is now appropriate to spell out the hypotheses of this dissertation.

2.8. Hypotheses and Purposes

Based on the literature review, it is expected that self-esteem is either related or not related to bodily communication expectancy scores since two proposed explanations have opposite predictions among the two possibilities, the first one is that low levels of self-esteem may lead to lower bodily communication expectancy scores and the second one is that people regardless of their level of self-esteem may have lower bodily communication expectancy scores since they may not be knowledgeable of their bodily communication capacity. Normally, from a falsificationist point of view, statement of hypotheses by an 'either or' construction would be avoided since it is tautological. However, as stated in

Subsection 2.4.3, two competing explanations exist in the literature: Firstly, people with lower self-esteem may be less likely to expect themselves to be able to communicate concepts by body consistent with Rosenberg (1962). Secondly, bodily communication capacities may be implicit for all people regardless of the levels of self-esteem. In that sense, 'either or' construction here is justified: The result of the 'either or' hypothesis will show which explanation is more corroborated.

Secondly, a relationship between introversion-extraversion and bodily representation performance is expected but the relationship is mediated by state-trait anxiety.

Thirdly, a relationship is expected between analogical reasoning and bodily representation performance.
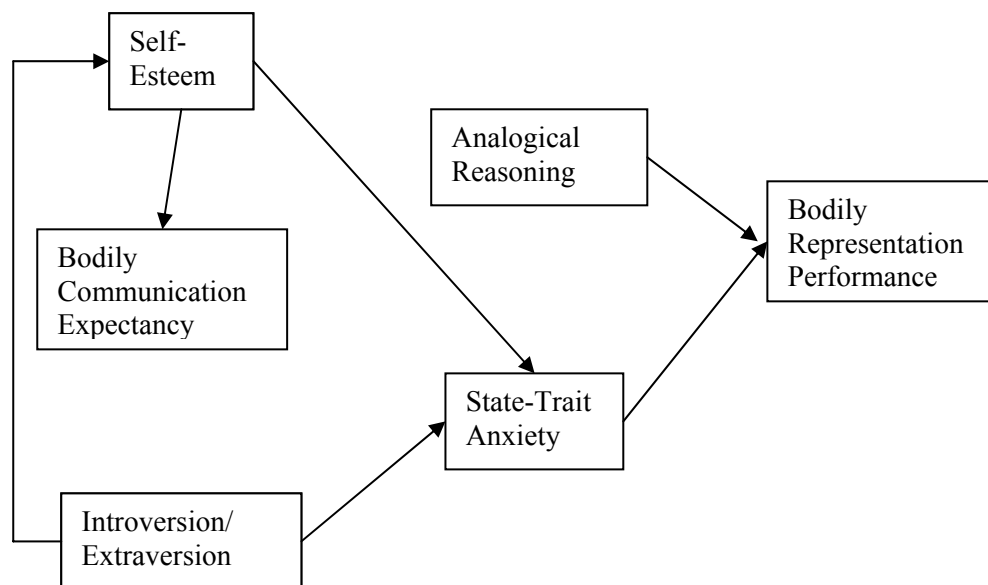
Figure 2.5. The independent, mediator and dependent variables of the study.[24]

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[24] In statistics, the term 'mediator variable' refers to a variable by which one variable affects another one (see Muller, Judd and Yzerbyt, 2005).

Finally, no relationship is expected between bodily communication expectancy and bodily representation performance since it is proposed that people are not knowledgeable about their bodily representation capacities. In addition, although not directly related to the study, an inverse relationship is expected between self-esteem and anxiety based on previous findings. Likewise, a positive relationship is expected between extraversion and self-esteem based on the findings and theoretical considerations by Rosenberg (1962). Figure 2.5 shows the independent, mediator and dependent variables of this study.[25]

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[25] Although it cannot be stated in a clear hypothesis form, in addition to these hypotheses, certain cognitive processings are expected to occur in bodily communication performance such as selection, metonymization, mind-reading and inference. These processes will be clarified in Chapter 5.

CHAPTER 3

METHOD

3.1. Participants

218 Atılım University students participated to the first phase of the study. Contrasting sampling method[26] was used to trim the number of participants. 115 participants were enlisted for the final (experimental) phase and finally 88 students participated to the experiment. 60 participants (68.2%) were male and 28 participants (31.8%) were female. The ages of the samples ranged from 17 to 26 (Mean age= 22).

3.2. Instruments

To determine the levels of introversion and extraversion, Eysenck Personality Questionnaire which comprises introversion and extraversion among its five dimensions (Akert and Panter, 1988; Gershuny and Sher, 1998, p. 254; Öner,

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[26] In the contrasting sampling method, the participants with middle scores are removed from further analyses and only those with extreme scores on both sides are called for the second phase. This method is employed to facilitate the comparison.

1997, pp. 382-383) was administered. To determine the levels of analogical reasoning, Raven's Standard Progressive Matrices Test was administered.

To determine the levels of state-trait anxiety, the State-Trait Anxiety Inventory was used. Rosenberg Self-Esteem Scale was used to determine the levels of self-esteem. It consists of 10 items involving self-esteem (Corwyn, 2000; Greenberger et al., 2003; Miyamoto et al., 2001). The set of items comprises 5 positive and 5 negative (i.e. reverse) items (Corwyn, 2000; Greenberger et al, 2003). It takes 5-10 minutes to fill in.

Finally, bodily communication expectancy ratings were used to check to what extent the participants are knowledgeable about their bodily communication capacities. The ratings comprise the words that the participants were expected to communicate non-verbally. They were asked how much they feel they are likely to represent 'Word A' non-verbally. The words were in 6 sets corresponding to Ricci Bitti and Poggi's 6 cognitive strategies. Each set included 5 words. The words were determined by the researcher after an informal pilot study that asked informants to nonverbally communicate various words that may correspond to each of the representational strategies.[27] As a consequence, the rating consisted of 30 (6 X 5) words. Words were given in Turkish. Table 3.1 shows the words used and the corresponding strategies.

3.3. Procedure

In the first phase of the study, 218 were given a set of tests successively. The set comprises the following instruments in the following order: Eysenck

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[27] In the pilot study, words were selected on the basis of whether they corresponded to Ricci Bitti and Poggi's 6 cognitive strategies.

Table 3.1. Words used in the study and expected strategies.

Words Used in the Study	The Representational Strategy
Bird (kuş)	Referent's Typical Actions
Fish (balık)	Referent's Typical Actions
Dragon (ejderha)	Referent's Typical Actions
Singer (şarkıcı)	Referent's Typical Actions
Boxer (boksör)	Referent's Typical Actions
Woman (kadın)	Shape
Tree (ağaç)	Shape
Pyramid (piramit)	Shape
Statue (heykel)	Shape
Beard (sakal)	Shape
Coldness (soğukluk)	Effect
Hotness (sıcaklık)	Effect
Wind (rüzgar)	Effect
Mud (çamur)	Effect
Lightness (aydınlık)	Effect
Phone (telefon)	Represener's Typical Actions
Salt (tuz)	Represener's Typical Actions
Weight (halter)	Represener's Typical Actions
Pencil (kalem)	Represener's Typical Actions
Comb (tarak)	Represener's Typical Actions
Festival (bayram)	Culture
Worship (ibadet)	Culture
Funeral (cenaze)	Culture
Wedding (düğün)	Culture
Wise (bilge)	Culture
Patience (sabır)	Negation
Adult (yetişkin)	Negation
Health (sağlık)	Negation
Life (yaşam)	Negation
Lie (yalan)	Negation

Personality Inventory, State-Trait Anxiety Inventory, Rosenberg Self-Esteem Scale, bodily communication expectancy ratings, and Raven's Standard Progressive Matrices Test.

After the evaluation of Raven's Standard Progressive Matrices Test and Eysenck Personality Inventory scores, 4 possible combinations of subsamples are determined ((1) high analogical capacity and high extraversion, (2) high

analogical capacity and low extraversion, (3) low analogical capacity and high extraversion, (4) low analogical capacity and low extraversion).

Participants with scores lower than 30 on Raven's Standard Progressive Matrices Test were eliminated from the study, since it is probable that the low scores were the consequence of low motivation rather than cognitive processes alone. This elimination is justified by the fact that those with scores lower than 30 failed in the simplest analogy questions that can be immediately answered by primary school students. Thus, those with scores lower than 30 were treated as outliers and eliminated from further analyses. Finally, the scores less than 50 on Raven's Standard Progressive Matrices Test were treated as the low score group and more than 50 as the high score group.[28]

Participants with scores lower than 7 on extraversion items of Eysenck Personality Inventory were treated as the low extraversion group and those with scores 11 and 12 were treated as the high extraversion group.

As stated above, this contrasting methodology formed 4 groups: Among the participants, 24 were from the first group; 20 were from the second group; 24 were from the third group and finally 20 were from the fourth group. In each group, the participants were randomly assigned to the performer group or the inferer group. That means, in the first and third group, 12 pairs were formed and in the second and fourth group, 10 pairs were formed.

In the experimental setting, the participants assigned to the performer role are asked to rate their bodily communication capacities on Bodily Communication

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[28] This cut-off point is also justified by the fact that similar scores are obtained in previous studies. For example, Morris and Alcorn (1995) in their brain-imaging study obtained a mean score of 49.2 in Raven's Test with 49 participants. Raven (2000) provides a review of standardization studies on Raven's Test since 1938.

Expectancy ratings instrument prior to the experiment to check the stability of the bodily communication expectancy ratings See Subsection 4.1.1 and Table 4.1.

Finally, the participants are instructed to play 'Silent Movie' with the words given in the Bodily Communication Expectancy instrument. 30 (6X5) words are given to each pair of participants to represent and infer in turn. The words were shown to the representer one by one. As a consequence, 1320 (44x30) trials of bodily communication performance were obtained. The performance of each word took maximum 1 minute. The representer passed to the new word when either the inferer found the right word or 1 minute assigned to each word ended. The bodily representation performances were recorded by a digital camera. After the experiment had ended, the participants and the experimenter signed the words that the inferer failed in infering on a performance rating form, to ease the movie rating work. Successful cases are operationally defined as those cases in which the inferer found the right word for the bodily performance going on at most in 1 minute.

3.4. Analyses

Descriptive analyses and structural equation modeling analysis were conducted on the data obtained. The stability of bodily communication expectancy ratings was estimated to check whether the expectancies are stable or volatile. The factor structure of bodily communication performance was described using SPSS 11.0 for Windows to see whether six strategies of bodily representation were distinctly observable. The frequency of the categories for each word was estimated to see whether the words employed in the experiment

corresponded to the categories proposed. Interrater reliability analysis was conducted to see whether the ratings of the bodily communication performances were reliable. These analyses were succeeded by case studies and the description of unsuccessful representations classified by strategies to describe the bodily communication performances at a deeper level. Third eye analyses were conducted to corroborate the findings of the interrater reliability analysis.

Finally, Structural Equation Modeling technique was employed to test the hypotheses involving Self-Esteem, Bodily Expectancy, Extraversion, Analogical Reasoning, Trait Anxiety and Bodily Performance –using AMOS 5.0. A set of models were tested to optimize the goodness of fit between the data and the model. Modification indices were used to come up with the best-fit model as elaborated in Chapter 4.

CHAPTER 4

RESULTS

4.1. Descriptive Analyses

The Descriptive Analyses Section consists of seven subsections. In Subsection 4.1.1, the stability of bodily communication expectancy ratings is analyzed. In Subsection 4.1.2, the factor structure of bodily communication performance is shown. In Subsection 4.1.3, the frequency of the categories for each word is provided. In Subsection 4.1.4, the result of the interrater reliability analysis is provided. In Subsection 4.1.5, case studies are presented. In the experiment, it has been found that some of the words were represented by various manners, while some others were represented almost uniformly across all the representers. The latter was almost always represented by manners expected before the experiment. Besides those, the former was quite interesting and worth case studies to unfold the underlying cognitive representations for the words at issue. Thus, Subsection 4.1.5 presents only the words for which representations are more or less varied. In Subsection 4.1.6, the unsuccessful ways of

representation are described and in Subsection 4.1.7, a general analysis of the unsuccessful representations are provided. Finally in Section 4.1.8, the findings of an extra study aiming to obtain independent observations of the data as a supplement to interrater reliability analysis are presented so that the possible unintended effects of the experimenter's ratings and enlistments of the video recordings of the bodily performance trials could be checked.

4.1.1. The Stability of Bodily Communication Expectancy Ratings

The correlation coefficients were checked to find out whether the bodily communication expectancy ratings were stable or not. Table 4.1 shows the test-retest correlations of the ratings for each word.

As seen in Table 4.1, 21 words over a total of 30 items are stable. One can ask at that point, whether unstable words above have common properties. It seems that there are no such properties. This phenomenon may be explained by the possibility that bodily communication expectancies are not well calibrated, but they are stable (see Subsection 5.1.4 for theoretical discussions).

Table 4.1. Test-retest correlations of the words.

Words Used in the Study	Pearson Correlation	Significance (2-tailed)
Bird	-,054	,730
Fish	,363*	,015
Dragon	,436**	,003
Singer	,701**	,000
Boxer	,255	,095
Woman	,257	,093
Tree	,455**	,002
Pyramid	,467**	,001
Statue	,689**	,000
Beard	,476**	,001

Table 4.1 (continued).

Coldness	,345*	,022
Hotness	,265	,082
Wind	,490**	,001
Mud	,434**	,003
Lightness	,414**	,005
Phone	,134	,386
Salt	,334*	,026
Weight	,211	,170
Pencil	,382*	,011
Comb	-,053	,732
Festival	,239	,118
Worship	,330*	,029
Funeral	,234	,126
Wedding	,354*	,018
Wise	,346*	,022
Patience	,422**	,004
Adult	,644**	,000
Health	,409**	,006
Life	,523**	,000
Lie	,511**	,000

* Correlation is significant at the 0.05 level.
** Correlation is significant at the 0.01 level.

4.1.2. The Factor Structure of Bodily Communication Performance

Principal factor extraction with varimax rotation was performed through SPSS 11.0 for Windows on 6 categories (Referent's Typical Actions, Shape, Effect, Representer's Typical Actions, Culture, Negation) treating each word as a questionnaire item for the corresponding category for a sample of 88 participants.[29]

In the exploratory factor analysis, two factors were extracted. Table 4.2 shows the total variance explained: first two factors explain 52,366% of the variation cumulatively.

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[29] Floyd and Widaman (1995), elaborating on the uses of factor analysis, suggest that principal component analysis is more suited for identification of latent constructs as in this dissertation while common factor analysis is more suited for data reduction. A formal treatment of varimax rotation method can be found in Wang, Liu and Tu (2005).

Table 4.2. Total variance explained.

	Initial Eigenvalues			Extraction Sums of Squared Loading			Rotation Sums of Squared Loading		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1,828	30,470	30,470	1,828	30,470	30,470	1,665	27,757	27,757
2	1,314	21,896	52,366	1,314	21,896	52,366	1,477	24,609	52,366
3	,989	16,477	68,842						
4	,801	13,357	82,200						
5	,609	10,158	92,357						
6	,459	7,643	100,000						

Extraction Method: Principal Component Analysis.

As seen in Table 4.3, the first factor maps onto Referent's Typical Actions, Shape, Representer's Typical Actions and Culture Categories while the second factor maps onto Effect and Negation Categories. All the words under the first factor corresponds to concrete concepts, therefore the first factor could be dubbed 'concrete'. However, the Effect category can also correspond to concrete concepts. Therefore, naming the first factor as the concrete factor and the second factor as the abstract factor is untenable.

Table 4.3. Rotated component matrix.

	Component	
	1	2
Shape	,777	,093
Representer's Typical Actions	,723	-,444
Culture	,656	,436
Referent's Typical Actions	,288	,148
Negation	,146	,803
Effect	,065	,644

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 3 iterations.

4.1.3. The Frequency of the Categories for Each Word

As Table 4.4 and the following section show, the categories proposed by Ricci Bitti and Poggi (1991) fits well with the findings of this study. All the words

thought to be represented by a certain category were represented by that category: bird, fish, dragon, singer and boxer were represented by referent's typical actions; woman, tree, pyramid, statue and beard were represented by shape; coldness, hotness, wind, mud and lightness were represented by their effects; phone, salt, weight, pencil and comb were represented as representer's typical actions; festival, worship, funeral, wedding and wise were represented as cultural performances,[30] and finally, patience, adult, health, life and lie were represented by negation. Table 4.4 presents the frequencies for expected strategies for each word:

Table 4.4. The words, expected strategies, and their frequencies and percentages.[31]

Word	Expected Strategy	Frequency	Percentage
Bird	Referent's Typical Actions	44/44	100%
Fish	Referent's Typical Actions	44/44	100%
Dragon	Referent's Typical Actions	44/44	100%
Singer	Referent's Typical Actions	44/44	100%
Boxer	Referent's Typical Actions	44/44	100%
Woman	Shape	39/44	89%
Tree	Shape	38/44	86%
Pyramid	Shape	44/44	100%
Statue	Shape	38/44	86%
Beard	Shape	44/44	100%
Coldness	Effect	44/44	100%
Hotness	Effect	44/44	100%
Wind	Effect	44/44	100%
Mud	Effect	34/44	77%
Lightness	Effect	33/44	75%
Phone	Representer's	44/44	100%

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[30] Fuoss (1995) characterizes cultural performances by 5 points: they "are temporally and spatially framed; (…) programmed; (…) communal insofar as they provide an occasion for coming together; (…) heightened occasions involving display" and finally they "tend to be prepared for and often publicized in advance" (Fuoss, 1995, p. 95).
[31] As stated in Section 3.2, the act of expecting a strategy for a given word is grounded by a pilot study.

	Typical Actions		

Table 4.4 (continued).

Salt	Representer's Typical Actions	44/44	100%
Weight	Representer's Typical Actions	44/44	100%
Pencil	Representer's Typical Actions	44/44	100%
Comb	Representer's Typical Actions	44/44	100%
Festival	Culture	44/44	100%
Worship	Culture	44/44	100%
Funeral	Culture	44/44	100%
Wedding	Culture	44/44	100%
Wise	Culture	44/44	100%
Patience	Negation	16/44	36%
Adult	Negation	44/44	100%
Health	Negation	29/44	66%
Life	Negation	19/44	43%
Lie	Negation	28/44	64%

That negation was used in only 16 cases to represent patience is remarkable. This unexpectedly low frequency can be explained by the low success rate in representations of patience. In only 9 cases, the bodily representation was successful to communicate patience. Among the successful cases for patience, negation was employed in 6 of the cases. In other words, in 67% of the successful cases, negation was employed.[32]

Likewise, the use of negation in only 19 cases to represent life is remarkable. Again, this frequency can be explained by the relatively low success rate in representations of life. The bodily representation was successful in only 23 cases to communicate life. Among the successful cases for life, negation was

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[32] See Subsections 4.1.6.4.5 and 4.1.6.5.1 to compare 'patience' with 'wise'. Since Ricci Bitti and Poggi (1991) do not provide information about unsuccessful cases, the data cannot be compared.

employed in 14 of the cases. In other words, in 61% of the successful cases, negation was employed.

4.1.4. Interrater Reliability Analysis

Two raters watched the movies of the experiments independently and rated whether the representation strategy/ strategies correspond(s) to one or more of the following: 1) Referent's Typical Actions, 2) Shape, 3) Effect, 4) Representer's Typical Actions, 5) Culture, 6) Negation. The raters were given brief explanations about the six strategies above and were not given the information of the expectations of the study. In other words, they were not told which words were expected to correspond to which strategies. The first rater was a research assistant in law. He had no background in cognitive science. The second rater was a graduate student in social psychology.

The analysis showed that α coefficient was .92. Thus, the interrater reliability was quite high.

4.1.5. Case Studies

Under this subsection in-depth analyses of the following words will be provided: woman, tree, pyramid, statue, festival, worship, patience, adult, health, life and lie.

4.1.5.1. Woman

The word 'woman' was expected to be represented by the shape strategy. This expectation almost always came true: 89% of the participants drew the

elliptic shape of a woman vertically with curvical lines of breasts and hips. Other manners in addition to drawing the lines were: pointing out the long hair; (for female participants) showing her body; pointing out the ring on the ring finger; walking by wiggling the hips, pointing out the breasts; rouging; pointing out the earrings; sitting with the legs crossed and caressing the hips; and drawing the male and female symbols in the air.

4.1.5.2. Tree

The word 'tree' was expected to be represented by the shape strategy. This expectation came true in 86% of the cases. The participants drew the lines of the tree in the first attempt. An interesting observation was that the same lines were used to represent the word 'woman' when starting point was above the middle of the representation space. These same lines were used to represent 'tree' when starting point was below the middle of the representation space. In other words, the same lines top down represent woman; bottom up represent tree.[33]

However the representations for the word 'tree' was always accompanied by other manners of representations. The shape-only representation was not sufficient for the success of the inferer. The following manners were those accompanying the shape representation: Picking a flower and smelling; collecting fruits and eating them; representing that it is something that grows (the representer raises his/her hands half broken, but in the beginning s/he squats down, and then

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[33] One can comment that bottom up lines represent tree since they also coincide with trees' vertical direction of growth as well. But this comment is not justified since women as a member of human species grow vertically too. The same gravitational law applies for trees and human beings. In other words, since both trees and women are subject to the same gravitational law, as physical objects, it has to be expected that not only 'tree' but also 'woman' has to be represented by bottom-up lines.

rises more and more in the meantime); representing a bird settling on the tree; pointing out the fruits on the hands as a consequence of representing the branches of the tree by arms; showing the chair; sowing seed and watering the field; and opening the palms slowly as the end points of the branches represented by arms broken at 45° to convey the maturation of fruits.

4.1.5.3. Pyramid

The word 'pyramid' was expected to be represented by the shape strategy. In all the cases, it is represented by shape strategy: The representer drew a triangle on air. In some of the cases where it was insufficient alone, the shape strategy was accompanied by worshipping movements; climbing stairs; and representing Pharaoh by a glorious walking style with a powerful stick at hand decimating everything on the way.

4.1.5.4. Statue

The word 'statue' was expected to be represented by the shape strategy. That expectation came true for 86% of the participants. Staying motionless in an extraordinary posture was the first representation that came to mind for most of the performers. However this manner of representation was not shared by the inferers. That is why complementary manners were employed to convey the word 'statue'. The complementary manners are the following: pointing out a stone, hitting the stone with hammer and taking the position of the stone and staying motionless there; in other words, imitating a sculptor sculpturing the stone; and imitating the Pensive Man Sculpture.

4.1.5.5. Festival

The word 'festival' was expected to be represented by cultural aspects. Actually, the word reminds the participants three distinct rituals: The most common ritual involves the Sacrificial Festival in Islam, the less common ritual involves official festivals of Turkish state, and the least common ritual involves a general public enthusiasm and mass dancing. That is why some of the participants represented the word 'festival' by imitating a person kissing the hands of elders; a person wearing on festival clothes; a person performing Islamic worshipping rituals; and a butcher sacrificing a sheep; some of the participants imitated soldiers in the official festival ceremonies and some of the participants danced joyfully pointing out the outer space of the personal dancing area.[34]

One interesting observation about the representations of the word 'festival' was that regardless of the rituals involved, most of the participants resorted to pointing out the outer space to indicate that what they represented was a societal and a public event. This resort was observed without exception for all the words that were expected to be represented by cultural aspects. Thus, pointing out the outer space for public events can be considered as the delineation of context in nonverbal cultural performance.

4.1.5.6. Worship

The word 'worship' was expected to be represented by cultural aspects. This expectation came true. Furthermore, the representation of worship was probably affected by Islamic knowledge. In that sense, a religious divide occurred in performances: People with more Islamic knowledge tended to imitate a believer

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[34] The word 'bayram' (festival) refers to official state ceremonies as well. E.g. Cumhuriyet *Bayram*ı, 30 Ağustos Zafer *Bayram*ı etc.

in its minute details. To convey the word 'worship' they really worshipped. On the other hand, the worshipping performance of the participants with less Islamic knowledge was quite coarse.[35] Some participants complemented the imitation of worshipping with the imitation of praying. In one extreme case, since the inferer was unsuccessful, the representer treated the table as Kaaba and moved around it for a number of times.

4.1.5.7. Patience

The word 'patience' was expected to be represented by the negation strategy. The findings indicated that 36% of the participants represented the word 'patience' by representing impatience and then negating it. The manners were the following: Imitating a person who nods for everything told by an imaginary speaker; imitating a person who looks at his/her watch and expressing his/her displeasure by arm and hand movements; imitating a person who opens his/her hands to heaven and prays while nodding; imitating a person who always complains and another person who tries to soothe him/her; imitating a person who paces back and forth with a facial expression indicating indifference; and imitating a person who has his/her fingers rhythmically moving on his/her lap.

4.1.5.8. Adult

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[35] One has to keep in mind that these comments on the link between bodily representation of worship and Islamic knowledge is the experimenter's inference based on repeatedly watching the videos of 44 cases in total representing 'worship' by body. No separate question or elicitation procedure was employed to determine the levels of religious knowledge. The only basis of the comment above is the fact that some participants provided detailed representations of Islamic 'worship' while others did not.

The word 'adult' was expected to be represented by the negation strategy. The performances showed that positioning the open hand parallelly near the ground conveyed the word 'child'. All of the participants represented the word 'child' by this way and negated it. The complementary manners were the following: Raising the open hand that was parallel to the ground slowly; squating down and then standing up slowly; bending to one side, keeping an imaginary child's hand and caressing his/her hair at times; and pointing out the beard.

4.1.5.9. Health

The word 'health' was expected to be represented by the negation strategy. In 66% of the cases, it was conveyed by negating sickness (e.g. coughing, putting an imaginary band on the front, and grasping or touching an organ with facial expressions conveying pain). Other manners included running and doing sports but this manner of representation was not more successful.

4.1.5.10. Life

The word 'life' was expected to be represented by the negation strategy. 43% of the participants represented death (e.g. cutting the throat, putting a gun on the temple, and bending the head with a deadly facial expression), since it was remarkably easier to convey. Besides, a number of participants put their hands on their heart and moved their open palms or fists rhythmically parallel to their heart. In another case, the performer slept, woke up, walked and checked the papers to convey the concept of 'white collar job'.

4.1.5.11. Lie

The word 'lie' was expected to be represented by the negation strategy. That was true for 64% of the cases, but this point needs an additional explanation: Half of the participants imitated a chitchatter with grotesque lip movements. The grotesquness of the movements conveyed that the content of the dialogue was unusual. At first blush, this manner of representation seems to involve a direct strategy rather than negation. However, in deeper analysis, the performer in effect negates the usual way of talking by the grotesque elements in their performance. A less controversial negation manner was also common: Some of the participants did not employ grotesque elements; they just imitated a talking person and then negated it. Another variety of negation involves the sign of true and false: In that variety the representer drew a $\sqrt{}$ in the air and then negated it.

The shortcut solution was the Pinoccio manner put forward in Ricci Bitti and Poggi (1991)'s original study: The performer talks and the more s/he talks, longer his/her nose becomes. This strategy was used by only one of the participants.

4.1.6. The Description of Unsuccessful Representations Classified By Strategies

Out of 30 words, 13 words were successfully represented without any failure. Those words have generally shared bodily conventions of representation. Those words were bird, fish, singer, boxer, beard, coldness, hotness, wind, phone, salt, weight, pencil, comb. Table 4.5 shows the success rates and percentages for each word.

The unsuccessful ways of representation for the remaining words are presented below.

Table 4.5. The words and the success rates.

Word	Success Rate	Percentage
Bird	44/44	100%
Fish	44/44	100%
Dragon	28/44	64%
Singer	44/44	100%
Boxer	44/44	100%
Woman	37/44	84%
Tree	32/44	73%
Pyramid	29/44	66%
Beard	44/44	100%
Coldness	44/44	100%
Hotness	44/44	100%
Wind	44/44	100%
Mud	33/44	75%
Lightness	34/44	77%
Phone	44/44	100%
Salt	44/44	100%
Weight	44/44	100%
Pencil	44/44	100%
Comb	44/44	100%
Festival	25/44	57%
Worship	34/44	77%
Funeral	32/44	73%
Wedding	41/44	93%
Wise	3/44	7%
Patience	9/44	20%
Adult	18/44	41%
Health	26/44	66%
Life	23/44	52%
Lie	17/44	39%

4.1.6.1. Referent's Typical Actions

4.1.6.1.1. Dragon

In the unsuccesful cases, the performer represented dragon in similar lines with other pairs whose representation was successful: The performer put one hand near to his/her mouth and then moved the other hand from mouth to outwards to communicate fire in the mouth. The failure may be due to the cognitive properties of the word 'dragon' itself: Its low word frequency, its being a nonprototypical animal, its cognitive salience and content effects such as its properties as a mythical creature may be partially or totally responsible for failures. Table 4.6 lists the unsuccessful ways of representing dragon, their frequencies and percentages.

Table 4.6. The unsuccessful ways of representing dragon, their frequencies and percentages among the unsuccessful cases of dragon representations.

The Unsuccessful Ways of Representing Dragon	Frequency	Percentage
The representer put one hand near to his/her mouth and then moved the other hand from mouth to outwards to communicate fire in the mouth.	13/35	37.14%
The representer moved his/her hands as if s/he flew.	8/35	22.86%
The representer lit a lighter and then moved the other hand from mouth to outwards to communicate fire in the mouth.	6/35	17.14%
The representer showed his/her tail.	2/35	5.71%
The representer rubbed his/her hands on the front as if there is fire in front of him/her.	2/35	5.71%
The representer drew a geographically rough ground.	1/35	2.86%
The representer threw his/her arms to the air as if s/he held a sword.	1/35	2.86%
The representer pushed his/her hand at once with pain as if s/he touched fire.	1/35	2.86%
The representer lit a cigarette.	1/35	2.86%

4.1.6.2. Shape

4.1.6.2.1. Woman

In all the unsuccessful cases, the performer drew the elliptic shape of a woman vertically with curvical lines of breasts and hips. Pointing out the long hair, rouging and pointing out the earrings were other additional unsuccessful ways of representation. However as in the case of dragon, these same ways of representation led to success in other pairs. Thus, the failure again can be attributed to the inferers. Table 4.7 lists the unsuccessful ways of representing woman, their frequencies and percentages.

Table 4.7. The unsuccessful ways of representing woman, their frequencies and percentages among the unsuccessful cases of woman representations.

The Unsuccessful Ways of Representing Woman	Frequency	Percentage
The represener drew the elliptic shape of a woman vertically with curvical lines of breasts and hips.	8/23	34.78%
The represener drew long hair.	4/23	17.39%
The represener drew the head scarf.	2/23	8.70%
The represener rouged.	2/23	8.70%
The represener showed his/her miniskirt.	2/23	8.70%
The represener looked at the mirror and checked make-up.	1/23	4.35%
The represener showed the earrings.	1/23	4.35%
The represener showed herself.	1/23	4.35%
The represener walked by wiggling the hips.	1/23	4.35%
The represener drew the female symbol.	1/23	4.35%

4.1.6.2.2. Tree

In none of the cases, was just drawing the contours of the tree successful. Thus, in terms of ease of communication, drawing the contours of the tree as a way of representation is the most difficult to infer among the more preferred

successful ways of representing tree such as picking a flower and smelling; collecting fruits and eating them; representing a bird settling on the tree; pointing out the fruits on the hands as a consequence of representing the branches of the tree by arms. Table 4.8 lists the unsuccessful ways of representing tree, their frequencies and percentages.

Table 4.8. The unsuccessful ways of representing tree, their frequencies and percentages among the unsuccessful cases of tree representations.

The Unsuccessful Ways of Representing Tree	Frequency	Percentage
The representer raised the arms by two sides.	9/19	47.37%
The representer opened and closed her hands that were raised by two sides as if they are fruits.	2/19	10.53%
The representer drew the outer lines of the tree.	2/19	10.53%
The representer imitated a bird and jumped to the ground as if it nested to the tree whose outer lines had been drawn before.	2/19	10.53%
The representer picked a fruit from the tree.	1/19	5.26%
The representer sowed seeds, watered the seeds, raised the hands or body as if it grew.	1/19	5.26%
The representer picked a flower from the ground and smelled it.	1/19	5.26%
The representer showed the chair.	1/19	5.26%

4.1.6.2.3. Pyramid

The successful way of representing pyramid in most of the cases fails in 1/3 of the cases: Drawing a triangle on air was obviously the easiest way of representing a pyramid. However, in all the cases –both in successful and unsuccessful cases, this way of representing was employed. This shows that in the unsuccessful cases, the failure is due to inferers. Worshipping movements; climbing stairs; and representing Pharaoh by a glorious walking style with a powerful stick at hand decimating everything on the way were used as

complementary representations, when drawing a triangle failed to communicate pyramid; but only in a few cases, these ways of representation contributed to success. Table 4.9 lists the unsuccessful ways of representing pyramid, their frequencies and percentages.

Table 4.9. The unsuccessful ways of representing pyramid, their frequencies and percentages among the unsuccessful cases of pyramid representations.

The Unsuccessful Ways of Representing Pyramid	Frequency	Percentage
The representer drew a triangle on air.	14/23	60.87%
The representer worshipped.	2/23	8.70%
The representer walked with the hand on the front and closed eyes as a ghost.	2/23	8.70%
The representer drew a triangle on air and lied as dead and throws soil by shovel.	2/23	8.70%
The representer represented Pharaoh by a glorious walking style with a powerful stick at hand decimating everything on the way.	1/23	4.35%
The representer ate a corn cob.	1/23	4.35%
The representer showed the shape of Pharaoh's long chin.	1/23	4.35%

4.1.6.2.4. Statue

In 86% of the cases, staying motionless in an extraordinary posture was employed as the first strategy. This shows that this way of representation is easily accesible to the representers. However, relatively lower success rate of this representation (66%) shows that it was not always shared by the inferers. Among the complementary ways of representation, pointing out a stone, hitting the stone

Table 4.10. The unsuccessful ways of representing statue, their frequencies and percentages among the unsuccessful cases of statue representations.

The Unsuccessful Ways of Representing Statue	Frequency	Percentage
The representer stood motionless with an extra-ordinary body posture.	11/29	37.93%
The representer represented the Pensive Man Statue.	6/29	20.69%
The representer represented the technical/ artistic process of making a statue.	5/29	17.24%
The representer stood motionless with the standard soldier posture.	4/29	13.79%
The representer drew something to the wall.	2/29	6.90%
The representer touched the wall.	1/29	3.45%

with hammer and taking the position of the stone and staying motionless there was the most employed way of representation, but it was successful for only a few number of cases. Table 4.10 lists the unsuccessful ways of representing statue, their frequencies and percentages.

4.1.6.3. Effect

4.1.6.3.1. Mud

In successful cases, the representer stepped on the ground and then act as if it was hard to raise his/her feet. In a less preferred but nevertheless successful case, the representer looked at the ground and then cleaned the lower parts of his/her trousers or shoes. A third successful way was representing rain and water, and then showing the ground and stepping on it. The first two were the most easily communicable representations. These ways of representation were used also in unsuccessful cases. Table 4.11 lists the unsuccessful ways of representing mud, their frequencies and percentages.

4.1.6.3.2. Lightness

In 75% of the cases, the represencer looked upwards with a face expression as if his/her eyes were dazzled. This was the most accessible way of representing lightness, but was not efficient enough to let inferers infer the representation alone. This way of representation is not distinctive enough to communicate lightness irrespective of the representers or inferers. They were complemented by other ways that were themselves unsuccessful to communicate lightness alone.

Table 4.11. The unsuccessful ways of representing mud, their frequencies and percentages among the unsuccessful cases of mud representations.

The Unsuccessful Ways of Representing Mud	Frequency	Percentage
The represencer squatted down and took something like dough from the ground and played with it.	3/13	23.08%
The represencer stepped on the ground and then act as if it was hard to raise his/her feet.	2/13	15.39%
The represencer moved his/her hands around each other as if s/he prepared dough.	2/13	15.39%
The represencer drove a car and showed the muds thrown besides the car.	2/13	15.39%
The represencer shook the lower parts of his trousers by hand.	2/13	15.39%
The represencer showed the ground.	1/13	7.69%
The represencer showed the ground and acted as if he poured water.	1/13	7.69%

Showing a black object and then negating it; closing the eyes by hands and then immediately opening them; moving the hands as if changing the light bulb and showing the surroundings; moving the hands on the eyes as if wearing eyeglasses; and finally, drawing a circle and lines emanating from it on the air to represent sun were among the unsuccessful ways of representation. Table 4.12 lists the unsuccessful ways of representing lightness, their frequencies and percentages.

4.1.6.4. Culture

4.1.6.4.1. Festival

As stated under Section 4.1.5.5, festival was represented by performing common rituals from festivals. The fact that similar representations in 43% of the cases failed while in others succeeded shows that the successfulness and unsuccessfulness of the representations for festival was due to inferers. Table 4.13 lists the unsuccessful ways of representing festival, their frequencies and percentages.

Table 4.12. The unsuccessful ways of representing lightness, their frequencies and percentages among the unsuccessful cases of lightness representations.

The Unsuccessful Ways of Representing Lightness	Frequency	Percentage
The representer closed his/her eyes and acted as if his/her eyes were dazzled by light.	11/30	36.67%
The representer drew the sun on air.	5/30	16.67%
The representer showed the surroundings.	3/30	10.00%
The representer showed a black object and negated it.	1/30	3.33%
The representer put the lamp on.	1/30	3.33%
The representer took on eyeglasses.	1/30	3.33%
The representer looked at higher points.	1/30	3.33%
The representer acted as if s/he woke up in the morning and opened the window.	1/30	3.33%
The representer walked with closed eyes and negated darkness after the inferer found darkness.	1/30	3.33%
The representer showed the window and moved his hands as if something comes from the outside.	1/30	3.33%
The representer showed the white t-shirt on himself.	1/30	3.33%
The representer looked for something with closed eyes.	1/30	3.33%
The representer closed and opened his palms.	1/30	3.33%
The representer pointed out the color contrast between the black cable and the white wall.	1/30	3.33%

4.1.6.4.2. Worship

The successful and unsuccessful ways of representing worship are identical. That is why, the failures can be due to inferers. Table 4.14 lists the unsuccessful ways of representing worship, their frequencies and percentages.

Table 4.13. The unsuccessful ways of representing festival, their frequencies and percentages among the unsuccessful cases of festival representations.

The Unsuccessful Ways of Representing Festival	Frequency	Percentage
The representer performed folk dance.	7/28	25.00%
The representer kissed the hands of elders.	4/28	14.29%
The representer cut a sacrifice (animal).	4/28	14.29%
The representer performed namaz.	2/28	7.14%
The representer cut a sacrifice and showed the surroundings.	2/28	7.14%

Table 4.13 (continued).

The representer clapped and walked with regular soldier steps.	1/28	3.57%
The representer acted as dead.	1/28	3.57%
The representer performed ablution ritual.[36]	1/28	3.57%
The representer performed soldier's greeting.	1/28	3.57%
The representer acted as waving a flag.	1/28	3.57%
The representer kissed the hands of elders and showed the surroundings.	1/28	3.57%
The representer served something on a tray.	1/28	3.57%
The representer played drums.	1/28	3.57%
The representer put her hand parallel and near to the ground to represent children and then gave sweets from the table to children.	1/28	3.57%

4.1.6.4.3. Funeral

The successful and unsuccessful representations for funeral did not differ from each other: in both successful and unsuccessful cases, the representer acted

Table 4.14. The unsuccessful ways of representing worship, their frequencies and percentages among the unsuccessful cases of worship representations.

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[36] "Ablution may refer to the practice of removing sins, diseases or earthly defilements through the use of ritual washing, or the practice of using ritual washing as one part of a ceremony to remove sin or disease" (Wikipedia). In Collins Cobuild English Language Dictionary, 'ablutions' is defined as "a formal or humorous word for the activity of washing yourself" (p. 3).

The Unsuccessful Ways of Representing Worship	Frequency	Percentage
The representer performed namaz.	7/19	36.84%
The representer prayed to the heavens.	5/19	26.32%
The representer prostrated himself/ herself.	2/19	10.53%
The representer revolved around the table as if it is Kaaba.	1/19	5.26%
The representer performed ablution ritual.	1/19	5.26%
The representer showed the heavens.	1/19	5.26%
The representer played with prayer beads.	1/19	5.26%
The representer ate food and negated it to represent fasting.	1/19	5.26%

as if he was dead and then represented scenes from funeral ritual. Thus again the failures may be due to inferers. Table 4.15 lists the unsuccessful ways of representing funeral, their frequencies and percentages.

Table 4.15. The unsuccessful ways of representing funeral, their frequencies and percentages among the unsuccessful cases of funeral representations.

The Unsuccessful Ways of Representing Funeral	Frequency	Percentage
The representer carried the coffin on his/her shoulders.	6/32	18.75%
The representer performed namaz.	4/32	12.5%
The representer dug the ground.	4/32	12.5%
The representer lied on one side as dead.	4/32	12.5%
The representer fired his/her head.	3/32	9.37%
The representer prayed while looking at the ground.	2/32	6.25%
The representer dug the ground and showed the surroundings.	1/32	3.13%
The representer pointed out that something lied on the ground.	1/32	3.13%
The representer pointed out something lying on the table.	1/32	3.13%
The representer lied on the table.	1/32	3.13%
The representer lied on the ground.	1/32	3.13%
The representer fired ahead.	1/32	3.13%
The representer placed the coffin to the graveyard.	1/32	3.13%
The representer cut his throat.	1/32	3.13%
The representer carried the coffin on his/her shoulders and showed the sorroundings.	1/32	3.13%

4.1.6.4.4. Wedding

In 3 cases, the representation for wedding failed. In 2 unsuccessful cases, the representer performed folk dance and in the remaining unsuccessful case, the representer showed the bridal veil. They did not differ from those in successful cases.

4.1.6.4.5. Wise

Wise was the most difficult word to represent. It was conveyed to the inferer in only 3 cases. The unsuccessful attempts of representation comprised meditation, looking far ahead absent-mindedly, writing something, pointing out things in far horizon and putting right (or left) hand to chin. The failures may be due to a point other than representers or inferers: The word 'wise' is a less frequently used word in the overall vocabulary. Thus the failures may be due to the difficulties in lexical access rather than the bodily representation per se. Table 4.16 lists the unsuccessful ways of representing wise, their frequencies and percentages.

Table 4.16. The Unsuccessful Ways of Representing Wise, Their Frequencies and Percentages among the Unsuccessful Cases of Wise Representations.

The Unsuccessful Ways of Representing Wise	Frequency	Percentage
The representer sat with the hand on the chin.	17/77	22.08%
The representer looked far ahead absent-mindedly.	9/77	11.69%
The representer wrote something.	9/77	11.69%
The representer showed his/her head by index finger.	8/77	10.39%
The representer showed long beard.	6/77	7.79%
The representer read something.	6/77	7.79%
The representer showed a headgear like a turban on the head.	5/77	6.49%
The representer pointed out his/her beard.	2/77	2.60%
The representer showed mustache and beard and patted them.	2/77	2.60%
The representer walked as if he had a baton.	2/77	2.60%
The representer wrote something on the wall.	2/77	2.60%
The representer showed his head and opened his hands	2/77	2.60%

near to his head to represent the greatness/ bigness of the head.		
The representer showed his head by index finger and clicks his fingers to represent "Euraka!".	1/77	1.30%
The representer showed his/her head by index finger and clenched his fist to represent strength.	1/77	1.30%
The representer rotated his/her index finger near his/her head.	1/77	1.30%
The representer showed long hair.	1/77	1.30%
The representer drew a question mark on air.	1/77	1.30%
The representer spoke without looking at the other speaker.	1/77	1.30%
The representer showed the outer lines of books put on each other on the table.	1/77	1.30%

4.1.6.5. Negation

4.1.6.5.1. Patience

The findings suggested that in terms of ease of communication, the use of negation to represent patience is the easiest way of successful representation. Attempts for directly representing patience were unsuccessful except 3 cases. In 9 cases that successfully represented patience, 6 of them employed negation. Table 4.17 lists the unsuccessful ways of representing patience, their frequencies and percentages.

4.1.6.5.2. Adult

In all cases, the participants first represented a child and then negated it. Although this same way of represention was used by all the representers without exception; in 59% of the cases, the outcome was unsuccessful. Obviously the failure can be attributed to inferers. Table 4.18 lists the unsuccessful ways of representing adult, their frequencies and percentages.

4.1.6.5.3. Health

The unsuccessful ways of representing health varied from negation of illness to direct ways of representation such as doing aerobics. Table 4.19 lists the unsuccessful ways of representing health, their frequencies and percentages.

4.1.6.5.4. Life

The unsuccessful ways of representing life varied from negation of death to direct ways of representation such as showing one's heart. Table 4.20 lists the

Table 4.17. The unsuccessful ways of representing patience, their frequencies and percentages among the unsuccessful cases of patience representations.

The Unsuccessful Ways of Representing Patience	Frequency	Percentage
The represener played a dual role: the first person shouted or slapped the other one and the second person nodded positively with an agreeable facial expression.	7/46	15.22%
The represener looked at an empty space.	5/46	10.87%
The represener huffed and puffed and negated the action.	4/46	8.70%
The represener united his/her hands on his navel and bowed his/her head.	4/46	8.70%
The represener played with praying beads.	3/46	6.52%
The represener looked at his/her watch.	3/46	6.52%
The represener paced back and forth quickly as in prison and negated the action.	3/46	6.52%
The represener prayed to the heavens.	2/46	4.35%
The represener walked quickly and negated the action.	2/46	4.35%
The represener acted as if he played a game like chess.	1/46	2.17%
The represener played his fingers periodically and negated the action.	1/46	2.17%
The represener bowed his/her head and stayed in this posture for some time.	1/46	2.17%
The represener sat with the hand on the chin.	1/46	2.17%
The represener hit his foot to the ground and looked harshly and then negated the action.	1/46	2.17%
The represener nodded positively as if there was someone in front of her.	1/46	2.17%
The represener acted as if his hand was being cut and he did not mind.	1/46	2.17%
The represener acted as if he slapped somebody and negated the action.	1/46	2.17%
The represener acted as if he built a house with playing	1/46	2.17%

cards and he built again and again after it collapsed many times.		
The representer played a dual role: In the first role he represented a bus driver and in the second role he represented a person apparently waiting for the bus and checking the time.	1/46	2.17%
The representer carried the chair on his back with a face expression indicating it was heavy and then continued carrying it with a face expression that did not mind the load.	1/46	2.17%
The representer shouted and negated the action.	1/46	2.17%
The representer talked with a mindless facial expression.	1/46	2.17%

unsuccessful ways of representing life, their frequencies and percentages.

Table 4.18. The unsuccessful ways of representing adult, their frequencies and percentages among the unsuccessful cases of adult representations.

The Unsuccessful Ways of Representing Adult	Frequency	Percentage
The representer put his open hand parallel and near to the ground to convey child, and raised that hand to convey growth.	12/38	31.58%
The representer put his open hand parallel and near to the ground to convey child, and negated it.	7/38	18.42%
The representer showed himself/herself, experimenter and the inferer.	7/38	18.42%
The representer showed his beard.	2/38	5.26%
The representer showed his beard, mustache and hair.	2/38	5.26%
The representer put his open hand parallel and near to the ground to convey child, showed his hair and negated it.	1/38	2.63%
The representer showed the ring on the finger.	1/38	2.63%
The representer showed necktie and jacket.	1/38	2.63%
The representer showed his long beard and raised his hand on his body to convey that he was longer.	1/38	2.63%
The representer walked as if s/he held a small child's hand and smiled; stood up and showed his/her beard.	1/38	2.63%
The representer walked as if s/he held a small child's hand and put his open hand parallel and near to the ground.	1/38	2.63%
The representer walked as if s/he held a small child's hand and smiled and raised the hand.	1/38	2.63%
The representer squatted down and smiled to the surroundings.	1/38	2.63%

4.1.6.5.5. Lie

In 67% of the unsuccessful cases, that is, in 18 of the 27 unsuccessful cases, the representers used negation. However, negation was not distinctive enough for inferers in all of the cases. The fact that it fails in some of the cases and it does not in others showed that failure can be attributed to inferers rather

Table 4.19. The unsuccessful ways of representing health, their frequencies and percentages among the unsuccessful cases of health representations.

The Unsuccessful Ways of Representing Health	Frequency	Percentage
The representer ran slowly.	10/48	20.83%
The representer contracted his/her biceps.	7/48	14.58%
The representer coughed and negated the action.	7/48	14.58%
The representer did aerobics.	5/48	10.42%
The representer breathed deeply.	4/48	8.33%
The representer showed his/her heart.	2/48	4.17%
The representer took out a voiced breath.	2/48	4.17%
The representer drew a crescent on air to represent the Red Crescent.	1/48	2.08%
The representer put his index finger perpendicular to his lips to represent the "Please Be Silent!" pictures at hospitals.	1/48	2.08%
The representer blew her cheeks and patted them.	1/48	2.08%
The representer acted as if she had headache and negated the action.	1/48	2.08%
The representer acted as if her hand ached and negated the action.	1/48	2.08%
The representer acted as if he had stomach ache and negated the action.	1/48	2.08%
The representer acted as if he took medicine.	1/48	2.08%
The representer drank something and ran slowly.	1/48	2.08%
The representer ate food on the table, brushed his teeth and lifted weights.	1/48	2.08%
The representer put her hand to her front as if she had fever and negated the action.	1/48	2.08%
The representer acted as if he was injected vaccine.	1/48	2.08%

than representers. Table 4.21 lists the unsuccessful ways of representing lie, their

frequencies and percentages.

Table 4.20. The unsuccessful ways of representing life, their frequencies and
percentages among the unsuccessful cases of life representations.

The Unsuccessful Ways of Representing Life	Frequency	Percentage
The representer acted as dead and negated the action.	5/24	20.83%
The representer showed his/her heart.	2/24	8.33%
The representer showed the surroundings.	2/24	8.33%

Table 4.20 (continued).

The representer breathed deeply.	2/24	8.33%
The representer walked happily.	1/24	4.17%
The representer walked as pregnant, acted as if he gave birth to a baby, put his open hand parallel and near to the ground to convey child and raised that hand to convey growth and showed the surroundings.	1/24	4.17%
The representer put his open hand parallel and near to the ground to convey child and raised that hand to convey growth.	1/24	4.17%
The representer smiled, cried and got angry.	1/24	4.17%
The representer cut his throat and negated the action.	1/24	4.17%
The representer put his open hand parallel and near to the ground to convey child and raised that hand to convey growth and showed his beard.	1/24	4.17%
The representer drew a large circle on air to convey world and showed the front by two hands and walked.	1/24	4.17%
The representer slept, brushed his teeth, ate food, walked and wrote something.	1/24	4.17%
The representer slept, walked and slept again.	1/24	4.17%
The representer acted as pregnant and acted as if he gave birth to a baby.	1/24	4.17%
The representer showed the surroundings, acted as dead and negated the action.	1/24	4.17%
The representer ate food, walked, ate food again and wrote something.	1/24	4.17%
The representer put his open hand parallel and near to the ground to convey child and raised that hand to convey growth and acted as dead in the end.	1/24	4.17%

4.1.7. General Analyses of Unsuccessful Representations

Some remarks are going to be made in this subsection on what the emerging picture is for unsuccessful representations. The failures in metonymic moves due to lack of distinctiveness/salience, clarity and relevance will be especially focused on. By focusing on the inferer's aspects, it is not meant that failures are always due to the inferers. But for the sake of analysis, bodily communication performances are considered as givens in this subsection to concentrate on cognitive and communicative aspects.

Cognitive and communicative aspects are intertwined, though they are somehow separate. A discussion of distinctiveness of bodily communication performance is incomplete without considering relevance and clarity of the performance. Thus, the question "with what kind of a motive does s/he perform such and such?" is enmeshed with the question "for what kind of a concept is it that s/he exhibits such and such performance?"

The cases below are particularly suitable for such an analysis.

One of the findings of the experiment was that the most frequent way of unsuccessful representation for 'dragon' is also the most frequent way of successful representation for 'dragon': The representer put one hand near to his/her mouth and then moved the other hand from mouth to outwards to communicate fire in the mouth (see Table 4.6). This opens up the possibility that the representation is not found to be relevant enough by the inferers. In their guesses, they are aware that something that emanates fire is represented, but they cannot get the connection between fire emanation and dragon. The representers selected the most distinctive property of dragons to bodily communicate it, but the performance is not distinctive and relevant for the inferers.

A reconsideration of Table 4.7 opens up the possibility that 'woman' is represented by property selection. The anatomy of women was selected for bodily communication performance. However, it seems that this manner of representation is not sufficiently distinctive and relevant for the inferers.

Table 4.8 opens up the possibility that 'tree' is bodily represented on the basis of human torso as tree metonymization.

Table 4.9 opens up the possibility that the inferer takes the bodily representation of 'pyramid' by representing triangle as it is. The video records show that the inferers could not move from 'triangle' to 'pyramid'. Thus the failure is not due to the bodily communication performance per se but due to conceptual links between 'triangle' and 'pyramid'.

Table 4.10 opens up the possibility that bodily communication performances too have their synonymous-like equivalents: in the most frequent unsuccessful way of representing 'statue', the representer stood motionless with an extra-ordinary body posture. This was usually interpreted by the inferer as an act of freezing. This same synonymous-like equivalency was observed also for Table 4.8 where the representation of tree on the basis of human torso as tree metonymization was interpreted wrongly as an act of freezing.

The most frequent unsuccessful representation of 'mud' (see Table 4.11) had also a synonymous-like equivalent: inferers interpreted it as something related to preparing food.

For the most frequent unsuccessful representation of 'lightness' (see Table 4.12), the problem seems to be one of taking the effect as it is. Thus the inferers interpreted the performance as an act of dazzlement but not an effect of lightness.

In the bodily representations of 'festival', the represeners' folk dance performances were interpreted as folk dances performed in traditional wedding ceremonies (see Table 4.13). This opens up the possibility that folk dance performance is not distinctive enough for the inferers to communicate 'festival' only.

In the representations of 'worship', the most frequent unsuccessful representation was representing it by 'namaz' (see Table 4.14). The problem seems to stem from a failure in demetonymization from 'namaz' to 'worship'. The inferers can easily comprehend that the performer represents 'namaz' but cannot move from 'namaz' to 'worship'.

The most frequent unsucccessful representation for 'funeral' was carrying the coffin on the shoulder (see Table 4.15). This way of representation alone was interpreted as theft or blue collar worker. So it may be proposed that the synonymous-like equivalent bodily representation of 'funeral' was 'theft' and 'blue collar worker'.

The problem for the unsuccessful representations for 'wise' seems to be a failure in moving from the concept of thinking which was immediately and successfully represented by a hand on the chin (see Table 4.16) to 'wise'. To use, Radden and Kövecses (1999)'s terms, the inferer could not move from action to agent in the ladder of metonymization.

The most frequent unsuccessful representation of 'patience' was a dialogical one (see Table 4.17). However, 'patience' is an internal attribute as a concept and not represented dialogically when human beings are not restricted by

bodily communication. It seems that this incongruence misled the inferers and they guessed that concepts like dialogue, communication and friendship are represented.

The most frequent unsuccessful representation of 'adult' opens up the possibility that the failure is due to an inability to move from action (what an adult does) to agent (adult) to use Radden and Kövecses (1999) terms (see Table 4.18).

The most frequent unsuccessful representation of 'health' opens up the possibility that the failure is due to an inability to move from cause (representer's slow running) to effect (health) to use Radden and Kövecses (1999) terms (see Table 4.19).

The most frequent unsuccessful representation of 'life' was by negation (see Table 4.20). This may be simply interpreted as a failure in moving from negation to the concept negated.

Finally, the most frequent unsuccessful representation of 'lie' can be interpreted as an example for common property selection (see Table 4.21). Lie is associated with not talking: Act of talking was negated to communicate 'lie', but this was interpreted by the inferers as 'not talking'.

To sum up, a general analysis of the unsuccessful cases is aimed to be provided in this subsection focusing on cognitive and communicative aspects. However, one has to be cautious in drawing inferences from this subsection since sample size is low and the number of unsuccessful representations are unevenly distributed among the words.

4.1.8. Third Eye Analyses

To obtain independent observations, an extra study was conducted in which 2 raters were instructed to identify the 6 strategies and then watched 11 sessions of bodily communication performance. The raters were asked to identify the strategy used in each performance and to guess the word that the representer intended to communicate. 11 sessions were randomly selected on the basis of strategy and success.

Table 4.21. The unsuccessful ways of representing lie, their frequencies and percentages among the unsuccessful cases of lie representations.

The Unsuccessful Ways of Representing Lie	Frequency	Percentage
The representer talked and negated the action.	14/28	50.00%
The representer played dual roles: One person talked and the other responded by a mindless, refusing facial expression.	4/28	14.29%
The representer played dual roles: one person talked with exaggerated arm movements, the other waves his index finger as admonisher.	2/28	7.14%
The representer talked with exaggerated lip movements.	1/28	3.57%
The representer talked with exaggerated arm movements.	1/28	3.57%
The representer acted as if he talked about secret things.	1/28	3.57%
The representer played dual roles: One person took the beret and hid it. When the other asked about the beret, he acted as if he did not know the whereabouts of it.	1/28	3.57%
The representer talked only.	1/28	3.57%
The representer hid the pencil and went by as if he was handcuffed.	1/28	3.57%
The representer talked and drew a tick on air.	1/28	3.57%
The representer drew a line and negated it.	1/28	3.57%

One successful and one unsuccessful case were selected for each strategy (2x6). This procedure yielded 11 cases and not 12 cases, since there was no unsuccessful case for representer's typical actions strategy. The two interraters' success in identification of strategy and in guessing the word represented is presented below.

As seen in Table 4.22, the consistency of the two interraters' success in identification of strategy is complete. In other words, the two raters reached a full consensus in strategy identification. In 10 of the total 11 cases, the raters reached a consensus in guessing success: In the cases where the first rater guessed correctly, the second rater succeeded too and in the cases where first rater failed, second rater failed too. In 8 of the total 11 cases, the first rater guessed the word

Table 4.22. The two interrater's success in identification of strategy and in guessing the word (0: unsuccessful; 1: successful).

Strategy	Session	Word	Rater1-Success (Strategy)	Rater 2-Success (Strategy)	Rater1 – Success in Guessing	Rater 2 – Success in Guessing
Referent's Typical Actions (successful)	02	03	1	1	0	0
Shape (successful)	11	06	1	1	1	1
Effect (successful)	19	13	0	0	0	1
Representer's Typical Actions (successful)	27	18	1	1	1	1
Culture (successful)	19	23	1	1	1	1
Negation (successful)	26	27	0	0	1	1
Referent's Typical Actions (unsuccessful)	13	03	1	1	0	0
Shape (unsuccessful)	08	09	1	1	1	1
Effect (unsuccessful)	19	15	1	1	1	1
Culture (unsuccessful)	31	25	0	0	1	1
Negation	43	27	1	1	1	1

(unsuccessful)						

correctly while that score for the second rater was 9. That the two raters' success

in guessing is not significantly low for unsuccessful cases shows that the failures

may be due to the inferers in the experiment. One can ask at that point whether

that number of raters are sufficient to draw such a conclusion. However, one has

to be reminded that it is an extra study and not a stand-alone one per se. This

conclusion is also corroborated by the interrater reliability analysis results (see

Subsection 4.1.4).

4.2. Structural Equation Modeling Results[37]

4.2.1. The Hypothesized Model

Using AMOS 5.0, the relationships were examined between self-esteem,

bodily expectancy, extraversion, trait anxiety, analogical reasoning and bodily

performance, a latent variable with two indicators (Factor1 and Factor2). The

hypothesized model is presented in Figure 4.1. The ellipse represent the latent

variable, rectangles represent measured variables. Absence of a line connecting

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[37] See Cheng (2001) for the advantages of structural equation modeling over other methods and DeShon (1998) for the problems of setting error terms in structural equation modeling.
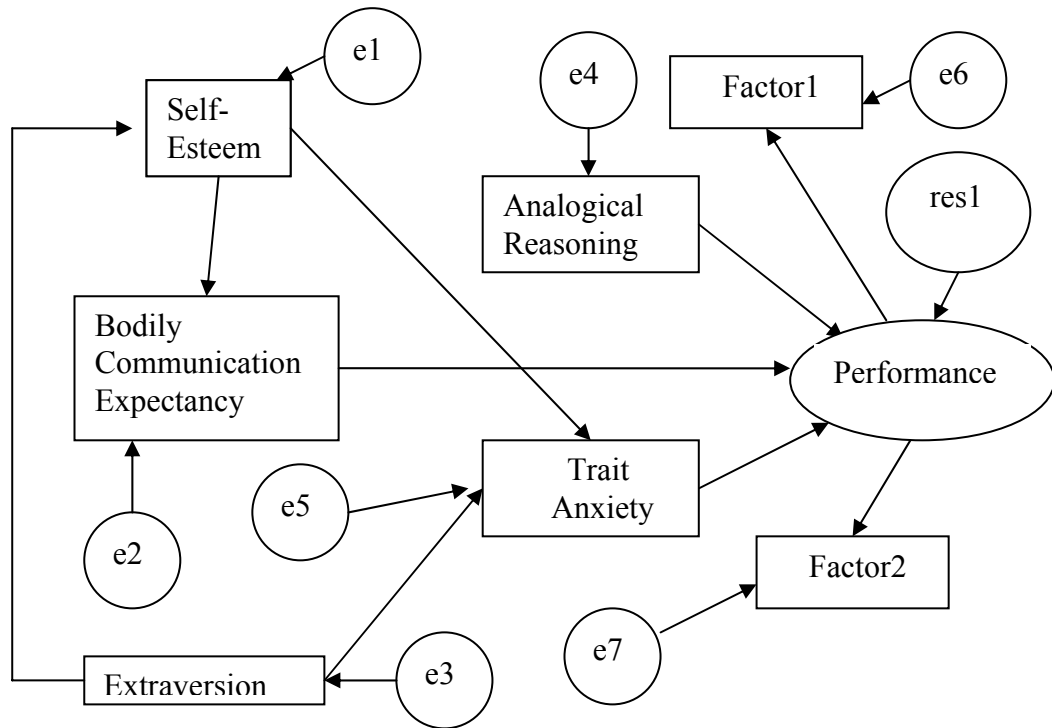
Figure 4.1. Hypothesized SEM model.

variables implies lack of a hypothesized direct effect (Tabachnick and Fidell,

2001) The circles with label 'e' represent error terms for measured variables while

the circle with label 'res' represents the residual of the latent variable.
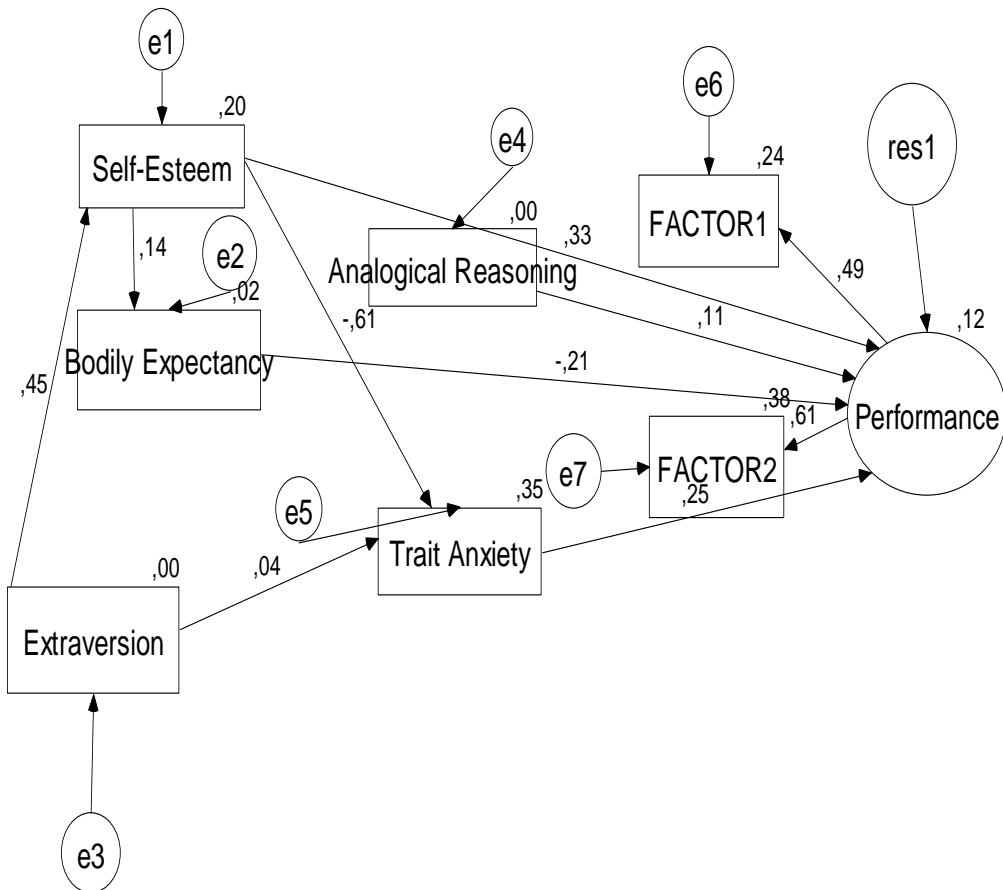
Figure 4.2. Final SEM model before modifications.

Figure 4.2 illustrates the six hypotheses of the study: Firstly, self-esteem affects bodily communication expectancy. Secondly, the relationship from extraversion to bodily representation performance is mediated by trait anxiety. Thirdly, analogical reasoning affects bodily representation performance. Fourthly, bodily communication expectancy affects bodily representation performance. Fifthly, self-esteem inversely affects anxiety. Finally, extraversion affects self-esteem.

4.2.2. Model Estimation

Maximum likelihood estimation was employed to estimate all models. A satisfactory support was found for the hypothesized model in terms of RMSEA and comparative fit index (CFI), χ^2(12, $\underline{N}$=88) = 14.634, $\underline{p}$<0.05, RMSEA = .050, CFI= .959.

Post hoc model modifications were performed in an attempt to develop a better fitting and possibly more parsimonious model. Since the indirect effect of extraversion on bodily representation performance is surprisingly low (standardized coefficient= .077), one path is added to the model from extraversion to bodily representation performance directly. Table 4.23 presents the models tested, scaled χ^2, CFI, and χ^2 difference test. The final model fit the data well, χ^2(11, $\underline{N}$=88) = 11.454, $\underline{p}$<0.05, RMSEA = .022, CFI= .993.

The final model with coefficients presented in standardized form is given in Figure 4.3.

Table 4.23. Comparison of models.

Model	Scaled χ^2	Df	CFI	X^2 Difference Test
Model1 Hypothesized Model	14.634	12	.959	
Model2 Path Added- Performance predicted by Extraversion	11.454	11	.993	M1-M2= 3.18

4.2.3. Direct Effects

In the final model, the relationship between self-esteem and bodily expectancy is significant though it is not a high coefficient (standardized

coefficient= .14). People with high self-esteem expect higher levels of bodily representation capability on their own.

Self-esteem directly affects bodily representation performance (standardized coefficient= .19), i.e. people with higher levels of self-esteem performed higher in terms of bodily representation.

Self-esteem inversely affects trait anxiety (standardized coefficient= -.61) and the relationship is the strongest one in the model.

The relationship between bodily expectancy and bodily performance is significant (standardized coefficient= -.24), however the relationship is inverted. Those expecting higher levels of bodily representation capability exhibit lower levels of bodily representation performance and those expecting lower levels of bodily representation capability on their own far exceeds their own expectations in terms of bodily representation performance.

The relationship between extraversion and trait anxiety is highly significant (standardized coefficient= .45). The relationship between extraversion and trait anxiety is not significant. However, the direct effect of extraversion onto bodily representation performance is significant (standardized coefficient= .30). That is, extraverts tend to exhibit higher levels of bodily communication performance.

The effect of trait anxiety on bodily performance is significant as well (standardized coefficient= .23). Contrary to expectations, people with higher levels of trait anxiety exhibit higher levels of bodily representation performance.

Bodily representation performance loaded on Factor 1 and Factor 2 particularly satisfactorily (standardized coefficient= .49 and standardized coefficient= .61).

Finally, the relationship between analogical reasoning and bodily representation performance is not significant.

In the next chapter, the hypotheses presented in Section 2.8 are discussed with regard to findings shown in Figure 4.3.
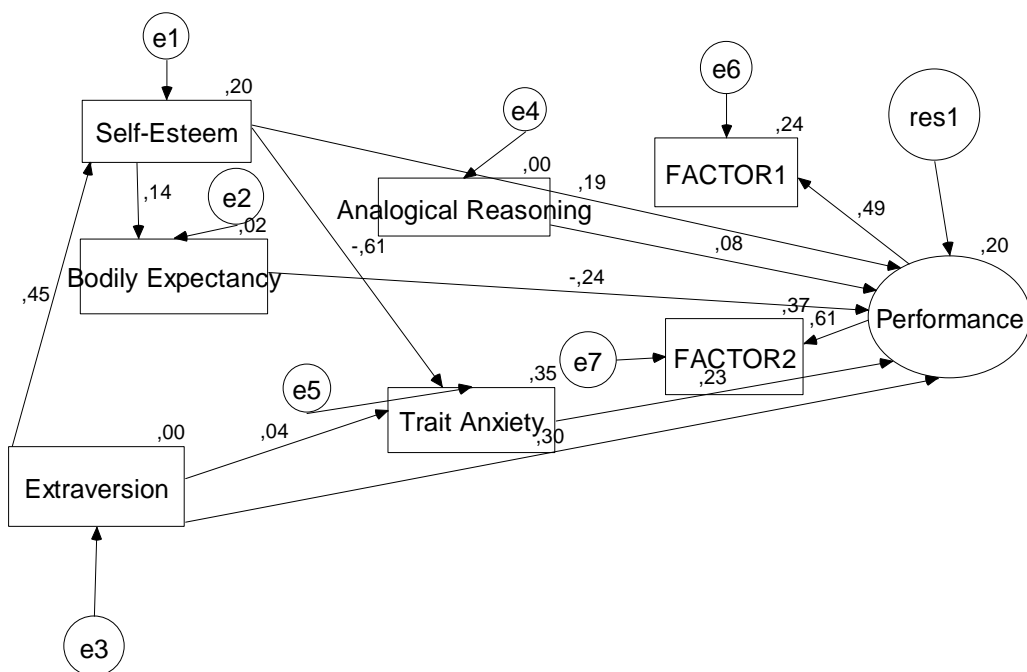
Figure 4.3. Final SEM model.[38]

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[38] The relationships between the variables can be tracked in Subsection 4.2.3.

CHAPTER 5

DISCUSSION

5.1. Evaluation of the Hypotheses

5.1.1. Hypothesis 1: Self-Esteem and Bodily Communication Expectancy

The first hypothesis of the study was that self-esteem is either related or not related to bodily communication expectancy scores since two proposed explanations have opposite predictions: Among the two possibilities, the first one is that low levels of self-esteem may lead to lower bodily communication expectancy scores and the second one is that people regardless of their level of self-esteem may have lower bodily communication expectancy scores since they may not be aware of their bodily communication capacity.

The findings show that the first explanation is true: People with higher levels of self-esteem tend to estimate their bodily communication capacity higher. This shows that bodily communication expectancy is among the various areas of human life Rosenberg (1962) stated in which self-esteem is influential.

It is a common finding that people with high self-esteem endorse self-enhancement as a style of thinking on their own (Brown, Collins and Schmidt, 1988) and this phenomenon may be responsible for this dissertation's finding that self-esteem and bodily expectancy are positively related.

5.1.2. Hypothesis 2: Extraversion and Bodily Representation Performance

The data does not support the second hypothesis. The relationship between extraversion and bodily representation performance is not mediated by trait anxiety. However, the direct relationship between extraversion and bodily representation performance is significant. This is consistent with the findings pointing out the relationship between extraversion and emotional expressiveness (Riggio and Riggio, 2002; Winter et al., 1998). In a meta-analytical study, Riggio and Riggio (2002) found that extraversion is significantly related with emotional expressiveness regardless of the type of measurement (behavioral vs. self-report data). The conclusion by Riggio and Riggio (2002) is the following:

> (…) [M]ore extraverted individuals, who are more sociable, talkative, impulsive, and sensation-seeking, tend to more accurately encode and communicate emotions through facial displays, and are more likely to endorse items that reflect typical behaviors involving nonverbal emotional communication skill. These results are intuitively sensible, as one would expect very extraverted individuals relative to others to communicate to a greater extent than introverted individuals through a variety of channels, including verbal and nonverbal channels (Riggio and Riggio, p. 213).

5.1.3. Hypothesis 3: Analogical Reasoning and Bodily Representation Performance

The relationship between analogical reasoning and bodily representation performance is not significant. This may be due to psychometrics: There is a psychometric divide in measuring creativity and analogical reasoning. The first

tradition has focused on standardization of commonalities; thus the emphasis is on the common patterns of creativity and analogical reasoning. The second tradition considers those that are not common. In other words, it focuses on the individual differences. The studies on how people establish analogies between scenarios belong to this tradition. In such studies, open-ended questions are asked and more than one response can be provided for target questions (Bonnardel, 2000; Keane, 1996).

Finally, the third tradition concentrates on the linguistic metaphors. The third tradition is hard to verify across cultures and the second is hard to verify across individuals. That is why the first tradition is preferred in research circles. Raven's Standard Progressive Matrices Test is a test from the first tradition. It concentrates mostly on what is common across individuals. The implication of the findings of the study may be that such a tradition may be inappropriate to investigate bodily representation performance. Nevertheless, it is not reasonable to adopt the second and third methodologies since it is almost impossible to make warranted quantitative analyses in this vein. Thus the analogical reasoning researcher faces a trade-off: Most of the time the researcher employs the first methodology but it has a low potential to capture the richness of analogical reasoning capacity. It is necessary to employ the second methodology to capture that richness, but it is almost impossible to standardize the second methodology.

As stated in Section 2.2, Dunbar (2001) had proposed the notion of analogical paradox which was the asymmetry between analogy generation and analogy comprehension. In Dunbar (2001)'s line of research, another account for the finding of the study comes from Dunbar and Blanchette (2001). They make

the distinction between *in vivo* (naturalistic) vs. *in vitro* (experimental) studies of analogical reasoning. The mechanisms underlying *in vivo* and *in vitro* cognition may be different. Dunbar and Blanchette (2001) showed that in naturalistic settings people established their analogies on structural similarities while in experimental settings they established their analogies on superficial similarities. Furthermore, people in naturalistic settings produce their own analogies while those in experimental settings are exposed to analogies produced by the researchers. In other words, the focus on analogy production as opposed to analogy comprehension is more pronounced in naturalistic settings. Following these lines, it is possible that Raven's Standard Progressive Matrices Test is a better predictor of *in vitro* cognition as opposed to bodily representation performance that seems to be more *in vivo*-like when framed as a 'Silent Movie' game just like in the study.

A third account related to the accounts above involves the notion of problem solving. Whether the problem is ill-defined or well-defined significantly alters the structure of the solution. Raven's Standard Progressive Matrices Test presents well-defined problems while bodily representation task involves ill-defined problems. In the former, the symbols and representations are explicitly stated whereas in the latter inputs and problem space are not clear enough to permit generation of potential solutions (Bonnardel, 2000).

Finally, the findings show that Raven's Standard Progressive Matrices Test, though supposed to tap a general analogical capacity by presenting figural relations, corresponds to only a particular kind of analogy: Visuospatial analogy. This position is supported by Antonietti and Gioletta (1995)'s and Novick and

Holyoak (1991)'s findings that confer that the Raven scores and analogical problem solving are not related. Furthermore, Denney and Heidrich (1990) shows that Raven scores are not immune to training effect: A brief pre-experimental training session suffices to raise the scores. Last but not least, Morais and Kolinsky (2001) states that the visual analysis necessary to solve Raven's Standard Progressive Matrices Test items are heavily influenced by schooling which is not explicitly taken into account as a controlled or matched variable by the test's developers. These findings as a whole open up the possibility that Raven's Standard Progressive Matrices Test measures something other than general analogical reasoning abilities.

Raven's Standard Progressive Matrices Test measures visuospatial analogy making, but it is known that there exist other kinds of analogies as well. Indeed, visuospatial analogy making is not a type of analogy, but a subtype of analogy. Forceville (2002), elaborating on metaphorical mappings in artistic works and certain movies as well as advertisements, presents a lively and open-ended discussion on various subtypes of visual analogy making such as scenic superimpositions in movies and advertisements.[39]

5.1.4. Hypothesis 4: Bodily Communication Expectancy and Bodily Representation

No relationship had been expected between bodily communication expectancy and bodily representation performance since it was proposed that

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[39] Forceville (2005; 2002) capitalizes on the possibility that conceptual metaphors may be manifested in visual representations, departing from conceptual metaphor researchers who look at language to extract conceptual metaphors. For the reasons stated in Section 2.3, this dissertation does not employ the notion of conceptual metaphors, but it shares Forceville's motivations to look for instantiations of metaphors in nonlinguistic areas such as bodily communication.

people might not be knowledgeable about their bodily representation capacities. But actually a significant relationship was found between bodily communication expectancy and bodily representation. Furthermore, the relationship is negative.

Two interpretations are viable: People perform better than they expected in the case of people with low level of bodily communication expectancy. This can be explained by a set of more or less coinciding constructs such as modesty (cf. Hareli and Weiner, 2000; Kurman, 2002; 2001; Tice et al., 1995) and low self-confidence.

Otherwise, people perform worse than they expected in the case of people with high level of bodily communication expectancy. Again this can be accounted by a set of more or less coinciding variables such as self-enhancement (cf. Campbell et al., 2000; Paulhus, 1998; Seta, Donaldson and Seta, 1999) and high self-confidence. High self-confidence is people's over-evaluation of their own performance before the performance (Klayman et al., 1999; Schaefer et al., 2004, p.473; Stankov, 2000, p.45). The significant negative relationship between bodily communication expectancy and bodily representation may be due to people's unrealistic high self-confidence.

Besides, bodily communication expectancy is a kind of self-concept and as Jopling (1997) puts it, "[s]elf-concepts are not faithful mirrors of the self; they range from more or less accurate representations to vaguely workable likenesses to outright illusions" (p. 255). Then, a relevant distinction in the literature is that between central self-conceptions and peripheral self-conceptions. Central self-conceptions comprise characteristics that an individual himself/ herself is sure to have, while peripheral self-conceptions consist of those characteristics that an

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individual himself/ herself is less certain to have (Foddy and Kashima, 2002). The findings show that bodily communication expectancy corresponds to peripheral self-conceptions.

This interpretation converges with the Self-Aspect Model of Identity (SAMI) proposed by B. Simon (2004), which states that self-conceptions are heterogeneously distributed along various areas of human life. Self-aspects described in Simon's model as such are both social and cognitive in nature. They are relationally constructed personality structures. Each person harbors multiple self-aspects. Furthermore, in SAMI, it is supposed that self-aspects are not hard-wired cognitive structures. They are malleable and informed by the biases and limitations of working memory and social context. They can be constructed online. Based on the findings of the study, bodily communication expectancy can be considered as a self-aspect in SAMI. It is a flexible self-structure. This may provide an account the surprising negative relationship between bodily communication expectancy and bodily communication performance.

5.1.5. Hypothesis 5: Self-Esteem and Trait Anxiety

The inverse relationship between self-esteem and anxiety is particularly high. This converges with previous studies (e.g. Davis et al., 1983). Actually the studies investigating the link between self-esteem and anxiety are relatively scarce since it is thought that the link between these two variables are theoretically beyond dispute.

5.1.6. Hypothesis 6: Extraversion and Self-Esteem

Likewise, the positive relationship between extraversion and self-esteem is remarkably high. This converges with Rosenberg (1962) as well as studies

following Rosenberg's framework (e.g. Farmer et al., 2001; Francis and James, 1996; Kling et al., 2003; Robins et al., 2001). This is accounted by societal norms: Extraverts are treated more favorably by society, therefore they have higher levels of self-esteem (Francis and James, 1996, p. 485).

5.1.7. Hypothesis 7: Extraversion and Trait Anxiety

The relationship between extraversion and trait anxiety is not significant. This finding diverges from previous studies (e.g. Gomez and Francis, 2003) at first blush. However, there are other studies finding no relationship at all: Gershuny and Sher (1998) found that extraversion scores alone did not predict the levels of trait anxiety, but the interaction of extraversion and neuroticism[40] scores did. Their account for this finding is below:

> neuroticism and extraversion predispose one's conditionability, sensitivity to signals of reward and punishment, and vulnerability to arousal and the development of anxiety. Low extraversion and high neuroticism relate to greater susceptibility to negative affect, less susceptibility to signals of reward, greater susceptibility to signals of punishment, and higher vulnerability to arousal and anxiety. Even if an individual is highly neurotic, this same individual with high extraversion would more likely also be sensitive to signals of reward, which may offset or mask feelings of extreme anxiety. Similarly, even if an individual is highly introverted, this same individual with low neuroticism and low emotional reactivity would be less likely to react to signals of punishment with negative affect such as anxiety. Thus, there are multiple plausible reasons to hypothesize that the effects of neuroticism are contingent on extraversion (and vice versa) (Gershuny and Sher, 1998, p.260).

Social accounts for the interaction of extraversion and neuroticism on trait anxiety exist as well. It is proposed that people with low levels of extraversion and high levels of neuroticism is less likely to capitalize on social support as a buffer to anxiety. Furthermore, people with low levels of extraversion and high

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[40] Neuroticism is usually defined as 'low emotional stability' in general (see Moon et al., 2003).

levels of neuroticism are focused on their inner lives and this focus exacerbates anxiety (Gershuny and Sher, 1998, p. 260).

Accounts other than those proposing the interactional (i.e. extraversion and neuroticism) view are possible too: The non-significance of the link between extraversion and trait anxiety can be accounted by the lax use of the word 'people' in Eysenck Personality Scale. The distinction between significant others and outgroups are not highlighted. Therefore probably, the extraversion items of the scale do not measure the factor that it intends to.

Considering these two points (i.e. the point of neuroticism and the scale), neuroticism can be measured along with extraversion in further studies investigating bodily representation performance and other scales intended to measure neuroticism and extraversion can be employed.

5.1.8. Hypothesis 8: Self-Esteem and Bodily Representation Performance

A positive relationship was observed between self-esteem and bodily representation performance. In other words, people with high levels of self-esteem exhibit better bodily representation performance. This finding is consistent with Jambor and Elliott (2005) who found that the levels of communication skills of deaf individuals were positively associated with their self-esteem.

5.1.9. Trait Anxiety and Bodily Representation Performance

Though not in the set of hypotheses tested, the statistical analyses showed that trait anxiety and bodily representation performance were positively related, in other words, people with higher levels of trait anxiety exhibit higher levels of

bodily representation performance. This is contrary to the intuitions that anxious people would not be good at bodily representation. Since there are no similar studies investigating the relation between trait anxiety and bodily representation performance, it is impossible to discuss this finding within the context set by the previous studies. However the positive relation may be due to a third variable effecting or mediating trait anxiety and bodily representation performance: Expressivity. Anxious people may be more expressive and this tendency to express oneself may contribute to the levels of bodily communication performance. Since -contrary to the common fallacy of treating extraversion and expressivity as a single identical variable- extraversion and expressivity are different constructs, it is impossible to know the links between anxiety, expressivity and bodily communication performance without further studies.

5.2. Strategies, Schemata, and Scripts

This dissertation proposes that a public theory of meaning focusing on conventionality, contextuality and use is necessary to investigate bodily representations –inspired by Sperber and Wilson (1997). Sperber and Wilson (1997) state that "there are many more concepts in our minds than words in the language we speak. These concepts may be both stable and communicable without being encoded in words. The concept communicated by use of a word on a given occasion may go well beyond the concept encoded" (p. 1) and they defend the inferentialist position in their paper against the code theory of communication as presented in Section 2.6.   In this dissertation, it is proposed that the notions of schema and script provide such a public understanding of meaning along with the

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notion of Theory of Mind exposed in Sections 2.5 and 2.6. The study showed that other-expectations were as important as self-expectations, in the sense that when the performer's expectations of himself/ herself in bodily communication are not complemented with the performer's expectations of the inferer, concepts cannot be conveyed.

Schemata are 'the patterns of expectations and assumptions about the world' (Tannen and Wallat, 1993, p. 73), while scripts are –in addition to the definitions provided in Section 2.1- simply defined as 'a standard event sequence' (Schank and Abelson, 1977, p. 38). In scripts, details are left out for ease of communication (Schank and Abelson, 1977, p. 45).

In this part, the case studies will be discussed in terms of schemata and scripts. These case studies are presented to unravel the processes underlying bodily communication and accordingly, to develop a model of bodily communication.

The terms 'salience' and 'distinctiveness' have been used interchangeably in this dissertation consistent with Radden and Kövecses (1999). In this dissertation, salience is considered to be perceptual while distinctiveness is considered to be conceptual. This perception/conception distinction melts down in the case of bodily communication where salience of bodily communication performance is intertwined with distinctiveness of concepts bodily represented. The following chain of propositions are formed on the basis of the repeated watching of the videos of 1320 bodily communication trials by the experimenter.

The essential claim is that all the concepts represented can be reconceptualized in the following form:

Presupposition 1: Concepts have certain properties.

Presupposition 2: Some properties are both performable by body and distinctive.

Conditional: If the aim is to communicate certain concepts nonverbally, the property of the concept considered should be both performable by body and distinctive.

The aim is to communicate certain concepts nonverbally.

Therefore the property of the concept considered should be both performable by body and distinctive.

Action-statement: Among the set of properties for Concept X, Property A… is (are) both performable by body and distinctive.

In this set of statements, by instantiating X and A… in the action-statement, it is possible to state all the cases in schematic or scriptual way. Thus, in the following sections how X and A… have been instantiated will be elaborated. Whenever there are multiple instantiations, i.e. where the participants resorted to different manners of representation, alternatives are also provided. The metonymies observed in the bodily communication performances are interpreted with reference to Radden and Kövecses (1999) in which 49 types of metonymy are presented and exemplified.[41]

Each subsection is concluded by the presentation of Wordnet 2.1 definitions and the comparison of the definitions with the bodily communication performances to show that the represanters select certain properties. English Wordnet is preferred over Turkish Wordnet since an equally developed Turkish Wordnet version is not available. Almost half of the words used in the

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[41] Only a small number of these types of metonymy are applicable to the case of bodily communication performances. See Table 2.2 to check the full list of types of metonymy.

experiments have no definition in Turkish Wordnet. They do not differ much from the English definitions (see Appendix A for the available definitions).

Wordnet 2.1 is preferred for comparative purposes rather than standard dictionaries since Wordnet 2.1 is based on conceptual relations among words rather than lexical relations (Fellbaum, 1998). Secondly, Wordnet 2.1 is more suitable for this dissertation since it explicitly represents part-whole relationships, whereas standard dictionaries treat part-whole relationships indirectly. However, these lines have to be read with the caveat that wordnets are text-based, but the data presented in this dissertation involve another medium of communication and thus the connection may be tenuous.

5.2.1. Referent's Typical Actions

5.2.1.1. X= Bird

For X= Bird, flying was the property that was both performable by body and sufficiently distinctive to communicate nonverbally. The participants opened their arms laterally with an angle and moved their hands from up to down. The direction of the movement was always precise. None of the participants moved their hands bottom up. Finally, none of the participants employed other strategies.

This representation of bird is metonymic: The participants did not try to represent all features of bird such as laying eggs or forming nests. They represented a single feature, that is, flying, not to convey flying but the whole concept of bird.

The definition of 'bird' in Wordnet 2.1 is that

The noun bird has 5 senses (first 2 from tagged texts)

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1. bird -- (warm-blooded egg-laying vertebrates characterized by feathers and forelimbs modified as wings)
2. bird, fowl -- (the flesh of a bird or fowl (wild or domestic) used as food)
3. dame, doll, wench, skirt, chick, bird -- (informal terms for a (young) woman)
4. boo, hoot, Bronx cheer, hiss, raspberry, razzing, razz, snort, bird -- (a cry or noise made to express displeasure or contempt)
5. shuttlecock, bird, birdie, shuttle -- (badminton equipment consisting of a ball of cork or rubber with a crown of feathers)

As the definition suggests, the word 'bird' corresponds to a set of concepts. Those concepts are metonymized, and schemata and scripts are accessed as a consequence. However, not all the concepts are equally performable and communicable by body. The available schemata and scripts are restricted by the bodily representation strategy options in bodily communication. As in all the bodily representations of the words corresponding to referent's typical actions strategy, the bodily representation of 'bird' is a case of salient property for a category type of metonymy as presented in Radden and Kövecses (1999).

5.2.1.2. X= Fish

For X= Fish, the distinctive and performable property was swimming as fish does. In most of the cases, the fish was represented by the hand rather than the whole body. The upper part of the arm was adjoined to the body and the lower part of the hand especially the wrist was moved quickly from up to down. In the meantime, the hands took a concave shape. The hands with the concave shape represents the fin of fish while moving in the water. Almost all of the participants employed this way of representation and all of them was successful in communicating fish.

Like the representation of bird, the representation of fish is metonymic. The participants tried to represent the whole concept of fish by representing

swimming. The metonymy is typical for swimming of fish. If it had been swimming of humans, it would have been different –involving movements of arms and the head.

The definition of 'fish' in Wordnet 2.1 is that

> The noun fish has 4 senses (first 2 from tagged texts)
>
> 1. fish -- (any of various mostly cold-blooded aquatic vertebrates usually having scales and breathing through gills; "the shark is a large fish"; "in the living room there was a tank of colorful fish")
> 2. fish -- (the flesh of fish used as food; "in Japan most fish is eaten raw"; "after the scare about foot-and-mouth disease a lot of people started eating fish instead of meat"; "they have a chef who specializes in fish")
> 3. Pisces, Fish -- ((astrology) a person who is born while the sun is in Pisces)
> 4. Pisces, Pisces the Fishes, Fish -- (the twelfth sign of the zodiac; the sun is in this sign from about February 19 to March 20)

As in the discussion for the bodily representation of bird, the word 'fish' triggers certain concepts like those in the first sense above. The concepts are metonymized to economize the set of concepts by schemata and scripts. Properties of fish other than swimming (i.e. cold-bloodedness, being a vertebrate, having scales and breathing through gills) do not emerge in the data. This seems to be due to the restrictions put by bodily representation strategies.

5.2.1.3. X= Dragon

For X= Dragon, the distinctive and performable property was the fire coming out of the beast's mouth. Most of the time, the participants opened their mouth, periodically moving their hands forward which they opened and closed starting from their mouth. In most of the cases the inference was successful. In a small number of cases, after unsuccessful attempts in communication, the participants intended to communicate fire by representing the firing of a cigarette lighter and when the inferer understood that it was fire that was intended to be

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communicated, the representer resorted to the common way of moving their hands forward which they opened and closed starting from their mouth.

Dragon is a creature that disperses fire from its mouth. The representation by fire emanating from mouth is salient enough to communicate dragon.

The definition of 'dragon' in Wordnet 2.1 is that

The noun dragon has 4 senses (first 1 from tagged texts)

1. dragon, firedrake -- (a creature of Teutonic mythology; usually represented as breathing fire and having a reptilian body and sometimes wings)
2. dragon, tartar -- (a fiercely vigilant and unpleasant woman)
3. Draco, Dragon -- (a faint constellation twisting around the north celestial pole and lying between Ursa Major and Cepheus)
4. dragon, flying dragon, flying lizard -- (any of several small tropical Asian lizards capable of gliding by spreading winglike membranes on each side of the body)

The word 'dragon' selects 'being a mythological creature', 'breathing fire', 'having a reptilian body' and 'having sometimes wings' among a universal set of concepts. The concepts selected are metonymized; 'being a mythological creature' and 'having a reptilian body' are omitted. Thus 'the dragon script' consists of 'breathing fire' and in a negligible number of cases 'having wings' are also represented as a supplement to the 'breathing fire' property. This 'dragon script' is communicable by bodily representation strategies. The script is expressed and the outcome is bodily representation performance. When the performance failed in communication, the script is calibrated with regard to ToM considerations and this process of calibration continues until successful communication or the end of allocated time. A further explanation could be that

the encoders are sensitive to the clues of non-comprehension and that therefore they shift the manner of representation.[42]

As to the inferer's side, the performance triggers salience and distinctiveness, and clarity and relevance considerations, which in turn lead to guessing and mind-reading. As stated in Subsection 4.1.6.1.1 and shown in Table 4.6, the unsuccessful cases do not differ from successful cases in terms of bodily representations. Thus the failures may be attributed to ToM considerations. The reasons may be also looked for at a conceptual level: The word 'dragon' may be a less accessible word for inferers and people in general. In this vein, the failures may be due to the low word frequency of 'dragon' as stated in Subsection 4.1.6.1.1.

5.2.1.4. X= Singer

For X= Singer, the distinctive and performable property was grasping the microphone, speaking to it and looking far ahead with one or both of the arms perpendicular to body and at times clapping to communicate that they are addressing an enormous number of audience. Thus, the representation of singer more likely corresponds to a script. The scriptual representation was always successful to communicate singer. The script was the following:

A singer does

      Grasps microphone

      Speaks to it

---

[42] Actually the empirical content of this sentence is not tested in the experiments, but nevertheless it is justified on the basis of the repeated watching of the videos of unsuccessful bodily communication trials by the experimenter.

Occasionally raises one or both of his/her arms

Occasionally claps

Looks ahead

(Accompanied by an absent-minded facial expression.)

The definition of 'singer' in Wordnet 2.1 is that

The noun singer has 3 senses (first 1 from tagged texts)

1. singer, vocalist, vocalizer, vocaliser -- (a person who sings)
2. Singer, Isaac M. Singer, Isaac Merrit Singer -- (United States inventor of an improved chain-stitch sewing machine (1811-1875))
3. Singer, Isaac Bashevis Singer -- (United States writer (born in Poland) of Yiddish stories and novels (1904-1991))

As a comparison of the script above and the Wordnet definition would suggest, the scriptual representation for 'singer' is not covered by the definition of it. The word 'singer' directly triggers a scriptual representation mediated by a quick calibration by ToM considerations. The represeter quickly considers what aspects of the script the inferer is likely to access easily. As to the inferer's side, guessing and mind-reading process for 'singer' is almost automatic.[43]

5.2.1.5. X= Boxer

For X= Boxer, the distinctive and performable property was boxer's typical way of hitting and his/her tough face expressions. But for a small number of participants, it was not distinctive enough. In their initial guesses, they pronounced the names of East Asian martial arts rather than boxing.

The definition of 'boxer' in Wordnet 2.1 is that

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[43] This is the description of bodily communication performances for the word 'singer' which were watched by the experimenter repeatedly post-experimentally to provide a comprehensive characterization of the bodily communication performance.

The noun boxer has 4 senses (first 1 from tagged texts)
1. boxer, pugilist -- (someone who fights with his fists for sport)
2. packer, bagger, boxer -- (a workman employed to pack things into containers)
3. Boxer -- (a member of a nationalistic Chinese secret society that led an unsuccessful rebellion in 1900 against foreign interests in China)
4. boxer -- (a breed of stocky medium-sized short-haired dog with a brindled coat and square-jawed muzzle developed in Germany)

The definition of 'boxer' is quite simple. The 'boxer script' is directly accesible. Its insufficient distinctiveness for a small number of inferers shows that the initial failures are not due to relevance and clarity considerations. and they do not stem from the mind-reading process, but from the guessing process where the salience and distinctiveness of the performance are considered. A brief guiding by ToM considerations on inferer's side leads to successful communication in this small number of failures in initial guessing.

5.2.2. Shape

5.2.2.1. X= Woman

For X= Woman, there were more than one way of representation: In the representation by shape, the distinctive and performable property of woman was the body contours. This is a schematic way of representation. There was also a scriptual way of representation. According to this representation

A woman does

    Combs her preferably long hair

    Wears rings and earrings

    Walks by wiggling the hips

    Rouges

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Sits with the legs crossed and caresses the hips

A third way of representation was neither schematic or scriptual. It is symbolic. Woman, according to this symbolic representation can be communicated by the female symbol (♀). This is a case of form for concept type of metonymy in Radden and Kövecses (1999). The example they provide for this type of metonymy is the relationship between '$' and 'dollar'. A very small number of participants made combinations by their fingers to communicate the female symbol. The scriptual way of representation was the most preferred, while the first and second ways of representation were equally successful in terms of inference.

As shown in Table 4.7, drawing body contours to represent 'woman' is the most preferred way of representation in unsuccessful cases too. This shows that the schematic representation of 'woman' is accessible to representers but the inferers do not have the same level of accesibility.

The definition of 'woman' in Wordnet 2.1 is that

The noun woman has 4 senses (first 4 from tagged texts)

1. woman, adult female -- (an adult female person (as opposed to a man); "the woman kept house while the man hunted")
2. womanhood, woman, fair sex -- (women as a class; "it's an insult to American womanhood"; "woman is the glory of creation"; "the fair sex gathered on the veranda")
3. charwoman, char, cleaning woman, cleaning lady, woman -- (a human female who does housework; "the char will clean the carpet")
4. woman -- (a female person who plays a significant role (wife or mistress or girlfriend) in the life of a particular man; "he was faithful to his woman")

The first sense of 'woman' in the definition above is quite brief but it points to a bodily communication option not employed by any of the participants:

'Woman' is the opposite of 'man' and accordingly it may have been represented by negation strategy. The non-use of this possibility may mean that the schematic and scriptual representations of woman presented above are more accessible than the representation by negation.

It seems that the word 'woman' selects a number of concepts not specified in the definition above. Those are metonymized to render schematic, scriptual and symbolic representations of 'woman'. Those representations are restricted by the availability of the bodily representation strategies, and calibrated by ToM considerations whenever the performance fails. Inferer's guessing and mind-reading lead to inference mediated by salience and distinctiveness, and relevance and clarity considerations (see Figure 5.4 for a graphical representation of this process).

5.2.2.2. X= Tree

Two ways of representation for tree were observed. One is schematic and the second one is scriptual. In the schematic representation, tree was an entity that includes among its properties the vertical posture that resembles a human being standing up and raising both of his/her arms with an angle of approximately 75° in an unusual position. The participants exhibited such unusual postures to communicate tree but most of the time, this way of representing alone was unsuccessful in terms of inference. The schematic representation is metonymic in the sense that the standing of tree was taken as the part to represent the wholeness of tree.

In the scriptual representation,

A tree pertains to

> Sowing seeds,

> Growing up (vertically),

> Having fruits

> Nesting birds.

In almost all the cases, the representation based on the above script was successful in terms of inference. In the first attempt of representation, the schematic way of representation was more preferred but since it was unsuccessful in communication, the participants employed the scriptual way of representation and were able to convey 'tree' to the inferers. Furthermore, the schematic way of representation is employed in almost half of the unsuccessful cases.[44]

The definition of 'tree' in Wordnet 2.1 is that

> The noun tree has 3 senses (first 1 from tagged texts)
> 1. tree -- (a tall perennial woody plant having a main trunk and branches forming a distinct elevated crown; includes both gymnosperms and angiosperms)
> 2. tree, tree diagram -- (a figure that branches from a single root; "genealogical tree")
> 3. Tree, Sir Herbert Beerbohm Tree -- (English actor and theatrical producer noted for his lavish productions of Shakespeare (1853-1917))

The word 'tree' selects concepts such as 'being a tall perennial woody plant', 'having a main trunk and branches forming a distinct elevated crown', and 'gymnosperms and angiosperms'. Certain properties of 'tree' such as 'woodiness' and 'gymnosperms and angiosperms' are omitted, and the concepts selected by the word 'tree' is metonymized: Schematic and scriptual representations of 'tree' are formed as presented above. The availability of bodily communication

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[44] Actual figure is 47.37 %. See Table 4.8.

strategies restricts these schematic and scriptual representations. For an unknown reason, in most of the cases, the schematic representation is preferred over the scriptual representation. Actually, an economy principle may be postulated which suggests that schematic representations are more preferred than scriptual representations by the represener, since schematic ones need less exertion of bodily energy. Ditto for the schematic and scriptual representations of statue. But such a principle would fail for the representations of woman: As stated above, scriptual representation of woman was more preferred than the schematic one.

When the schematic representation fails, the performance is calibrated by ToM considerations and as a consequence, scriptual representation is employed in the next attempt. From the inferer's perspective, the schematic representation of 'tree' is not salient and distinctive enough to allow right guessing and correct mind-reading; but guessing and mind-reading is improved when the scriptual representation for 'tree' is employed in the bodily communication performance.

5.2.2.3. X= Pyramid

Pyramid too had schematic and scriptual representations. In the schematic representation, the distinctive and performable property of pyramid was its being a three dimensional substantiation of triangle. The participants either drew a triangle by their index fingers or combined their left index finger and left thumb with right index finger and right thumb to form a triangle with its sides represented by index fingers and thumbs. This was the most preferred way of representing pyramid. Most of the time, this way of representation was successful in terms of inference. In a small number of cases, this way was unsuccessful. In

those cases, the participants employed the scriptual representation. Furthermore, the schematic representation of 'pyramid' is employed in nearly 60% unsuccessful cases.[45] This shows that the schematic representation is accessible to the representer, but is not salient and distinctive enough for inferers.

In the scriptual representation, a pyramid was a building that has outer (up)stairs and associated with anything related to pharaohs. The participants drew huge triangles by their hands on the air and then represented climbing upstairs of a pyramid. In one of the cases, when the communication was unsuccessful, the participant pointed out his beard extending downwards thinly. That was the typical chin ornament of the pharaohs. He represented a facial expression that reminds one of the megalomania of the pharaohs. Finally, he walked slowly. Representing a royal stick at his hand, he hit the ground with the stick while walking.

The definition of 'pyramid' in Wordnet 2.1 is that

> The noun pyramid has 3 senses (no senses from tagged texts)
>
> 1. pyramid -- (a polyhedron having a polygonal base and triangular sides with a common vertex)
> 2. pyramid -- ((stock market) a series of transactions in which the speculator increases his holdings by using the rising market value of those holdings as margin for further purchases)
> 3. Pyramid, Great Pyramid, Pyramids of Egypt -- (a massive monument with a square base and four triangular sides; begun by Cheops around 2700 BC as royal tombs in ancient Egypt)

It is observed that the schematic representation of 'pyramid' corresponds to the first sense of the word, while the scriptual representation leaps to the third sense.

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[45] The actual figure is 60.87%. See Table 4.9.

5.2.2.4. X= Statue

Statue too had schematic and scriptual representations. The schematic representation of statue resembled that of tree: The distinctive and performable property of statue was its posture. To raise the distinctiveness, the statues were in unusual postures most of the time. Furthermore, famous statues that became icons (e.g. The Pensive Man) were represented. Actually, this is a case of the type-token relationship. This way of representing was successful in more than half of the cases in terms of inference.[46] Most of the unsuccessful represerters employed the scriptual representation after their failed attempts by schematic representation.

In the scriptual representation, the statue was considered to be the product of the effort by the sculptor. The creation process was represented. A stone was taken and it was carved gently. In nearly half of the cases, this way of representation was successful in terms of inference. It was observed that the schematic representation was more preferred but upon failure in communication, the scriptual representation was employed.

The definition of 'statue' in Wordnet 2.1 is that

> The noun statue has 1 sense (first 1 from tagged texts)
>
> 1. statue -- (a sculpture representing a human or animal)

Actually, the definition above is not so much informative. One is unable to deduce the set of concepts selected by the word 'statue' and metonymized later on. However, it can be firmly stated that in the schematic way of representing 'statue', the posture of the statue is figured, but other properties of a statue such as its material or color are omitted. In that sense, the shematic representation of

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[46] The actual figure is 66 %. See Subsection 4.1.6.2.4.

'statue' is the product of a metonymization process. Likewise, the scriptual representation of 'statue' focused on 'how the statue is produced' but omitted other properties such as 'why the statue is produced', 'for whom it is produced' and where and when. Thus, the scriptual representation of 'statue' too is the product of a metonymization process.

5.2.2.5. X= Beard

The representation of beard was unanimously quite direct: Just patting the facial region for the beard was sufficient to communicate beard.

The definition of 'beard' in Wordnet 2.1 is that

> The noun beard has 5 senses (first 1 from tagged texts)
>
> 1. beard, face fungus, whiskers -- (the hair growing on the lower part of a man's face)
> 2. beard -- (a tuft or growth of hairs or bristles on certain plants such as iris or grasses)
> 3. beard -- (a person who diverts suspicion from someone (especially a woman who accompanies a male homosexual in order to conceal his homosexuality))
> 4. beard -- (hairy growth on or near the face of certain mammals)
> 5. byssus, beard -- (tuft of strong filaments by which e.g. a mussel makes itself fast to a fixed surface)

As the success rate for the representation of 'beard' is 100% and the representation is quite direct, it seems that no further inquiry is necessary to discuss the representation of 'beard'.

5.2.3. Effect

5.2.3.1. X= Coldness

The representation of coldness was quite direct and schematic: Consistent with the framework of the study, coldness was considered to be something that leaves some effects on human beings. The participants trembled with their hands

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adjacent to and in front of their body. This representation was always successful to communicate coldness.

The definition of 'coldness' in Wordnet 2.1 is that

> The noun coldness has 3 senses (first 2 from tagged texts)
>
> 1. cold, coldness -- (the sensation produced by low temperatures; "he shivered from the cold"; "the cold helped clear his head")
> 2. coldness, coolness, frigidity, frigidness, iciness, chilliness -- (a lack of affection or enthusiasm; "a distressing coldness of tone and manner")
> 3. coldness, cold, low temperature, frigidity, frigidness -- (the absence of heat; "the coldness made our breath visible"; "come in out of the cold"; "cold is a vasoconstrictor")

Actually the first sense of the word 'coldness' above is an effect-definition. It defines 'coldness' by the effects it produces on the human beings. From the point of view of metonymy, this is a case for effect for cause as explicated in Radden and Kövecses (1999). Radden and Kövecses (1999)'s example for effect for cause metonymy is the following: "*slow road* for 'slow traffic resulting from the poor state of the road'".

Besides, the third definition points to a negation strategy that is not employed in bodily communication performances: 'Coldness' is the opposite of 'hotness'. It seems that the representation by effect is more accessible to the representers.

5.2.3.2. X= Hotness

Likewise, the representation of hotness was quite direct, but this time scriptual: Hotness was considered to be something that makes people sweat, complain and try to cool themselves. The participants grasped their shirt or t-shirt and pulled it outwards to air the body. This representation was always successful to communicate hotness.

The definition of 'hotness' in Wordnet 2.1 is that

> The noun hotness has 3 senses (first 1 from tagged texts)
>
> 1. hotness, heat, high temperature -- (the presence of heat)
> 2. horniness, hotness, hot pants -- (a state of sexual arousal)
> 3. hotness, pepperiness -- (a hot spiciness)

Contrary to the definition of 'coldness', the definition of 'hotness' in Wordnet 2.1 does not include a negative characterization and in its brevity, it is not an effect-definition. However, in the bodily communication performances, 'hotness' was communicated by the effect strategy. The bodily representations for 'hotness' also fall into the category of effect for cause metonymy, just like 'coldness'.

5.2.3.3. X= Wind

Two scriptual ways of representing wind was observed: In the former, wind was considered to be something that makes people's hair and hat(s) fly, while in the latter the distinctive and performable property of wind was considered to be its sounding as 'u' vowel. Both ways of representation were always successful in terms of inference.

The definition of 'wind' in Wordnet 2.1 is that

> The noun wind has 8 senses (first 3 from tagged texts)
>
> 1. wind, air current, current of air -- (air moving (sometimes with considerable force) from an area of high pressure to an area of low pressure; "trees bent under the fierce winds"; "when there is no wind, row"; "the radioactivity was being swept upwards by the air current and out into the atmosphere")
> 2. wind -- (a tendency or force that influences events; "the winds of change")
> 3. wind -- (breath; "the collision knocked the wind out of him")
> 4. wind, idle words, jazz, nothingness -- (empty rhetoric or insincere or exaggerated talk; "that's a lot of wind"; "don't give me any of that jazz")
> 5. tip, lead, steer, confidential information, wind, hint -- (an indication of potential opportunity; "he got a tip on the stock market"; "a good lead for a job")
> 6. wind instrument, wind -- (a musical instrument in which the sound is produced by an enclosed column of air that is moved by the breath)

7. fart, farting, flatus, wind, breaking wind -- (a reflex that expels intestinal gas through the anus)
8. wind, winding, twist -- (the act of winding or twisting; "he put the key in the old clock and gave it a good wind")

Obviously, both scriptual ways of representing 'wind' is metonymical by effect for cause on the basis of the definition above. Before all, the bodily representations of wind exclude the pressure explanation. It is not represented as something moving 'from an area of high pressure to an area of low pressure'. This may be attributed to the restrictions posed by the availability of bodily strategies.

5.2.3.4. X= Mud

Two scriptual ways of representing mud was observed: In the former, mud was considered to be a consequence of walking near the cars when it had rained whereas in the latter, mud was represented by a difficulty in walking (or physically speaking, a rise in the gravitational force) and then trying to clean the lower parts of the trousers. The second way of representation was the most preferred and more successful in terms of inference.

The definition of 'mud' in Wordnet 2.1 is that

The noun mud has 2 senses (first 1 from tagged texts)

1. mud, clay -- (water soaked soil; soft wet earth)
2. mud -- (slanderous remarks or charges)

The definition above is a disembodied definition, while both of the scriptual representations communicate 'mud' by referring to the bodily experience with mud: Mud is either represented as a thing that splashes to the body or a thing that does not allow body to move properly. Actually the representation based on

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Wordnet's disembodied definition was the most preferred way of representation among the unsuccessful cases.[47]

5.2.3.5. X=Lightness

A majority of the participants represented 'lightness' by a script of waking up, opening the windows and consequently, narrowing the eyes due to a difficulty at looking.[48] This way of representation was successful in communicating lightness, but was also the most preferred way of representation in unsuccessful cases.[49]

The definition of 'lightness' in Wordnet 2.1 is that

The noun lightness has 6 senses (no senses from tagged texts)

1. elation, high spirits, lightness -- (a feeling of joy and pride)
2. lightness, weightlessness -- (the property of being comparatively small in weight; "the lightness of balsa wood")
3. agility, legerity, lightness, lightsomeness, nimbleness -- (the gracefulness of a person or animal that is quick and nimble)
4. lightness -- (having a light color)
5. light, lightness -- (the visual effect of illumination on objects or scenes as created in pictures; "he could paint the lightest light and the darkest dark")
6. lightsomeness, lightness -- (the trait of being lighthearted and frivolous)

The fifth sense of the word matches the bodily representations observed in the experiments.[50] Again, the definition is disembodied. It is obvious that the representers do not metonymize over the definition above, i.e. 'the visual effect of illumination on objects or scenes as created in pictures'. However, in a deeper analysis, the definition is embodied and matches the bodily representations in a

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[47] The actual figure for the disembodied definition is 23.08%. In 23.08% of the unsuccessful cases, the representer squatted down and took something like dough from the ground and played with it (see Table 4.11).
[48] The actual figure is 75%. See Subsection 4.1.6.3.2.
[49] The actual figure is 36.67%. See Table 4.12.
[50] This fact does not cast doubt on the findings, since the fifth sense and the other senses are designated by different words in Turkish language.

certain way: Lightness is defined as a 'visual effect', and it is the exaggerated form of this visual effect, i.e. dazzlement that is represented by body in the experiments. Nevertheless, it is not convincing that the Wordnet definition is applicable to the 'opening of the window' script since that involves 'the daily routine activity'. So it is a metonymy based on the salient feature of an event – something like "waking up in the morning etc."

5.2.4. Representer's Typical Actions

5.2.4.1. X= Phone

Phone was always represented by thumb and little finger extended outwards to imitate the shape of phone and putting the hand in that shape to ear and mouth. As valid for all the words corresponding to representer's typical actions strategy, the bodily representation of 'phone' is a case for a subevent for whole event type of metonymy as presented in Radden and Kövecses (1999). They are also cases for instrument for action type of metonymy exemplified by the words 'to ski' and 'to hammer' in Radden and Kövecses (1999).

The representation of phone was undergirded by a simple script. It was one of the most easily accessible concepts in the list for bodily performance. The success rate for 'phone' is 100%.

The definition of 'phone' in Wordnet 2.1 is that

> The noun phone has 3 senses (first 1 from tagged texts)
>
> 1. telephone, phone, telephone set -- (electronic equipment that converts sound into electrical signals that can be transmitted over distances and then converts received signals back into sounds; "I talked to him on the telephone")
> 2. phone, speech sound, sound -- ((phonetics) an individual sound unit of speech without concern as to whether or not it is a phoneme of some language)
> 3. earphone, earpiece, headphone, phone -- (electro-acoustic transducer for

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converting electric signals into sounds; it is held over or inserted into the ear; "it was not the typing but the earphones that she disliked")

The first sense above provides a technical definition of 'phone'. However, the experiments show that representing 'phone' by its use is more accessible both to representers and inferers. Besides, the restrictions of bodily communication do not allow for the representation of the technical definition of 'phone'.

5.2.4.2. X= Salt

Salt was always represented by putting salt to the meal. Like that of phone, the representation of salt was based on a simple script. It was easily accesible. The success rate for 'salt' is 100%.

The definition of 'salt' in Wordnet 2.1 is that

> The noun salt has 4 senses (first 2 from tagged texts)
>
> 1. salt -- (a compound formed by replacing hydrogen in an acid by a metal (or a radical that acts like a metal))
> 2. salt, table salt, common salt -- (white crystalline form of especially sodium chloride used to season and preserve food)
> 3. Strategic Arms Limitation Talks, SALT -- (negotiations between the United States and the Union of Soviet Socialist Republics opened in 1969 in Helsinki designed to limit both countries' stock of nuclear weapons)
> 4. salt, saltiness, salinity -- (the taste experience when common salt is taken into the mouth)

Again, the chemical definition above is not represented by body. Actually it is impossible to represent this definition by body. Besides, unless the participant is a chemist or from a near discipline, s/he would not define 'salt' verbally in these chemical terms.

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5.2.4.3. X= Weight

Like phone and salt, the representation of weight was based on a simple script: Lifting weight. It was easily accessible too. The success rate for 'weight' is 100%.

The definition of 'weight' in Wordnet 2.1 is that

> The noun weight has 8 senses (first 5 from tagged texts)
>
> 1. weight -- (the vertical force exerted by a mass as a result of gravity)
> 2. weight, free weight, exercising weight -- (sports equipment used in calisthenic exercises and weightlifting; it is not attached to anything and is raised and lowered by use of the hands and arms)
> 3. weight, weightiness -- (the relative importance granted to something; "his opinion carries great weight"; "the progression implied an increasing weightiness of the items listed")
> 4. weight -- (an artifact that is heavy)
> 5. weight -- (an oppressive feeling of heavy force; "bowed down by the weight of responsibility")
> 6. system of weights, weight -- (a system of units used to express the weight of something)
> 7. weight unit, weight -- (a unit used to measure weight; "he placed two weights in the scale pan")
> 8. weight, weighting -- ((statistics) a coefficient assigned to elements of a frequency distribution in order to represent their relative importance)

The second sense of the word 'weight' corresponds to the bodily representations observed in this experiment.[51] The definition is embodied, it defines 'weight' by its relation to bodily activities: It 'is raised and lowered by use of the hands and arms'. In that sense it is consistent with the bodily representations of 'weight'.

5.2.4.4. X= Pencil

The representation of pencil was almost always scriptual: It was represented by writing something. However, in a small number of cases, the

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[51] The word used in Turkish ('halter') only matches the second sense; another word is used for the first sense in Turkish.

scriptual representation was supported by a schematic one: After writing, the contour of the pencil could be pointed out and in that sense, the distinctive and performable property of pencil was its shape. It was easily accessible. The success rate for 'pencil' is 100%.

The definition of 'pencil' in Wordnet 2.1 is that

> The noun pencil has 4 senses (first 1 from tagged texts)
> 1. pencil -- (a thin cylindrical pointed writing implement; a rod of marking substance encased in wood)
> 2. pencil -- (graphite (or a similar substance) used in such a way as to be a medium of communication; "the words were scribbled in pencil"; "this artist's favorite medium is pencil")
> 3. pencil -- (a figure formed by a set of straight lines or light rays meeting at a point)
> 4. pencil -- (a cosmetic in a long thin stick; designed to be applied to a particular part of the face; "an eyebrow pencil")

The first sense in the definition of 'pencil' is clear: It expresses the use of 'pencil', i.e. writing. The bodily representations of 'pencil' are obviously metonymical, since the representations exclude pencil's certain properties: that it is a cylindrical implement or that it is encased in wood are not represented in the experiments. The concept of 'pencil' is represented solely by referring to its use.

5.2.4.5. X= Comb

The representation of comb was easily accessible too. It was also based on a simple script of combing hair. The success rate for 'comb' is 100%.

The definition of 'comb' in Wordnet 2.1 is that

> The noun comb has 6 senses (first 2 from tagged texts)
>
> 1. comb -- (a flat device with narrow pointed teeth on one edge; disentangles or arranges hair)
> 2. comb, cockscomb, coxcomb -- (the fleshy red crest on the head of the domestic fowl and other gallinaceous birds)
> 3. comb -- (a fleshy and deeply serrated outgrowth atop the heads of certain birds especially domestic fowl)
> 4. comb -- (any of several tools for straightening fibers)

5. comb -- (ciliated comb-like swimming plate of a ctenophore)
6. comb, combing -- (the act of drawing a comb through hair; "his hair needed a comb")

The first sense of 'comb' above is embodied; it defines comb with relation to a body part, i.e. hair. The bodily representations observed in the experiments are consistent with this definition.

5.2.5. Culture

5.2.5.1. X= Festival

For festival, three distinct ways of scriptual representation were observed. The first one pertains to a religious script; the second one pertains to an official state script while the third one involves a general societal script. The general societal script viewed festivals as mass events unspecifying religosity and official traces. For the general societal script, festival was something in which people dance and sing in an unrestrained manner. The religious script was the following:

In festival, people do

wear stylish clothes or customes

go to namaz

give animal sacrifices for worshipping purposes

visit elders

kiss elders' hands

In this script, kissing elders' hands was the most distinctive subscript among the ones performable by body.

The state official script was brief and was not as distinctive as the religious script. In this script, the grotesquely regular passing of soldiers in an official ceremony was used as a figure against a vague background. Thus this script as a system was underspecified compared to the religious script.

Finally the general societal script considered festival as an occasion for mass dancing in a hysterical sense. This was also a simple script.

The religious script was the most preferred way of representation and it was the most successful in terms of inference followed by state official script.

The definition of 'festival' in Wordnet 2.1 is that

> The noun festival has 2 senses (first 1 from tagged texts)
>
> 1. festival -- (a day or period of time set aside for feasting and celebration)
> 2. festival, fete -- (an organized series of acts and performances (usually in one place); "a drama festival")

The first definition above is too general to cover the particularities of the scriptual representations observed in the experiments. The second definition above seems to be what the representers are working with. Indeed the existence of three distinct scripts for a single word provides an opportunity for metonymization: The representers select a portion of the properties of festivals and the selected properties differ. Festivals are scriptualized and the constraints of the bodily representation strategies are imposed, and finally one of the three scriptual representations of festival is expressed by bodily performance. The performance triggers the cognitive aspect, i.e. salience and distinctiveness considerations and the communicative aspect, i.e. relevance and clarity considerations. Then guessing and mind-reading processes operate to establish an inference based on the bodily communication performance. This characterization

is based on the repeated watching of 1320 trials by the experimenter. It seems that guessing corresponds to semantic processes where the cognitive features of the concepts are considered, while mind-reading corresponds to pragmatic processes where the communicative features of the bodily communication performance are considered in the sense that the bodily communication performance is not taken as it is by the inferers, but as a performance underlied by performer's intention to communicate something other than the literal meaning of the bodily communication performance.

5.2.5.2. X= Worship

Two scriptual representations of worship were observed. In the former, the script was coarse and in that sense underspecified. A general way of worshipping was represented such as raising hands for heavens. In the latter, the representation was obviously based on an Islamic script of namaz. The fine details of the Islamic ritual were provided. The representation based on the script of namaz was more preferred and more successful in terms of inference.

The definition of 'worship' in Wordnet 2.1 is that

The noun worship has 2 senses (first 1 from tagged texts)

1. worship -- (the activity of worshipping)
2. worship, adoration -- (a feeling of profound love and admiration)

Since the definition is not informative, it does not contribute to an interpretation of the bodily representation for 'worship'.

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5.2.5.3. X= Funeral

A religious funeral ceremony was represented by all the participants. This was clearly scriptual. This way of representation was successful in communicating funeral in most of the cases. The funeral script was as follows:

A person somehow dies

Others put his/her body to a coffin

People carry the coffin on their shoulders

(Optionally, they put the coffin on the musalla stone and perform namaz)

They put the coffin under the ground level and bury.

The definition of 'funeral' in Wordnet 2.1 is that

> The noun funeral has 1 sense (first 1 from tagged texts)
>
> 1. funeral -- (a ceremony at which a dead person is buried or cremated; "hundreds of people attended his funeral")

The definition of 'funeral' pronounces two central elements: that funeral is a ceremony, and that there is a dead person. These two elements provide the gist of the funeral script observed in the experiments.

5.2.5.4. X= Wedding

A single script for wedding was observed across all the participants. This script was almost always successful in communicating wedding. The script for wedding is the following:

In a wedding (ceremony)

People perform folk dances

The couple puts on rings

(Optionally, the bridegroom uncovers the bridal veil.)

Performance of folk dances alone was sufficient enough to communicate wedding in most of the cases. Wedding ceremony was the most frequented occasion for folk dancing.

The definition of 'wedding' in Wordnet 2.1 is that

> The noun wedding has 3 senses (first 2 from tagged texts)
>
> 1. wedding, wedding ceremony, nuptials, hymeneals -- (the social event at which the ceremony of marriage is performed)
> 2. marriage, wedding, marriage ceremony -- (the act of marrying; the nuptial ceremony; "their marriage was conducted in the chapel")
> 3. wedding, wedding party -- (a party of people at a wedding)

Just like the definition of 'funeral', the definition of 'wedding' pronounces two central elements: That wedding is a ceremony, and that it involves marriage. These two elements provide the gist of the wedding script observed in the experiments.

5.2.5.5. X= Wise

The representation of a wise person was underlied by a simple script. It is the most preferred way of representation. However, it was successful only in 3 cases. Wise seems to be the most difficult concept to communicate among the set of concepts in the study. The script for wise is the following:

A wise person does

Meditates

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Looks far ahead absent-mindedly

Writes something

Points out things in far horizon

Puts his right (or left) hand to his/her chin.

The definition of 'wise' in Wordnet 2.1 is that

The adj wise has 4 senses (first 2 from tagged texts)

1. wise -- (having or prompted by wisdom or discernment; "a wise leader"; "a wise and perceptive comment")
2. judicious, wise, heady -- (marked by the exercise of good judgment or common sense in practical matters; "judicious use of one's money"; "a wise decision")
3. knowing, wise, wise to -- (evidencing the possession of inside information)
4. fresh, impertinent, impudent, overbold, smart, saucy, sassy, wise -- (improperly forward or bold; "don't be fresh with me"; "impertinent of a child to lecture a grownup"; "an impudent boy given to insulting strangers"; "Don't get wise with me!")

The first sense of 'wise' is less informative while the second and the third senses state that wise people are 'marked by the exercise of good judgment or common sense in practical matters' and 'evidencing the possession of inside information'. These descriptions are not performable and communicable by body; thus it is not an accident that the representers in the experiments resort to secondary, observable properties of wise people such as meditation, absent-mindedness etc. As stated in Subsection 4.1.6.4.5, the high rate of failures may be due to a difficulty in lexical access. The lexical frequency of the word 'wise' is low.

Generally it was seen that culture words conform to the definition provided by Fuoss for cultural performances. Let us quote it again: they "are

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temporally and spatially framed; (…) programmed; (…) communal insofar as they provide an occasion for coming together; (…) heightened occasions involving display" and finally they "tend to be prepared for and often publicized in advance" (Fuoss, 1995, p. 95). However, it is seen that a gradation exists for the cultural performances observed in the experiments. The cultural performances for 'festival', 'worship', 'funeral' and 'wedding' fare well with Fuoss' definition, while the bodily communication performances for 'wise' tend to exhibit cultural aspects, but can not be called as 'cultural performances' with all the features the definition possesses, since the bodily communication performances for 'wise' do not fit well with the above definition. For one thing, they are temporally and spatially framed, but not communal events.

5.2.6. Negation

5.2.6.1. X= Patience

Patience was represented by parts of a script by various participants. It was represented on the basis of a script for a patient person as following:

A patient person does/ does not

> Does not frequently check the time
>
> Does not pace back and forth quickly as in prison
>
> Does not react against severe treatment from others
>
> Does not exhibit signs of displeasure
>
> (Optionally, prays God at length and tries to soothe others).

The subscripts 'does not react against severe treatment from others' and 'does not exhibit signs of displeasure' were represented by double acting in the sense that the participant seemed to speak with exaggerated hand and lip movements in the first part, then changed his/her position and in the second part, s/he seemed to listen to someone speaking in front of him/her and seemed to nod for everything said. The success rate of the scriptual representation of patience was quite low. But this is not due to the way of representation but the complexity of the concept itself.

The definition of 'patience' in Wordnet 2.1 is that

The noun patience has 2 senses (first 1 from tagged texts)

1. patience, forbearance, longanimity -- (good-natured tolerance of delay or incompetence)
2. solitaire, patience -- (a card game played by one person)

The definition is consistent with the scriptual representation of 'patience' observed in the experiment. The definition contains negative elements. 'Patience' is defined with reference to the words 'delay' and 'incompetence'.

5.2.6.2. X= Adult

Though usually accompanied by scriptual components, the representation of adult is based on a simple schema: Adult is the person who is not child. Thus, the distinctive and performable property for adult is what it is not in the human aging system.

Scriptual components pertained to the growing of human beings. Another scriptual component focused on how children were treated when walking

accompanied by an adult (i.e. keeping the child's hand, bending for him/her at times and occasionally caressing his/her hair). The negated way of representing adult was always preferred though not always successful.[52]

The definition of 'adult' in Wordnet 2.1 is that

> The noun adult has 2 senses (first 2 from tagged texts)
>
> 1. adult, grownup -- (a fully developed person from maturity onward)
> 2. adult -- (any mature animal)
> The adj adult has 1 sense (first 1 from tagged texts)
>
> 1. adult, big, full-grown, fully grown, grown, grownup -- ((of animals) fully developed; "an adult animal"; "a grown woman")

The definition is consistent with the bodily representations of 'adult': It is somehow a negative schematic definition with scriptual components: It pronounces the concept of 'growth' to define 'adult'. It seems that bodily representation of 'adult' is a case of action for agent type of metonymy by which adult is conceptualized as a 'grower' and represented by the action s/he performs as in the case of 'writer' or 'driver'.[53]

5.2.6.3. X= Health

One schematic and one scriptual ways of representation were observed for health. The schematic representation was easily accesible: Health is the opposite of illness. Representing illness and then negating it conveyed health in a couple of seconds. Interestingly enough, medical anthropologists such as Levin and Browner (2005) complain of the prevalence of the negative conceptualization of

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[52] See Subsection 4.1.6.5.2 and Table 4.18.
[53] These were the words provided as examples of the action for agent type of metonymy in Radden and Kövecses (1999).

health (i.e. as the reverse of pathology or illness) in the field of medical anthropology. Thus, the negative representation of health seems to be prevalent.

Scriptual representation for health was less accessible, though it sometimes communicated health. It was based on a simple script for a healthy person.

A healthy person does

> Sleeps well
>
> Does jogging
>
> Has balanced meals.

Indeed, the representation of balanced meals were far from clear. The participant sat and started to imitate getting food from the table by spoons and forks. She cut her right hand resembling bread into very small portions. It was not distinctive enough to communicate that it is not an ordinary meal, but a balanced one. This is another indication of the fact that it is not always the inferers' lack of understanding that leads to unsuccessfulness in bodily representations. It may due to schemata and scripts selected by the representers for bodily communicating the word. This scriptual representation for health clearly involves cause for effect metonymy: The representer becomes healthy as a consequence of sleeping well, jogging and balanced meals. This scriptual representation was successful in a small number of cases to communicate health. It was also less preferred.

The definition of 'health' in Wordnet 2.1 is that

The noun health has 2 senses (first 1 from tagged texts)
1. health, wellness -- (a healthy state of wellbeing free from disease; "physicians should be held responsible for the health of their patients")
2. health -- (the general condition of body and mind; "his delicate health"; "in poor health")

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The definition of health is negative by itself. It defines 'health' with reference to 'disease'. This is consistent with the schematic representation of 'health'.

5.2.6.4. X= Life

Two schematic ways of representation (one negative, one positive) were observed. In the negative schema, life was the opposite of death: representing death of a human being and then negating it conveyed life.

In the less used positive schema, heart was the source of life as the blood supplier: Some of the participants pointed out heart and its pumping by moving their hand parallelly on their heart.

The first way of representation was more preferred and successful in approximately half of the cases. The second way of representation was successful in a small number of cases. It seemed that it was not distinctive enough to communicate life. The second way of representation is metonymic since pointing out the heart was not employed to represent heart but to convey that heart is the basic element of something else i.e. life.

The definition of 'life' in Wordnet 2.1 is that

> The noun life has 14 senses (first 13 from tagged texts)
>
> 1. life -- (a characteristic state or mode of living; "social life"; "city life"; "real life")
> 2. life -- (the course of existence of an individual; the actions and events that occur in living; "he hoped for a new life in Australia"; "he wanted to live his own life without interference from others")
> 3. life, living -- (the experience of being alive; the course of human events and activities; "he could no longer cope with the complexities of life")
> 4. animation, life, living, aliveness -- (the condition of living or the state of being alive; "while there's life there's hope"; "life depends on many chemical and physical processes")
> 5. life, lifetime, life-time, lifespan -- (the period during which something is functional (as between birth and death); "the battery had a short life"; "he lived a

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long and happy life")
6. life -- (the period between birth and the present time; "I have known him all his life")
7. liveliness, life, spirit, sprightliness -- (animation and energy in action or expression; "it was a heavy play and the actors tried in vain to give life to it")
8. biography, life, life story, life history -- (an account of the series of events making up a person's life)
9. life -- (the period from the present until death; "he appointed himself emperor for life")
10. life -- (a living person; "his heroism saved a life")
11. life -- (living things collectively; "the oceans are teeming with life")
12. life -- (a motive for living; "pottery was his life")
13. life -- (the organic phenomenon that distinguishes living organisms from nonliving ones; "there is no life on the moon")
14. life sentence, life -- (a prison term lasting as long as the prisoner lives; "he got life for killing the guard")

It is seen that in two senses of 'life' (5 and 9) 'death' is pronounced to define 'life'. However, the definition above is concentrated on the life cycles in general. As presented in Subsection 4.1.6.5.4 and shown in Table 4.20, apart from the successful representations of life by negation, the most frequent unsuccessful way of representing life is still by negation (20.83%). This shows that representers have a preference towards representing life by negation, but they fail in calibrating by ToM or the failures are due to the unsuccessfulness of inferers' guessing and mind-reading processes.

5.2.6.5. X= Lie

Two schematic and one symbolic ways of representing lie were observed. In the first schematic way, the participants moved their lips and then negated their act. In the second schematic way, the participants moved their lips grotesquely and did not negate their act. In this second schematic way, the distinctive and performable property of lie was communicability by exaggeration. Finally in the symbolic way, the representer drew a tick in the air and then negated it. As stated for the discussion of the representations of 'woman', this symbolic way of

representing 'lie' is a case of form for concept type metonymy as presented in Radden and Kövecses (1999).

The prevalence of representation by exaggerated lip movements shows that lie is associated with gossiping that is semantically similar to lie.

The definition of 'lie' in Wordnet 2.1 is that

> The noun lie has 3 senses (first 1 from tagged texts)
>
> 1. lie, prevarication -- (a statement that deviates from or perverts the truth)
> 2. Lie, Trygve Lie, Trygve Halvden Lie -- (Norwegian diplomat who was the first Secretary General of the United Nations (1896-1968))
> 3. lie -- (position or manner in which something is situated)

The definition of 'lie' is a negative definition. It is defined as 'deviation and perversion from truth'. This is consistent with the prevalence of bodily representations of 'lie' by negation in the experiments. In exactly half of the unsuccessful cases too, representing 'lie' by negation is employed. This shows that representing 'lie' by negation is accessible to representers, but not so much to inferers.

5.2.7. General Discussion for a Cognitive Framework

The above discussion over the cases is a characterization of the possibility that at least for this sample of concepts and participants, representations by body can be expressed in schematic and scriptual terms. Certain strategies are used and certain analogies appear to dominate. The analyses show that a proposal of economy principle that predicts a preference for schematic representations over scriptual representations cannot provide an adequate account of the data (see Subsection 5.2.2.2).

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It was observed that the referent's typical actions strategy corresponded to salient property for category type of metonymy; the effect strategy corresponded to the effect for cause type of metonymy and the representer's typical actions strategy corresponded to the subevent for whole event type of metonymy and instrument for action type of metonymy proposed in Radden and Kövecses (1999) along with other types of metonymies observed in the bodily representations of other words (see Subsection 2.2.2).

The use of Wordnet 2.1 for comparative purposes and its consequences lead to general discussion points that can better be treated in this subsection rather than in specific case studies. Wordnet, as its relatives such as Conceptnet or Framenet, is textually-based (Boas, 2005). Thus, the names are misleading: they are not conceptual dictionaries uninfluenced by language, though they have advantages over standard dictionaries with regard to certain conceptual relationships such as part-whole relationships.[54] That is why there are different wordnets for different natural languages. However, the embodied definitions observed in 1320 trials in this dissertation are not corpus-based. This fact is especially pronounced in comparisons of Wordnet definitions and bodily communication performances. For instance, Wordnet's definition for 'mud' is "water soaked soil" while bodily definition observed in the experiments was the following: "mud is a thing that splashes to the body or a thing that does not allow body to move properly" (check Section 5.2 for more examples).

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[54] This situation has led some computational linguists to start developing Eurowordnet to gather language-independent data based on wordnets designed for certain European languages (Peters et al., 1998; Vossen et al., 1998). However this huge endeavor is in process of development and therefore the definitions it provides are not so different from those by the original English Wordnet. See for instance Euswordnet website, which provides definitions in Spanish, Catalan and Basque languages.

These differences in definitions are also associated with other conceptual relations: What is common in Wordnet definitions for a given concept may differ in embodied representations. For instance, the Wordnet definition for 'statue' is 'a sculpture representing a human or animal' while embodied definitions revolved on the process of producing a statue. In that sense, what is common for 'statue' in bodily communication was the process of producing a statue regardless of whether it represents a human or animals. It will be speculative to make more comments on this point, but the replication and extension of the experiments in this dissertation in other studies would let the researchers discuss the possibility and feasibility of constructing a bodily wordnet which would extract definitions and conceptual relations not from textual corpus but bodily performance.

Keeping in mind the "cognition beyond the skull" approach proposing that "cognition is distributed across individuals, cultural tools, and institutions, and does not reside wholly inside individual heads" (Symons, 2004, p. 179), a critical point in researching bodily communication is that it is hard to demarcate cognition from culture. For instance, the representations for woman in this study can be classified under the shape strategy, but this can also be a *cultural* shape schema. One could easily imagine some cultures representing the concept with nurturance of a baby. The same may apply for all the words used in the experiment expect those corresponding to negation strategy. Ultimately, it may not be the categories themselves but cultural 'referent's typical actions', 'shape', 'effect' and 'representer's typical actions' conventionalized metaphors/ metonymies that form part of the grammar of bodily representation. On the other hand, it may be

proposed that the negation strategy as a formal tool exists across cultures regardless of its content.[55]

In terms of analogies, it was observed that the analogies below appear to dominate: Human hands as the bird wings; human hands as fish in water; human mouth as the mouth of the dragon; singing as an activity accompanied by certain facial expressions and body movements; representer's hands as the boxing hands; woman as an entity having a clear curved shape; human torso as trunk of a tree; pyramid as a triangular 3-dimensional entity; statue as an object with an extraordinary body posture; representer's chin as beard; coldness as an entity affecting human body; hotness as an entity affecting human body; wind as an entity affecting human body; mud as an entity preventing someone from moving his/her feet easily; lightness as an entity affecting human eyes; thumb and little finger as telephone; salt as an entity put onto food; weight as a lifted object; pencil as an object permitting writing; fingers as comb; representer's actions as festival rituals; representer's movements as namaz movements; representer's actions as funeral rituals; representer's movements as wedding rituals; wisdom as a concept accompanied by certain facial expressions and activities such as reading, writing and teaching; patience as indifference to pressures; adult as grown-up child or opposite of child; health as the opposite of illness; life as the opposite of death; lie as the opposite of truth. As stated above, though these analogies do not seem to have commonalities at first blush, they are products of shared bodily communication strategies and metonymies.

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[55] Obviously, this proposal necessitates another study anthropologically surveying the existence of negation across different cultures.

Obviously, the selection of the analogies to represent does not seem to be arbitrary; the analogies represented seem to be calibrated right in the very beginning or upon failures in communication by the guesses of the inferers. In this vein, the task of bodily communication involves a metacognitive component, too. Knowledge of the schemata and scripts is not sufficient for communication, the knowledge of which schemata and scripts are probably shared by the representer and inferer is also critical. Communication is a bidirectional process where the representer's representations are compromised and negotiated by the inferer's representations. As in all kinds of communication, the process is intersubjective and the notion of theory of mind is indispensible for bodily communication:

> If different people conceptualize bird differently on a given occasion, and if the same individual conceptualizes bird differently across occasions, how can stability be achieved for this concept? (…) Although two individuals may represent the same category differently on a given occasion, each may have the ability to simulate the other's conceptualization (Barsalou, 1999, p. 588).

5.2.8. Towards a Model of Bodily Communication

Taub (2000) investigating iconicity in American Sign Language (ASL) in terms of metaphorical representations proposes a model of analogue-building process of ASL lexems. For the analysis of ASL TREE, she draws Figure 5.1:
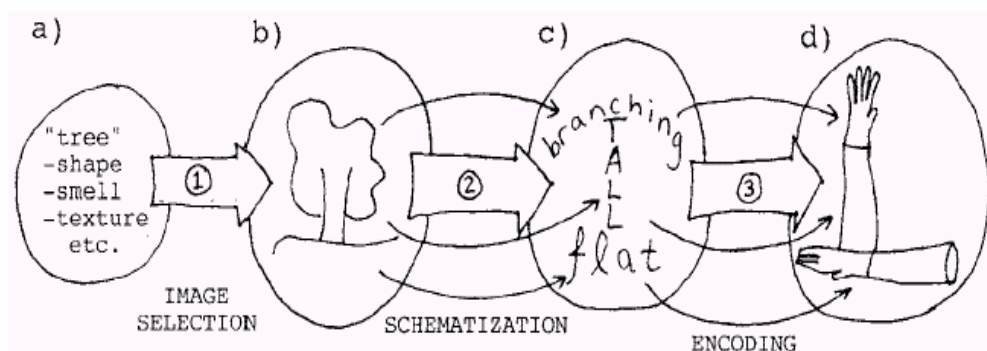

Figure 5.1. Analogue-Building Process for ASL TREE (reprinted from Taub, 2000, p. 35).

According to Taub's model, the concepts are represented by their properties, a set of properties of a given concept is formed to compose an image, the image is schematized i.e. its certain properties are trimmed to render a communicable schema and finally this schema is 'encoded' by the communicative tools provided by body. Though the figure above implies a serial order of image selection, schematization and 'encoding', Taub (2000) warns that the model does not specify a strict sequential order; schematization process may shape the choices in image selection in advance (pp. 45-46).

To couch in more cognitive scientific terms, Taub (2000)'s model does not preclude feedback and feedforward mechanisms. Actually, this caution is more significant for the case of bodily communication. When the communication fails, the bodily communicators backtrack to the properties of a given concept, select another image or schematize the image selected beforehand again to satisfy the demands of the communicative situation. In that sense, Taub's model as a system halts in two ways: It halts either when the concept is successfully communicated within the boundaries of bodily communication (and backtracks whenever the attempt is unsuccessful) or when the spared time for each bodily performance (i.e. one minute in the experiment) is over. Taub (2000) also adds that the stages may operate in parallel in the sense of mutual constraint satisfaction (p. 48).

As presented in the analyses above, tree has also a scriptual representation. Thus, the schematization process would be substituted by scriptualization for the scriptual representation of tree where the process of becoming a tree is represented, as well as for other dynamically represented concepts.

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Taub (2000) considers the move from concept to image as a metaphorical process where the image stands for the concept (p. 35). This study shows that this metonymicity is also observed in the move from concept to a sequence of events in scriptual representations. A sequence of events stands for the concept in those cases.

Schank and Abelson (1977) state that

> [a] script is a structure that describes appropriate sequences of events in a particular context. A script is made up of slots and requirements about what can fill those slots. The structure is an interconnected whole, and what is in one slot affects what can be in another. Scripts handle stylized everyday situations. They are not subject to much change, nor do they provide the apparatus for handling totally novel situations. Thus, a script is a predetermined, stereotyped sequence of actions that defines a well-known situation. Scripts allow for new references to objects within them just as if these objects had been previously mentioned; objects within a script may take 'the' without explicit introduction because the script itself has already implicitly introduced them (Schank and Abelson, 1977, p. 41).

As stated in Section 5.2, scriptualization was observed in bodily representations of singer, woman, tree, pyramid, statue, mud, lightness, festival, worship, funeral, wedding, wise, patience, adult, health, life, and lie. It is noteworthy that the words represented by the last two strategies, i.e. those represented by culture and negation strategies outnumbered words represented by other strategies in scriptualization. Actually, all the words represented by culture and negation strategies were scriptualized. This is due to the fact that the culture words pertained to cultural performances as defined by Fuoss (1995) that are apt to be scriptualized and that negation words could not be represented by schematization due to their abstractness (however, cf. the end of this subsection for criticism of Taub's model).

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Taub (2000) extends the list of the differences between bodily communication and linguistic iconicity (including sign languages) by two further properties: The nature of the constraints and the communicative tools. According to her, linguistic iconicity is constrained by semantic and phonetic features of the language while bodily communication as observed in mime performances, "is constrained only by the imitator's conceptualizing power and physical skills" (Taub, 2000, p. 37). Secondly, bodily communication provides shapes and movements as communicative tools, "while linguistic iconicity draws on the conventional resources of a given language" (Taub, 2000, p. 37).

In Chapter 2, it was stated that Taub's model and Escandell-Vidal's model were complementary. Taub's model involved representer's point of view while Escandell-Vidal's model was inferer-oriented. In Escandell-Vidal's characterization of the inferential system that had been shown in Figure 2.2, a serial processing was proposed in the following order: 'decoded' information, working memory, accessibility, inference patterns, and relevance. According to the model, if the input is considered to be relevant, interpretation occurs as an outcome and otherwise, the serial processing mentioned above is repeated. A number of objections can be pronounced against Escandell-Vidal's characterization. For one thing, assuming that the components in the model are correctly identified, the order of processing is particulary problematic: According to the model, the information is first 'decoded' and sent to working memory for considerations of accessibility, whereby inference patterns are activated, this leads to a check of relevance, and this ends up with interpretation. Actually, one cannot understand how this model is inferentialist, since the order of processing is serial

from the direction of semantics (information is first 'decoded' in the model) to pragmatics (inference patterns are activated and relevance is checked only after the information is taken as 'decoded'). As stated in Section 2.6, inferential positions propose that semantic and pragmatic processes go in parallel.

Secondly, Escandell-Vidal's model is marred with a lack of distinction between cognitive and communicative aspects à la Radden and Kövecses. In other words, the processes concerning "what is communicated" and "how it is communicated" are not distinguished. In that sense, this model fails to answer the questions "why communicative failures occur" and "how they are resolved". The content of communication has certain characteristics, but communication is not a product of the content only. It is also the product of the opportunities and limitations of the communicative devices, i.e. verbal or non-verbal language. As Radden and Kövecses (1999) puts it commenting on Langacker (1993), the communicative aspect pertains to clarity and relevance, while the cognitive aspect pertains to salience and distinctiveness. Taylor (2002) expresses this duality of cognitive and communicative aspects (see the italicized portion) in a nutshell:

> It is surely a matter of everyday experience that on hearing another person's utterance we attempt to work out what the person meant. That is, what conceptualization that person was attempting to symbolize, however tentatively and fragmentarily, *using the linguistic resources available to him or her* (Taylor, 2002, p. 353, emphasis mine).

The social system in Escandell-Vidal's model is even more problematic: It is quite cursory in its characterization of social categorization, and it does not specify how this so-called 'social' model is integrated into the inferential processes. It says so little about human communication and does not hold

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explanatory power due to this deficiency. The worst of all, it does not take Theory of Mind (ToM) mechanism as a component.

Considering these problems and difficulties, an alternative model is proposed in Figure 5.2 based on the case studies presented in Subsection 4.1.5 and conceptual analyses and discussions presented in Section 5.2:
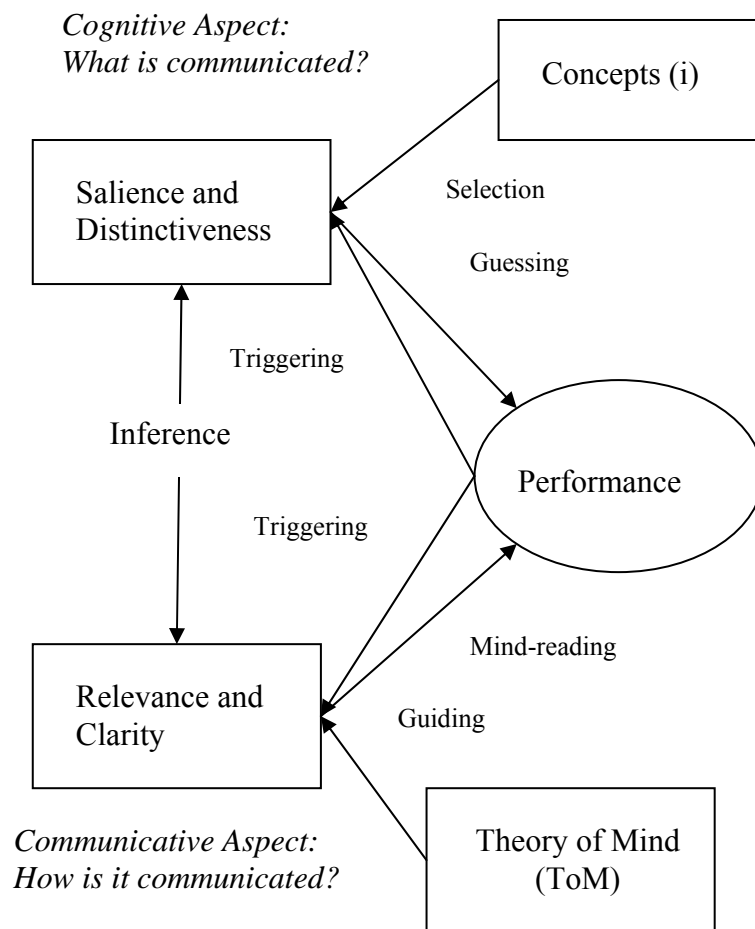

Figure 5.2. The proposed inferer model in bodily communication.

In Figures 5.2-5.4, boxes represent proposed components, the single circle represents bodily communication performance, and the names on the arrows correspond to the processes.

In Figure 5.2, bodily communication performance triggers salience and distinctiveness which are selected by access to concepts of the inferer. The inferer accordingly guesses the concept. Simultaneously, bodily communication performance triggers relevance and clarity considerations, and in turn leads to mind-reading attempts on the basis of performance. In Section 2.5 it was stated that it would not make any difference for the dissertation that Theory of Mind is identical with mind-reading as El Kaliouby and Robinson (2005) put it or they are slightly different as put by Gallese and Goldman (1998). However in Figure 5.2, it is seen that mind-reading and Theory of Mind are distinctly represented. In Figure 5.2, Theory of Mind is a component and mind reading is a process.

Relevance and clarity considerations are also guided by Theory of Mind (ToM) component. Guiding means that the inferer does not check all possible possibilities of intentionality and motivations, but heuristically searches only a small number of possibilities in interpreting the bodily communication performances. Salience and distinctiveness (cognitive aspect) and relevance and clarity considerations (communicative aspect) constitute the inferential mechanism.

Figure 5.2 illustrated the proposed model for inferers. To account for the bodily communication, the characterization of performer or expresser part is indispensible. Taub (2000)'s model as shown in Figure 5.1 is illuminating, but it has certain problems. Before all, it is a model to explain metaphorization in

American Sign Language and not specifically geared to bodily communication. First, as stated above, in some cases as observed in the experiments of this study, some concepts are scriptualized rather than schematized. Second, Taub (2000) does not incorporate metonymization into the model, whereas, as stated in Chapter 2, this dissertation converges with Barcelona (2000a; 2000b) in endorsing the view that metonymization is omnipresent in metaphorical processes. Thus, in an alternative performer model, the terms 'schematization' or 'metaphorization' will be replaced by the term 'metonymization'. Thirdly, how the communication is restricted by linguistic limitations (in this case, bodily communication) is not explicitly addressed in Taub's model. Finally, Taub's model is philosophically solipsistic since no consideration of others is indicated in the model. In other words, just like Escandell-Vidal's model, Taub's model does not comprise the Theory of Mind (ToM) mechanism.

Considering these problems and difficulties, an alternative model is proposed in Figure 5.3. In Figure 5.3, the words said to the expresser by the experimenter lead to a selection of concepts of the expresser. The concepts selected are metonymized to render schemata and scripts. The schemata and scripts are calibrated by Theory of Mind (ToM) considerations and restricted by the bodily communication strategies.

As presented in Chapter 4, these 6 strategies (referent's typical actions, shape, effect, representer's typical actions, culture and negation) are used singly or in combination. These strategies restrict the schemata and scripts that can be communicable. Thus, schemata and scripts calibrated and restricted by this way express itself in bodily communication performance.
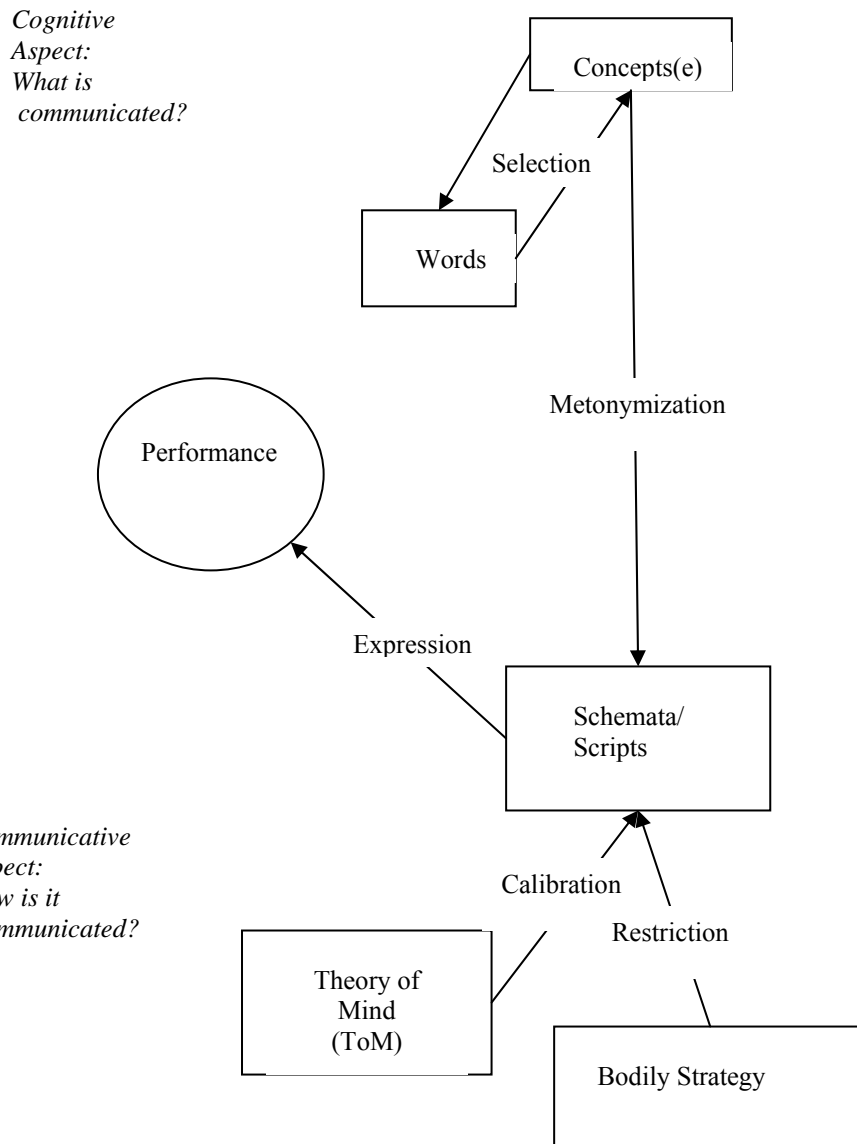
Figure 5.3. The proposed performer model in bodily communication.

Finally, Figure 5.4 illustrates the bodily communication model which is a concatenation of Figures 5.2 and 5.3 which are unidirectional bodily communication models based on the repeated watching of video recordings of 1320 bodily communication performance trials.

In Figure 5.4, three points are notable other than those in Figure 5.2 and 5.3. First, as the bodily communication goes on, the inferer's concepts and the expresser's concepts are aimed to be mapped. Thus, in Figure 5.4, the arrows between inferer's concepts (concepts(i)) and expresser's concepts (concepts (e)) are bidirectional. If the mapping fails, bodily communication fails (F) and if it succeeds, bodily communication is successful (S).

The model proposed in Figure 5.4 is bidirectional. It does not end up by an output, but a mapping between the concepts as stated above. It is designed to explain bodily communication performance, therefore both the arrows on the expresser side and the arrows on the inferer side are towards the bodily communication performance with the exception of the expected mapping between expresser's and inferer's concepts.

This process of checking observed in the experiments presented in Chapter 4 is ingeniously characterized by Tuggy (1999) who considers communication as hypothesis testing where a mapping between the concepts of the communicators are looked for. When they map, the communication is successful, when they do not, communication fails. Whenever bodily communication fails due to a failure in a component, the communicator goes back to the last node s/he has already passed. For instance, when metonymization fails, the communicator goes back to concepts component to realize new metonymizations. Finally, the arrows signify the directionality of the process and no causality relationship is assumed.

Secondly, the Theory of Mind (ToM) mechanism is shared both by the inferer and the expresser unless there exists a disorder related to ToM or communication.

There are also individual differences in mind-reading abilities as reviewed in Chapter 2.[56]

Thirdly, the performer side of the figure left out the salience and distinctiveness and the relevance and clarity components. However, this does not mean that Figure 5.4 suggests that they are only comprehension-relevant components. The performer considers the issues of what would be salient, distinctive, relevant and clear for the inferer too. However, performer has no direct access to inferer's cognitive and communicative aspects. The performer needs a simulation of the mental states of the inferer. Therefore, rather than a direct access, the performer has an indirect access to the inferer's cognitive and communicative considerations via the shared Theory of Mind.

As stated in Chapter 5, it seems that guessing corresponds to semantic processes where the cognitive features of the concepts are considered, while mind-reading corresponds to pragmatic processes where the communicative features of the bodily communication performance are considered in the sense that the bodily communication performance is not taken as it is by the inferers, but as a performance underlied by performer's intention to communicate something other than the literal meaning of the bodily communication performance.

In this model, the main aim is to show how one can move from concepts to bodily communication performance on the performer side and from bodily communication performance to concepts on the inferer side. The general prediction of the model shown in Figure 5.4 for performer's side involves autistic

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[56] Performance of mind-reading is strongly likely to be open to several constraints in normally functioning people. E.g. situational factors (attention, fatigue etc.) and others (the discourse –topic, genre, the interlocutor features etc.)
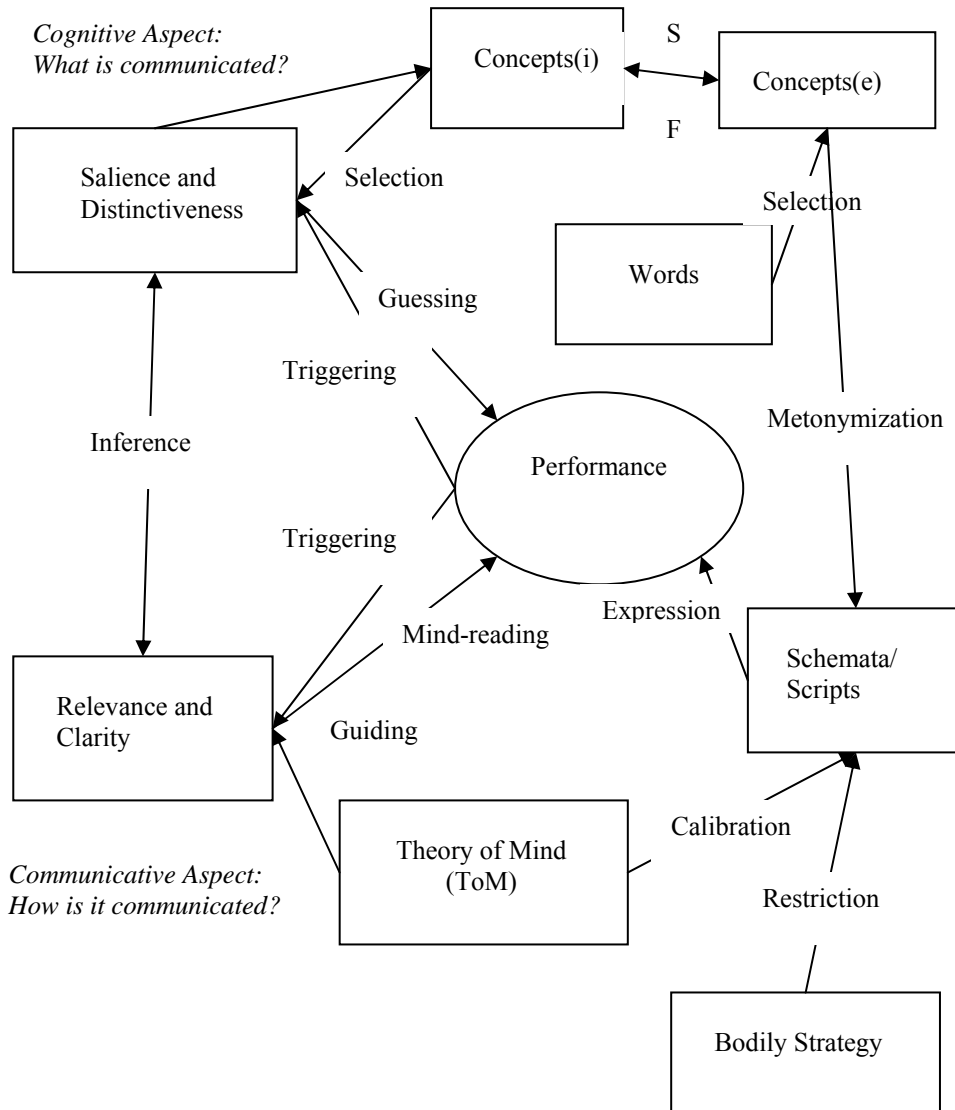
Figure 5.4. The proposed bodily communication model.

people, people with prefrontal lesions, somatotopagnosia cases and people with formal thought disorder (FTD).[57] The model predicts that they will fail as performers of bodily communication and that they will fail specifically due to failures in operating one of the four components: Theory of Mind,

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[57] As stated in Chapter 1, in somatotopagnosia cases, the spatial abilities are kept intact, but differential problems in identifying or using body parts are observed (Coslett, 1998; Denes et al., 2000; Felician et al., 2003; Guariglia et al., 2002).

schemata/scripts, bodily strategies and concept selection as spelled out in the predictions below.

The general prediction of the model shown in Figure 5.4 for inferer's side involves autistic people and people with prefrontal lesions. The prediction is that they will fail in inference due to differential deficiency in either considering cognitive aspect or communicative aspect.

Thus, the model has basically 6 predictions.

Prediction 1) Autistic people will exhibit bodily communication performance based on metonymization and restricted by bodily strategies but not calibrated by ToM (cf. Beadle-Brown, 2004; Hobson and Lee, 1999; Lee and Hobson, 1998). Therefore the prediction of the model is that autistic people will most of time be unsuccessful in bodily communication performance, but able to metonymize the words. To show that the failure is differentially due to ToM but not metonymization and bodily strategy restriction, two tasks can be given to autistic people: To check whether they can metonymize, the experimenter can give the participants definitions of the words used in this dissertation and ask them to summarize the definitions (an alternative procedure can be asking them to select what best represents the word). If they can summarize by selecting certain features and acccordingly economize the definitions in the summary –and actually, this economization is central to schemata and scripts, this shows that they are able to metonymize. Secondly, to show that schemata and scripts of autistic people are restricted by bodily strategies,[58] the experimenter can present Ricci Bitti and

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[58] The term 'restricted' here is not used in a negative manner specifically for autistic people. As presented in Figure 5.4, it is proposed that the same restriction applies for neurologically normal populations as well.

Poggi's 6 strategies to the autistic people verbally and then ask them to show how the definitions they summarized could be represented by body by utilizing at least one of the 6 strategies. Here it is not assumed that the strategies are metonymies themselves. This task is suggested as a way to check their ability to perform. In that way, one is able to distinguish between the performative ability and the communicative ability.

Prediction 2) Since communicative considerations of autistic people are not expected to be guided by ToM, they will fail due to a differential deficiency in operating considerations of the communicative aspect. Autistic people can be asked the definitions of the words used in the experiments or they may be administered a word-definition matching task to check whether their considerations of the cognitive aspect is preserved.

Prediction 3) Neurological cases with prefrontal lesions will fail in bodily communication performance as performers since prefrontal lesions lead to organizational deficiencies (Clark et al. 2003; Fellows, 2006; Fellows and Farah, 2005; Funahashi, 2001), and metonymization needs organizational skills. Organizational deficiencies in people with prefrontal lesions are observed in everyday decision making where one has to categorize alternatives with regard to certain criteria, and in the gambling tasks where people with prefrontal lesions could not pay attention to for instance the color of the cards after been habituated to paying attention to the figures of the cards (Fellows, 2006; Knight et al., 1999). Contrary to the theory that people with prefrontal lesions are impaired in attention switching, Gehring and Knight (2002) experimentally showed that they are impaired not in attention switching, but in the very process of cognitive selection.

Furthermore, in brain imaging study, Swick (1998) established the significance of prefrontal cortex for categorization and selection processes that occur in lexical-semantic tasks. Consequently, it is expected that they will fail in metonymization since metonymization takes the ability to select for granted.

The same procedure can be utilized as suggested for testing bodily strategy restrictions of autistic people to check whether bodily representations of people with prefrontal lesions are restricted by bodily strategies.[59] To check whether people with prefrontal lesions have intact ToM skills, the ToM tests used to identify and taxonomize autistic people can be used.[60]

Prediction 4) People with prefrontal lesions will fail in bodily communication as inferers due to a differential deficiency in considerations of cognitive aspect (Gehring and Knight, 2002; Knight et al., 1999; Waltz et al., 1999; Zalla, Pradat-Diehl and Sirigu, 2003) but not due to deficiencies in considerations of communicative aspect.[61] ToM tasks employed to identify and taxonomize autistic

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[59] It is not meant that they are expected to be restricted *in* bodily strategies, but *by* bodily strategies as all neurologically normal human beings are expected to be. In Figure 5.4, it was presented that the selection of schemata/scripts expressed in bodily communication performance is not arbitrary, but calibrated by ToM considerations and restricted by bodily strategies.

[60] For instance, The Revised Eyes Test (Baron-Cohen et al., 2001) that is able to discriminate autistic people from neurologically normal people or Social Attribution Task (SAT) (Klin, 2000) can be used for testing this prediction.

[61] The expectations of the neurological studies for people with prefrontal lesions are actually far from being uniform. For one thing, which subcomponent of prefrontal cortex was impaired is significant for failures in various tasks. Furthermore, the relevant findings are mixed as briefly reviewed below:

The medial prefrontal cortex (paracingulate cortex) is implicated in mind reading processes and Theory of Mind component in a number of studies (Brunet et al., 2000; Calder et al., 2002; Gallagher et al., 2000). Brunet et al. (2000) stress their comparative finding that attribution of intentions on a nonverbal task involves right medial prefrontal cortex. Schilbach et al. (2006) found that what they call 'interactionally relevant mimic gestures' were associated with ventral medial prefrontal cortex.

However, other researchers obtained different results: Abu-Akel (2003) proposes that mind reading processes and ToM were not located in prefrontal cortex, but in posterior brain regions (temporal and parietal) and that prefrontal regions serve executive functions only (Abu-Akel, 2003). Likewise, Vogeley et al. (2001)'s findings indicated that anterior cingulate cortex and left temporopolar cortex were activated in mind reading processes and Theory of Mind

people can be used to test whether people with prefrontal lesions have intact ToM skills and considerations of communicative aspect.

Prediction 5) Somatotopagnosiacs will fail as performers of bodily communication since they have differential deficiency in their bodily capacities. The model predicts that they can metonymize and they can calibrate their representations by ToM considerations. Whether they can metonymize can be tested by the procedure offered for autistic people, and whether they can utilize from ToM considerations can be tested by standard ToM tests used to identify and taxonomize autistic people as stated above.

Prediction 6) Another prediction with less significance for the overall model can be about people with formal thought disorder (FTD). Formal thought disorder has two kinds of symptoms: positive and negative. Positive symptoms are characterized by associational loosening and tangential speech while negative symptoms are characterized by mutism and blocking in speech (Moritz et al., 2002) People with formal thought disorder will fail in bodily communication as performers because the words would not select concepts for them due to

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component. Völlm et al. (2006) in their brain-imaging study comparing the neural correlates of ToM and empathy found that lateral orbitofrontal cortex, middle frontal gyrus, cuneus and superior temporal gyrus were differentially activated for Theory of Mind tasks. Castelli et al. (2002) found that the extrastriate cortex exhibited reduced activation in Theory of Mind tasks administered to an autistic sample in their brain imaging work comparing autistic participants with neurologically normal participants.

     Frith and Frith (2001)'s finding is in the middle: They found that both medial prefrontal and temporal cortex areas mapped mind reading processes and Theory of Mind component.
Channon and Crawford (2000) which is not a brain-imaging study but a lesion study comparing patients with left anterior, right anterior, left posterior and right posterior lesions and cerebrally healthy participants found that left anterior impairment was responsible for deficiencies in mind reading processes and Theory of Mind component.

     These differences in findings can be attributed to methodological (different tasks and different brain-imaging techniques, and brain imaging studies vs. lesion studies) differences in investigating the mind reading processes and Theory of Mind component. As stated above, which subcomponent of the prefrontal cortex was impaired is quite important. Thus, prospective neurological studies aiming to utilize or test the proposed bodily communication model as presented in Figure 5.4 can use the model as a way to test the neurological theories on the functions of prefrontal cortex as a whole and those of its subcomponents.

especially the positive symptoms (this applies also for concept selection on inferer's side, but does not apply to the other cases above.) (Docherty et al., 2003; Kerns and Berenbaum, 2002; Leeson et al., 2005; Rodriguez-Ferrera, McCarthy, McKenna, 2001; Moritz, 2002). However, whether this is a differential impairment is a moot issue since they cannot metonymize too (cf. Bagner, Melinder and Barch, 2003; Barrera, McKenna and Berrios, 2005; Quelen, Grainger and Raymondet, 2005).

The predictions above have focused only on the distinction between neurologically normal and non-normal populations. This focus has been motivated by methodological considerations: Predictions are about non-normal populations, since the aim of the predictions is to see differential contributions of the components of the proposed bodily communication model and it is thought that investigating certain neurologically non-normal populations is more suitable for the aim of studying the differential contributions of the components.

Regardless of this methodological motivation, there are other questions that are not addressed in this model and the predictions extracted from it about neurologically normal populations: Are there likely to be differences among neurologically normal populations in the differential contributions of the components such as ability to perform bodily, the metonymization capacities, ToM etc. There is also the question of the so-called 'intelligence' discussed in Section 2.2 and the role of practice for that matter. Finally how would people's ability to think metacognitively about concepts and their knowledge representations of what concepts consist in (e.g. their knowledge of representations of concepts) may effect success of performance or comprehension.

Those questions can be investigated in further studies, but the basic problem is methodological: Before answering this kind of questions, one needs to establish in what ways and how one can obtain justified answers for these questions, i.e. the method.

Of course, the epistemic status of the model in Figure 5.4 is a moot issue for the time being. This model, apart from the statistical findings of this study, is constructed for further testing and experimentation in other studies on the basis of repeated watching of 1320 trials of bodily communication performance by the experimenter.[62] There may be problems in the selection of the components involved in bodily communication and the relations among them, but considering the rarity of the studies and lack of models on bodily communication, it is hoped that this model would be valuable for other researchers as a heuristic model.

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[62] Actually, the synthesis of the findings is aimed to be implemented in two separate models (cf. Figure 4.3 and Figure 5.4).

CHAPTER 6

CONCLUSION

In this study, the aim was to characterize the bodily communication phenomenon and its relation to cognitive processes, especially metonymization on the one hand and to explain the possible contribution of certain variables to the individual differences in bodily communication performance success. The metonymization processes for the words employed in this study were described (cf. especially Section 5.2) and a cognitive framework that intends to account for the relationship between bodily communication and cognition is proposed and discussed. In this dissertation, representations by body have been expressed in terms of schemata and scripts within a cognitive framework that can be incorporated to a cognitively oriented model of bodily communication which has predictions for neurological cases that can be tested in further studies.

As to the possible contribution of certain variables to the individual differences in bodily communication performance success, the findings supported certain hypotheses while discarding others: People with higher levels of self-

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esteem tended to estimate their bodily communication capacity higher. The direct relationship between extraversion and bodily representation performance was significant. The relationship between analogical reasoning and bodily representation performance was not significant. The inverse relationship between self-esteem and anxiety was particularly high. Likewise, the positive relationship between extraversion and self-esteem was remarkably high.

There was a significant negative relationship between bodily communication expectancy and bodily representation (cf. Subsection 5.1.4). Thus, a suggestion for further studies would be to go into the study of what makes people rate themselves high or low with a variety of research techniques –e.g. interviewing, i.e. asking people how they would represent a given word and why they thought it could be easy or difficult to represent etc.

At this point, the questions posed in Chapter 1 can be answered: How can the individual differences in people's bodily communication performance success be explained? The study showed that the individual differences in bodily communication performance success can be explained by the levels of extraversion and self-esteem.

Why are some people good at bodily communication performance while others are worse at that? People with higher levels of extraversion and self-esteem exhibited better bodily communication performance.

What is the relationship between the bodily communication performance and bodily communication expectancy? The findings showed that bodily communication expectancy was not well calibrated: People with lower

expectations exhibited higher levels of performance, while those with higher expectations exhibited lower levels.

Supposing that bodily communication is a kind of analogy making, what is the relationship between analogical reasoning and bodily communication performance? No significant relationship was observed between bodily communication and analogical reasoning. But this may be due to the way analogical reasoning was measured, i.e. due to particular characteristics of Raven's Standard Progressive Matrices Test (cf. Subsection 5.1.3).

Which analogies would appear to dominate in bodily communication, and in what ways would the metaphorization and metonymization processes operate? This double question was answered in detail in Subsections 5.2.1-5.2.6. The bodily communication performances were compared with Wordnet 2.1 definitions, and how the bodily communication performances have been metonymized on the basis of schemata and scripts extracted from the word definitions were shown and discussed. The types of metonymies enlisted by Radden and Kövecses (1999) were incorporated to the discussions whenever they were applicable. It was proposed that the words represented by the referent's typical actions strategy were cases for salient property for category type of metonymy, the effect strategy were cases for the effect for cause type of metonymy, and those represented by the representer's typical actions strategy were cases for the subevent for whole event type of metonymy and instrument for action type of metonymy proposed in Radden and Kövecses (1999).

Along with the representation side, this study aimed to construct a bidirectional model, in which inference and representation are considered to be the elements of a single model of bodily communication, and salience and distinctiveness, and relevance and clarity were proposed as significant components of the inferential processes. It should be kept in mind that it is neither a computational model nor a cognitive model in the cognitive modeling sense. It is a psychological model in the second sense of the term 'model' in Greco (1994) as quoted in Section 1.2.

The contributions of the Relevance Theory to the study of bodily communication and the interpretation of the bodily communication data were elaborated in Section 2.6 and Subsection 5.2.7 respectively before modestly proposing a model of bodily communication in Subsection 5.2.8 -crystallized in Figure 5.4.

In the proposed model of bodily communication, a synthesis of the various areas of inquiry as elaborated in Chapter 2, i.e. personality and cognition; metaphors, analogies and metaphorical representations; personality variables (introversion-extraversion, state-trait anxiety, and self-esteem); bodily representations; Theory of Mind, mind-reading and pragmatics have been aimed. In this dissertation a particular cognitive perspective on personality have been endorsed and the cognitive and personality variables and cognitive processes underlying bodily communication performance have been investigated. In the conceptual analyses of the data and in the discussion of the findings, the notion of schemata and scripts have been a central notion. Gibbs (2001)'s approach to metaphorical processes and Barcelona (2000a; 2000b), and Radden and Kövecses

(1999)'s cognitive theory of metonymy have been endorsed in this dissertation. One of the most central study in the statistical and conceptual analyses and the discussions have been Ricci Bitti and Poggi (1991), the nearest academic neighbour of this dissertation, which proposed that there existed six strategies of bodily communication. This dissertation has been subscribed to a cognitive approach to pragmatics especially inspired by Breheny (2006; 2002), and Sperber and Wilson (2002). Finally a heuristic model of bodily communication performance has been proposed with the aim to integrate these various studies. Its success as a model is to be judged by empirical studies.

On the other hand, saying that the model synthesizes the personality variables is problematic because the model is geared toward the communicative and cognitive aspects. What one can deduce from this dissertation is that it has looked into the topic from two perspectives. A synthesis on how the personality variables and the cognitive processes interact would be a case for further research. The aim of such a synthesis can actually lead to studies on how personality variables interact with success or failure in communication not only in bodily communication but also in verbal communication.

It is possible to propose a number of future works based on or inspired by this dissertation other than the predictions of the proposed bodily communication model for autistics, somatotopagnosiacs, people with prefrontal lesion and finally people with formal thought disorder (FTD): Before all, the limitations of this study have to be overcome in further studies. As stated in Section 1.4, there were basicly five limitations of this study: 1) The limitations drawn by the use of self-report measurements for personality variables, 2) the impossibility of cross-

cultural comparisons, 3) unavailability of a more comprehensive test of analogical reasoning, 4) the relative scarcity of the studies linking bodily communication phenomena and cognitive processes, 5) the uncontrolled variable of prior experience in playing 'Silent Movie' game.

Thus, in further studies, methods of measurement other than self-report method can be looked for to measure the levels of personality variables; cross-cultural data can be obtained; a more comprehensive test of analogical reasoning that corresponds to the richness of human analogical reasoning capacity can be looked for or developed and prior experience in playing 'Silent Movie' game can be asked before the experiment and controlled accordingly. As to the fourth limitation, this dissertation itself is a modest attempt to overcome the relative scarcity of the studies linking bodily communication phenomena and cognitive processes. Finally, other variables such as shyness, self-monitoring and self-presentation can be included in variable set in further studies.

As stated in Section 1.2, this dissertation improves the ideas and findings of Ricci Bitti and Poggi (1991) which is the nearest neighbour to this dissertation. Ricci Bitti and Poggi (1991) concentrated on commonalities among bodily communication, whereas in this dissertation the individual differences and possible reasons underlying the differences were investigated along with commonalities. Secondly, Ricci Bitti and Poggi (1991) did not relate bodily communication with cognitive processes, whereas this dissertation related bodily communication in the context of bodily representations with metaphors, metonymies and analogy making. Thirdly, while Ricci Bitti and Poggi (1991)'s account was outcome-oriented, this dissertation dwelled on the processes

underlying bodily communication as well. Finally, Ricci Bitti and Poggi (1991) mostly focused on cross-cultural differences among bodily representations, while this dissertation endorsed an explicitly cognitive orientation investigating the cognitive processes underlying bodily communication.

A cognitive psychologist within the dual tasks paradigm may modify the methodology and add simultaneous tasks as cognitive loads to either or both of inferers and representers to test certain theories of cognitive interference.

A developmental psychologist may concentrate on the development process of bodily communication capacity –both inference and representation capacities. With this aim, the researcher can compare the performance of preschoolers and children of various ages.

A social psychologist may make variation in the social relationship of the inferers and representers by manipulating the social categories and identities that the inferers and representers belong.

For a more linguistically oriented researcher, the challenge is to test whether the model proposed for bodily communication in this dissertation would be comprehensive enough to suggest a solution for the problem of semantic underspecification in both verbal and nonverbal languages.

For a more anthropologically oriented researcher, the challenge can be to investigate how culture participates to the bodily communication processes. This would probably involve cross-cultural comparisons.

A more neurologically oriented researcher can use the 'Silent Movie' methodology to investigate the differential deficiencies of body-related neurological disorders such as somatotopagnosia.

Finally, for a more artistically oriented researcher, the challenge can be to relate the findings of this dissertation and the model proposed, with performing arts, especially mime and the history of silent films. These may include *in vivo* studies (e.g. live performance and video recordings of mime artists) or *in vitro* studies (e.g. studying the performance of mimers and others in an experimental setting). The model proposed may also be used by film critiques to analyze silent films. They may use the model in the way Forceville (2005) analyzed an Asteriks album from a pragmatics point of view.

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APPENDIX

DEFINITIONS FROM TURKISH WORDNET

Kuş: Yumurtlayan omurgalılardan, akciğerli, sıcak kanlı, vücudu tüylerle örtülü, gagalı, iki ayaklı, iki kanatlı uçucu hayvanların ortak adı.

Balık: Omurgalılardan, suda yaşayan, solungaçla nefes alan ve yumurtadan üreyen hayvanların genel adı.

Şarkıcı / **Vokalist** / **Muganni** / **Muganniye:** Şarkı söyleyen, şarkı söyleme yeteneği olan veya mesleği şarkı söylemek olan kimse.

Ağaç: Gövdesi odun veya kereste olmaya elverişli bulunan ve uzun yıllar yaşayabilen bitki.

Piramit: Tepeleri ortak bir noktada birleşen, tabanları da herhangi bir çokgenin birer kenarı olan birtakım üçgenlerden oluşmuş cisim, ehram.

Rüzgar / Yel: Havanın yer değiştirmesinden oluşan esinti.

Aydınlık: Işık alan.

Telefon: Birbirinden uzakta bulunan iki kişinin konuşmasını sağlayan cihaz.

Tuz / **Sofra Tuzu:** Kokusuz, suda eriyen, yiyecekleri korumada ve tatlandırmada kullanılan billursu madde (NaCl); bir asitteki hidrojenin yerini bir bazın almasıyla oluşan birleşim.

Tarak: Saçların, sakalın, hayvan tüylerinin karışıklığını gidermeye veya kadınların saçlarını tutturmaya yarayan dişli araç.

İbadet / Tapınma: Tanrı buyruklarını yerine getirme, Tanrı`ya yönelen saygı davranışı.
İbadet / Ayin / Kült: Dini tören.

Düğün: Evlenme dolayısıyla yapılan tören, eğlence.

Yetişkin: Beden, ruh ve duygu bakımlarından olgunluğa erişmiş olan kimse.
Yetişkin İnsan / Erişkin İnsan / Yetişkin / Büyük

Sağlık / **Sağlıklı olma:** Sağ, canlı, diri olma durumu.

Yaşam / **Hayat:** Canlı olma durumu.
Ömür / **Hayat** / **Yaşam:** Yaşama veya var olma süresi; doğumdan ölüme kadar geçen süre.

VITA

Ulaş Başar Gezgin was born in İstanbul on May 25, 1978. After graduating from Darüşşafaka Lisesi in 1996, he received his B.A. degree in Educational Sciences from Boğaziçi University in June 2000, and his M.A. degree in Psychological Sciences (Division of Social Psychology) from the same university in July 2002. He worked as a research assistant at Boğaziçi University, Department of Educational Sciences between 2000-2002 and at Mersin University, Department of Psychology between 2002-2003. He taught science at Makud Muang Ratchawithayalai (Prince School) at Thailand before enrolling to the PhD program in cognitive science at Informatics Institute, METU. Awarded with University of Canterbury Postgraduate Scholarship, New Zealand in 2004-2005, he enrolled to the PhD program in anthropology at Department of Sociology and Anthropology, University of Canterbury and left the program after submitting his PhD proposal in anthropology in order to complete his PhD thesis work in Cognitive Science program at METU. Since 2002 he had taught psychology, anthropology, linguistics and cognitive science courses in various institutes of higher education. His main areas of interest cover: Pragmatics, discourse analysis, human-computer

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