

UNIVERSIDAD COMPLUTENSE DE MADRID

FACULTAD DE FILOLOGÍA

Departamento de Filología Inglesa I
(Lengua y Lingüística Inglesa)



TESIS DOCTORAL

Reconsideración de los campos semánticamente dependientes e independientes de la metáfora conceptual y su impacto en el marco teórico y práctico sobre la teoría de embodiment

MEMORIA PARA OPTAR AL GRADO DE DOCTOR

PRESENTADA POR

Mostafá Boieblan

Directores

Michael White Hayes
Enrique Bernárdez Sanchís

Madrid, 2013

UNIVERSIDAD DE COMPLUTENSE DE MADRID
PROGRAMA DE DOCTORADO EN ESTUDIOS INGLESES: COGNICIÓN,
COMUNICACIÓN E INTERCULTURALIDAD
FACULTAD DE FILOLOGÍA
DEPARTAMENTO DE FILOLOGÍA INGLESA I



DOCTORAL THESIS

RECONSIDERACIÓN DE LOS CAMPOS SEMÁNTICAMENTE DEPENDIENTES E
INDEPENDIENTES DE LA METÁFORA CONCEPTUAL Y SU IMPACTO EN EL
MARCO TEÓRICO Y PRÁCTICO SOBRE LA TEORÍA DE EMBODIMENT

MOSTAFA BOIEBLAN

MADRID, 2013

To the memory of my aunt Fatima

UNIVERSIDAD DE COMPLUTENSE DE MADRID

DOCTORAL THESIS

RECONSIDERACIÓN DE LOS CAMPOS SEMÁNTICAMENTE DEPENDIENTES E
INDEPENDIENTES DE LA METÁFORA CONCEPTUAL Y SU IMPACTO EN EL
MARCO TEÓRICO Y PRÁCTICO SOBRE LA TEORÍA DE EMBODIMENT

(RETHINKING EMBODIMENT THEORY: RE-CONCEPTUALIZING DIRECTLY AND INDIRECTLY
MEANINGFUL CONCEPTS IN METAPHOR AND THE IMPACT OF THIS STUDY ON THE
THEORETICAL AND EXPERIMENTAL FRAMEWORKS OF EMBODIMENT)

MOSTAFA BOIEBLAN

SUPERVISED BY

PROFESSOR MICHAEL WHITE HAYES

PROFESSOR ENRIQUE BERNÁRDEZ SANCHÍS

MADRID, 2013

El doctorando MOSTAFA BOIEBLAN y los directores de la tesis DON MICHAEL WHITE HAYES y DON ENRIQUE BERNÁRDEZ SANCHÍS certificamos que la investigación ha sido realizada por el doctorando bajo la dirección de los directores de la tesis respetando los derechos de autor.

Madrid, 10 de diciembre de 2013

Acknowledgements

First and foremost I want to thank my advisors Michael White and Enrique Bernárdez. It has been an honor to be their Ph.D. student. I appreciate their contributions to make my Ph.D. experience productive and stimulating even during tough times in the Ph.D. pursuit.

I am thankful to the linguistic department at Berkeley University. My stay there has immensely contributed to my personal and professional time. In particular, I want to thank George Lakoff, Eve Sweetser, and John Searle.

I am also thankful for the excellent support from Richard Koenigsberg, Mei ha Chan, and from Richard Klein at the Library of Social Science in New York. It is so appreciated.

Lastly, I would like to thank my wife, my family and friends for all their love and encouragement. Thank you.

Table of contents

Abstract.....	xiii
Summary of this doctoral thesis in Spanish	16
1. Hipótesis general de la tesis.....	17
2. Metodología y corpus	18
3. Resultados.....	19
4. Discusión de los resultados	20
4.1. Tipologías de la metáfora conceptual.....	20
4.2. La perspectiva de Proposicionalidad y Linealidad.....	24
4.3. La teoría del Embodiment y la necesidad de examinar la metáfora conceptual en términos tipológicos.....	27
4.4. La proyección metafórica en un solo sentido vs. interacción	29
4.5. Interacción de dominios fuente y meta vs. proyección metafórica en un solo sentido.....	31
4.5.1. Concurrencia y Correlación	32
4.5.2. Causalidad y co-activación	32
4.6. Un estudio bio-cognitivo de la metáfora conceptual.....	34
4.6.1. Definición de las condiciones que nos han permitido estudiar esta tipología desde la teoría de la Interacción.....	37
4.6.1.1. Los fenómenos fuente y meta comparten el mismo campo léxico y se activan en paralelo.....	37
4.6.1.2. Los fenómenos fuente y meta comparten la misma zona neurológica.....	38
5. Conclusión.....	39
5.1. Contribución del presente estudio.....	41
5.2. Futuras líneas de investigación	41
5.3. Limitación del estudio	41
Chapter 0: Introduction.....	43
Chapter I: Embodied Metaphor, Embodied Simulation, and Mapping Typologies.....	54
1. Introduction and Hypothesis.....	54
2. Background.....	56
2.1. Embodied Metaphor.....	56
2.1.1. Patterns and principles of mapping in conceptual metaphor.....	59
2.2. Embodied Simulation.....	62
3. Data Analysis.....	66
3.1. Embodied Metaphor: Principles of Mapping	66
3.1.1. Sensory Phenomena as Source Domains.....	66
3.1.2. Motor Phenomena as Source Domains	68
3.2. Patterns of Mapping in Conceptual Metaphor	69

3.2.1.	Primitive and Complex phenomena	69
3.2.2.	Metaphorical mapping typologies	72
3.2.2.1.	Concrete-onto-Concrete-mapping typology	73
3.2.2.2.	Metaphorical mappings across sensorimotor experiences	76
3.2.2.3.	Abstract-onto-abstract-mapping typology	77
3.2.2.4.	Uni-directionality of metaphorical mapping	79
3.2.2.4.1.	Can the same domain be abstract (target) and concrete (source)?	80
3.2.2.4.2.	Reversal Mappings	83
3.3.	Embodied Simulation	86
3.3.1.	Different Bodily Experiences in Source Domains	86
3.3.2.	Partial Mapping and Embodied Simulation	90
3.3.3.	Partial mapping and the neural instantiation of simulation	95
3.3.4.	Uni-directionality and Embodied Simulation.....	96
3.3.5.	Co-occurrence-based-mapping typology and Embodied Simulation	98
	Conclusion	100
Chapter II: Propositionality and Linearity of Metaphor: an Asymmetrical Mapping of		
Source and Target Phenomena		
	1. Introduction and Hypothesis.....	103
	2. Background.....	106
	2.1. Uni-directionality of metaphorical mapping	106
	2.2. Meaning-transfer based on the experiential character of source domains.....	107
	3. Data Analysis.....	108
	3.1. Metaphors as Propositions	109
	3.1.1. Metaphorical Propositions as Meaning transfer based on the experiential character of the source domain	113
	3.1.2. Metaphors as Uni-directional propositions	115
	3.1.3. Predictability of the cognitive topology of the target domains	116
	3.1.4. Propositions are based on Mapping Concrete onto abstract domains	118
	3.2. Linearity of Metaphorical Mapping	120
	3.2.1. Linearity in Time of Metaphorical Mapping.....	120
	3.2.2. Linearity of meaning construction	126
	3.2.3. Linearity of projection based on uni-directionality	129
	3.2.4. Extended Linearity	130
	Conclusion	134

Chapter III: Mapping across Bodily-experienced Phenomena: A Challenge to the Embodied Metaphor Theory	136
1. Introduction and Hypothesis.....	136
2. Background.....	138
2.1. Three Main Tenets Characterizing Metaphorical Mapping which fit Propositionality- Linearity perspective	139
2.1.1. Meaning transfer based on the experiential character of source domains	139
2.1.2. Uni-directionality of metaphorical mapping	140
2.1.3. Mapping Bodily onto non-bodily experience phenomena	141
3. Data Analysis.....	142
3.1. Propositionality based on the experiential character of source domains.....	143
3.1.1. The Problem of Meaning Transfer Principle.....	144
3.1.1.1. Propositionality across domains.....	144
3.1.1.2. Mapping across Bodily-experienced phenomena.....	149
3.1.1.3. Propositionality and components of source and target domains	151
3.1.2. Is Literal-onto-Literal Mapping an Instance of Metaphor?.....	155
3.1.2.1. The Problem of Applying Uni-directionality Principle to this Type of Metaphorical Mapping	155
3.1.2.2. Uni-directionality principle and cross-modalities mapping, the case of synaesthesia.....	159
3.1.2.3. The problem of Concreteness-Abstractness Principle.....	164
3.2. Lineal construction of Metaphorical Mapping.....	170
3.2.1. Linearity of projection based on uni-directionality	170
3.2.1.1. Linearity in Time of Metaphorical Mapping.....	170
3.2.1.2. Linearity of metaphorical mapping based on meaning construction.....	177
3.2.2. Linearity of projection based on meaning transfer.....	177
3.2.2.1. Autonomous (source) domains and subordinate (target) domains	177
3.2.3. Linearity of Metaphorical Mappings vs. Synaesthesia-based mapping typology	184
3.2.3.1. Mapping across sensory modalities and the chronological order of source and target domains	184
3.2.3.2. Mapping across sensory modalities and lineal meaning transfer principle	186
Conclusion	188
Chapter IV: From Projection to Interaction: a Further Step towards a more Embodied Approach to Metaphor.....	193
1. Introduction and Hypothesis.....	193
2. Background.....	199

2.1.	Interaction Theory (Richards 1936; Black 1962, 1981, 1993; Forceville 1996, 2006)	199
2.2.	Conceptual Metaphor and Interaction Theory	201
2.3.	Blending Theory	202
2.4.	Synaesthetic metaphor	205
3.	Data analysis	208
3.1.	From projection to interaction	209
3.1.1.	On-line and off-line reasoning and meaning-transfer principle	211
3.1.2.	Categorization process in interaction-based metaphor	214
3.1.3.	Categorizing abstract phenomena through metaphorical mapping	217
3.1.4.	Further-categorizing	218
3.1.5.	Re-categorizing	219
3.2.	Interaction Theory	221
3.2.1.	Bi-directionality of mapping as evidence of interaction	222
3.2.2.	Emergent structure in metaphorical mapping: evidence of interaction between source and target domains	226
3.2.3.	Semantic change of source and target domains	234
3.2.4.	One-way-meaning transfer vs. interaction	237
	Conclusion	240
	Chapter V: Interaction: Its Mechanisms and Typologies	243
1.	Introduction and Hypothesis	243
2.	Background	245
2.1.	Conceptual Organization of Metaphor	245
2.2.	The experiential basis of conceptual metaphor	247
3.	Data Analysis	247
3.1.	Dynamics of interaction	247
3.1.1.	Co-occurrence and co-relation of domains of experience	247
3.1.2.	Causality and Co-activation in Metaphorical mapping	251
3.1.2.1.	Causality	251
3.1.2.1.1.	Synaesthesia: a causality-based metaphorical mapping	253
3.1.2.2.	Co-activation	259
3.2.	Interaction at Physiological and Cognitive Levels	261
3.2.1.	Synaesthesia metaphor, inputs from different modalities	261
3.3.	Interaction in Cognitive system	264
3.3.1.	Do mapping typologies follow the same patterns of interaction?	264

3.4.	Typologies of interaction	266
3.4.1.	Interaction within one modality	266
3.4.2.	Interaction in Cognitive system.....	269
3.4.2.1.	Adaptation and Transformation processes in metaphorical mapping	269
3.4.3.	Interaction among sensory modalities.....	272
3.4.3.1.	Synaesthesia	272
3.4.3.2.	Literary metaphor: how it does not fit the interaction approach	274
3.4.3.2.1.	The mapping process is conscious and deliberate.....	275
3.4.3.2.2.	Literary metaphor does not normally manifest itself in a rich systematic use of linguistic expressions	278
3.4.3.2.3.	There is no co-occurrence or co-activation of the two phenomena.....	279
	Conclusion.....	282
	Chapter VI: A Bio-cognitive Model for Metaphorical Mapping: Bringing Cognitive and Biological Systems together in the Framework of Interaction	286
1.	Introduction and Hypothesis.....	286
2.	Background.....	290
2.1.	Uni-directionality of metaphorical mapping	290
2.2.	Motor modalities and conceptual frames	291
2.2.1.	Patterns of activity within motor modality	291
2.2.2.	Patterns of activity within conceptual frames	292
3.	Data Analysis.....	293
3.1.	The situational conditions observed in this metaphorical mapping typology	295
3.1.1.	Source and target domains share the same lexical repertoire.....	295
3.1.2.	Certain source and target domains share the same neural network.....	297
3.1.3.	Different stimulus formats leading to identical response.....	300
3.1.4.	Conceptual frames and motor modalities: cognitive topology vs. motor topology 305	
3.1.5.	Conceptual frames and Linguistic Stimuli	308
3.2.	Interaction	312
3.2.1.	Semantic features exchange between motor and cognitive topologies	313
3.2.2.	Mirror Neurons and the interaction theory.....	317
3.2.2.1.	Automaticity in metaphorical mapping.....	317
3.2.2.1.1.	Implied motor and cognitive topologies in conceptual mapping	317
3.2.2.1.2.	Implied stimulus	321

3.2.3.	Co-activation in mapping motor actions onto mental activities.....	324
3.2.4.	Causality in mapping motor actions onto mental activities.....	329
3.2.5.	Adaptation of cognitive and motor topologies in metaphorical mapping	334
3.2.5.1.	Abstracting source domains and embodying target domains	334
3.2.5.2.	Abstraction of the motor topology of source domains	336
	Conclusion.....	340
	Chapter VII: Summary and Conclusions.....	346
1.	Summary and General Conclusions	346
2.	Summary of Contributions	366
2.1.	Overgeneralization within Embodied Metaphor Theory and the need for a more complex classification of metaphorical mapping typologies	366
2.2.	The Embodied Approach vs. the Interactist Model.....	368
2.3.	Black's Interaction Model (1962, 1981, 1993) vs. Ours	369
3.	Future Research	371
	Bibliography	374
	Subject Index	385

Abstract

The inception of Embodied Metaphor Approach (Lakoff and Johnson 1980) laid down the foundations of a theory which accounts for metaphor not merely as a linguistic phenomenon but as a conceptual tool that manifests itself cognitively through engaging directly and indirectly meaningful phenomena—source and target domains, respectively. Being directly and indirectly meaningful are intrinsically related to whether a given phenomenon is bodily-experienced or abstract (e.g. Gibbs 1994, 2011; Gibbs and Matlock 2008; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Szwedek 2011).

Given that source domains are bodily experienced (therefore, they are directly meaningful), the experiential character of conceptual metaphor is fully attributed to source domains whose structures emerge as a result of the interaction of our body, mind, and environment (e.g. Lakoff and Johnson 1999:278; Szwedek 2011:343). That is, the foundational assumption within this approach is that the constitutive nature of source domains plays a dominating role in conceptual metaphor insomuch that their topology is imposed on target domains (e.g. Szwedek 2011).

The fact that it is widely accepted within the embodiment theory that metaphorical mapping is a homogeneous cognitive process—namely, it is based on one-way-meaning transfer—has yielded two overarching principles. First, conceptual metaphor is instantiated through one mapping typology—concrete-onto-abstract phenomena. Second, this typology is governed by the following set of tenets: *uni-directionality* (Lakoff 1987:268), *invariance principle* (Lakoff 1990), and *partial mapping* (Lakoff and Johnson 1980:52-55).

Based on these assumptions, we formulate the following hypotheses: because our interaction with the environment is carried out via different modalities (vision, audition, motor, sensory etc.) and conceptual metaphor exploits this heterogeneous bodily-based information to reason about target domains, the embodiment theory may have obscured potential patterns and principles of mapping. That is, we hypothesise that the source domains which are grounded in different modalities will lead to significant variations regarding the mechanisms that operate in conceptual metaphor. Second, we expect that scrutinizing the constitutive natures of target domains will reveal that conceptual metaphor is instantiated through different mapping typologies. Third, this may also cast target domains in an active role both in the construction and processing of metaphorical mapping.

Taken together, these three hypotheses predict that (1) different mapping typologies will be underpinned by distinct cognitive operations and patterns of mapping. Consequently, (2) these typologies will posit a challenge to the tenets of the embodiment theory. We shall argue that the tenets of the embodiment theory (Gibbs 1994, 2011; Gibbs and Matlock 2008; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Johnson 1981, 1987; Johnson and Lakoff 2002; Lakoff 1993, 1987; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Ruiz de Mendoza 2005, 2011; Steen 2011; Szwedek 2011) particularly fit the mapping typology which engages bodily-experienced and non-bodily-experienced phenomena as source and target domains, respectively.

Based on the data from *Metalude*¹, we will test these hypotheses by exploring the constitutive natures of source and target domains to identify potentially different mapping

¹ METALUDE (Metaphor at Lingnan University Department of English) was first accessed at, <http://www.ln.edu.hk/le/cwd/project01/web/internal/database.html> on December 2th, 2011. I am especially grateful to professor Michael White for recommending me this corpus and to professor Andrew Goatly for allowing me to have access to it.

typologies. Then, it will be necessary to assess whether these typologies draw on different cognitive operations and patterns of mapping. Therefore, the main goal of this thesis is to establish the first step toward a more complex classification of conceptual metaphor in terms of its typologies and their respective cognitive operations.

Key words: Interaction, cognitive topology, motor topology, emergent structure, metaphorical mapping typologies.

Summary of this doctoral thesis in Spanish

En la tesis actual tomamos como punto de partida y de contexto general, los trabajos de Bernárdez (2005, 2013), Pinker (e.g. 2007) y Rakova (2003) que argumentan que la teoría del Embodiment no es viable en tres aspectos. En el primer caso, por ejemplo, Bernárdez apunta que la teoría del Embodiment está basada en dos fundamentos erróneos: (1) el marco experimental, en el cual se escoge la lengua inglesa como único punto de referencia (Caballero y Díaz-Vera 2013:205). Y (2) el marco teórico que ignora el aspecto cultural de la proyección metafórica, asumiendo que los patrones y principios que gobiernan la metáfora conceptual, encontrados en la lengua inglesa, son universales (Bernárdez 2005, 2013).

En el segundo caso, Pinker (e.g. 2007) también se opone a la teoría del Embodiment ya que ésta sostiene que áreas de conocimiento tan abstractos como *las matemáticas, filosofía, moralidad, etc.* son propensas al uso de la metáfora conceptual. En particular, este autor sostiene que, aunque esta teoría aborda importantes aspectos de la cognición, la metáfora conceptual no opera en todos los procesos cognitivos (Pinker 2007:245-247).

Por último en el tercer caso, Rakova (2003) demuestra que la teoría del Embodiment no puede abarcar el fenómeno de sinestesia puesto que este tipo de metáfora depende de dos fenómenos concretos. Así pues, los principios y patrones que presuntamente, y de forma absoluta, gobiernan la proyección metafórica no se pueden aplicar en algunos ejemplos de la metáfora conceptual. Por ejemplo, la *unidireccionalidad* de la proyección metafórica no se puede usar para explicar este tipo de metáfora ya que los dominios fuente y meta hacen referencia a dos fenómenos fisiológicos. Es importante

anotar aquí que este principio está intrínsecamente unido al hecho de que los dominios fuente y meta son concretos y abstractos, respectivamente.

En conjunto, estos estudios sacan a la luz una tendencia generalizadora adoptada en la teoría del Embodiment para explicar el lenguaje figurativo. En la misma línea de razonamiento, en la tesis actual hemos examinado cómo dicha tendencia está presente también en el desarrollo de los principios y patrones de la teoría. Esta tendencia se puede percibir en el hecho de que la metáfora conceptual ha sido tratada como un proceso cognitivo homogéneo y que se rige por un conjunto de principios y patrones invariables (Johnson 1987; Lakoff and Johnson 1980). Dicho proceso consiste en transferir datos semánticos en un solo sentido, desde fenómenos semánticamente independientes hacia otros dependientes (Lakoff y Turner 1989).

La teoría del Embodiment presupone por lo tanto que la metáfora conceptual se manifiesta a través de una sola tipología: proyectar desde dominios experienciales (los denominados *fuente*) hacia dominios abstractos (*meta*) (Kövecses 1988, 2011; Lakoff y Johnson 1980, 1999) y que existe un conjunto determinado de principios y patrones, como la *unidireccionalidad* y la *proyección parcial*, que caracterizan todas las metáforas conceptuales (e.g. Lakoff y Johnson 1980).

1. Hipótesis general de la tesis

El objetivo de la tesis es comprobar la veracidad de la hipótesis basada en el hecho de que nuestra interacción con el entorno se lleva a cabo mediante varias modalidades sensoriales (visión, audición, motor, olfato etc.) y que la metáfora conceptual explota dichas modalidades para razonar sobre los dominios meta, de modo que no se pueden capturar las proyecciones metafóricas bajo un solo tipo de proceso cognitivo. Es decir, que en la teoría

del Embodiment, la metáfora conceptual se concibe como una transferencia de significado en un solo sentido—desde los dominios fuente hacia los dominios meta (Lakoff and Johnson 1980).

Este fundamento también conlleva hacer una distinción radical entre los dominios fuente y meta. Por lo tanto, es importante primero verificar si la metáfora conceptual se manifiesta mediante varias tipologías y segundo ver si estas tipologías siguen diferentes mecanismos. En este sentido, formularemos la siguiente hipótesis: las distintas tipologías de la metáfora conceptual pueden suponer un problema para los principios y patrones de la teoría del Embodiment, los cuales han sido aceptados como operativos en todas las metáforas conceptuales.

2. Metodología y corpus

Con el fin de verificar nuestra hipótesis, hemos analizado las metáforas recogidas en METALUDE (Metaphor at Lingnan University Department of English-<http://www.ln.edu.hk/lle/cwd/project01/web/internal/database.html>), el 2 de diciembre de 2011. Algunas de las ventajas de este corpus es que recoge una gran variedad de tipologías de la metáfora conceptual y así mismo ofrece una representación detallada de los dominios fuente y meta. Estas dos ventajas han favorecido el estudio de la metáfora conceptual en términos tipológicos.

Por lo tanto, nuestra metodología en la verificación de la hipótesis ha consistido en analizar las *topologías* de los dominios fuente y meta permitiéndonos identificar diferentes tipologías de la metáfora conceptual. A partir de ahí, nuestra labor ha consistido en desarrollar una representación esquemática de la proyección metafórica que facilita comprobar la aplicación de los principios y patrones de la teoría del Embodiment.

3. Resultados

Nuestro estudio revela que, los dominios fuente están basados en varios tipos de experiencias. Al mismo tiempo, los dominios meta también admiten una clasificación más detallada de sus topologías. Estos dos factores indican que la metáfora conceptual se manifiesta a través de varias tipologías:

- 1) Proyección metafórica entre fenómenos físicamente accesibles. Esta tipología a su vez muestra las siguientes sub-tipologías:
 - a. Proyección metafórica entre fenómenos concretos
 - b. Proyección metafórica entre modalidades sensoriales (sinestesia)
 - c. Proyección metafórica entre dos fenómenos concurrentes
 - d. Proyección metafórica de fenómenos que intercambian la función de meta y fuente
- 2) Proyección metafórica desde fenómenos físicamente accesibles hacia otros abstractos:
- 3) Proyección metafórica desde acciones físicas hacia acciones mentales
- 4) Proyección metafórica entre fenómenos abstractos

Y por tanto, estas tipologías no se pueden estudiar siguiendo el conjunto (invariable) de patrones y principios de la proyección metafórica establecido en la teoría del Embodiment. A continuación discutiremos estos resultados, los problemas que suponen para la teoría del Embodiment, y cuáles han sido nuestras propuestas para resolver estos problemas.

4. Discusión de los resultados

4.1. Tipologías de la metáfora conceptual

En el primer capítulo, nuestro principal objetivo ha sido sacar a la luz las diferentes experiencias que operan como dominios fuente. Hemos observado que estos dominios admiten una clasificación más precisa, la cual facilita identificar los mecanismos que operan en cada tipología. A esto se le añade el hecho de que los dominios meta también presentan una variedad substancial, que podría influir en la manera de cómo se lleva a cabo el proceso de la proyección metafórica.

Basándonos en estos dos descubrimientos, proponemos que la metáfora se manifiesta en varias tipologías y, por consiguiente, examinarla en estos términos puede revelar que el conjunto de los principios y patrones desarrollados en la teoría del Embodiment no pueden abarcar todas las tipologías.

Por lo tanto en este capítulo empezamos con la siguiente hipótesis: la experiencia corporal es tan variada que, al intentar incluirla en una sola categoría, se podrían pasar de largo ciertos factores que potencialmente operan en algunas tipologías. A modo de ilustración del hecho de que los fenómenos fuente admiten una clasificación más detallada. Por lo tanto, se pueden clasificar los fenómenos que funcionan como dominios fuente en varias categorías según los mecanismos operativos de cada uno de ellos.

A este factor se le podría añadir el hecho de que los dominios meta no son siempre abstractos como se concibe en la teoría del Embodiment (Lakoff y Johnson 1980, 1999) ya que presentan una variedad substancial, la cual podría influir significativamente en el proceso de la proyección metafórica. En este sentido, el corpus revela que estos dominios también pueden tener un fundamento en la experiencia corporal.

Así pues, hemos propuesto que la metáfora conceptual se manifiesta en varias tipologías. El hecho de que los dominios fuente se basan en varios tipos de experiencia y que los dominios meta no son siempre abstractos contradicen los principios y patrones de la teoría del Embodiment. Es decir, dado que esta teoría concibe la metáfora conceptual como un proceso cognitivo idéntico, ya que supuestamente consiste en proyectar el significado de un dominio concreto (fuente) hacia otro dominio abstracto (meta) (Lakoff y Johnson 1980, 1999), esta teoría no puede explicar los ejemplos (1) y (2).

Esta situación es debida a que los patrones y principios de la proyección metafórica fueron desarrollados basándose en la tipología que depende de fenómenos concretos y abstractos como dominios fuente y meta, respectivamente. Por esta razón, proponemos estudiar la metáfora como un proceso cognitivo que se manifiesta a través de distintas tipologías y que podría seguir diferentes mecanismos. Es importante destacar aquí que el intento de identificar las tipologías de la metáfora conceptual no desempeña un objetivo meramente clasificatorio; más bien, nuestro estudio puede revelar varios mecanismos que operan en las proyecciones metafóricas que no han sido considerados ya que la teoría del Embodiment da por sentado el hecho de que la metáfora conceptual sigue un conjunto de patrones y principios invariables.

Así pues, hemos formulado la siguiente hipótesis: dado que la metáfora conceptual se manifiesta a través de varias tipologías, el conjunto de los principios y patrones de la proyección metafórica no puede abarcar diferentes tipologías. Para comprobar si la variedad tipológica de la metáfora conceptual merece un estudio detallado y si dicho estudio ayuda a tener una mayor comprensión de los mecanismos operativos en la construcción de la metáfora, hemos tratado de ver si estas tipologías presentan un problema para los patrones y principios de la teoría del Embodiment. Si es así, el siguiente paso sería

identificar cómo estas tipologías distorsionan dicha teoría. Este acercamiento requiere tener en cuenta también la variedad de los dominios meta.

Como habíamos predicho, se observa que los mecanismos adoptados en el estudio de la metáfora desde la perspectiva del Embodiment operan en una tipología pero no en otras. En este sentido, hemos descubierto que, efectivamente, la metáfora conceptual se manifiesta a través de distintas tipologías tales como:

- Proyección desde fenómenos corporales hacia otros fenómenos corporales.
- Proyección desde fenómenos abstractos hacia otros fenómenos abstractos
- Proyección desde fenómenos motor hacia otros fenómenos motor
- Proyección desde fenómenos sensoriales hacia otros fenómenos sensoriales

En este sentido, los dominios que hemos examinado proporcionan una base inicial para un mayor entendimiento de las tipologías de la metáfora conceptual y sus mecanismos. El estudiar la metáfora en términos tipológicos nos ha permitido identificar qué mecanismos operan en cada tipo de tipología. Así pues, hemos demostrado que el marco teórico del Embodiment no puede abordar todos los mecanismos que operan en estas tipologías.

Dado la inmensa variedad de la base experiencial de los dominios fuente y el hecho de que los dominios meta muestran varios tipos de topología, podemos investigar los mecanismos de la metáfora conceptual como un proceso cognitivo que se manifiesta en varias tipologías. Por ejemplo, hemos argumentado que, aunque la metáfora conceptual está basada en la experiencia corporal, dicha experiencia varía substancialmente requiriendo una clasificación más precisa de la tipología de la metáfora conceptual para lograr un mayor entendimiento de los mecanismos que operan en cada tipología. Por lo tanto, proponemos

estudiar la metáfora conceptual como un proceso heterogéneo que se manifiesta en diferentes tipologías.

Después de identificar algunas tipologías que potencialmente presentan una variedad cuyos mecanismos no se pueden abordar en la teoría del Embodiment, hemos intentado analizar dichas tipologías utilizando los siguientes criterios: *unidireccionalidad* y *proyección metafórica parcial* en un solo sentido.

Como resultado, estos criterios no parecen encajar en las tipologías identificadas en el corpus. En este sentido, el hecho de que los principios y patrones de la proyección metafórica encajan en algunos tipos de la metáfora conceptual pero no en otros, es una fuente de evidencia acerca de cómo la metáfora se manifiesta en distintas tipologías que requieren un análisis particular de cada una de ellas.

También, hemos observado que la teoría de *embodied simulation* concibe la metáfora conceptual como un proceso de simulación que concierne *íntegramente* a las acciones físicas de los dominios fuentes en los dominios meta (Feldman 2006; Kintsch 2008). A este respecto, observamos que las acciones físicas de los dominios fuente se pueden clasificar, al menos, en diferentes categorías.

Por consiguiente, comprobamos que no todos los dominios fuente siguen el fundamento de la simulación para proyectar significados en los dominios meta. En este sentido, argumentamos que mientras que algunas metáforas conceptuales se basan en la simulación de la acción física del dominio fuente como *She grasps the idea*, otras no están motivadas por el proceso de la simulación. Este factor otorga más argumentos para sostener nuestra hipótesis sobre la variedad tipológica de la metáfora conceptual.

Otro factor importante que hemos observado al analizar la metáfora conceptual que depende de acciones físicas como dominios fuente es que los principios y patrones de la

teoría del Embodiment no encajan con los principios de la teoría de *Embodied Simulation*. En especial, la proyección metafórica parcial presenta un problema teórico al intentar aplicar este criterio a algunas tipologías como More Is Up debido a que los dominios fuente y meta en esta tipología son acciones físicas que se activan en paralelo. En este sentido, comprobamos que la proyección metafórica parcial tampoco se observa en esta tipología. Por lo cual, concluimos que la teoría de la *Embodied Simulation* y la *Embodied Metaphor* no encajan para explicar algunas tipologías.

4.2. La perspectiva de Proposicionalidad y Linealidad

En el segundo capítulo hemos tratado de identificar los fundamentos de la tipología que depende de fenómenos concretos y abstractos como dominios fuente y meta, respectivamente. Es importante destacar aquí que la teoría del Embodiment otorga a los dominios fuente un papel dominante en la construcción y procesamiento de la metáfora conceptual (Lakoff y Johnson 1980, 1999; Szwedek 2011); de hecho, esta teoría define los dominios fuente y meta como fenómenos semánticamente independientes y dependientes, respectivamente (Kövecses 2011; Lakoff 1993; Lakoff y Turner 1989; Szwedek 2011). Es decir, los dominios fuente proporcionan una estructura conceptual (parcial) a los meta ya que estos últimos no están dotados de significado por sí mismos. Por lo tanto los fenómenos que funcionan como dominios meta requieren otros fenómenos que son procesados a través de los mecanismos del cuerpo (Lakoff and Johnson 1980, 1999; Kövecses 2011; Szwedek 2011). Por el contrario, los dominios meta desempeñan un papel menor al de los dominios fuente ya que de acuerdo con la teoría del Embodiment, estos dominios no aportan ningún cambio en el estructura de los dominios fuente.

Basándonos en estos principios de la proyección metafórica, hemos propuesto una hipótesis: *Proposicionalidad* y *Linealidad* de la proyección metafórica. Los objetivos de esta propuesta son: primero ver si la creación del significado mediante la metáfora conceptual en esta tipología es *proposicional* y *lineal* y, segundo, ver si los principios y patrones de la teoría del Embodiment encajan con la propuesta.

A este fin, nos hemos centrado en la tipología que depende de fenómenos experienciales y abstractos como dominios fuente y meta, respectivamente. La perspectiva que hemos adoptado en este capítulo nos ha abierto una nueva línea de investigación que nos permite ver más de cerca los fundamentos de la tipología que se basa en los fenómenos concretos y abstractos como dominios fuente y meta, respectivamente.

Dado que este criterio no descansa sobre una base sólida, ya que no se satisface cuando se trata de fenómenos que intercambian el papel de fuente y de meta en distintas metáforas (Human Is Plant y Plant Is Human), hemos optado por analizar la metáfora conceptual que sigue estrictamente los fundamentos de la teoría del Embodiment. Es decir, hemos analizado la tipología que toma los fenómenos concretos y abstractos como dominios fuente y meta, respectivamente (Love Relation Is Journey). Hemos podido así identificar cuáles son los patrones y principios que operan particularmente en esta tipología permitiéndonos ver en cuál encajaría la teoría del Embodiment y al mismo tiempo poner al descubierto los fundamentos de dicha teoría.

Anteriormente, hemos argumentado que, de acuerdo con la teoría del Embodiment, el dominio fuente juega un papel dominante en la metáfora conceptual. Esto se deduce del hecho de que los dominios fuente y meta son respectivamente directa e indirectamente significativos. La creación del significado a través de la metáfora conceptual es a la vez proposicional y lineal. En el primer caso, hemos demostrado que los principios y patrones

de la proyección metafórica indican que la teoría del Embodiment concibe la metáfora como un proceso cognitivo que se desarrolla en el tiempo ya que sin la experiencia corporal del dominio fuente, el dominio meta carece de significado.

Por otra parte, en el segundo caso, la proyección metafórica es proposicional porque el dominio meta adquiere su significado basándose en la topología del dominio fuente. Lakoff y Johnson (1980:56) sostienen que no se puede entender la metáfora sin su fundamento en la experiencia corporal. En este sentido el significado de los dominios meta se deriva de la experiencia de los dominios fuente.

En este punto, es importante verificar si la *Proposicionalidad* y *Linealidad* encajan con los principios y patrones de la teoría del Embodiment. El objetivo de este planteamiento es llevar a cabo un análisis exhaustivo de los principios y patrones de la teoría del Embodiment con el fin de verificar si dicha teoría concibe la proyección metafórica como un proceso cognitivo *proposicional* y *lineal*.

Como resultado, los fundamentos del Embodiment como la *unidireccionalidad* y la *proyección metafórica parcial de un solo sentido* encajan en la perspectiva de *Proposicionalidad* y *Linealidad*. Asimismo, hemos demostrado que dicha propuesta, junto con la teoría del Embodiment no suponen ningún problema para analizar la tipología que se basa en fenómenos experienciales y abstractos como dominios fuente y meta, respectivamente. En este sentido, también hemos demostrado que este estudio cubre exclusivamente la metáfora que incorpora dos tipos de fenómeno: concreto (como dominio fuente) y abstracto (como dominio meta).

Sin embargo, en el corpus de otras tipologías como, por ejemplo, aquellas en las cuales los dominios tanto meta como fuente están basados en experiencias corporales suponen un problema potencial para el Embodiment. Por lo cual, el siguiente punto a tratar

en la tesis es analizar esta tipología desde la perspectiva de *Proposicionalidad y Linealidad* de la proyección metafórica.

4.3. La teoría del Embodiment y la necesidad de examinar la metáfora conceptual en términos tipológicos

En el capítulo anterior, hemos centrado nuestra atención sobre la tipología que se desarrolla de forma *proposicional y lineal*. La teoría del Embodiment otorga un papel dominante a los dominios fuente en la proyección del significado a través del uso de la metáfora. Según esta teoría, dicha situación es debida al hecho de que estos dominios son experienciales, y por lo tanto, son semánticamente independientes.

Por otra parte, los fenómenos que funcionan como dominio meta, dado que son físicamente inaccesibles, carecen de significado. Por esta razón, según la teoría del Embodiment, dichos fenómenos requieren de otros para adquirir significado.

En este capítulo, analizamos la tipología que depende de dos fenómenos experienciales. Una de las características de esta tipología es el hecho de que el fundamento experiencial de la metáfora conceptual puede ser compartido por los fenómenos fuente y meta. Hemos argumentado que este tipo de metáfora conceptual supone un problema para la teoría del Embodiment y para la teoría de *Proposicionalidad y Linealidad*. En particular, hemos demostrado que las características que otorgan a los dominios fuente un papel dominante en la metáfora también están presentes en los dominios meta. Es decir, los dominios meta en esta tipología son experienciales, son semánticamente independientes y, por lo tanto, son aptos para proyectar significado. Una prueba de que estos dominios son capaces de proyectar significado a otros fenómenos es el hecho de que también funcionan como dominios fuente en algunas metáforas. Esto indica que el criterio según el cual los dominios

fuente y meta están diferenciados no parece viable en esta tipología. El hecho de que los dominios meta también tienen un fundamento experiencial, pone en cuestión los principios y patrones de la proyección metafórica. Es decir, dado que los dominios meta también están sujetos a la experiencia corporal, hemos argumentado que el carácter experiencial de la metáfora conceptual en esta tipología no se debe solamente a los dominios fuente.

Otro factor a tener en cuenta es el hecho de que el principio de la *unidireccionalidad* tampoco opera en los ejemplos anteriores. En este caso estos ejemplos demuestran que los dominios meta también tienen un fundamento experiencial y por lo tanto son semánticamente independientes y también son aptos para transferir datos semánticos a otros fenómenos.

Asimismo, otra tipología que hemos identificado en el corpus y que no sigue los criterios de la teoría del Embodiment es aquella que se basa en el fenómeno de sinestesia. Según Rakova (2003), la metáfora que se base en sinestesia combina dos fenómenos fisiológicos. Otra tipología de la metáfora conceptual que no sigue los principios y patrones de la proyección metafórica es aquella que combina dos fenómenos fisiológicos. En este sentido, la teoría del Embodiment no puede tratar esta tipología ya que ésta última presenta varios factores que no se contemplan en la teoría del Embodiment.

Primero, la teoría del Embodiment sostiene que la razón del uso de la metáfora conceptual es siempre proveer de significado a los fenómenos semánticamente dependientes. Es decir, éstos últimos carecen de significado y la única manera de que lo tengan es combinarlos con otros fenómenos que son semánticamente independientes; por lo tanto, al contrario de los fenómenos meta, los que funcionan como fuente, según quedó reflejado anteriormente, desempeñan un papel dominante en la metáfora conceptual.

El problema en este caso es que la tipología que hemos examinado en este capítulo toma como dominios meta fenómenos que son físicamente accesibles y semánticamente independientes. Por consiguiente, esta tipología depende de dos fenómenos que son aptos para dar significado a otros fenómenos. De ahí hemos propuesto que esta tipología no encaja con los principios y patrones que gobiernan la proyección metafórica y que pueda necesitar otra perspectiva para examinarla detalladamente.

4.4. La proyección metafórica en un solo sentido vs. interacción

En el capítulo anterior habíamos demostrado que la tipología que depende de dos fenómenos experienciales presenta un problema para la teoría del Embodiment. Es importante señalar que el hecho de que los dominios fuente jueguen un papel dominante en la construcción y procesamiento de la metáfora conceptual es debido a que estos dominios son experienciales. En este sentido, hemos observado que esta característica también se observa en los dominios meta ya que tienen igualmente un fundamento experiencial en esta tipología. Por consiguiente, argumentamos que son semánticamente independientes. Como prueba de ello, señalamos el hecho de que los dominios meta funcionan como dominios fuente en otras metáforas, lo cual les hace aptos para transferir datos semánticos a otros fenómenos. Esto, a su vez, implica un papel más participativo de los dominios meta en la metáfora conceptual.

Luego, en este capítulo hemos formulado la siguiente hipótesis: puesto que el fundamento experiencial de los dominios fuente les capacita para proyectar significado a otros fenómenos y este fundamento también se observa en los dominios meta de la tipología analizada en este capítulo, hemos propuesto que éstos últimos también proyectan

significado. Es decir, los dominios meta pueden desempeñar un papel más importante en la construcción y procesamiento de la metáfora conceptual.

La teoría de *Proposicionalidad y Linealidad* y la teoría del Embodiment no abarcan este tipo de metáfora conceptual puesto que los dominios meta presentan las mismas características que se observan en los dominios fuente. Basándose en estas características, la teoría del Embodiment otorga un papel dominante a los dominios fuente en la construcción y procesamiento de la metáfora conceptual. Dado que los dominios meta en esta tipología son también experienciales, hemos propuesto que la proyección metafórica en este caso sigue otros mecanismos.

Esta tipología no consiste en establecer una correspondencia sistemática entre los componentes existentes por defecto en los dominios fuente y meta. Más bien esta tipología se basa en la interacción de dos fenómenos a través de datos semánticos, lo cual resulta en una *estructura emergente* (Fauconnier y Turner 2007:362; Turner 2011: 12-16; Coulson 2008:181; Ruiz de Mendoza y Peña 2005).

Es importante recordar aquí que esta estructura es dinámica ya que es variable dependiendo de cómo interactúan los dos fenómenos. En algunas metáforas la inferencia que se obtiene a través de la metáfora conceptual no pertenece a ninguno de los dos dominios. Por lo tanto, esta tipología no satisface los patrones y principios de la proyección metafórica adoptados en la teoría del Embodiment en dos importantes aspectos: (1) la metáfora conceptual en esta tipología no consiste en transferir significado desde un fenómeno hacia otro; y (2) el dominio meta en este caso muestra una participación activa ya que sus ficheros interactúan con los del dominio fuente. Así pues los dominios meta no son simplemente *receptores* de datos semánticos de los dominios fuente.

De esta forma, el hecho de que los dominios fuente y meta son capaces de proyectar significado nos ha permitido estudiar esta tipología desde la perspectiva de la *Interacción*. Por lo tanto, dicha perspectiva contradice drásticamente el principio de la proyección metafórica en un solo sentido; desde el dominio más concreto al más abstracto. Primero, la metáfora conceptual, en esta tipología en particular, no consiste en establecer una correspondencia sistemática estable de ficheros que previamente existen en los dominios fuente y meta. Segundo, el dominio meta adquiere un papel dinámico en la metáfora conceptual, el cual consiste en participar activamente en la construcción y procesamiento de la tipología que depende de dos fenómenos experienciales.

Entonces, la afirmación más importante de este capítulo es que la tipología que depende de dos fenómenos experienciales demuestra que la metáfora conceptual recoge datos semánticos de los dos dominios.

4.5. Interacción de dominios fuente y meta vs. proyección metafórica en un solo sentido

Como hemos visto anteriormente, una de las características de la tipología que depende de la interacción de los dominios fuente y meta es la estructura cognitiva que emerge como resultado de ésta interacción. Por lo tanto, examinar la metáfora conceptual prestando atención a sus tipologías no es un proceso meramente clasificatorio; más bien, es un acercamiento revelador de los mecanismos que operan en diferentes tipologías. Así pues, hemos examinado en detalle los procesos subyacentes en la tipología que toma fenómenos experienciales como dominios fuente y meta. Es importante recordar que en el capítulo anterior, hemos argumentado que esta tipología está basada en la interacción de los dominios meta y fuente.

En el capítulo V, hemos observado que algunas metáforas conceptuales que encajan en ésta tipología están motivadas por mecanismos como *conurrencia*, *correlación*, *causalidad* y *co-activación*. Es importante señalar que la siguiente clasificación no es determinante. Es decir, se puede apreciar que varios mecanismos pueden operar en una misma metáfora.

4.5.1. Conurrencia y Correlación

Se presentan estos dos mecanismos cuando dos fenómenos se toman como un conjunto de dos experiencias que concurren. Por ejemplo, el fenómeno *Up* va acompañado del fenómeno *More*, tanto que no se puede concebir un fenómeno sin activar el otro. En este caso, sostenemos que los dos fenómenos están relacionados en el mundo exterior, por lo cual se puede deducir que la tipología de este tipo se construye inconscientemente.

4.5.2. Causalidad y co-activación

Hemos observado que la tipología que esta motivada por los dos mecanismos anteriores también depende de los de *causalidad* y *co-activación*. Uno de los casos donde se observa estos dos mecanismos es la metáfora conceptual que se basa en la sinestesia. En este caso, dos fenómenos se activan mutuamente. Por ejemplo, *sharp taste*, *bright sounds*, *loud color*, *heavy smell etc.* demuestran que este tipo de metáfora no consiste en una transferencia de datos en un sólo sentido ya que según Ramachandran y Hubbard (2003:54) la experiencia en una modalidad induce a efectos en la otra modalidad. Teniendo en cuenta, por ejemplo, *bright sounds*, *loud color etc.* se ve claramente que las dos modalidades-visión y audición-intercambian los papeles de fuente y meta en diferentes metáforas. Dado que este tipo de metáfora induce a experimentar efectos en una modalidad distinta a la del fenómeno meta,

se puede entender que esta tipología está motivada por dos mecanismos: *causalidad* y *co-activación*.

La construcción y el procesamiento de la metáfora conceptual se llevan a cabo de forma inconsciente (Lakoff y Johnson 1980,1999; Ruiz de Mendoza 2011). Este argumento encaja con los mecanismos de la interacción que hemos identificado en la tipología ya analizada en este capítulo. En particular, la metáfora conceptual que está motivada por la sinestesia se construye y se procesa de forma automática. Esta característica abarca los mecanismos de la interacción como *causalidad*, *co-activación*, *corelación* etc.

Después de identificar los mecanismos de la interacción, hemos intentado ver qué tipo de tipología no puede abarcar esta teoría. Anteriormente, habíamos notado que una de las recurrentes características en la tipología que depende de la interacción de los fenómenos fuente y meta es que los procesos de construcción y procesamiento de la metáfora conceptual se llevan a cabo de manera inconsciente (e.g. sinestesia). Así, queríamos comprobar si esta característica juega un papel primordial en la interacción de dos fenómenos en otras tipologías.

Este tipo de metáfora no se construye ni se procesa de manera consciente ya que se puede elegir el dominio fuente para razonar sobre el dominio meta. Aunque, los dos dominios son semánticamente independientes, hemos demostrado que la interacción entre estos dos fenómenos sigue diferentes mecanismos. Como modo de ilustración, el sujeto construye esta metáfora de forma consciente. Mientras que cuando se trata de una tipología como la que vimos anteriormente (More Is Up), tanto la construcción como el procesamiento de esta metáfora son inconscientes.

En este sentido, también hemos argumentado que otro factor que diferencia estas dos tipologías es el hecho de que More Is Up no admite otras posibilidades para la

construcción y el procesamiento de estos dos fenómenos en términos metafóricos. Siguiendo a Gibson (1977), *la teoría de affordances* sostiene que nuestra interacción con el entorno esta gobernada por las posibles acciones que permiten los fenómenos para que un individuo interactúe con ellos.

En términos metafóricos argumentamos que esta característica también juega un papel importante en la construcción de la metáfora conceptual. Por ejemplo, los fenómenos More y Up llevan a construir una metáfora conceptual única (More Is Up) ya que no admite variantes. Es decir, esta metáfora se puede interpretar sólo en un sentido. Sin embargo, otros fenómenos tales como Juliet y Sun admiten varias posibilidades para construir la metáfora.

Por lo cual, las metáforas literarias no siguen estrictamente los mecanismos de la interacción. Esto indica que la interacción no es homogénea, sino que también se manifiesta a través de varias tipologías. En este sentido, hemos tratado de ver cómo diferentes tipologías revelan varios modos de interacción entre los dominios fuente y meta. Aunque cada tipología depende de diferentes mecanismos de la interacción, se observa que los dominios fuente y meta se transforman y se adaptan en la metáfora conceptual.

4.6. Un estudio bio-cognitivo de la metáfora conceptual

En este capítulo, hemos propuesto que si los mecanismos de la interacción de los dominios fuente y meta se aprecian en otras tipologías, entonces, éstas últimas también se pueden estudiar desde la teoría de la Interacción. De esta forma, hemos observado en la literatura de la teoría de la Embodied Simulación muchos estudios indican que las acciones físicas que se utilizan para estructurar un fenómeno abstracto, mantienen activas sus topologías tanto en la construcción y como en el procesamiento de la metáfora conceptual que depende

respectivamente de acciones físicas y fenómenos abstractos (Feldman 2006; Feldman y Narayanan 2004; Gibbs y Matlock 2008; Kintsch 2008). Hemos de señalar aquí, que una de las características que nos ha permitido examinar la metáfora conceptual desde la perspectiva de la Interacción es el hecho de que los dominios fuente y meta son fenómenos experienciales. Sin embargo, la metáfora que hemos investigado en este capítulo, aparentemente, sigue los principios y patrones de la tipología que toma fenómenos experienciales y abstractos como dominios fuente y meta, respectivamente. Es decir, esta tipología supuestamente consiste en transferir significado (en un solo sentido, de ahí que la proyección metafórica es proposicional y lineal) a los dominios abstractos y semánticamente independientes.

Hemos observado en el corpus que la tipología que se caracteriza por la proyección metafórica desde fenómenos experienciales hacia otros abstractos incorpora otra tipología que sigue algunos mecanismos de la interacción. Es aquella tipología que depende de acciones físicas y acciones mentales como fenómenos fuente y meta, respectivamente.

A modo de ilustración de los mecanismos operativos en esta tipología, hemos enfocado nuestra atención sobre la siguiente metáfora: *She grasps the idea* (Understanding Is Grasping). Dado que existen varios estudios sobre la metáfora conceptual que depende de acciones físicas como dominios fuente y la mayoría de estos estudios coinciden en el hecho de que cuando se procesa un fenómeno abstracto mediante una acción física, la topología de dicha acción se activa (Gibbs and Matlock 2008:163).

Probablemente, el descubrimiento más importante que soporta la teoría del Embodiment es el hecho de que la topología del dominio fuente (Grasp) se activa cuando se procesa el dominio meta (Understand) (Gibbs 2008).

Primero hemos notado que el dominio meta en este caso es semánticamente independiente. Una prueba de ello es que se puede razonar sobre la acción mental Understanding sin recurrir a la metáfora conceptual. Esto indica que el dominio meta, aunque es abstracto, es semánticamente independiente ya que podemos entenderlo sin recurrir al uso de la metáfora conceptual. Esto, a su vez, contradice los principios y patrones de la teoría del Embodiment. Por ejemplo, en esta teoría se argumenta que el motivo de entender un fenómeno en términos de otro es que el último es abstracto y semánticamente dependiente.

Segundo, el dominio meta en este caso dispone de una topología propia: *un sujeto entiende el concepto*. Entonces hemos analizado detalladamente las topologías de los dominios fuente y meta para ver más de cerca los mecanismos operativos en cada una de ellas. En este sentido, la topología de la acción física del dominio fuente consiste en tres elementos: un sujeto, la acción de coger, y un objeto. Esta topología, según la neurociencia cognitiva, se activa cuando su acción física es utilizada metafóricamente para designar una acción mental (Gibbs and Matlock 2008:163). Por ejemplo, la técnica de la imagen por resonancia magnética funcional (IRMf) demuestra que la zona cerebral responsable de la acción física se activa en tres casos: (1) cuando un sujeto realiza la acción de coger un objeto; (2) cuando la topología de esta acción se utiliza metafóricamente; y (3) cuando un sujeto observa a otro realizando la acción de coger un objeto (e.g. Coulson 2008).

Por otro lado, como hemos argumentado antes, el dominio meta en este tipo de metáfora también se puede estructurar en términos de marcos conceptuales que se activan mediante el uso del léxico de dichos marcos. Es importante recordar aquí que el uso de los términos lingüísticos que describen dichas acciones físicas también activan la topología correspondiente (Guarddon 2003:56-57).

Por lo tanto, las dos topologías comparten el mismo sistema lingüístico. Por ejemplo, a través del uso de la metáfora *Understanding Is Grasping*, las dos topologías llegan a compartir el término *Grasp* que activa la topología física (dominio fuente) y la topología cognitiva (dominio meta).

4.6.1. Definición de las condiciones que nos han permitido estudiar esta tipología desde la teoría de la Interacción

4.6.1.1. Los fenómenos fuente y meta comparten el mismo campo léxico y se activan en paralelo

La metáfora conceptual es un recurso muy importante para el fenómeno de polisemia (Gibbs 1994; Lakoff 1978; Lehrer 1990; Miller 1993; Nunberg 1979; Rakova 2003; Sweetser 1990). Según Talmy (2000) una de esas metáforas es aquella que depende de acciones físicas y acciones mentales como dominios fuente y meta, respectivamente. En este sentido los dos fenómenos llegan a compartir el mismo léxico. Según Richards (1950:93) cuando utilizamos la metáfora, tenemos dos fenómenos activos y sostenidos con una sola palabra o frase.

Este fenómeno de polisemia presenta un problema para la teoría del Embodiment porque en esta teoría, el fenómeno de polisemia se basa en la noción de que en las palabras que mantienen una relación polisémica hay una que es literal y los significados de las otras palabras son derivados de la que tiene el sentido literal (Gibbs 1994:9-10).

En estos ejemplos, tanto el fenómeno *Understand* como el de *Grasp*, comparten los mismos términos lingüísticos, *Grasp* y *get hold of*. Lo importante de esta observación es que las palabras que describen un acción física, cuando se procesan literal o metafóricamente, inducen a que la topología de este fenómeno se active (Feldman 2006;

Guarddon 2003:56-57). Dado que el fenómeno de Understand dispone de una topología propia que se activa mediante un sistema lingüístico y que la topología del dominio fuente también se activa, podemos deducir que ambas se activan en paralelo.

4.6.1.2. Los fenómenos fuente y meta comparten la misma zona neurológica

Probablemente, el aspecto más irrefutable de la teoría del Embodiment es su fundamento neurológico. Utilizando la imagen por resonancia magnética funcional (IRMf) y la tomografía por emisión de positrones (ERP), Roy and Sherrington (1890) fueron los primeros en documentar que hay una relación intrínseca entre los procesos cognitivos y el flujo sanguíneo en el cerebro ya que los dos funcionan en paralelo. Estudios más recientes en neurociencia afirman que las áreas motor y pre-córtex asociadas con algunas partes del cuerpo se activan cuando se procesa el léxico que designa dichas partes, lo cual indica que procesar acciones metales a través del uso de la metáfora conceptual también incorpora actividades neurales (Chang, Feldman and Narayanan 2005:4).

Después de discutir cómo los dos fenómenos en la tipología, que depende de acciones físicas y acciones mentales como dominios fuente y dominios meta respectivamente, comparten varios sistemas tales como neurológico y lingüístico en la metáfora conceptual, el siguiente punto es identificar posibles puntos de interacción entre los dos fenómenos.

Es importante recordar que, en el anterior capítulo ya hemos identificado los mecanismos de la interacción. Por lo tanto, nuestro objetivo es verificar si dichos mecanismos también operan en la tipología que hemos analizado en este capítulo. Dado que la interacción puede estar basada en diferentes mecanismos, hemos especulado que esta

tipología podría seguir otros mecanismos. Sin embargo, verificar si esta tipología esta basada en la interacción entre los dominios fuente y los dominios meta requerirá una exploración sobre cómo las topologías cognitivas y las topologías físicas se influyen mutuamente en la metáfora conceptual.

5. Conclusión

Como conclusión general de la tesis afirmamos que la metáfora conceptual se manifiesta a través de varias tipologías donde la proyección metafórica no se puede abordar siguiendo un determinado conjunto de principios y patrones. Una muestra de ello es que hacen falta varias teorías para examinar diferentes tipologías.

Después de determinar las tipologías más frecuentes en el corpus, hemos tratado de ver los problemas que surgen al intentar examinar varios tipos de la metáfora conceptual siguiendo el mismo conjunto de principios y patrones. Así pues, hemos encontrado una forma de empezar a identificar detalladamente qué tipologías sostienen la metáfora conceptual y qué problemas presentan a la teoría del Embodiment. Es importante recordar aquí que en el primer capítulo, hemos argumentado que la metáfora conceptual permite una clasificación más detallada en términos tipológicos.

Para resolver estos problemas proponemos diferentes soluciones para tratar las diferentes tipologías. Por ejemplo, hemos adoptado la perspectiva de *Proposicionalidad* y *Linealidad* para examinar la tipología que depende de fenómenos concretos y abstractos como dominios fuente y meta, respectivamente. Por otro lado, hemos sostenido que la tipología que depende de dos fenómenos físicamente accesibles es más viable tratarla desde la perspectiva de la Interacción.

Así, hemos demostrado que este estudio no es meramente clasificatorio, más bien, revela que la metáfora conceptual se fundamenta en distintos mecanismos de la proyección metafórica. Como habíamos predicho, estudiar la metáfora conceptual como un proceso cognitivo homogéneo nos lleva a pasar por alto los mecanismos de la proyección metafórica que varían dependiendo de la tipología en cuestión.

Por lo tanto, el fundamento de la teoría del Embodiment, el cual toma la metáfora conceptual como un proceso cognitivo esencialmente idéntico, es falso. Esta situación es debida a que, al estudiar la metáfora enfatizando sobre sus distintas tipologías, pone al descubierto varios problemas teóricos, los cuales no podrían salir a la luz sin llevar a cabo un estudio exhaustivo de las tipologías metafóricas. Esto a su vez implica que es necesario tratarlas en la teoría del Embodiment abandonando la generalización sobre el hecho de que se puede analizar todas las metáforas conceptuales siguiendo un conjunto de principios y patrones invariables.

Así pues, deducimos que la teoría del Embodiment está basada en una generalización sobre los mecanismos operantes en la metáfora conceptual, lo cual obstaculiza un posible estudio sobre las manifestaciones tipológicas del lenguaje figurativo. Ahora bien, al estudiar este lenguaje más detalladamente se pone de manifiesto la complejidad de las tipologías de la metáfora conceptual. Probablemente, esta generalización es la que motiva la generalización sobre la aplicación de la metáfora conceptual.

Tal como apuntamos en el primer capítulo, la metáfora conceptual está mejor examinada en términos tipológicos ya que revela varios mecanismos sobre los cuales se lleva a cabo la proyección metafórica. En este sentido, hemos propuesto que diferentes tipologías requieren diferentes análisis.

5.1. Contribución del presente estudio

Basándonos en el estudio que hemos realizado en esta tesis, formulamos nuestra teoría sobre la metáfora conceptual. La metáfora conceptual es un proceso cognitivo heterogéneo que se manifiesta a través de varias tipologías. Por lo tanto, al examinarla se necesita incorporar varias teorías para capturar los diferentes mecanismos que operan en la misma. En la tesis, hemos identificado algunas topologías y hemos examinado sus mecanismos. Así pues, el hecho de estudiar la metáfora conceptual asumiendo que ésta se manifiesta mediante una sola tipología obscurece los mecanismos operativos en varias tipologías.

5.2. Futuras líneas de investigación

Sería conveniente ver otras tipologías y sus correspondientes mecanismos que operen en la proyección metafórica. En esta línea de investigación también sería interesante ver cómo la variedad cultural de la experiencia corporal puede conllevar una variedad en los mecanismos operativos en diferentes tipologías.

5.3. Limitación del estudio

Al estudiar las tipologías de la metáfora conceptual y las topologías de los dominios fuente y meta no hemos cubierto el aspecto cultural que pensamos juega un papel primordial en la construcción del lenguaje figurativo. En la tesis nos hemos limitado a investigar los mecanismos que gobiernan la proyección metafórica en sus diferentes tipologías. Los mecanismos identificados en la tesis no son absolutos ya que creemos que están sujetos al factor cultural.

Otra limitación es aquella que hemos encontrado en el último capítulo al tratar de examinar cómo se lleva a cabo la proyección metafórica en el caso de la metáfora

conceptual que depende de acciones físicas y cognitivas como dominios fuente y meta, respectivamente, ya que no se ha demostrado cómo la representación neuronal de la metáfora puede diferir dependiendo del tipo de tipología.

Chapter 0: Introduction

The notion of representing abstract concepts has been torn between two opposing approaches: the embodiment theory (Gibbs 1994, 2011; Grady 2005a, 2005b; Johnson 1981, 1987, 2008; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1990, 1993, 1987; Lakoff and Johnson 1980, 1999; Lakoff and Núñez 2000; Lakoff and Turner 1989; Reddy 1993; Ruiz de Mendoza 2005, 2011; Steen 2011; Szwedek 2011) and the Disembodied cognition theory (Chomsky 1975; Fodor 1975; Murphy 1988).

According to the first approach, cognitive processing is rooted in bodily-experienced phenomena (e.g. Lakoff and Johnson 1980, 1999; Szwedek 2011). Furthermore, this theory stands on two enterprises: Embodied Metaphor, which holds that conceptual metaphor is a feature-mapping process (e.g. Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff and Johnson 1980, 1999). Embodied Simulation, on the other hand, points to the central role of simulating the physical action of the source domain in the embodied approach to metaphor (Barsalou, Santos, Simmons, and Wilson 2008; Feldman 2006; Gibbs and Matlock 2008; Kintsch 2008; Mahon and Caramazza 2008; Narayanan and Feldman 2004). In contrast, the disembodied approach advocates an abstract symbol-based process to reason about concepts (e.g., Chomsky 1975; Fodor 1975).

Accordingly, conceptual metaphor has been treated in two different ways. On one extreme, metaphor is an unconventional combination of symbols (Black 1962, 1981; Chomsky 1975; Fodor 1975; Searle 1975). On the other extreme, conceptual metaphor is *strictly* embodied and a far-reaching cognitive process characterizing major aspects of cognition (Johnson 1981, 1987, 2008; Johnson and Lakoff 2002; Lakoff 2002; Lakoff and Johnson 1980, 1999; Lakoff and Núñez 2000).

Though the embodied metaphor and embodied simulation approaches have proposed new insights as to how cognition and, in particular, conceptual metaphor depend on body properties, these approaches still need to go through a refinement process (e.g. Bernárdez 2005, 2013; Kristiansen, Dirven, and Ruiz de Mendoza 2006; Ruiz de Mendoza 2011; White 2004) which in some cases would mean constraining the realm of the application of the theory of embodiment (see Chapter III). For instance, Pinker (2006:2), argues against the absolutely far-reaching ambition within embodiment to explain all human cognition in terms of the tenets of this approach. He (2005, 2007) argues against reducing cognition and metaphor to sensorimotor experience. Because this approach intends to address a wide range of human fields such as morality, science, philosophy, politics etc., Pinker (2005, 2006, 2007) suggests that though metaphor is used to reason about a considerable number of abstract concepts, it is not ubiquitous in our reasoning system modes.

Similarly, based on recent discoveries in Neurophysiology, Rakova (2003) conducted a research on polysemy and words meanings. She identified a type of metaphor –synaesthetic metaphor- that can hardly fit into the framework of Embodiment Theory. She explains how the tenets of the embodied approach to metaphor fail to account for cross-modalities mapping. She observes that a polysemous adjective does not include one literal meaning and all the other meanings are metaphorically derivative. Rather, some polysemous adjectives reveal synaesthetic metaphors where the linguistic terms of a semantic field are based on meanings that are directly grounded in sensory modalities (Rakova 2003:139). That is, Synaesthesia represents a phenomenon that when we experience sensations in one modality, a second modality is stimulated (Rakova 2003:49-53).

Accordingly, she argues that there is no transfer of conceptual structures across domains in the case of synaesthetic metaphor and double function adjectives. To illustrate, the adjective ‘hot’ is not metaphorically derivative from the adjective ‘spicy’. But, according to Rakova (2003:45), it is a “literal concept” that associates two experiences: that of *spicy food* and that of *high temperatures*. That is, certain metaphors can draw on a literal concept that recruits literal meaning from both source and target (sensory) modalities (Rakova 2003:46). Following these assumptions, the cognitive structures of source and target domains in certain metaphors are literal; hence, there is more literalness in metaphors than what is being suggested in Cognitive Linguistics (Rakova 2003:172).

Since this type of metaphorical mapping is based on two sensory domains, Rakova assures that it is at odds with the tenets of the embodiment theory—namely, because source and target domains in this case² derive from two "literal phenomena" (Rakova 2003:48). She further claims that this kind of metaphor is physiologically motivated and engages two bodily-experienced domains (2003:48). In this setting, the concrete-abstract criterion does not fit Synaesthesia-based metaphor where the mapping draws on sensory modalities as source and target domains.

In addition, Bernárdez (2005, 2013) claims for a deep consideration of the cultural aspect of the cognitive processing that underlies metaphorical mapping (see also Geeraerts, Kristiansen, and Peirsman 2010:3-10; Caballero and Díaz-Vera 2013; Ibarretxe-Antuñano 2013). In this respect, he points out that there are mistaken theoretical and experimental foundations within the framework of Embodiment theory. According to him, in the

² At this point, following Rakova (2003), at least, synaesthetic metaphor draws on a literal concept which associates two different sensory experiences. The fact that source and target domains are sensory may confirm that certain target domains are semantically independent. If such domains have their own cognitive structures, then, a closer examination of the way they are mapped with other domains is crucial towards a more complex classification of metaphorical mapping. Later, we will analyze the current data to explore how other conceptual metaphors may (or may not) draw on a “literal concept” that associates two experiences.

experimental realm, this wrong assumption is obvious in the fact that the investigation within the embodied approach takes the English language as the only source of evidence for the operating patterns and principles in metaphorical mappings (Bernárdez 2013). For instance, he argues that "...in order to reach valuable generalizations about human language [...], we have to study the variety of human languages—in plural." (Bernárdez 2005:192).

Similarly, in the theoretical framework, this wrong assumption is observed in that those patterns and principles are claimed to be universal (Bernárdez 2013). Furthermore, Correa-Beningfield, Kristiansen, Navarro-Ferrando, and Vandeloise (2005:344-345) recommend to "take no specific language—English included—as the model against which the other languages are to be compared,...". Accordingly, Bernárdez (2005, 2013) assures that the embodied approach to metaphor mistakenly takes its findings concerning the English language to be universal, ignoring in this way potential cultural factors that may variably operate in cognitive processing across cultures. In this respect, the "cultural construal" of bodily-experienced phenomena potentially results in a significant variation on both the construction and processing of conceptual metaphor (Bernárdez 2013).

In this setting, he further claims that it is inadequate to draw conclusions on metaphorical mapping focusing only on the experience of the body. Instead, he calls for a cross-cultural study of metaphor to show where conceptual metaphor differs. In this respect, he argues that studying conceptual metaphor needs to take into consideration also the cultural aspect of conceptual metaphor (Bernárdez 2013; Geeraerts, Kristiansen, and Peirsman 2010:3-10).

Taken together, these findings point out to an *overgeneralization* widely adopted within the embodied approach to explain all instances of conceptual metaphor as a

homogeneous cognitive process. Accordingly, these scholars argue that the theoretical and experimental frameworks of the theory lead to dangerous flaws regarding human cognition (e.g., Bernárdez 2005, 2013; Pinker 2006, 2007; Rakova 2003).

In this thesis, we shall assess how this overgeneralization might also be echoed in other aspects of the application of the tenets of the embodied approach to metaphor. More specifically, though certain patterns and principles of mapping cover a broad range of conceptual metaphors, they may not be observed in others. To examine how conceptual metaphors differ in terms of patterns and principles of mapping, we shall not seek one single theory to cover all the metaphor instances. Rather, we shall need to construct a family of theories to enable the embodiment theory to deal with metaphors which are based on different mapping typologies. That is, while the embodied approach has gained more terrain against the disembodied approach, in our thesis we shall attempt to show that though conceptual metaphor is based on bodily-experienced phenomena, it is not a homogeneous cognitive process.

In addition, it is widely accepted within the theory of the embodied approach that metaphorical mappings are based on projecting features of source onto target domains (e.g. Gibbs 1994, 2011; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1993, 1987; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Ruiz de Mendoza 2005, 2011; Steen 2011; Szwedek 2011). In this respect, though certain mapping typologies that may be undelied by an active role of target domains (such as co-occurrence and co-relation based metaphors, see e.g. Grady 1997b) a heavy emphasis is still placed on source domains in the sense that their characteristics ‘constrain’ metaphorical mapping (e.g. Szwedek 2011). This overgeneralization is obvious because within Cognitive Linguistics and Cognitive Science (e.g. Feldman 2006; Feldman and

Narayanan 2004; Narayanan 1999), this excessive focus on source domains has led scholars to analyze metaphorical mappings in terms of the characteristics of source domains, hence embodied metaphor (e.g. Johnson 1981, 1987; Johnson and Lakoff 2002; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Szwedek 2011).

Being bodily-experienced, a phenomenon has the following characteristics: being semantically independent and adequate to be used to give conceptual structure to other phenomena. In contrast, target domains presumably lack these two characteristics in that they are semantically dependent and, consequently, have a passive role³ in metaphorical mapping (at least less active than source domains) (e.g. Johnson 1981, 1987; Johnson and Lakoff 2002; Lakoff and Johnson 1980, 1999; Szwedek 2011). This has had significant impact on the way research is being done to explore how we reason about abstract concepts through the use of metaphorical mapping.

To test the hypotheses put forward in this thesis, we shall start Chapter I by asking how a generalization over the tenets which operate on metaphor can be made in Cognitive Linguistics, given that metaphorical mappings draw on different kinds of bodily experience. We shall have a closer look at the embodiment theory to address the principles and patterns of mapping and argue that this theory dwells on two core approaches: Embodied metaphor (Gibbs 1994, 2011; Johnson 1981,1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1993, 1987; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Ruiz de Mendoza 2011; Ruiz de Mendoza and Peña 2005; Steen 2011; Szwedek 2011) and Embodied Simulation (Barsalou, Santos, Simmons,

³ By “a passive role” we mean that in a metaphorical mapping, only the target domain is the one that is structured and conceptualized in terms of the cognitive topology of the source. Indeed, Lakoff (1993) assures that target domains determine what (source) components we need to carry out the mapping. However, target domains are influenced when they are mapped.

and Wilson 2008; Feldman 2006; Gibbs and Matlock 2008; Kintsch 2008; Narayanan and Feldman 2004).

Based on empirical evidence, we shall hypothesize that (1) though conceptual metaphor can be traced back to sensory and motor experiences, it is misleading to classify it in one group; and (2) the Concrete-Abstract criterion -while it is viable to explain some cases of metaphorical mapping- it is not fully applicable to the current data. In particular, a deep analysis of certain tenets, such as *partial mapping* and *embodied simulation* process, will show that Embodied Simulation theory is at odds with Embodied metaphor. Particularly, in certain mapping typologies we cannot reconcile *partial mapping* and *simulating* entirely the physical action of source into target domains.

These findings are of deep interest for Cognitive Linguistics because they will reveal a greater variability and complexity⁴ of conceptual metaphor. Hence, Embodiment theory might need further exploration for a more complex classification of metaphor types based on their different patterns and principles. This means that there may not be a core process governing all types of conceptual metaphor.

To assess whether the embodiment theory can be looked at from a different perspective, in Chapter II, we shall propose a new perspective to look at metaphorical mapping—Propositionality-and-Linearity based metaphor. We shall hypothesize that the tenets of embodied approach of metaphor fit perfectly well this perspective because the theoretical framework of this approach rests on the assumption that meaning construction via metaphor takes always more concrete phenomena as source domains and more abstract

⁴ There have been attempts to classify metaphor as *ontological*, *structural*, and *orientational* (e.g. Lakoff and Johnson 1980). Other attempts concern the primitiveness and complexity of metaphors (Grady 1998; Grady, Taub, and Morgan 1996; Kintsch 2008:130). However, this classification still submits to the general assumption that conceptual metaphor is a homogeneous cognitive process in that there is always semantic features transfer from a more concrete to a more abstract domain.

ones as target. We shall test this hypothesis by identifying which type of metaphorical mapping the two theories can account for. Our goal of proposing this new perspective is to identify certain incongruities which particularly emerge in attempting to deal with metaphorical mapping as a homogeneous figurative process (see Chapter III).

To show that the embodied approach needs to avoid this over-generalizing theoretical standpoint, in Chapter III, we shall focus our attention on the metaphorical mapping typology which involves bodily-experienced phenomena in source and target domains. We shall assess whether source and target domains show common features—namely, those bodily based features that are held, within Embodied Metaphor theory, to be circumscribed to source domains and which are believed to constrain metaphorical mappings. This finding may induce to a different analysis of this type of metaphorical mapping.

We shall further hypothesize that since in this type of conceptual metaphor target domains are also experienced through the body, there is no reason to believe that the features of source are imposed onto target domains. In this respect, we shall show that target domains can be at the same level as source domains in terms of the experiential basis of metaphor; this is the case of metaphorical mapping which engages bodily experience in its source and target domains. In cognitive linguistics, this experiential basis is claimed to be exclusive to source domains.

Given that in this mapping typology, source and target domains are grounded in bodily-experienced phenomena, the idea of projecting features of source domains onto target domains will not stand on a solid foundation. Accordingly, we shall show that while one-way-features transfer can be applied to a certain type of metaphorical mapping—namely, the metaphorical mapping which engages bodily and non-bodily-experienced

phenomena as source and target domains, respectively; it falls short when it comes to metaphorical mapping across bodily-experienced phenomena. This finding reveals a more participating role of target domains. The following step will be to show that target domains actively participate in both constructing and processing metaphorical mapping.

We saw how the tenets of Embodied approach to metaphor and Propositionality-Linearity of metaphorical mapping do not fit the data. A major finding in this chapter is the fact that target domains in this type of metaphorical mapping share the same characteristics of source domains which are held to be circumscribed to the latter. These features include being *concrete*, *primitive*, and *bodily-experienced*. In contrast, within embodiment theory, source domains have been claimed to be more active in metaphorical mappings because their features characterize the nature of metaphor, target domains should be given a more dynamic role in metaphorical mapping.

In Chapter IV we shall demonstrate that target domains fulfill a more participating role in metaphorical mappings. This finding posits a challenge to the embodiment theory in two ways: (1) target domains in this type of mapping are neither abstract nor semantically dependent; and (2) the assumption that all metaphors are characterized by one single core process is false. In this respect, we show that one metaphor type cannot be analyzed in terms of the tenets of the embodied approach. This means that we are in need of a more complex classification of metaphor to capture potential differences in the process of constructing metaphorical mappings.

Given that target domains in the mapping which engages bodily-experienced phenomena in source and target domains take on a more participating role in this type of metaphor, in Chapter V we shall propose to look at this mapping typology from an *interactionist* point of view. In this chapter, we hypothesize that the interaction process

between source and target domains originates in three main conditions: *co-occurrence*, *co-relation*, and *causality-and-co-activation*. We shall also assess whether the interaction process is homogeneous in this type of metaphorical mapping. More importantly, we shall show how target domains take on a more participating role in this type of metaphorical mapping, in that source and target domains are engaged in a mutual influence.

In contrast, within the embodiment theory, source domains have been claimed to be more active in metaphorical mappings because their features characterize the nature of metaphor, target domains should be given a more dynamic role in metaphorical mapping. We shall outline the mechanisms and typologies that characterize this type of metaphorical mapping. We shall claim for an *interactionist* nature of source and target domains instead of meaning transfer (or projecting features) from one domain onto another. Since source and target domains have a more dynamic participation in metaphorical mapping, we hypothesize that they influence each other in metaphorical mapping. We shall test this hypothesis by exploring the cognitive topologies of source and target domains and assess how they are engaged in a mutual influence.

In the previous chapters VI and V, we demonstrated that (1) the mechanisms of interaction operate in the metaphorical mapping which engages two bodily-experienced phenomena; and (2) this interaction follows different typologies within this type of metaphor. Accordingly, in Chapter VI we hypothesized that if the mechanisms of interaction-such as *co-activation*, *causality*, and *automaticity*- operate in other metaphorical mapping typologies, then it is possible to analyze these types of mapping from the *interactionist* point of view. In line with the findings in the first chapter, namely the wrong assumption that metaphorical mapping is a homogeneous cognitive process, the interaction process might differ.

The interaction between motor actions and cognitive processes as source and target domains, respectively, is triggered by the linguistic system of source domain. Linguistic labels that are inherently associated with source domain, though they are used metaphorically, they still activate physical actions. Then source and target domains are engaged in mutual influence.

Chapter I: Embodied Metaphor, Embodied Simulation, and Mapping Typologies

1. Introduction and Hypothesis

Embodiment Theory suggests that indirectly meaningful concepts borrow their structures from directly meaningful concepts (e.g. Boroditsky and Ramscar 2002; Johnson 1981, 1987; Johnson and Lakoff 2002; Lakoff and Johnson 1980, 1999). This assumption lies at the heart of (1) Embodied metaphor (Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1987, 1993; Lakoff and Johnson 1980, 1999) and (2) Embodied Simulation (e.g. Feldman 2006; Feldman and Narayanan, 2004; Gibbs and Matlock 2008).

These two approaches explain conceptual metaphor based on different, though related, principles and patterns. For instance, Embodied Metaphor Theory accounts for conceptual metaphor as *meaning transfer* via drawing semantic correspondences from source to target domains (e.g. Grady 1998; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Reddy 1993). This transfer concerns topological properties such as image schemas (Grady 2005a; Lakoff 1990:53) and follows a set of principles that governs metaphorical mapping: *invariance principle* (Lakoff 1990), *concreteness-abstractness* criterion (Gibbs 2011; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1987; Lakoff and Johnson 1980, 1999; Szwedek 2011), and *partial mapping* (Lakoff and Johnson 1980).

Embodied Simulation, while fitting into the embodiment theory, argues that metaphor follows different patterns and principles, which can be summarized as follows:

(1) physical actions in source domains are simulated in target domains and (2) the simulation process has its origin in the more concrete domain (Gibbs and Matlock 2008:163). Interestingly, the two approaches coincide in the fact that there is one core process that underlies all metaphorical mappings—transferring features from more concrete onto more abstract domains (e.g. Gibbs 1994, 2011; Johnson 1981, 1987; Johnson and Lakoff 2002; Lakoff 1990; Lakoff and Johnson 1980, 1999; Szwedek 2011).

In this chapter we shall discuss the tenets of the two approaches to show whether they could account for different mapping typologies. We hypothesize that since metaphorical mappings draw on different kinds of bodily experience, these tenets may not permeate all mapping typologies. By the same token, it might not be safe to draw an overgeneralization of metaphorical mappings. Instead, we shall argue that these patterns and principles vary significantly.

Accordingly, we claim that this generalization stems from the fact that the analysis of the data within the framework of Embodiment Theory is not taken at an adequate level because the topology of source domains could afford a deeper classification in terms of its constitutive nature (see Table 1). And in terms of the way they contribute to the construction and processing of conceptual metaphor. To illustrate, some source domains are sensory (*touch, taste...*) (see page 66); others are motor experiences (*grip, grasp, fall...*) (see page 68). Accordingly, conceptual metaphor might expose a large variety of experience whose participation in mapping construction and processing may not be captured under a single core cognitive process.

That is, when source domains are grounded in different kinds of experience, conceptual metaphor might be based on different patterns and principles. Therefore, we hypothesize that it is a misleading conception to take all metaphors to follow the same

patterns and principles of mapping. Accordingly, metaphorical mapping typologies need further analysis for a more complex classification.

In this setting, we predict that exploring such patterns and principles will raise important issues that have not been addressed within the embodiment theory. These may include, for instance, how to refine this theory to make it flexible enough to account for different mapping typologies. In this respect, the data might reflect the variety of patterns and principles of mapping.

Our primary concern in this chapter is to analyze the principles and patterns of Embodied metaphor and Embodied simulation to show whether they fit into the data put forward. Our hypothesis concerns whether metaphorical mappings which dwell on different kinds of experience follow different patterns and principles. In the following section we shall review the tenets of Embodied metaphor and Embodied simulation.

2. Background

2.1. Embodied Metaphor

In Chomskian and post-Chomskian Linguistics, it is believed that cognitive operations consist of manipulating abstract symbols (Chomsky 1984). This affirmation yields two important implications: (1) the mind is an abstract formal system which innately consists of a set of rules (Universal Grammar) which governs the process of symbols combination (Chomsky 1984). Following this approach, metaphor breaks such set of rules because it draws on an “unconventional” symbol manipulation process. Thereby, it is claimed that metaphor operates exclusively in literary discourse (e.g. Chomsky 1984).

Given that the mind fulfills its function through manipulating symbols, this theory failed to explain why some grammatically correct utterances are unacceptable. A typical example to show this inadequacy was the following statement:

Colorless green ideas sleep furiously (Chomsky 1957: 15).

This utterance is not semantically acceptable though it is grammatically correct. This inadequacy has led cognitive linguists to follow a different line of investigation. For instance, Lakoff and Johnson (1980, 1999), focused on everyday language to see whether metaphor operates in our cognition and, if so, how it carries out its function. They concentrate their inquiry on examples such as the following (Lakoff and Johnson 1980):

Did you see the race?

Halfway into the race, I ran out of energy.

In washing the window, I splashed water all over the floor.

How did Jerry get out of washing the windows? (31)

I look forward to the arrival of Christmas.

Coming up in the weeks ahead...

The time will come when (42)

Look how far we've come.

It's been a long, bumpy road.

We can't turn back now.

We're at a crossroads.

We may have to go our separate ways.

The relationship isn't going anywhere. We're spinning our wheels.

Our relationship is off the track.

The marriage is on the rocks.

We may have to bail out of this relationship.

Prices rose, stocks sky-rocketed (44).

These scholars observed that these everyday-language expressions reveal how metaphorical mapping across phenomena plays a central role in our cognition. They argue that metaphor, as the examples above indicate, captures our interaction with the environment, shapes our cognitive processing of abstract phenomena, and plays a crucial role in our reasoning system (e.g. Johnson and Lakoff 2002; Lakoff and Johnson 1980:7; see also Lakoff and Johnson 1999).

Moreover, they established a set of patterns and principles that governs metaphorical mapping. This includes, for instance, the rules that determine how source and target domains should be mapped (1980:40; see the following section for an elaborate discussion of such rules). For instance, one of the most important generalizations made about this study is the fact that all these metaphors exploit bodily experience as their source domains (Johnson 1981, 1987; Johnson and Lakoff 2002; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989). This notion constrains metaphorical mapping in that it, by default, engages more concrete and more abstract domains as source and target domains, respectively.

Equally important is the fact that these domains are directly meaningful (source domains) indirectly meaningful (target domains). Importantly, the notion of metaphor as based on mapping more concrete domains onto more abstract carries with it another important entailment: the conceptual structure of a given metaphorical mapping is derivative from source domains (e.g. Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1993; Lakoff and Johnson 1980, 1999).

The result of these studies was the inception of *Embodied cognition* and particularly *Embodied Metaphor* (Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999; Reddy 1993). Within this framework, the above mentioned inadequacy has been used to argue against the idea that the mind is a formal system (Lakoff and Johnson 1980:8).

However, this notion could also serve as evidence against the idea that metaphor is an (unconventional) symbols-manipulation-based process in that the inadequacy of the aforementioned statement reveals why metaphor is not a matter of symbols-manipulation process. That is, we cannot map a given source domain onto *any* target domain however grammatical the statement is. This is because metaphor is not merely a symbol-combination-based process: but also a meaning-transfer process. Equally important, metaphor proves crucial to our cognitive system as it shapes our way of thinking (e.g. Lakoff and Johnson 1980, 1999).

These remarkable insights about conceptual metaphor have led cognitive linguists to argue that the mind acquires its conceptual structure from body properties and that our cognitive system is grounded in everyday experience (e.g. Johnson 1981,1987; Johnson and Lakoff 2002; Lakoff 2008:18-19; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989).

2.1.1. Patterns and principles of mapping in conceptual metaphor

In the previous section, we explained how the embodied approach to metaphor emerged and how a new conceptualization of mind and cognition took place. Possibly, the most influential approach in Cognitive Linguistics and Cognitive Science which provides

insights into the underlying mechanisms that lead to metaphorical mapping is the embodiment theory (Boroditsky and Ramscar 2002; Feldman 2006; Gibbs 2011; Glenberg and Kaschak 2002; Grady 1998; Johnson 1987; Johnson and Lakoff 2002; Kövecses 2011; Lakoff and Johnson 1980).

In this section, we will overview patterns and principles of mapping. The above mentioned studies (Lakoff and Johnson 1980, 1999) demonstrate that the mind is not abstract as is held within the disembodied mind theory (Chomsky 1984). Instead, it is embodied (e.g. Barsalou and Wiemer-Hastings 2005; Gibbs 1996, 2005, 2011; Grady 1998, 1996; Kövecses 1988, 2011; Lakoff and Johnson 1980, 1999). In this setting, Lakoff and Johnson (1980) outline the following characteristics which are presumably inherent to any metaphorical mapping:

- (1) Meaning transfer from one domain onto another (48).
- (2) This transfer is always partial (7).
- (3) Invariance principle (Lakoff 1990; Lakoff and Turner 1989:82).
- (4) *Uni-directionality* of meaning transfer: this transfer takes always one direction: from concrete to abstract domains and, (Lakoff 1987:268).

In some cases⁵, this transfer includes transferring primary image schemas⁶ onto target domains (Lakoff and Turner 1989:97-100) (see also Grady 2005a and Lakoff 1990:53).

⁵ Typical examples of this are
The last clause leaves the door open for extending the contract.
After his teenage years he began to come out of his shell.

⁶ Within Embodied Approach to metaphor an *Image Schema* includes bodily-experienced phenomena, which we use to give structure to abstract phenomena such as when we conceptualize Time in terms of Space (Time Is Space). *As we go further into the 1980s... We're approaching the end of the year* (1980:44).

Accordingly, conceptual metaphor also shows three main patterns that, together with the above mentioned principles, constrain metaphorical mapping construction:

- (1) Properties of bodily experiences are imposed on target phenomena.
- (2) Source and target domains are by default concrete and abstract, respectively.
- (3) Brain does not have any other way to access abstract domains, except through conceptual metaphor (Lakoff 1987:303; Lakoff and Johnson 1980:3-4).
- (4) There are two kinds of metaphor: complex and primary (Grady, Taub, and Morgan 1996; Lakoff and Johnson 1999).
- (5) Source domains are primitive, physical, and concrete (e.g. Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff and Johnson 1980, 1999; Szwedek 2011).

These intrinsically related patterns and principles of mapping construction have led scholars within the embodiment theory of metaphor to affirm that abstract domains are understood in terms of bodily-experienced domains (e.g. Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff and Johnson 1980, 1999; Szwedek 2011). On that view, concepts concerning target domains are shaped by the bodily-based experience of source domains.

In contrast, primitive phenomena that characterize source domains cannot be understood in terms of other phenomena (Feldman 2006; Grady, Taub, and Morgan, 1996; Lakoff 1990; 1993; Lakoff and Johnson 1980, 1999). That is, they do not allow further structures in their internal composition (Lakoff and Turner 1989; Szwedek 2011). These primitive concepts emerge from the interaction between the sensorimotor system and the environment (see also Roldán-Riejos and Úbeda Mansilla 2013:109). Furthermore, these primitive concepts, according to Grady, Taub, and Morgan, give rise to “*more basic*,

independently motivated metaphors (“primary” or “primitive” metaphors) which combine into complex (or “compound”) metaphors” (Grady 1998:210; see also Grady, Taub, and Morgan 1996).

From our discussion above, we can conclude the following points, which are crucial to our thesis:

- (1) conceptual metaphor is ubiquitous in abstract phenomena;
- (2) we resort to metaphor to reason about physically inaccessible phenomena;
- (3) metaphorical mapping is constrained by the above mentioned patterns and principles;
- (4) it follows from this that metaphorical mapping is a homogeneous cognitive process—one-way-meaning transfer (from more concrete onto more abstract phenomena).
- (5) and the domains that are mapped are classified in terms of two different (directly and indirectly meaningful) phenomena.

2.2. Embodied Simulation

Neuro-imaging studies which Embodied Simulation is based on focus on action domains such as *grasp, kick, grip etc.* to assess whether the neural network which is responsible for motor domain is activated in the case of metaphorical meaning (Gallese and Lakoff 2005; Lakoff 2008). In experiments concerning brain imaging, subjects were exposed to different stimuli while tracking their brain activities. First, the subjects were shown pictures of phenomena such as someone carrying out the action of *grasping a paper*. Later, those participants were asked to read the following statement:

Grasp an idea (Feldman 2006; Gallese and Lakoff 2005; Lakoff 2008).

Interestingly, brain imaging confirmed that the same brain area(s) fire in the two cases (Coulson 2008:189; Gallese and Lakoff 2005; Lakoff 2008). These experimental results indicate that the neural network which is responsible for the motor task involved in *grasping* activates also when the metaphorical meaning of the term *grasp* is processed. This finding reveals that both metaphorical and literal meanings elicit the same response from the brain.

Consequently, scholars supporting this theoretical framework take a new line of investigation on metaphor: focusing on the motor system to explore how metaphorical mappings are built when they engage in physical actions as source domains (e.g. Barsalou 2005, 2007, 2008; Barsalou, Santos, Simmons, and Wilson 2008; Boroditsky and Ramscar 2002; Kintsch 2008).

Following the embodied simulation approach, the overall-operating mechanism in constructing and processing conceptual metaphor is simulating the physical action of source domains onto target domains (e.g. Barsalou and Wiemer-Hastings 2005; Kintsch, 2008). For instance, Richardson, Spivey, McRae, and Barsalou (2003:772) state that, "...comprehending a verb [...] can activate a spatial representation that [...] resembles the image schema associated with the meaning of that verb." Proponents of this theory further assure that this simulation concerns all the components of the physical action that function as source domain (Kintsch 2008; Feldman and Narayanan 2004; Gibbs and Matlock 2008). For instance, expressions such as *grasp an idea* and *She finds even the easy concepts difficult to get hold of* are good examples to assess how the embodied simulation process is carried out in metaphorical mapping (e.g. Gallese and Lakoff 2005; Lakoff 2008). In this respect, metaphorical mapping is constructed by simulating entirely the physical action of source domains in target domains (see pages 90-95).

However, this criterion has been claimed to cover other instances of metaphorical mapping inasmuch that all the metaphorical mappings that draw on physical actions as source domains are based on simulation (e.g. Feldman and Narayanan 2004; Gibbs and Matlock 2008; see page 86; Gibbs and Matlock 2008) for how this assumption is not observed in certain metaphorical mappings).

More importantly, the major contribution of this theory is the fact that it puts a special emphasis on the *automaticity* of metaphorical mapping construction and processing. In this respect, simulating motor topologies of source domains requires activating certain brain areas during the construction and processing of metaphorical mapping which engages motor actions as source domains (Feldman 2006; Gallese and Lakoff 2005; Lakoff 2008). It is worth noting here, that within this framework, metaphorical mappings are not *propositionally* but *motorically* motivated. To illustrate, both literal and metaphorical meanings of action verbs are active regardless of which meaning is involved (Feldman 2006; Gallese and Lakoff 2005; for contrasting views, see Giora 2002, 2008).

So far we have been outlining the patterns and principles of metaphorical mapping. We have observed a generalization within the theoretical framework of Embodied Metaphor that is evident mainly in three aspects:

(1) in terms of mapping typology, namely there is one mapping typology—from concrete onto abstract domains;

(2) in terms of the tenets of the embodied approach: within the theoretical framework of embodied metaphor, the tenets which govern metaphorical mapping are claimed to be ubiquitous in conceptual metaphors;

(3) another overgeneralization is observed in the role conceptual metaphor fulfills. That is, all abstract concepts are metaphorically represented, including abstract domains

such as *mathematics* (Lakoff and Núñez 2000), *reason* (Johnson and Lakoff 2002), *philosophy* (Lakoff and Johnson 1999), and *morality* (Lakoff 2002: 41-42; for a contrasting view on this issue see Pinker 2007:245-278).

The embodiment theory of metaphor has been criticized mainly for the above mentioned assumptions. With regards to the mapping typology of conceptual metaphor (mapping concrete onto abstract), Rakova (2003:48) assures that a certain metaphorical mapping is based on two physiological phenomena, wherein literal meaning transcends both source and target domains.

Another criticism which concerns the very nature of metaphor is the one which comes from Evolutionary Psychology (e.g. Pinker 1997, 2003, 2006, 2007). While the Embodied Approach to cognition advocates a far-reaching realm for the theory of Embodied Metaphor –playing a crucial role in reasoning about a wide range of human fields of knowledge (see (3) above), Pinker (2007: 245-278) calls into question the generally accepted view that all abstract concepts are accessed metaphorically. Instead, he proposes that though metaphor is an intrinsic parcel of our reasoning system, it is by no means as such in more abstract fields such as mathematics, philosophy etc.

Furthermore, he (2006:3) sustains that “...the ubiquity of metaphor in language does *not* imply that all thinking is concrete”. This notion, in particular, goes strongly against Lakoff and Núñez (2000) and Lakoff (2002). These two approaches (Pinker 2007 and Rakova 2003) point out a strikingly important issue which needs to be addressed within the theoretical framework of the embodied approach to metaphor.

3. Data Analysis

We shall divide this section into two main subsections: Embodied metaphor and Embodied Simulation. In the Embodied metaphor section, we shall analyze instances of metaphor to assess (1) whether the bodily experience which functions as source domain can be further classified into subgroups; (2) whether the patterns of mapping within this framework are viable to analyze the current data; and (3) how our analysis could enhance our understanding of metaphorical mapping.

In the second section, we shall assess the Embodied Simulation approach bearing in mind the following questions: (1) could the simulation process be used to explain all metaphors? (2) Does *partial mapping* fit into Embodied Simulation, given that the process of simulation is claimed to engage entirely the physical action of source domain? (3) Does this process operate in all metaphorical mappings which draw on physical actions as source domains? And if so, (4) is the simulation process identical in this mapping typology?

3.1. Embodied Metaphor: Principles of Mapping

3.1.1. Sensory Phenomena as Source Domains

Source domains in the data show that they are accessed via the sensorimotor system.

Let us consider the following examples:

- (1) *I have never had a taste of the outdoor life in Florida.*
- (2) *The argument with my mother-in-law left a nasty taste.*
- (3) *Stay in touch and maybe we can meet up sometime.*
- (4) *She's been in hot water at school twice this year.*
- (5) *I've never edited a book before, so I'm partly just feeling my way.*

- (6) *My wife is very good at smelling out bargains.*
- (7) *Journalists are keen to sniff out scandals.*
- (8) *The murder was preceded by a blazing row we could hear through the wall.*
- (9) *She saw red when she caught him stealing.*
- (10) *It was not until I met Mother Teresa that I saw the light.*
- (11) *Ask your mother for money—she's a soft touch.*
- (12) *Social Studies is viewed by economists as a soft option at university.*
- (13) *He shook my hand with great warmth.*
- (14) *As they entered the narrow pass the sheriff smelt danger smell.*
- (15) *You're too soft with your kids—You'll spoil them.*
- (16) *“‘don't contradict your father,’ was the sharp reprimand”*

Metaphor	Sensory domain
(1) (2)	Gustatory modality
(3) (11) (12) (15) (16)	Tactile modality
(4) (5) (13)	Sensory modality
(6) (7) (14)	Olfactory modality
(8)	Auditory modality
(9) (10)	Visual modality

Table 1 Subcategories of experience-based-domains.

As the table above indicates, the phenomena which function as source domains can be further classified into subgroups of sensory experiences. There are domains which are accessed via auditory, visual, olfactory, gustatory, and somato-sensory modalities.

As will be seen later, this classification will provide new insights into how different mapping typologies may follow different patterns and principles of mapping. For now, it suffices it to outline the different types of experience on which source domains draw on and to identify potential mapping typologies.

3.1.2. Motor Phenomena as Source Domains

Other source domains in the data show that they are accessed via the motor system. These domains are known in Cognitive Linguistics and Cognitive Science as *image schemas* (Lakoff and Turner 1989: 97-100). Let us consider the following examples:

- (1) *He wanted safety, a home, and the opportunity to get ahead.*
- (2) *Uganda will have to push ahead with destructive World Bank policies.*
- (3) *I do not understand the attraction of the Beatles.*
- (4) *He trotted out all the old arguments against GM foods.*
- (5) *I was pressured into marriage by my wife's parents.*
- (6) *I've been appointed as headmaster to raise standards.*
- (7) *Since he once loved her passionately, she still has a hold on him.*

Metaphor	Source domain
(1)	Movement
(2) (4) (6)	Force
(3)	Attraction
(5)	Pressure
(7)	Control or Hold

Table 2 Subcategories of motor-experience-based domains.

The table above shows that source domains in certain conceptual metaphors are grounded in different motor activities. For instance in (1), (2), and (4) the motor experience in question is *movement*. On the other hand, (3), (5), and (6) implies *force*. Thus, it is not safe to group all motor experiences in the same way because it may be the case that different motor activities contribute distinctly to metaphorical mapping construction and processing. If these domains draw on different motor experiences, metaphorical mapping may follow different patterns and, consequently, it may need a more complex classification (see Chapter III).

Accordingly, though all source domains draw on sensorimotor experiences, it is misleading to cluster them into a homogeneous group because these experiences fall at least into two groups which could be further classified into subgroups⁷: they are sensory and motor experiences. It should be noted that the main concern here is not merely pursuing another classification of metaphor. Rather, we advance our hypothesis that probably different types of source domain may draw on different mapping mechanisms. Since sensorimotor experiences can be classified into different categories, it is safe to argue that their operating mechanisms may not be homogeneous to all metaphors.

3.2. Patterns of Mapping in Conceptual Metaphor

3.2.1. Primitive and Complex phenomena

Following Grady (2007), the phenomena which function as source domains are primitive in that they are processed by the sensorimotor system and do not afford further

⁷ As seen in the data, sensorimotor experience could be divided into other subgroups such as *orientation, spatial etc.*

conceptual structuring. Accordingly, experiencing such phenomena leads to the construction of *primitive concepts*, which cannot be cognitively processed in terms of other concepts. Grady (1998:213) argues that conceptual metaphors are based on “*basic perceptual factors [...]*”

On the other hand, complex phenomena are considered indirectly meaningful because they require other directly meaningful phenomena to be mapped onto (Lakoff and Turner 1989; Szwedek 2011).

It turns out that certain conceptual metaphors in the data are rooted in co-occurrence of phenomena in the external world (Grady 2007). A case in point is when we conceptualize Quantity in terms of Verticality (Lakoff 1990:53; Valenzuela 2009:239). Consider the following examples:

More Is Up

- (1) *The number of books printed each year keeps going up.*
- (2) *My income rose last year* (Lakoff and Johnson 1980: 16).

Less Is Down

- (3) *The amount of artistic activity in this state has gone down in the past year.*
- (4) *The number of errors he made is incredibly low* (Lakoff and Johnson 1980:16).

Other examples which are found in the data include,

Less Is Low

- (5) *He greeted me in a low voice.*

Loud Is High

- (6) *He spoke in such a low voice I could not hear what he said.*

These instances of metaphor engage two primitive phenomena⁸—Verticality and Quantity as source and target domains, respectively. Our judgment is based on the fact that the two phenomena are bodily experienced (Grady, Taub, and Morgan 1996). In this respect, the data above fails to meet the complex-primitive criterion. To start with, the general assumption within the embodied approach to metaphor that primitive phenomena are used metaphorically to give conceptual structure to complex concepts (e.g. Kövecses 2011; Lakoff and Johnson 1980, 1999) requires that Verticality and Quantity in these examples should be considered primitive and complex, respectively. That is, in order to explain this metaphorical mapping typology within this framework, we need to differentiate these source and target domains in terms of *primitiveness* and *complexity*, respectively.

This assumption yields two theoretical problems: first, why are Verticality and Quantity treated differently (in terms of primitiveness and complexity) within the embodied approach to metaphor when they are engaged in metaphorical mapping, given that they are bodily experienced? Accordingly, to differentiate them, cognitive linguists subscribing to the embodied approach to metaphor argue that the phenomenon which is more literal takes on the role of the source domain, whereas the more abstract functions as target (1980:61). Furthermore, within this approach, co-occurrence of two experiences such as Quantity and Verticality leads to a metaphorical mapping where some properties of source domains are transferred onto the target domains (Lakoff and Johnson 1980:10). This mapping must also result in highlighting some aspects of the target and hiding others (e.g. Lakoff and Johnson 1980:10-13). In turn, these metaphorical mappings later form the basis for more complex metaphorical mappings (Grady 1998) where partial mapping criterion is also operating

⁸ Within the embodied approach to metaphor, the term *primitive phenomena* refers to those phenomena which are bodily experienced and whose cognitive topology does not allow further structuring (e.g. Grady 1998; Grady, Taub, and Morgan 1996).

(Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff and Johnson 1980, 1999).

Therefore, sticking to this criterion to analyze the data, a second theoretical problem emerges. Because metaphorical mapping in this case is based on co-occurrence of two phenomena, this mapping typology fails to satisfy the partial mapping criterion.

To illustrate, the conceptual metaphor which engages Verticality and Quantity is causality-based mapping in that the increase and decrease in the domain Quantity cause changes in our conceptualization of Verticality (see pages 251, 259). More importantly, this causal relationship is bodily-experienced in both source and target domains—increase and decrease in Quantity often leads to up and down in Verticality. Accordingly, the partial mapping criterion does not fit this mapping typology because the phenomena of Verticality and Quantity are active in parallel. Consequently, we suggest that this criterion is not a common feature to all metaphorical mappings. It is obvious that in some instances of metaphor the *partial mapping* criterion is recurring but this does not mean that it is an absolute feature to all metaphorical mapping typologies (see page 90).

3.2.2. Metaphorical mapping typologies

So far we have shown that source domains draw on different kinds of experience and target domains in certain conceptual metaphors are bodily experienced (e.g. More Is Up). Though the embodiment theory claims that the two domains are different in terms of primitiveness and complexity, we have not observed any substantial difference to support the notion that source domains are bodily experienced and target are abstract. Hence, theoretical problems arise when we tested the patterns and principles of mapping against the data.

This situation hints at the fact that conceptual metaphor is instantiated through different mapping typologies which cannot be account for using the same patterns and principles of mapping.

In the following sections we shall outline metaphorical mapping typologies and assess whether the tenets of the embodiment theory can account for them.

3.2.2.1. Concrete-onto-Concrete-mapping typology

Within the embodiment theory, the Concrete-Abstract criterion, which lies at the heart of such theory, is assumed to govern all conceptual metaphors (e.g. Gibbs 1994, 2011; Gibbs and Matlock 2008; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Steen 2011; Szwedek 2011). This view is rooted in the foundational assumption that conceptual metaphor is instantiated through one mapping typology—concrete-onto-abstract mapping (Lakoff and Johnson 1980, 1999). Let us consider the following examples:

Human Is Animal, Human Is Bird

(1) *a. My husband turned out to be an animal.*

b. He picked up this bird at a downtown disco.

Human Is Army

(2) *When she opened the door there was an army of journalists waiting for her.*

Human Is Liquid

(3) *Crowds spilled out of the train over the platform.*

Human Is Building

(4) *Animo acids are the building blocks of the proteins and these building blocks of muscles.*

Human Is Plant

(5)The FBI planted informers in the Mafia.

Human Is Fruit

(6)For a month or so I was the apple of the head's eye.

Human Is Animal

(7)Every education reform makes pupils guinea pigs.

Words/Language Is Human

(8)The introduction is too long and the body is too short.

Money Is Liquid/Blood

(9)Most of my money is in stocks and shares not liquid assets.

Money Is Food

(10)He earned his daily bread as a music teacher.

Vehicle Is Animal/Human

(11)The torn body of the aircraft was finally found

In these examples, bodily-experienced phenomena are understood in terms of other bodily-experienced phenomena (see Chapter III, for an in-depth analysis of this mapping typology and how it posits a challenge to the embodiment theory). More precisely, both source and target domains draw on sensorimotor experiences. For instance, in (1)-(6) the domain Human Being is mapped onto other bodily-experienced domains such as Bird, Building, Animal, Ship etc.). This finding jars with the very essence of the cognitive function of conceptual metaphor in that its use is circumscribed to mapping concrete (directly meaningful phenomena) onto abstract (indirectly meaningful phenomena). For instance, Szwedek (2011:344) stresses that “Without the metonymic derivation, the metaphor [Captain Thelwal is a perfect iceberg] would have the form AN OBJECT IS AN

OBJECT, which is not only in no way metaphorical, but also impossible, because, literally, one object cannot be another object. This leads to yet another assumption that does not characterize the data—that the domain of “objects” cannot fulfill the role of a target domain”.

However, the data above shows that bodily-experienced phenomena can equally fulfill the role of target domain. Therefore, in order for the theory of embodiment to account for this mapping typology, we need to consider the domain, Human more abstract than the domains, Bird, Army, Building, Plant, Animal, and Ship. That is, in order for the *concrete-abstract* criterion to be applied to explain the patterns of mapping in these instances of metaphor, we have to assume that the characteristics of the domain Human are more abstract than those of the domains Animal, Building, Ship, Bird etc. In addition, we have to suppose that the characteristics of the domains Animal, Ship, Bird, and Building are more primitive than those of Human. This standpoint has a conflicting entailment because it implies that the characteristics of Animal, Ship, Bird are bodily experienced whereas the characteristics of Human are not. More interestingly, we have to assume that the domains of Ship, Bird, Animal etc., are directly meaningful; hence, they are used as source domains. On the other hand, the domain Human is indirectly meaningful since it is accessed via other bodily-experienced domains. Furthermore, the domain Human Being functions as source in (10) and target as in the other examples (see page 73 for a deep analysis of this metaphorical mapping typology).

These findings are also pointed out by Caballero (2009:78), who stresses that “...although helping our understanding of the most abstract via the most concrete is one of the most salient properties of metaphor, this does not rule out the concreteness of both the source and target in certain metaphors”.

3.2.2.2. Metaphorical mappings across sensorimotor experiences

In the previous section we demonstrated that concrete-onto-concrete mapping typology cannot be explained in terms of the concrete-abstract criterion. Another mapping typology that cannot be accounted for within the embodiment theory is the typology which engages sensorimotor phenomena as source and target domains. Let us consider the following examples:

Sight Is Touch

(1) *a. A good teacher must always maintain eye contact with her pupils.*

b. The dog fastened her eyes on my every movement as soon as she knew I had food for her.

Sound Frequency Is Height

(2) *The melody falls suddenly to indicate despair.*

Loud Is High

(3) *He spoke in such a low voice I could not hear what he said.*

Listening/Reading Is Eating/Drinking

(4) *He drank in the praise I gave him.*

Bad Is Low

(5) *The governor's popularity is at its lowest ebb.*

Steal Is Lift

(6) *He lifted whole sections from Beethoven.*

Since our aim in this chapter is to sketch out how conceptual metaphor may be based on different metaphorical mapping typologies, we are not going to deeply address

potential patterns and mechanisms of each mapping typology. As the examples above indicate, conceptual metaphor may engage sensorimotor modalities as source and target domains. For instance, in the example (1) Sight Is Touch, the mapping is based on two somatosensory modalities: Sight and Touch. Similarly, examples (2) and (3) visual and auditory are mapped as source and target, respectively. Also, in (4) a somatosensory activity (drinking and eating) are mapped onto the auditory modality. Furthermore, (5) Quality is viewed in terms of Height. And finally, number (6) engages two motor modalities: Lifting and Stealing. Again, the notion of mapping source domains onto target domains based on Concrete-Abstract- criterion does not seem to encompass these mapping typologies.

3.2.2.3. Abstract-onto-abstract-mapping typology

In the view of metaphor as based on the notion that to construct a metaphorical mapping there must be bodily-based information to be projected onto other phenomena, significant theoretical problems arise. To illustrate this point, let us consider the following metaphor:

Thinking/Considering Is Calculating

I have been spending ages trying to work out why he did what he did.

This example includes two conceptual metaphors: Time Is Commodity and Thinking Is Calculating, which are represented in this case respectively by the expressions *I have been spending ages*, and *trying to work out why he did what he did*. It is worth noting that the two metaphors are instantiated through different mapping typologies. In the first case, the mapping engages concrete (Commodity) and abstract (Time) phenomena and in the second case, the mapping draws on two abstract domains: Calculating and Thinking as

source and target domains, respectively. Lakoff and Núñez (2000) sustain that Calculating is an abstract phenomenon which is grounded in the experience of the body. However, in attempting to account for the metaphorical mapping which engages two abstract phenomena from the embodied approach to metaphor, we need to solve two theoretical problems.

First, given that abstract phenomena do not have the necessary bodily-based information to be projected onto other phenomena, the metaphorical mapping between abstract phenomena would not be possible. For instance, metaphors such as *Love is the wisdom of the fool and the folly of the wise* (Szwedek 2011: 345), would be inconceivable. Our judgment is based on the fact that the embodied approach is based on the assumption that the bodily-based information of source domains is absolutely necessary to project semantic features onto target domains. The problem to account for Thinking Is Calculating from the embodied approach to metaphor is that Calculating (as an abstract phenomenon) functions as source domain. Therefore, this mapping typology lacks the experiential basis that source domains presumably provide to conceptual metaphor to make possible meaning transfer across phenomena (see also White and Herrera Soler 2003:140-141). Put differently, this metaphorical mapping typology lacks the bodily-based information which presumably (1) serves as the conceptual basis for conceptual metaphor and (2) fulfills the conceptual structuring role of conceptual metaphor. By the same token, the metaphorical mapping which draws on abstract phenomena as source and target domains also posits a theoretical problem to Embodied Simulation because this approach takes as the foundational assumption that there must be bodily-based information to be simulated in target domains (Feldman 2006; Gibbs and Matlock 2008; Kintsch 2008).

More importantly, abstract onto abstract mapping seems to characterize other metaphorical mappings that have been taken as concrete-onto-abstract typology. According to Szwedek (2011:345-346), this pattern characterizes also Life Is Journey and Argument Is War because source domains in these metaphors are not physical objects though they include physical components. Moreover, there is a case where subjects do not have access to the bodily-experienced phenomena of source domains; yet, they use them to construct metaphorical mappings (Szwedek 2011: 346). Accordingly, the phenomena which function as source domains are not embodied in the same way for all subjects because we do not experience certain phenomena in the same way. For instance, subjects may have a direct experience of phenomena but others lack this direct interaction (Steen 2011:30-31). For instance, for someone who has never been involved actively in hunting, such experience should be an abstract experience for them. Yet, the domain of hunting would be assumed to be experienced bodily in order to fit the tenets of the embodied approach to metaphor. In addition, a subject—even without being actively involved in the experience of hunting—needs to simulate the physical action of the source domain in the target domain.

Moreover, this approach assumes that this experience is embodied to all subjects in the same way. It follows from this that if for instance a subject is actively involved in a given experience, the mapping of such experience is based on simulating this experience in target domains. This observation seems to contradict the Embodied Simulation approach to metaphor in that simulation is based on a direct engagement with a given motor experience as source domain and its simulation in target domains (Gibbs 2005: 225-226).

3.2.2.4. Uni-directionality of metaphorical mapping

Uni-directionality within the embodied approach to metaphor is claimed to assure that if a phenomenon is understood in terms of another phenomenon, then the process cannot be reversed (e.g. Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff and Johnson 1980, 1999). Given that within Embodiment, the process maps more concrete onto more abstract phenomena, then the process of metaphorical mapping should yield two entailments: (1) meaning transfer always takes place from more concrete to more abstract domains; and (2) source and target domains of a given metaphorical mapping cannot be engaged in other metaphorical mappings otherwise. Specifically, given the strict notion of the principle of *uni-directionality*, phenomena which are mapped in metaphorical mapping are always mapped in one way. The source domain is always more concrete than the target. In the following sections we shall gauge this tenet against the data to see how *uni-directionality* principle may not characterize certain metaphorical mapping typologies.

3.2.2.4.1. Can the same domain be abstract (target) and concrete (source)?

In this section we shall assess how certain types of metaphor posit a theoretical problem to the embodied approach to metaphor in that a given phenomenon needs to be considered as concrete or abstract depending on whether it is bodily-experienced and which role it takes on in metaphorical mapping. Let us consider the following examples:

Human Is Army

(1) When she opened the door there was an army of journalists waiting for her.

Human Is Animal

(2) My husband turned out to be an animal.

Human Is Bird

(3)He picked up this bird at a downtown disco.

Human Is Fish

(4)He was a cold fish--I never really got to know him.

Human Is Machine (see also Johnson 1987:134)

(5)The Labour Party machine is running smoothly

Machine Is Human

(6)He drove, or tried to drive, a clapped-out mini.

Animal Is Human

(7)Blue whales are the largest of the animal kingdom

Body Part Is Human

(8)Democracy involves the whole body politic in decisions.

Liquid Is Human

(9)The Aral Sea was once a large body of water.

Human Is Plant

(10)He planted his feet firmly on the surfboard and waited for the next wave.

Plant Is Human

(11)No one realized that James was a KGB plant.

Source Experience	Target Experience
Army	Human
Human	Animal
Fish	Human
Machine	Human
Human	Body Part
Liquid	Human
Human	Plant
Plant	Human

Table 3 Bodily-experienced phenomena as source and target domains.

Analyzing this set of metaphors sticking to the tenets of Embodiment theory, we encounter the following problem: the domains *Animal/Machine/Human* function as source domains in some metaphorical mappings and target in others. So, if we are to accept the concrete-abstract criterion, we have to consider the domains Human, Machine, and Animal, as abstract phenomena when they are the target of the mapping but more concrete when they carry out the function of source domains.

More importantly, as the table above shows, Animal, Machine, and Human function as source and target domains in different metaphorical mappings. The embodiment approach to metaphor would suggest that the domains Animal and Machine are more concrete than the domain Human. However, the theory does not explain why we should consider these three domains (Animal, Machine, Human) differently in terms of concreteness-abstractness. Our judgment is based on the fact that since they are not inherently source or target domains.

Another instance of mapping which is problematic to be analyzed in terms of the Concrete-Abstract criterion is the domain Disease. This domain appears to be as source domain (more concrete than the target one), and as target domain (more abstract than the source domain). Consider the following examples:

Problem/Difficulty Is Disease

We suffer from the crippling disease of privatization.

The health of the project depends on all participants working co-operatively.

The health of the economy will suffer from inflation.

Disease Is War/Invasion

White cells attack the invading bacteria.

They were fighting a losing battle trying to save my father from cancer.

or Emotion/Idea Is Disease

The growing pains of adolescence often leave teenagers depressed.

Again, Problem, Difficulty, Disease, and Idea function as source and target domains in different metaphorical mappings. From here, it is clear that the concrete-abstract criterion is not absolute in this type of metaphorical mapping because we cannot differentiate source and target domains based on such criterion.

3.2.2.4.2. Reversal Mappings

In the previous section we showed that certain phenomena in some instances of metaphorical mapping are not inherently source or target domains. Equally interesting is the fact that these domains can be mapped onto each other in different ways to form different conceptual metaphors. Grady (2005b:330-331) argues that *uni-directionality* is not

absolute to all conceptual metaphors, stressing that, “Metaphors of the GENERIC-IS-SPECIFIC type also seem to be symmetrical, allowing projection in either direction...”

For instance, the domain of Animal can be used to give conceptual structure to the domain of Machine;

Machine Is Animal

(1)The murder weapon appears to have been a monkey wrench—shades of the Rue Morgue.

Similarly, the domain of Human can be structured in terms of Animal;

Human Is Animal

(2)She’s never at home—she’s a real party animal.

Also, the domain of Animal can be understood in terms of Human;

Animal Is Human

(3)Property developers in Hong Kong are a bunch of fat cats.

the domain of Machine is understood in terms of Human;

Machine Is Human

(4)These sports utility vehicles are real gas guzzlers.

and the domain of Machine is understood in terms of Human

Human Is Machine

(6) a. It was a high octane performance that left the audience stunned.

b. I could never discover what makes Ann tick.

Liquid Is Crowd/Human

(7)The Aral Sea was once a large body of water.

Human Is Liquid

(8)Crowds spilled out of the train over the platform.

As the data shows, source and target domains in the examples above have in common the fact that they are experienced by the perceptual mechanisms of the body (Human, Liquid, Machine, and Animal). It is worth noticing here that these domains equally fulfill the roles of source and target domains in different conceptual metaphors. This finding entails that (1) target domains also can be accessible via perceptual mechanisms; and (2) the concrete-abstract criterion, which presumably helps to distinguish source from target domains, does not stand on a solid basis.

This means also that the “*uni-directionality*” criterion cannot fit the data to explain this metaphorical mapping typology. We argue that this uni-directionality cannot hold always from more concrete to more abstract domains.

These findings show that in this type of metaphorical mapping, being abstract or concrete is a relative characteristic of source and target domains (see page 80). That is, analyzing this type of metaphorical mapping following the tenets of the embodied approach to metaphor rightfully claims for a conceptual change of certain phenomena when they function as source and target domains in different metaphorical mappings.

To sum up, the polarized belief that a given phenomenon is either concrete or abstract cannot hold because certain phenomena can function as source and target in different metaphorical mappings. Notice that, although in this section we have shown that *uni-directionality* does not hold in all metaphorical mappings because in some cases, certain domains can exchange the roles they play in conceptual metaphor. However, we need to point out that if we understand Human in terms of Liquid and Liquid in terms of Human, we do not get the same inferences in both metaphorical mappings (see examples (7) and (8) above). The two cases of metaphorical mapping are instances of different metaphors.

Another possible account of the mismatch between the tenets of the embodiment theory and the present data is the fact that the concrete-abstract criterion creates a “unidirectional” interdependence between source and target domains. This interdependence is obvious inasmuch as our understanding of target phenomena depends on our experience of source phenomena (see Chapter II).

3.3. Embodied Simulation

In the previous sections, we demonstrated that source domains draw on different bodily-experienced phenomena. In addition, target domains also draw on different types of phenomenon. Henceforth, we proposed that conceptual metaphor is instantiated through distinct mapping typologies. Accordingly, we analyzed the data paying special attention to these mapping typologies and argued that different typologies may draw on different mechanisms. In the following sections, we shall focus on the source domains which are based on *spatial*, *orientation*, *state* and *location* experience to assess how these kinds of experience particularly posit a significant theoretical problem to the embodied simulation approach.

3.3.1. Different Bodily Experiences in Source Domains

Embodied Simulation is based on the assumption that in order to construct a metaphorical mapping, the physical action of the source domain needs to be simulated in the target (e.g. Glenberg and Kaschak 2002; Kintsch 2008). So far in this chapter, we have explored mapping typologies based on the constitutive natures of source and target domains. We have also shown that the tenets of the embodied approach to metaphor cannot account for certain conceptual metaphors (see page 73). We took this finding as a piece of

evidence that conceptual metaphor is instantiated through different mapping typologies. In this section, we will address the mapping typology which draws on physical actions as source domains from the embodied simulation approach. Our purpose is to assess whether this mapping typology follows the same patterns of mapping. It is worth noting here that the embodied simulation approach resides in the assumption that metaphorical mapping consists of simulating entirely such actions in the target domains. In this section we shall gauge this tenet against the data to assess whether source domains which consist of physical actions are simulated in target domains in the same way. To carry out this task, first we will consider this example:

Human Is Plant

The FBI planted informers in the Mafia.

According to the embodied simulation approach, to process the meaning of this metaphor, a given subject needs to entirely simulate the action of planting in the target domain. The question here is whether processing this metaphor requires simulating the whole physical action of *planting*. Following Giora (2002, 2008), not all conceptual metaphors consist of activating the literal meaning of source domains.

Second, as stated before, source domains draw on different kinds of bodily-experienced phenomena. Accordingly, we suggest that source domains which are grounded in physical actions may afford further classification and may lead to different patterns of mapping. To illustrate this point, let us consider the following table:

LOCATION/SPATIAL domains	ORIENTATION domains	STATE domains
<p>GOOD (Quality/Morality) IS HIGH <i>(1)She is head and shoulders above all the other actors.</i></p> <p>UNKNOWN/IGNORED IS INVISIBLE <i>(2)She's still trying to put the death of the twins behind her.</i></p> <p>COMPETITIVE SUCCESS IS LEADING/WINNING A RACE <i>(3)He is behind with German compared with the other students in his class.</i></p> <p>LESS IS LOW <i>(4)His blood pressure is below normal.</i></p> <p>BAD IS LOW <i>(5)Those comments about your wife were really below the belt.</i></p> <p>TIME IS SPACE <i>(6)Much of Iraq's infrastructure was destroyed in the space of three days.</i></p>	<p>FUTURE IS AHEAD <i>(1)We never know what lies ahead.</i> <i>(2)The recently widowed woman couldn't bear to think of the lonely year ahead.</i></p> <p>SHARE PURPOSE IS ALIGN <i>(3)The prime minister is aligning himself with the liberals.</i></p> <p>JUSTICE/LAW IS STRAIGHT (LINE) <i>(4)I'll bend the rules just this once and let you in.</i></p>	<p>IMPORTANT IS BIG <i>(1)This is a big decision you have to make.</i></p> <p>ORGANIZATION PART IS BODY PART <i>(2)They brought in fresh blood to rejuvenate the department.</i></p> <p>SOCIAL ORGANIZATION IS BODY <i>(3)We need a new body to regulate genetic modification.</i></p>

Table 4 Subcategories of source domains.

As the table above shows, source domains can draw on different kinds of physical phenomenon—these domains are not circumscribed to one type of physical action. Instead, they can also include other kinds of phenomenon such as *space-location*, *orientation*, and *state*. For instance, in the first column we deployed source domains which are grounded in spatial experience. Given that this experience draws on different topologies (*location* and *space*) and the fact that it is mapped onto different kinds of target domain (see the table above), we suggest that the mechanisms of mapping differ substantially across these mapping typologies. For instance, spatial experience is mapped onto Quality/Morality (1); onto Unknown (2); onto Success; onto Race (3); onto Quality (4) and (5); and onto Time

(6). Similarly, in the Orientation column, source domains are mapped onto different types of target domain. In these cases, target domains include Future, Purpose, and Justice. Meanwhile, in the third column, target domains concern Quality and Organization.

To argue that metaphorical mapping consists of simulating the physically-based experience of the source domains onto target domains, it would necessarily entail that the physical topologies of such domains are activated while processing their metaphorical meanings (Feldman 2006; Glenberg and Kaschak 2002; Kintsch 2008). That is, sentences such as, *She is head and shoulders above all the other actors* and *She's still trying to put the death of the twins behind her*, would necessarily activate the corresponding physical topology. While the simulation theory lends a significant support to the embodied approach to cognition demonstrating that action words such as *grasp*, *grip*, *hold* etc., when they are used metaphorically, they recruit their corresponding motor topology (e.g. Glenberg and Kaschak 2002), it is not clear whether the conceptual metaphors shown in the table above follow the same pattern. That is, one cannot clearly identify which spatial topology is involved in (1-6). Given that simulation requires simulating the physical actions of source domains to process the meaning of abstract phenomena, this pattern does not seem to characterize the examples above. Giora (2002, 2008) for instance, argues that the literal meaning of source domains is not always active during metaphorical mapping. Therefore, the embodied simulation theory needs to deal with metaphorical mapping not as based on one single cognitive operation—namely, simulating entirely the physical action of source domains. As the examples above show, source and target domains may draw on different kinds of phenomenon, enough so that it is difficult to capture their cognitive operations under one single pattern.

3.3.2. Partial Mapping and Embodied Simulation

In the previous section, we demonstrated that certain conceptual metaphors are instantiated through different mapping typologies. This is due to the fact that the data indicates that not all physical actions are simulated entirely in the target domains. Taken together with the fact that source domains are not always based on physical actions that need to be activated when processing metaphorical mappings (e.g. Giora 2002), we argued that there cannot be a single pattern characterizing all the mapping typologies that engage physical actions as source domains. It has thus been suggested that the embodied simulation needs to account for metaphorical mapping as involving different cognitive operations. In this section we will assess the *partial mapping* principle taking into account the embodied simulation.

This principle is claimed to characterize all types of metaphorical mapping (Lakoff and Johnson 1980:54). This pattern is at odds with the tenet of the Embodied Simulation approach in that this theory resides in the fact that physical actions of source domains are entirely mapped onto target domains. Gibbs and Matlock (2008:163), for instance, sustain that the metaphorical mapping which engages a physical action in its source domain involves simulating entirely this action onto the target domain. A typical instance of this mapping typology is instantiated through expressions such as,

(1)*She grasped the idea*

(2)*I managed to grasp the main points of the lecture.*

(3)*After the interview, he thought the job was within his grasp* (see Chapter VI for in an-depth analysis of the mechanisms underlying this mapping typology). These metaphorical mappings could be graphically represented as follows:

Mental Action Is Physical Action
Understanding Is Grasping

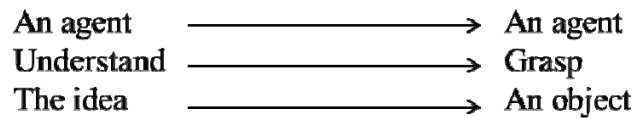


Figure 1 Physical components of the motor actions Grasping.

Control is Handle/own

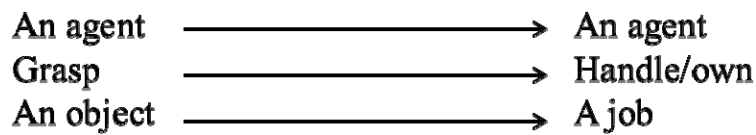


Figure 2 The physical components involved in Control Is Handle/Own.

As figures 1 and 2 show, metaphors (1), (2), and (3) can be represented by the same physical topology in the source domain. To illustrate, the three examples draw on a physical action which includes *an agent* fulfilling the action of *grasping an object*. This finding is particularly interesting to support the notion that the simulation process of the physical action of the source domain Grasping is carried out entirely. As observed in the two figures, the physical topology of the source domain Grasping is invariable though the target domain is not identical. For instance, in (3) the target domain falls on Job. However, in these examples all the physical components of the topology of the source domain Grasping are simulated in the target domains (an agent, the action of grasping, and an object).

Nonetheless, this finding is not observed in certain metaphorical mappings which engage a physical action as source domain:

Thinking/Believing Is Walking/Traveling

(1)*My thoughts wandered off on to memories of my last holidays.*

Activity Is Boat Travel

(2)*After the Wall Street crash, the American economy moved into uncharted waters.*

Love Relation Is Traveling

(3)*We arrived at a crossroads and had to split up* (e.g. Lakoff and Johnson 1980:44-45).

Verbal Communication Is Travel/Movement

(4)*Could you please give way to the next speaker?*

Examples (1-4) indicate that though source domains in these cases draw on the physical action Traveling. Though at a general level, the mapping typologies lead virtually to the same inferences, namely an Agent Moving through a Path toward a Destination, not all the physical components of such phenomena are simulated in the target domains in the examples above. First, whereas the physical topology of the example (3) includes by default two different “agents” moving together toward a common destination, in (1), (2), and (4) only one agent is involved.

These metaphors are different from the one analyzed in Figure 1 in that the latter includes always the same components of the source domain. Therefore, this finding supports the notion that when a metaphorical mapping draws on a physical action as source domain, this action is simulated entirely onto the target domain. That is, whenever the action grasping functions as source domain the simulation process includes the same physical components *an agent grasping an object*.

So far, we have attempted to outline that certain physical actions include determined physical components that are mapped whenever these actions are involved metaphorical mappings (e.g. Grasping). However, certain metaphorical mapping typologies do not

necessarily involve the same physical components of the source domains (see the examples above).

Another way to test the assumption that the simulation process concerns all the components of the physical actions of source domains is to assess whether the mapping typology which depends on a physical action as source domain activates all of its components. To address this issue, let us consider the following example:

Activity Is Boat Travel:

- (1) *We went full steam ahead in buying the house.*
- (2) *He made heavy weather of ordering just 20 books.*

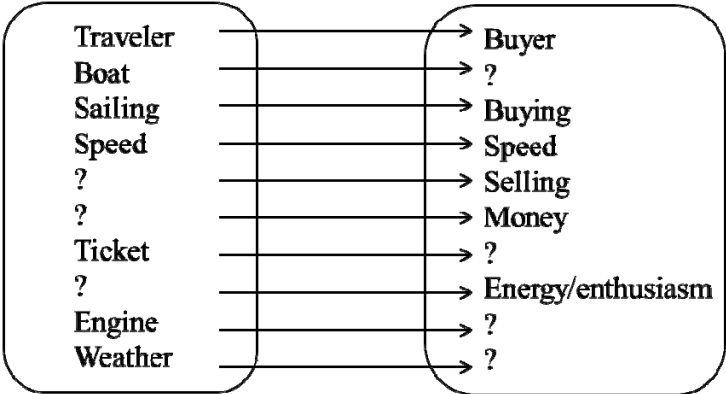


Figure 3 Partial simulation process in metaphorical mapping.

According to the tenets of the Embodied Simulation theory, this metaphor would be a result of simulating *entirely* Boat Travel onto the activity of *Buying the house*. The question which arises here is why the entire domain of Travel is not activated in this metaphorical mapping. That is, this example does not show that all the physical components of the source domain are mapped onto the target domain. To further explore this theoretical problem, let us consider the following examples,

Love Is Journey

(1) *We arrived at a crossroads and had to split up* (e.g. Lakoff and Johnson 1980:44-45).

Competition Is War

(2) *The two leading brands have been engaged in a price war.*

The two examples do not support the embodied simulation theory as based on the notion of simulating entirely the physical actions of source domains in target domains because not all the components of the source domains Journey and War are mapped. For instance, example (1) shows that the mapping between the two domains (Love Relationship and Journey) is partial because not all the physical components of the source domain Journey are mapped onto the target domain. To illustrate, components such as *tickets* and *luggage etc.* are not included in the mapping. Hence, the mapping is partial. Therefore, simulating entirely the physical action of the source domain Journey is not observed in this mapping typology. If we argue that the simulation process is being carried out entirely while processing these metaphorical mappings, then the “partial mapping” principle would not fit their analysis. Similarly, in (2) we conceptualize Competition in terms of War, in which not all the components of the physical action of the source domain are mapped. That is, if we simulate entirely such physical actions, then it would be possible for us to conceptualize Competition in terms of *an army uniform, bungalow etc.*

Therefore, based on the data analysis, it becomes obvious that the embodied simulation does not explain how simulating (entirely) physical actions onto target domains could fit the *partial mapping* principle. Though certain mapping typologies are based on simulation, it does not follow from this that all mapping typologies that engage physical actions as source domains follow the same pattern—simulating entirely the physical action of source domains.

3.3.3. Partial mapping and the neural instantiation of simulation

As shown before, the metaphorical mapping which engages physical actions as source domains cannot be looked at as a homogeneous cognitive operation. In this respect, we demonstrated that while certain physical actions maintain their components regardless of which phenomena these actions are mapped onto (e.g. Grasping), other physical actions vary depending on the target domain (see the examples above). This means that certain mapping typologies are based on partial mapping because not all the components of such physical actions are mapped but others consist of simulating entirely the physical action of the source domain (e.g. Grasping). However, there is still an important theoretical problem we need to address here: how is the simulation process instantiated neutrally given that this process in certain mapping typologies is carried out entirely and in others varies or is partial?

To handle this issue, we propose to consider the following expressions: *grasp a paper vs. grasp the idea* (Feldman 2006; Gallese and Lakoff 2005; Lakoff 2008). Studies show that these two expressions activate the same neural network in three conditions: (1) when a subject executes the action of *grasping*; (2) when a subject observes an agent carrying out such action; and (3) when this action is used metaphorically (Gallese and Lakoff 2005). An important finding of such studies that is particularly relevant to our discussion here is that both literal and metaphorical meanings are neurally instantiated in the same brain area (Barsalou 2007, 2003a, 2003b; Barsalou and Wiemer-Hastings 2005; Boroditsky and Ramscar 2002; Coulson 2008; Gallese and Lakoff 2005; Lakoff 2008; see also Chapter VI for an in-depth analysis of this type of metaphorical mapping). In other

words, given that metaphorical mapping is always partial (Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989), the action of *grasping* would be mapped partially onto the target domain Understanding. However, as Figure 1 indicates, the components of the physical action *grasping* are invariable—whenever the action is mapped, the physical components of such action are *an agent, the action of grasping, and an object*. Therefore, claiming that the simulation process is neurally instantiated seems to fit this mapping typology (Grasping Is Understanding) with certain constraints on the application of the tenet of the embodied simulation, which resides in the principle that the simulation process concerns the whole physical action of the source domain. For instance, according to Feldman (2006:216-217) the difference between the metaphorical meaning and the actual execution of the action Grasping depends on the neural distribution in a given brain area. Nonetheless, if conceptual metaphor has a neural basis, the *partial mapping* between the literal and abstract phenomena might present some variations in the neural network responsible for the literal meaning of other mapping typologies (see examples 1-4 above). Our judgment is based on the finding above that not all the physical actions which function as source domains include an invariable set of features that are mapped whenever the corresponding domain is engaged in metaphorical mappings (see the examples above).

3.3.4. Uni-directionality and Embodied Simulation

We saw before that there are different types of metaphorical mapping. This difference should be carefully dealt with within the embodied approach to metaphor since it is difficult to identify a specific pattern that may govern all metaphorical mappings. Particularly, we saw that *uni-directionality* is not applicable to all instances of metaphorical

mapping (see page 83). In this section we shall test this criterion within the Embodied Simulation perspective and assess whether it can be used to explain the data. This criterion seems to apply to certain types of metaphorical mapping such as Understand Is Grasp/Hold (see also Feldman 2006; Gallese and Lakoff 2005).

She finds even the easy concepts difficult to get hold of.

Uni-directionality entails that if we simulate the action of *grasping* in the domain Understanding, the process cannot be reversed. In this metaphorical mapping, we do not reason about the domain Grasping in terms of Understanding. In addition, the constitutive nature of the two domains seems to be in line with the principles of this tenet. For instance, *uni-directionality* principle requires that source and target domains be concrete and abstract, respectively.

However, trying to apply *uni-directionality* to the metaphorical mapping which draws on two bodily-experienced phenomena such as More Is Up raises the following theoretical problems. First, as we saw before, this criterion is based on differentiating source and target domains in terms of concreteness and abstractness. However, More Is Up involves two concrete phenomena: Verticality and Quantity. In this respect, the two phenomena are semantically independent—we do not need simulation to understand the target domain.

Second, this criterion is also based on the fact that if we understand Quantity in terms of Verticality, the simulation process could not be reversed. That is, if we simulate the increase or decrease of Quantity in terms of going up or down, the simulation process cannot take Verticality as source domain. This notion runs counter to the data because there are examples where Verticality is understood in terms of Quantity (see page 69).

3.3.5. Co-occurrence-based-mapping typology and Embodied

Simulation

In the previous section, we showed how the un-directionality principle does not characterize certain metaphorical mapping typologies. For this reason, we argued that this principle is not an absolute feature to all mapping typologies. One such typology includes the mapping which draws on two phenomena that co-occur. In particular, we focused our attention on the metaphorical mapping typology which engages a motor action and an abstract phenomenon as source and target domains, respectively. That is, the expressions *grasp a paper* and *grasp an idea* do not satisfy the *uni-directionality* criterion. In this section, we shall compare this metaphorical mapping typology to another one which is based on two primitive phenomena—More Is Up.

First, in More Is Up, there is no transfer of meaning from one domain onto another because our experience of one of the two phenomena goes in parallel with the other one. That is, whenever we experience, for instance, Up, we also experience the phenomenon More. According to Gibbs and Matlock (2008:162) embodied metaphors are constructed due to the brain's ability to imagine a physical action in the target knowledge. Based on this evidence, metaphorical mapping typologies such as More Is Up cannot be accounted for by Embodied Simulation. Our judgment is based on the fact that the two domains in this metaphor are semantically independent and do not require imagination of a given subject to reason about the target domain because he or she could map the two phenomena based on his or her experience of two co-occurring phenomena.

In contrast, metaphorical mapping typologies, such as the one which is involved in Understanding Is Grasping, present major differences in the constitutive nature of source

and target domains. For example, the source domain in this metaphorical mapping typology is grounded in the physical action—grasping. Mapping this domain onto Understanding may require the simulation of the physical action of the source domain to construct such mapping (Gibbs and Matlock 2008:162). In addition, the two phenomena in this metaphorical mapping do not co-occur. The question which arises here is how we could reconcile “simulation” and “mapping” to explain metaphorical mappings such as the one involved in Understanding Is Grasping and More Is Up.

The two notions here are mutually exclusive in the sense that conceptual metaphors cannot depend on mapping and simulation. Our judgment is based on the fact that metaphorical mappings mean drawing systematic correspondences between constituents of source and target domains (e.g. Johnson and Lakoff 2002; Lakoff 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Valenzuela 2009:311-312), whereas Simulation Theory assumes that we understand abstract knowledge in metaphorical mappings in the same way as when we experience source phenomena in that simulation recruits neuronal features that are also necessary for the execution of the physical action of the source domain (e.g. Gibbs and Matlock 2008: 162-165; Lakoff 2008). In addition, according to Steen (2011) whether we have experienced a given phenomenon bodily or not does not matter since the basis of metaphorical mapping is simulation.

To sum up, while the tenets of Embodied Simulation covers a certain metaphorical mapping typology—physical actions and abstract phenomena—it does not cover other metaphorical mapping typologies such as the one which is based on co-occurring phenomena.

Conclusion

We started this chapter by asking how a generalization over the underlying mechanisms of conceptual metaphor can be made in Cognitive Linguistics, given that metaphorical mappings draw on different kinds of bodily experience. In this setting, we sketched out different experiences on which source domains dwell on (motor, sensory, space, location etc.). Interestingly, we also observed that target domains are grounded in different kinds of phenomenon. Therefore, we suggested that conceptual metaphor is instantiated through various mapping typologies that differ in terms of their underlying mechanisms.

To show that this is indeed the case we proceeded to test the tenets of the embodiment approach to different mapping typologies. Consequently, major problems arose—certain mapping typologies do not neatly fit into this approach. Accordingly, the data shows that conceptual metaphor is not instantiated through a single mapping typology. In this respect, we noticed that (1) some phenomena function as source and target in different mapping typologies; (2) some abstract domains fulfill the role of source domains; and (3) certain domains are engaged on reversal mapping.

In this setting, first, *partial mapping* and *uni-directionality* operate in certain mapping typologies but do not fit others such as *reversal mapping* (see page 83) and *multimodal-based mapping* (see page 76), and *co-occurrence based mapping* (see page 98).

Second, the Concrete-Abstract criterion –while it is viable to explain some metaphorical mappings- it is not applicable to the current data (see page 73). In this respect, we observed that the mapping typology which engages two bodily-experienced phenomena such as More Is Up does not satisfy the partial mapping principle (see page 90).

Accordingly, we argued that the *concrete-abstract*, *uni-directionality* and *partial mapping* criteria are not absolute to all metaphorical mapping typologies.

Third, with a view to setting further evidence that conceptual metaphor is instantiated through different mapping typologies and follows distinct mechanisms, we attempted to analyze the mapping typology which engages physical action as source domain paying special attention to the embodied simulation approach. As a result, we noticed that this approach is at odds with the Embodied metaphor theory in that we cannot reconcile *partial mapping* and simulating *entirely* the physical action of source domains in target domains, on the one hand, and *co-occurrence-based mapping* on the other hand. To illustrate, co-occurrence-based mapping does not draw on simulating the physical action of this source domain in the target as both experiences go in parallel in the external world.

These findings are of deep interest for Cognitive Linguistics because they point to a greater variability and complexity of metaphorical mapping—they show that there cannot be a core process governing all conceptual metaphors. Accordingly, we have suggested that while conceptual metaphors in the data are embodied, it is misleading to classify them into one group.

As the data indicates, source domains draw on different kinds of bodily-experienced phenomena and target domains are not always abstract as it is claimed within the embodiment theory (e.g. Lakoff and Johnson 1980,1999; Szwedek 2011). Hence, this theory needs to account for conceptual metaphor as being instantiated through different mapping typologies. To show that this theory needs to avoid this theoretical standpoint, in the next chapter we are going to focus our attention on the mapping typology which engages bodily-experienced and abstract phenomena as source and target domains, respectively. Our goal will be to enhance our understanding of this typology by sketching

out its potential mechanisms. By getting a deeper understanding of such mechanisms, we will be in a better position to differentiate the mapping typologies through which conceptual metaphor is instantiated.

Chapter II: Propositionality and Linearity of Metaphor: an Asymmetrical Mapping of Source and Target Phenomena

1. Introduction and Hypothesis

Our goal in the previous chapter was to test the general assumption within the embodiment theory that conceptual metaphor is instantiated through a single mapping typology (meaning transfer from more concrete to more abstract phenomena) which is governed by an invariable set of tenets (see Chapter I). However, we demonstrated that conceptual metaphor is manifested through different mapping typologies. A piece of evidence for the existence of such variety of mapping typologies is the fact that the tenets of the embodiment theory do not cover all the data. A general observation that we can make here is that *uni-directionality*, *one-way-meaning transfer*, and *partial mapping* fit the conceptual metaphor that draws on bodily-experienced and abstract phenomena as source and target domains, respectively. In this respect, we noticed that meaning construction via metaphorical mapping always stems from source domains. Therefore, we further observed that meaning construction in this mapping typology is *propositional* in that the topology of bodily-experienced phenomena is transferred to the target. Accordingly, the inference which we build in target domains follows the logic of the semantic topology of the source. Besides, this meaning construction is based on an asymmetrical mapping between source and target domains inasmuch that without our experience of the source domain, we do not have the necessary bodily-based features to give structure to the target (see pages 109-113).

Therefore, in this chapter, we shall put forward a new perspective to closely look at the metaphorical mapping which engages bodily-experienced and abstract phenomena as

source and target domains, respectively: *Propositionality and Linearity of meaning construction*.

We suggest that this step is crucial towards understanding exactly which type of metaphorical mapping neatly fits into the tenets of Embodiment. We hypothesize that analyzing conceptual metaphor within this theory is based on the assumption that meaning construction and processing via metaphorical mapping are carried out propositionally and lineally. By this, we mean that within the embodied approach to metaphor (e.g. Johnson and Lakoff 2002; Lakoff and Johnson 1980; Lakoff and Turner 1989), reasoning about target domains is an off-line cognitive process (see Chapter I). It is propositional as the conceptual structure of the target domain is exclusively rooted in the source. In particular, according to the embodied approach to metaphor the cognitive topology of the source domain is extended to abstract phenomena which lack such topology (e.g. Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Ruiz de Mendoza 2005, 2011).

Propositionality also denotes that mapping source onto target domains does not include only elements of the former as separate units, but they are mapped alongside the relation that these elements maintain in the source domains. Additionally, reasoning about target domains also is lineal—without a prior experience of the source domain, the target is meaningless (e.g. Johnson and Lakoff 2002; Lakoff and Johnson 1980, 1999; Szwedek 2011). This linearity manifests itself in three ways: *in time*, *in meaning construction*, and *in meaning retrieval*.

First, metaphorical mapping is built fitting into a chronological order where the source domain precedes its counterpart (the target) in that, without experiencing the former, the latter is meaningless. Also, this linearity can be tracked by analyzing how the

conceptual structure of the target domain is shaped through the filter of the source (e.g. Szwedek 2011; see also Chapter I). That is, meaning construction via conceptual metaphor is lineal because first, the cognitive topology that we use in mapping source and target domains is previously built while processing sensory and motor experiences. In this setting, our understanding of the target domain is lineal because it starts when we activate the cognitive topology of the source domain.

Taken together, these views establish a basis to distinguish source and target domains in the sense that our reasoning about source and target domains is on-line and off-line, respectively.

In this chapter, we shall explain how a Propositionality-Linearity perspective fits a certain type of metaphorical mapping—the mapping which engages bodily-experienced and abstract phenomena, respectively. Then, we shall test this perspective against the theoretical framework of embodied metaphor. In this step, we shall attempt to see which data our perspective and Embodied approach to metaphor may fit. We shall focus on three main tenets of this approach, which are claimed to be operating in metaphor: “meaning transfer”, “uni-directionality of metaphorical mapping”, and “mapping bodily experienced onto non-bodily-experienced phenomena”.

We mentioned before that the assumption concerning metaphorical mapping processing is not made at an adequate level. For instance, we saw in the previous chapter that metaphorical mapping is not based on a single metaphorical mapping typology where principles and patterns of mapping are identical. In this chapter we propose a wider perspective for the tenets of Embodied Metaphor and see whether these tenets fit into our perspective. If our interpretation of this account is correct, we should also be able to single out different types of metaphorical mapping.

2. Background

The Embodied approach to metaphor has arisen as a strong opposing theoretical stream to the traditional view of language and cognition as a symbol-manipulation based process (Chomsky 1984; Fodor 1975). Thus, instead of looking at cognition as a highly abstract process, scholars within the embodied approach propose that cognition (including conceptual metaphor) is based on bodily experience (e.g. Gibbs 1994, 2011; Gibbs and Matlock 2008; Kintsch, 2008; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Johnson 1987; Johnson and Lakoff 2002; Lakoff 1993; Lakoff and Johnson 1980, 1999). While the first approach rests on the notion that cognition is symbol manipulation (Chomsky 1984), the embodied approach to metaphor points out that all cognitive processes are rooted in bodily experience (e.g. Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff and Johnson 1980, 1999). In particular, this approach stands on two basic tenets: “meaning transfer based on the experiential basis of source domains” and “uni-directionality of metaphorical mapping”. In the following two sections we shall introduce and discuss these patterns.

2.1. Uni-directionality of metaphorical mapping

A particularly influential sense of Embodiment stems from Lakoff and Johnson’s (1980: 112) early formulation of the embodiment hypothesis as being a constraint on the directionality of metaphorical mappings. In this strong directionality constraint, they claim that we normally project the bodily-experienced phenomena uni-directionally from the source domain onto a less well understood target domain. Similar findings have been reported in (Steen 2011:30), that metaphorical mappings are “...constructed from concrete domains...to abstract domains... ”.

That is, if we understand a given phenomenon in terms of another, the metaphorical mapping cannot be reversed (e.g. Johnson 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989). In this respect, these scholars sustain that conceptual metaphor must be looked at as a uni-directional mapping. For instance, to support this claim they analyzed conceptual metaphors such as Love Relation Is Journey. Accordingly, if we conceptualize the domain Love Relation in terms of Journey, then the mapping cannot be reversed (see page 83 for contrasting views). From a cognitive point of view, it is impossible to map Love Relation as source onto the domain Journey as target (see page 79).

2.2. Meaning-transfer based on the experiential character of source domains

It is widely accepted within the theory of Embodied metaphor that metaphorical mappings are based on projecting bodily-based features of source domains onto target domains. Therefore, for a domain to be eligible to consist of a conceptual structure and to project it onto other domains, it needs to be accessible to the sense organ (e.g. Johnson 1987; Johnson and Lakoff 2002; Lakoff and Johnson 1980, 1999; Szwedek 2011). Since conceptual metaphor is mainly viewed as meaning transfer among domains, and only those domains which are experienced bodily are the ones eligible to instigate the mapping process, a heavy emphasis has been put on source domains in the sense that their characteristics ‘constrain’ metaphorical mappings. It follows from this that tracing back how the conceptual metaphor is built consists of identifying which aspects of the source domains are transferred to the target. These aspects may range from Image Schemas (Grady

2005a; Lakoff 1990; Lakoff and Turner 1989), motor action (Feldman 2006; Feldman and Narayanan 2004; Talmy 1988, 2000) to Cognitive Models (Lakoff 1987).

However, in the previous chapter we demonstrated that neither *Uni-directionality* nor *mapping concrete-onto-abstract-phenomena* is observed in certain types of metaphorical mapping (see page 83).

To solve this problem we suggest that these two tenets fit a certain type of metaphorical mapping—the one which engages bodily-experienced phenomena and non-bodily-experienced phenomena as source and target domains, respectively.

In this chapter, we shall focus our attention on this type of metaphorical mapping from the embodied approach perspective and assess whether its tenets fit the Propositionality-Linearity perspective.

3. Data Analysis

The tenets of Embodied Metaphor (e.g. Johnson 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2005, 2010, 2011; Lakoff and Johnson 1980, 1999) and Embodied Simulation (e.g. Barsalou 2003b; Feldman 2006; Feldman and Narayanan 2004; Gallese and Lakoff 2005; Gibbs and Matlock 2008; Kintsch 2008) are based on the assumption that metaphorical mapping includes transferring bodily experience onto target ones. In the previous chapter, we demonstrated how the patterns and principles of mapping within the theoretical framework of embodiment do not fit the data. More importantly, the two approaches are not at accordance in handling some cases of metaphorical mappings (see Chapter I, for more details).

3.1. Metaphors as Propositions

The Embodied Metaphor theory has been proposed to argue against the idea that cognition (including metaphor) is a formal system which is monitored exclusively by the mind and which consists of manipulating abstract symbols (e.g. Chomsky 1984; Fodor 1975). In this setting, the embodied approach to metaphor claims for an embodied metaphorical mapping, giving a crucial role to the properties of the body, environment, and the brain to shape cognition (e.g. Lakoff and Johnson 1980, 1999; Johnson 1987; Johnson and Lakoff 2002). Furthermore, this embodied aspect of metaphorical mapping exclusively resides in the experiential character of source domains. In this respect, the bodily-experienced phenomena of source domains play a dominating role in understanding abstract phenomena. This depends on the process of embodying target domains through the filter of the bodily-experienced phenomena of source domains (Szwedek 2011). The tenets of this theory are claimed to be observed in all metaphorical mappings.

However, in the previous chapter, we demonstrated that this pattern is observed in a certain type of metaphor—in particular, the metaphorical mapping which engages bodily-experienced and non-bodily-experienced phenomena (see the previous chapter for more details). Accordingly, we put forward another theory to closely analyze this type of metaphor—Propositionality and Linearity of metaphorical mapping.

It is worth noting here that one of the challenges that the theory has to face is to explain why the concrete-abstract criterion is absolutely decisive to engage source and target phenomena in metaphorical mapping given that certain metaphors do not follow this pattern (see Chapter III). That is, within the embodied approach to metaphor, whether a phenomenon takes on the role of source or target domain hinges on this criterion.

This view is also adopted to explain conceptual metaphor within the theoretical framework of Embodied Simulation (Gibbs and Matlock 2008; Kintsch 2008; Lakoff 2008). Accordingly, the physical action of source domains is simulated in target phenomena (Gallese and Lakoff 2005; Gibbs and Matlock 2008). Either via mapping correspondence between source and target domains, or via simulating the physical action in the target, both approaches subscribe to the belief that target domains acquire the embodied character of the source (e.g. Johnson 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2010, 2011; Lakoff and Johnson 1980, 1999; Szwedek 2011). To illustrate, let us consider the following examples of Time Is Money (Lakoff and Johnson 1980:7-8)

You are *wasting* my time.

This gadget will *save* you hours.

I do not *have* the time to *give* you.

How do you *spend* your time these days?

That flat time *cost* me an hour.

I have *invested* a lot of time in her.

I do not *have* enough time to *spare* for that.

You are *running out of* time.

You need to *budget* your time.

Put aside some time for ping pong.

Is that *worth* your while?

Do you *have* much time *left*?

He is living on *borrowed* time.

You do not *use* your time profitably.

I *lost* a lot of time when I got sick.

Thank you for *your* time.

Features transfer across domains is based on the fact that we need two kinds of phenomenon in metaphorical mapping—namely, concrete and abstract (Johnson 1987; Johnson and Lakoff 2002; Lakoff 1993; Lakoff and Johnson 1980, 1999; Szwedek 2011). These domains are also substantially different in terms of the way we conceptualize them in that, source and target domains consist of directly and indirectly meaningful phenomena. More precisely, to construct a metaphorical mapping, we need a bodily-experienced phenomenon whose bodily-based semantic features are imposed on the abstract phenomena. To illustrate, in the examples above, we understand Time in terms of Money. In this respect, the bodily-based semantic features are proposed to reason about Time. Our experience of the domain Money encompasses semantic features such as *waste, save, give, take* etc., then via metaphorical projection of these features onto the domain Time, the latter gets to fit into the cognitive topology the domain Money.

To look at metaphorical mapping from the Propositionality-Linearity perspective is to analyze how the bodily-based features are proposed to shape the conceptual structure of abstract domains. According to the embodied approach to metaphor, the only way to reason about abstract phenomena is to embody them (Feldman 2006). However, apart from stating that the embodying process includes transferring the *image schemas* (Grady 2005a; Lakoff 1990; Lakoff and Turner 1989), cognitive models of the source domains (Lakoff 1987), the embodied approach to metaphor needs to further identify which metaphorical mapping typology this process is observed. To illustrate, the embodying process might be needed to construct *only* the type of metaphorical mapping which engages abstract phenomena as target domains (see Chapter III). Furthermore, this process always means that understanding abstract phenomena is a proposition-based metaphorical mapping. For

instance, in the examples above, all these metaphorical expressions fit into the proposition Time Is Money. According to Lakoff and Johnson (1980), such propositions were drawn after studying linguistic metaphors. That is, all the expressions above manifest a metaphorical mapping which is *propositionally* based (Time Is Money). This means that the bodily-based semantic features are proposed to reason about Time.

More interestingly, however, this pattern has not been observed in all the types of metaphorical mapping which have been covered in the previous chapter. In particular, a certain mapping typology seems to neatly follow this criterion—namely, the metaphor which engages bodily-experienced and non-bodily-experienced phenomena as source and target domains, respectively (see Chapter I). This entails that metaphorical mapping does not, by default, follow the proposition which is based on the mapping from more concrete domains onto more abstract ones (see Chapter III). As the data indicates, in certain types of metaphorical mapping, source and target domains are bodily experienced, which might require a different approach.

So far, we have analyzed the metaphorical mapping which engages bodily and non-bodily-experienced phenomena as source and target domains, respectively, to see how the Propositionality perspective can account for this type of mapping. In this setting, meaning transfer across domains could be analyzed in terms of a proposition such as Time Is Money. However, within the embodied approach to metaphor, meaning transfer is constrained mainly by two principles: *meaning transfer* is based on the experiential character of the source domain and on the *uni-directionality* principle. In the following two sections we shall dig more into these tenets to assess whether they fit into the theoretical framework of *Propositionality*.

3.1.1. Metaphorical Propositions as Meaning transfer based on the experiential character of the source domain

The meanings of target domains are derivative from the literal meanings of source domains (e.g. Bowdle and Gentner 1999: 92). This sense is also similar to that stated in Lakoff and Turner's grounding hypothesis, in which they argued that the meaning of abstract phenomena is grounded in terms of semantically autonomous domains (Lakoff and Turner 1989: 113-120). Our reasoning of source domains is extended to the cognitive topology of the target domain, in that this reasoning process is identical to both domains. In this respect, engaging two phenomena in metaphorical mapping does not consist only of drawing a systematic correspondence between the elements of source and target domains, but also the cognitive topologies, which unify the elements of source domains as domains of experience, are transferred. For instance, the components of the source domain Journey, (*travelers, vehicle, path, goal*) are mapped onto their counterparts in the target domains Love (*lovers, love relationship, goal*) together with the cognitive topology that maintains *travelers, vehicle, path, and goal* as a determined domain of experience. This cognitive topology within the source domain leads to inferences such as *difficulties, easiness, and changing or maintaining the direction of the trip*. Similarly, from a propositional point of view, this cognitive topology also operates in the target domain, Love. Therefore, the difficulty or easiness of movement, changing or maintaining the direction of the trip are also applicable to Love. This is evident in the following expressions (Lakoff 1993:206):

Look how far we've come.

It's been a long, bumpy road.

We can't turn back now.

We're at a crossroads.

The assumption here is that without grounding the abstract phenomenon Love in our bodily-experienced phenomenon, Journey, our reasoning system would be unable to process the former. Accordingly, the cognitive topology of the source domain is transferred to the target.

Cognitive scientists and Cognitive Linguists supporting this theory draw their assumption concerning metaphor based on the topology of source domains (e.g. Feldman 2006; Johnson 1987; Johnson and Lakoff 2002; Kövecses 2000, 2010, 2011; Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999; Szwedek 2011). There are three main entailments of this assumption:

- (1) all metaphorical mappings engage bodily-experienced phenomena (as source domains) and non-bodily-experienced phenomena (as target domains);
- (2) meaning construction in metaphorical mapping is shaped through the experiential character of source domains; and
- (3) metaphorical mapping is always unidirectional (e.g. Lakoff 1990; Szwedek 2011).

The Embodied approach to metaphor suggests that metaphorical mapping is based on projecting bodily-experienced domains onto abstract ones.

In the following two sections we shall assess whether this projection can be looked at from two key aspects: *Propositionality* and *Uni-directionality*. Recall that these two aspects are claimed to range over all cross-domain mappings. *Propositionality* in metaphorical mapping is evident in meaning transfer from source onto target domains in the sense that features of bodily-experienced domains are transferred onto target domains. Accordingly, bodily-experienced phenomena, which function as source domains, consist of bodily features that govern metaphorical mapping. These features are transferred onto

target phenomena to impose on them the embodied character of source phenomena. In this way, bodily-experienced phenomena and their features give rise to metaphorical mappings. The process of projecting these features onto other phenomena implies transferring also the embodied character of source phenomena onto target ones. Via this metaphorical projection, these target phenomena receive and adopt the embodied character of source phenomena.

The second aspect, *Uni-directionality* (see the following section), is observed in that there is a one-way transfer of features across domains (see *Love Relation Is Journey*, above). That is, metaphorical mapping involves features projection which is carried out always from bodily-experienced onto *abstract* phenomena. However, as will be seen in Chapter III, not all conceptual metaphors satisfy this pattern. We will argue that to account for different conceptual metaphors, the embodiment theory may require significant modification of its tenets.

3.1.2. Metaphors as Uni-directional propositions

The second aspect of the propositional character of conceptual metaphor resides in the fact that there is a one-way transfer of features across domains. That is, metaphorical mapping involves features transfer always from bodily-experienced onto abstract phenomena.

The other idea that is intrinsically related to this pattern is that if we understand a phenomenon in terms of another one, then the mapping cannot be reversed (e.g. Lakoff and Johnson 1980, 1999). The examples above seem to follow this pattern in that if we understand Time in terms of Money, then the proposition cannot be reversed. That is, we do not understand Money in terms of Time.

However, the data shows that certain phenomena can exchange the roles of source and target domains in different metaphorical mappings (see Chapter I). Accordingly, we hypothesize that if this pattern does not hold in these instances of metaphor, then probably the entailments of one-way-meaning transfer criterion may not hold either. Namely, we are referring here to the fact that there is no reason why we should assume that all metaphorical mappings include Uni-directionality and concrete-abstract mapping principles. In fact, conceptual metaphor has been examined as based on one mapping typology: a unidirectional meaning transfer from more concrete onto more abstract domains (e.g. Ungerer and Schmid 1996).

In the previous chapter, we demonstrated that some instances of metaphor *do* not consist of mapping bodily-experienced phenomena (as source domains) and non-bodily-experienced phenomena (as target domains). Instead, metaphorical mapping has a hybrid nature (see Chapter I). A particular type of metaphorical mapping which may be a fruitful setting for a challenge to the Embodied Metaphor theory is the one that engages pairs of bodily-experienced phenomena (Chapter III). Our assumption is based on the fact that since the tenets of this theory are shaped based on the bodily characteristics of source domains (e.g. Szwedek 2011), the theory needs to analyze differently the metaphorical mapping where source and target domains are bodily-experienced.

3.1.3. Predictability of the cognitive topology of the target domains

Propositionality of conceptual metaphor is also evident in the fact that its inference is predictable. When we map, let us say, Journey onto Love, we predict the cognitive topology of the target domain. As seen before, the domain Journey consists of *travelers*

who make a *trip* toward a *destination* following a certain *path*. Accordingly, when these two domains are mapped, we assume that the domain Love will include *subjects* who are engaged in a *love relation* who intend to reach a certain *goal* such as having a family etc. Because there are certain attributes which are intrinsically associated with the components of the source domain Journey, we predict that these attributes will also arise in the target. For instance, certain characteristics of *path* in the source domain Journey (*bumpy road*) induce semantic features describing *love relation* in the target domain: *It's been a long, bumpy road*.

Taken together, these elements allow us to predict the inferences of the target domain Love. In particular, we expect that Lovers may face difficulties during the *trip*; they might need to change their *goal*; they might encounter an *obstacle* that impedes them from continuing in the same *path* and *rhythm*. For instance, *path* in the source domain can be difficult (bumpy road) or it may be a wrong *path* (a dead-end street) etc. These attributes are predictable in the domain Love, when the two phenomena are mapped. That is, understanding the cognitive topology of the source domain allows us to predict the inference of the target.

Still, another piece of evidence for predictability in metaphor which is based on bodily-experienced and abstract phenomena is the case where the cognitive topology of the source domain is extended *in* the target domain. This can be observed in Time Is Money (see page 120). For instance, when we map Money onto Time, we expect that Time acquires the property of being *valuable*. We argue that the cognitive topology of the source domain in this metaphorical mapping is extended in the target domain in the sense that if it is *valuable*, then we can *take advantage* of it or *waste* it, *give* it to others or *receive* it from them etc. In this respect, perhaps, initially the reason why Money is mapped onto Time is

its high value but not the property of being transferable (see page 120). However, this predictability is not observed in all metaphorical mappings. To illustrate this point, let us consider the following metaphor:

Juliet is the sun.

This conceptual metaphor engages Juliet and Sun. That this type of proposition is different from Time Is Money in the sense that in the former we cannot predict the cognitive topology of the target domain. Perhaps, the lack of predictability is due to the fact that *Juliet is the sun* is constructed deliberately (see page 275).

3.1.4. Propositions are based on Mapping Concrete onto abstract domains

We saw in the previous chapter how some tenets of the Embodied metaphor theory do not fit the data. Conceptual metaphor within this approach is studied in terms of primitive and complex concepts as source and target domains, respectively. By the use of the term *primitive*, source domains do not allow further structuring of their conceptual topology. Conversely, complex domains which function as target do have a decomposable structure (Szwedek 2011).

The way these patterns do not fit certain mapping typologies seems to reflect a certain incongruity within the theory when it comes to the dichotomy of physical and abstract phenomena, being inherently source and target domains, respectively.

Our next step in this chapter is to have a closer look at *Propositionality* in metaphorical mapping within the theoretical framework of embodied metaphor. This *Propositionality* arises from the premise that target domains are understood in terms of the cognitive topologies of source domains. Our judgment is based on the fact that the theory of

embodiment claims that the inferences of conceptual metaphor are built in terms of the bodily-based features of source domains (e.g. Johnson 1987; Kövecses 2000, 2010, 2011; Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999; Szwedek 2011). As seen before, within embodiment theory of metaphor, target phenomena are held to be abstract and complex. A question which arises here is whether there is a strict criterion that we can adopt to differentiate source and target phenomena in terms of this complexity. In Cognitive Linguistics, it is claimed that conceptual metaphor depends on imposing conceptual structures of source onto target domains. Furthermore, bodily experiences and the brain lend their structures to target domains (e.g. Lakoff and Johnson 1980). Accordingly, concrete and abstract phenomena are engaged in metaphorical mappings whose aim is to semantically structure target domains.

Propositionality of metaphorical mapping is also evident in the way conceptual mapping depends on two different phenomena: Autonomous and subordinate phenomena as source and target domains, respectively. In this respect, our understanding of target domains is shaped through our experience and understanding of semantically independent domains (see Chapter III). This means that the brain processes target phenomena via domains which are bodily-experienced phenomena and are semantically autonomous (Johnson and Lakoff 2002; Lakoff and Johnson 1999; Lakoff and Turner 1989). That is, the experiential basis of conceptual metaphor stems from the fact that it makes use of bodily-experienced phenomena as source domains. A major point that has been made in the previous chapter is that not all conceptual metaphors follow the same patterns and principles of mapping.

According to the embodied approach to metaphor, target phenomena do not have structures of their own. Hence, we require transferring the embodied structures of source

domains onto target domains because through this process we manage to understand abstract phenomena. For instance, the above mentioned metaphors are constructed via mapping constituents from source phenomena onto target phenomena alongside the internal relation between those constituents in each domain. Notice that within the embodiment theoretical framework it is assumed that the components of source phenomena are physical but the ones in target phenomena are more abstract (Szwedek 2011).

3.2. Linearity of Metaphorical Mapping

If we assume that metaphorical mapping is lineal, then we also need to accept that it evolves through *time* and *meaning*. It is worth noting here that when we assume that metaphorical mapping evolves through time course and meaning development, we are not necessarily adopting the ‘metaphor career’ (Bowdle and Gentner 1995, 2005) in either case. Because by being lineal we are referring to the process of metaphorical mapping, but not metaphor per se.

3.2.1. Linearity in Time of Metaphorical Mapping

Conceptual metaphor within the embodied approach can be looked at in terms of Linearity in time. In particular, in the metaphorical mapping which engages bodily-experienced and abstract phenomena as source and target domains, respectively, these phenomena fit into a chronological order. In the theoretical framework of embodied metaphor, it is widely accepted that metaphorical mappings require a priori experience of source domains and later (Kövecses 2011) the perceptual properties of these domains such as image schemas are mapped onto target domains (e.g., Grady 1998, 2005a; Johnson 1987; Johnson and Lakoff 2002; Lakoff 1993; Lakoff and Johnson 1980, 1999; Szwedek 2011).

Importantly, source domains, according to this approach, encompass immediate bodily-based features which capture our interaction with the environment and which are used to give conceptual structures to the phenomena which are not accessible by the sense organ.

To illustrate, let us reconsider Time Is Money. We saw before, that this conceptual metaphor is based on two different phenomena: concrete and abstract as source and target domains, respectively. This assumption is intrinsically related to the fact that since human experience is getting more and more complex, new needs for organizing these new domains of experience emerge (e.g. Mouton 2012; White 2003:132). In this respect, bodily-experienced phenomena are used to reason about newly emergent domains of experience (Tejada Caller and Guzmán Guerra 2012:30).

Within the embodied approach to metaphor, this notion seems to include also metaphorical mappings that are based on 'correlation of source and target phenomena' such as More Is Up and Less Is Down (e.g., Grady 2005b). That is, each metaphorical mapping is an instance of mapping a previously experienced phenomenon onto a new and abstract one. Based on this assumption, phenomena which do not meet this condition are not engaged in metaphorical mapping. This, in turn, indicates that metaphorical mapping always dwells on two phenomena that can be situated in a chronological order where our understanding of source domains precedes that of target domains. In this respect, it is safe to argue that concepts such as *democracy*, *economy*, *politics*, *freedom*, *morality* etc. are structured in terms of previously experienced (and primitive) phenomena. This notion has two main entailments: (1) in metaphorical mappings, bodily experiences are previous to abstract phenomena. And subsequently (2) source domains are prior to target domains. However, this is not a clear-cut criterion if we compare abstract domains such as Love and its source domain Journey in the following examples (Lakoff 1993:206):

Look how far we've come.

It's been a long, bumpy road.

We can't turn back now.

We're at a crossroads.

In order for the tenets of Embodied Theory to fit the examples above, we need to assume that experiencing the phenomenon Journey took place before experiencing Love. More importantly, the concept Love is subordinate to the concept Journey. Furthermore, the phenomenon of Love is meaningless before it is engaged in metaphorical mapping with its correspondent, Journey. This assumption is based on the basic premise that source phenomena are presumably experienced previously to target ones. For instance, Feldman (2006:8) assures that, "...abstract thought *grows out* of concrete embodied experiences, typically sensorimotor experiences" (*our emphasis*).

Here, it becomes clear that the core of embodiment theory is that without bodily-experienced phenomena, there would be no access to target phenomena. And without such bodily-experienced phenomena and potential target domains there would be no metaphorical mappings. For instance, Glenberg and Kaschak (2002:558) stress that, "...the abstract symbols of language must be grounded, or mapped, to the world if they are to convey meaning...if one has only abstract symbols at one's disposal, determination of the correct mapping is impossible". Also, without abstract concepts there would be no need for cross-domain mapping. This means that the Embodied theory of metaphor attributes certain characteristics to domains and the role they take on in metaphorical mappings. These characteristics determine the role which a given phenomenon has to take on in metaphorical mappings. Namely, phenomena which are bodily experienced function by default as source domains but non-bodily-experienced phenomena carry out always the function of target

domains. For instance, Gibbs (1994:6) states that, “Conceptual metaphors arise when we try to understand difficult, complex, abstract, or less delineated concepts, such as love, in terms of familiar ideas, such as different kinds of nutrients”. The question which arises here is to what extent metaphorical mappings which engage bodily experiences in source and target domains may break the tenets of Embodied Theory of metaphor.

Based on our analysis in the previous section, we conclude that another criterion which characterizes metaphorical mapping within the theoretical framework of embodiment is Linearity in time. This linearity puts a time-interdependence relationship between source and target domains in that (1) we need a given bodily-experienced phenomenon and (2) a more recent phenomenon whose semanticity is shaped through another concept. This condition is also argued to cover instances of metaphor that shows a correlation of phenomena:

More is Up

Less is Down

As we can see here, not only does the embodiment theory constrain the mapping in terms of concrete/abstract criterion but also in terms of a chronological order. In this respect, our understanding of target domains is shaped by our experience of source domains. Given that all concepts are embodied (e.g. Feldman 2006; Johnson 1987; Johnson and Lakoff 2002; Lakoff and Johnson 1980, 1999; Szwedek 2011), all source phenomena are limited to our bodily experiences which take place before our understanding of target domains.

From here, it becomes clear that the embodiment theory of metaphor is based on the fact that we experience and process information concerning source phenomena and then we experience target phenomena by projecting onto them the information of the former. That

is, even when two phenomena tend to co-occur, source domains are the dominant ones. They are dominant in the sense that they impose their characteristics on target domains. This means that metaphorical mapping is lineal because source phenomena are processed before the target ones. In addition, source domains in this type of metaphorical mapping are meaningful outside metaphorical mapping. In contrast, target domains are meaningless before being involved in a given metaphorical mapping. As seen before, this assumption leads to an overgeneralization regarding metaphorical mappings, namely that they are lineal in time: bodily experiences are previous to target phenomena.

This linearity in time of metaphorical mapping is based on the assumption that mapping always engages bodily experiences as source domains and abstract phenomena as target domains. While it is a compromising issue to affirm that the domain of Journey takes place before the concept of Love, the question which arises here is whether this linearity can be applied to other instances of the metaphorical mapping typology where source and target phenomena are grounded in bodily experience (see Chapter III). For instance,

Machine Is Human

These sports utility vehicles are real gas guzzlers.

Human Is Machine

I could never discover what makes Ann tick.

I started well, but later I ran out of steam.

Human Is Plant

The FBI planted informers in the Mafia.

Human Is Animal

Every education reform makes pupils guinea pigs.

Words/Language Is Human

The introduction is too long and the body is too short.

Human Is Ship

She was rigged out in ballerina.

These instances of metaphor indicate that metaphorical mapping can also engage bodily-experienced phenomena as target domains, but not only in source domains as it is claimed in Embodied theory of metaphor (e.g. Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999). To start with, these instances of metaphor are based on mapping Human onto Plant, Words onto Human, and Human onto Machine. This type of metaphorical mapping excludes the assumption that Human (as abstract and indirectly meaningful target domain) is embodied via Machine (as a bodily-experienced and directly meaningful source domain). If these phenomena, in source and target domains, are bodily experienced, then we cannot explain metaphorical mapping in terms of embodying one phenomenon in terms of another.

Again, this requires a chronological order of source and target domains. As observed here, since these instances of metaphor do not meet the concrete-abstract criterion, this linearity in time that is claimed to characterize cross-domain mapping would not hold either. In this setting, Rakova (2003) calls into question this chronological order of source and target phenomena, “Does it [mapping bodily experiences onto non-bodily experience] mean that without the concept of journey the concept of love would be meaningless?”(28).

Another piece of evidence for this incongruity is proposed by Steen (2011:30-31) where he asks why it is assumed within the Embodied Theory of metaphor that children acquire the literal meaning of terms such as *defend*, *attack*, *win*...and then project these meanings figuratively onto abstract phenomena such as Argument, given that there are

some cases where those children are exposed to the metaphorical meaning of these terms without having been exposed to their literal meaning.

In line with this argument, Gibbs (1994:19) argues that "...it is not necessarily the case that people automatically activate their preexisting metaphorical knowledge that ANGER IS HEATED FLUID IN A CONTAINER each time they read or hear the expressions *He almost exploded with anger...*"

As noted before, there is no cogent evidence for the assumption that the experience of source domain should be first and then our understanding of the phenomena which are mapped as target domain takes place by metaphorically projecting the cognitive topology of the former. To illustrate, whereas the metaphorical mapping which engages bodily and non-bodily-experienced phenomena may include source and target phenomena which fit into this chronological order, it does not follow from this that all metaphorical mappings fit into this chronological order. To the contrary, we do have evidence to assume that this chronological order standpoint is weak in the case of mapping across bodily-experienced phenomena because the process can be reversed (see page 83). That is, since source and target phenomena are grounded in bodily experience, there is no evidence for this chronological order in this metaphorical mapping typology.

3.2.2. Linearity of meaning construction

The meaning which we construct via metaphorical mapping is a lineally-based process. First, we process the meaning of the phenomena in source domains and afterwards through this knowledge we proceed to understand the phenomena in target domains (Feldman 2006:8). Similar findings have been reported by Pinker (2007:243), who assures that the theory of embodiment is based on a system of "Combinatorics [which] allows a

finite set of simple ideas to give rise to an infinite set of complex ones”. This assumption puts metaphorical mapping in two sequenced cognitive processes. Without processing the meaning of the phenomena in source domains, presumably we cannot process the ones in target domains. In this respect, the semanticity of the phenomena in the target domains depends exclusively on the semanticity of the phenomena in source domains. This means that the inference that we get out of metaphorical mappings is also lineally based.

We saw in the previous section that *meaning-transfer* principle puts source and target domains on a lineal scale. That is, we cannot understand target domains without a priori experience of a given phenomenon which, by default, functions as source domain, and which can allow us to give a conceptual structure to target phenomena. This linearity is determined by the fact that first we experience source domains and then we map our knowledge of such domains onto the target. A basic feature of this linearity is that more concrete domains function always as source domains (e.g. Johnson 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff and Johnson 1980, 1999; Szwedek 2011). However, later we shall see how this notion is not inherent to conceptual metaphor since target domains in some metaphorical mappings are concrete, physical, and bodily experienced (see page 164).

Knowledge representation via metaphorical mapping is lineal in that it starts from one point and ends in another. It takes one direction, hence *uni-directionality* principle. Within the embodied approach to metaphor this principle has been adopted to explain all conceptual metaphorical mappings (see pages 79-83).

Another observation which is relevant to our discussion here is that there is no interference from other experiences when we map a given phenomenon onto another one. Put differently, we do not include our experience of other phenomena when we understand

one domain in terms of another. At this level the influence of culture is disregarded while putting a particular emphasis on the bodily (individual) experience (Bernárdez 2013). That is, the information which we need to construct metaphorical mapping to reason about target domains is not grounded exclusively in bodily-experienced phenomena. Here we are not going to discuss whether some metaphors depend on this direct bodily experience. Rather, our aim is to show how the tenets of Embodied approach to metaphor point to the general assumption that metaphorical mapping is lineal and propositional.

Mapping is not an *isolated* cognitive process where two phenomena are mapped. It is difficult to find a single mapping between source and target domains which is not shaped through other factors such as culture (Bernárdez 2013). That is, if A is mapped onto B, this does not mean that this mapping does not take features from other domains of experience. There are two pieces of evidence that corroborate this notion. First, Barsalou (2007:219) claims that no single phenomenon is a single experience. He (1999:219) further assures that, “As the brain captures modality-specific content about a category from experience, it stores content on all the relevant modalities. Not only is visual content captured for *chairs*, but motor, somatosensory, auditory, motivational, and emotional content is captured as well by the respective neural systems”.

Rather, whenever we process information about a given phenomenon, we are not doing this in terms of one modality. For instance, our experience of the source domain Journey would recruit features from different modalities. One further implication that follows from this situation is that analyzing conceptual metaphor may need to account for such features to have a deeper appreciation of the mechanisms of metaphorical mapping.

3.2.3. Linearity of projection based on uni-directionality

So far we have approached linearity of metaphorical mapping from two angles: *linearity in time* and *linearity in meaning construction*. In this section we shall assess how these two assumptions bear on the premise that such *linearity* is uni-directional and depends on autonomous and subordinate phenomena as source and target domains, respectively. Uni-directionality is one of the core characteristics of conceptual metaphor (see Chapter II). This criterion constrains metaphorical mapping in that if we understand one domain in terms of another, the metaphorical mapping cannot be reversed (e.g. Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989). Accordingly, if we understand Time in terms of Money, then we cannot understand Money in terms of Time. However, as we demonstrated before, conceptual metaphors such as Machine Is Human, Human Is Machine, Human Is Plant, Human Is Animal etc., are based on bi-directionality. This entails that, though this criterion neatly fits into some conceptual metaphors such as Juliet Is the Sun, certain mapping typologies do not (see Chapter III).

Another important feature which is associated with Linearity is the fact that it is manifested through time and knowledge construction. In the first case, our experience of source domains always takes place before our experience of target domains. Nonetheless, source and target domains, in certain types of metaphorical mapping, do not fit into this chronological order in the strict meaning of the term. That is, it may be the case that we are exposed to target domains before source domains (Steen 2011). Still, the mapping cannot take place without the experience of source domain and building the respective cognitive topology. In contrast, this case is not straightforward in certain metaphors. For instance, Fauconnier and Turner (2007:362) suggest that metaphorical mapping is an online

cognitive processing. In contrast, cross-domain mapping assures that in metaphor there is a fixed systematic correspondence between source and target domains (e.g. Johnson 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1987, 1993; Lakoff and Johnson 1980, 1999; for contrasting views see Mouton 2012).

3.2.4. Extended Linearity

In this section, we shall assess whether *Linearity* differs across metaphorical mappings. For this purpose, we shall focus our attention on two metaphors: Juliet Is the Sun and Time Is Money. In the first example, linearity is limited in that the inference which is obtained via the metaphorical mapping is a “single inference”—namely, the aspect of shining. According to Lakoff and Turner (1989: 91) metaphors such as this one is known as “one-shot mapping” (see also Lakoff 1990:67-68). On the other hand, in Time is Money, Linearity can be traced in different lines of inference. To illustrate, let us consider the following graph:

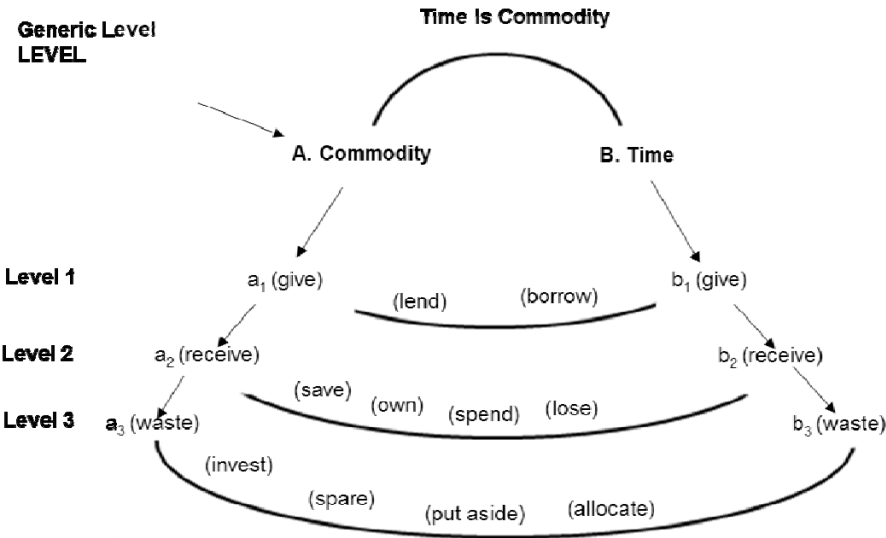


Figure 4 Extended linearity in Time Is Commodity

In this graph, the source (Commodity) and target (Time) domains are represented by the symbols A and B, respectively. The Generic Level at which the metaphorical mapping is constructed is represented by the verb *have* and its semantic features. Also, a_1 , a_2 , a_3 , b_1 , b_2 , and b_3 stand for different semantic levels of source and target domains. In this respect, a_1 , a_2 , and a_3 represent different elements of the source domain Commodity—that is, they are features which are mapped onto their counterparts b_1 , b_2 , and b_3 in the target domain. Notice that b_1 , b_2 , and b_3 emerge as a result of an extension process that operates on the cognitive topology of the target domain Time.

As the graph indicates, this type of metaphorical mapping is based on *extended linearity*. For instance, if we conceive of Time in terms of Money, the main inference is that it is a valuable Commodity. Based on the analysis of the data above, we argued that certain metaphorical mappings are constructed lineally (see also Mouton 2012; Tejada Caller and Guzmán Guerra 2012). To illustrate, the mapping from a_3 onto b_3 cannot be built without having constructed the mapping from a_2 onto b_2 . Likewise, the mapping between a_2 and b_2 cannot be constructed without including a metaphorical mapping between a_1 and b_1 . To illustrate, mapping Money onto Time, a metaphorical proposition emerges. As Figure 4 indicates, this proposition includes variables which are represented by a_1 , a_2 , a_3 , b_1 , b_2 , and b_3 alongside their semantic relations at different levels of constructing conceptual mapping between the two phenomena. This idea could be represented as follows:

a_1 : the semantic property of *give*;

a_2 : the semantic property of *receive*;

a_3 : the semantic property of *waste*;

b_1 : the semantic property of *give* being transferred onto an aspect of Time.

b_2 : the semantic property of *receive* being transferred onto an aspect of Time.

b₃: the semantic property of *waste* being transferred onto an aspect of Time.

This graph shows that the proposition Time Is Commodity could be captured at three levels of meaning construction. However, these levels are suggestive rather than mandatory. For instance, at level 1, we find the verb *to give* (a bodily feature of Commodity) whose property arises from the fact that Time is conceived of in terms of Commodity. Then, if we can *give* it to someone else, it means that we can *receive it, hold it etc.*

Similarly, at level 2, the conceptual metaphor focuses on another aspect of the proposition. Again, at this level the terms *receive, save, own, spend etc.* are indicative of the fact that meaning construction in this type of metaphorical mapping is lineal. Notice that in the proposition Time Is Commodity, we cannot move from the Generic Level directly to, let us say, level 2 or level 3. Our judgment is based on the fact that without having the knowledge of the previous level represented by *give*, it is hard to understand Time in terms of the concept *receive*. That is, we cannot conceive of Time as a commodity that can be wasted without having first understood it as a Commodity. Similarly, we cannot reason about a certain aspect of Time in terms of the action of receiving an object without having previously reasoned about it in terms of a transferable object.

One further implication that follows from this situation is that linearity can be captured in terms of meaning construction within the target domain Time. That is, the cognitive topology of this domain is made up of *immediate* and *emerging constituents*. The *Immediate constituents* in the target domain is the verb *have* and its semantic features. Other verbs such as *give, borrow, lend, receive, lose, spend etc.* are emergent constituents in the target domain Time in that they are intrinsically related to the immediate constituent *have*. A piece of evidence for this claim is that the basic feature of a *commodity* is that it can be

possessed. Henceforth, the semantic features represented by *give, borrow, lend, receive, invest, spare, waste, allocate, lose, save* cannot become constituents of the cognitive topology of target domains without having conceptualized Time as a commodity that can be owned.

Similarly, when this domain is mapped onto Time, we observe that the latter adopts the same pattern of meaning construction. This pattern also characterizes our conceptualization of Time because the semantic features of *have* become immediate constituents to the latter. In contrast, the verbs *borrow, spend, lose, spare etc.* emerge after the semantic features of the verb *have* are mapped onto the target domain Time—henceforth, linearity of meaning construction.

This finding might explain the underlying mechanisms of partial mapping. For instance, we argue that this partiality concerns certain levels of meaning construction within a conceptual metaphor. Though within the embodied approach to metaphor, *partial mapping* is meant to explain how the constituents of the source domains are mapped and how some of the constituents of the target are highlighted while others are hidden (Lakoff and Johnson 1980:53-56), this principle does not explain the underlying mechanisms of such partiality. In this respect, examining conceptual metaphor from propositionality-linearity perspective allows us to see how constructing conceptual metaphor can concerns different levels of mapping.

Finally, notice that the emergence of constituents in a given domain might differ depending on the metaphorical mapping typology (see page 226). In this case, we have seen that certain semantic features emerge within the same domain. That is, since the semantic features of *have* are mapped onto the target domain Time, then we could conceptualize the latter as being *saved, wasted, received etc.* However, in the following chapter, we will see

that emergent structure could occur based on the interaction between constituents from source and target domains.

Conclusion

In this chapter, we have proposed the Propositionality-Linearity perspective to closely look at the data with a view to assessing which metaphorical mapping typology fits into the tenets of the Embodied Approach to metaphor. Interestingly, these tenets and our proposed perspective fit perfectly well the metaphorical mapping which engages bodily and non-bodily-experienced phenomena as source and target domain, respectively. Accordingly, we argued that the embodied approach to metaphor dwells on the assumption that metaphorical mapping is propositional and lineal.

In the first case, we have shown how meaning transfer particularly sustains that conceptual metaphor is propositional in that we understand a given phenomenon in terms of another without any significant participation on the part of the target domain. That is, the inference which is drawn from the conceptual metaphor is fully attributed to the bodily-experienced phenomena of the source domain.

In the second case, *linearity* of metaphorical mapping can be captured in how meaning construction takes place. In this respect, we have shown that linearity is evident within the embodied approach in two ways: *linearity in time* and *linearity of meaning transfer*. This linearity could be extended (see Time Is Commodity) or “constrained” (see Juliet Is The Sun).

More importantly, the data indicates that mapping bodily-experienced onto non-bodily-experienced phenomena fits perfectly well into the proposed perspective. In this

setting, we also saw that certain types of metaphorical mapping may not fit either the proposed perspective or the embodied approach to metaphor.

To further explore these types of metaphorical mapping and to show the theoretical problems that may arise in dealing with conceptual metaphor as a homogeneous cognitive process within the embodied approach, in the following chapter we shall focus on the metaphorical mapping which engages two bodily-experienced phenomena. We shall hypothesize that, given the fact that the *Propositionality-Linearity* perspective is based on *uni-directionality* and *concrete-abstract* principles, the theory of embodiment needs to face the challenge of explaining different mapping typologies sticking to a set of tenets which are mostly observed in one mapping typology—the one which engages bodily-experienced and abstract phenomena as source and target domains, respectively. We will hypothesize that approaching conceptual metaphor as a homogeneous cognitive process will raise major theoretical problems within the theory of embodiment.

Chapter III: Mapping across Bodily-experienced

Phenomena: A Challenge to the Embodied Metaphor Theory

1. Introduction and Hypothesis

We saw in the previous chapter that analyzing metaphor from the Propositionality-Linearity perspective is in line with the embodied approach to metaphor. A major finding in this respect is that metaphorical mapping is propositional and lineal. In particular, we observed that Propositionality-Linearity and the embodied approach to metaphor perspectives fit the mapping typology which employs bodily-experienced and non-bodily-experienced phenomena as source and target domains, respectively. Nonetheless, based on the data, we observed that this is not the case of all mapping typologies (see Chapters I and II).

In this chapter, we hypothesize that while Propositionality-Linearity seems to be applicable to some types of metaphor (see Chapter II), it may not cover all. Our aim in this chapter is to identify the problems derived from attempting to analyze metaphor as involving only *one mapping typology*: mapping bodily-experienced-onto-non-bodily-experienced phenomena.

In this setting, this typology creates theoretical incongruities to the embodiment theory in that this mapping typology draws on two bodily-experienced phenomena (see pages 155-164). Since, in this case, source and target are bodily experienced, the Embodiment and Propositionality-Linearity theories may not apply to this mapping typology.

One way to assess whether this typology fits into these theories is to examine whether this type of conceptual metaphor is constructed lineally and propositionally. In this respect, we need to test the tenets of Embodied metaphor from the proposed perspective, but this time we shall focus our attention on mapping across bodily-experienced phenomena. When this characteristic (being bodily-experienced) is also observed in target domains, it is plausible to hypothesize that Propositionality and Linearity may not hold since this perspective requires target domains to be abstract. This potential incongruity may indicate that at least three tenets of Embodied metaphor theory will not hold up:

- (1) Bodily-onto-non-bodily mapping principle;
- (2) Meaning transfer based on the experiential basis of source domains;
- (3) Uni-directionality of metaphorical mapping principle.

We hypothesize that these tenets may not be applicable to the metaphorical mapping we are concerned with in this chapter because they have been elaborated based on one metaphorical mapping typology: bodily-experienced-onto-non-bodily-experienced mapping (see Chapter II). It is worth noting here that one of the core assumptions in the cognitive approach to metaphor is not observed in the data; namely, the abstractness of target domains.

Therefore, if the tenets of the two theories are not applicable, then it follows that mapping across bodily-experienced phenomena may differ substantially from the one which engages bodily-experienced and non-bodily-experienced phenomena as source and target domains, respectively (see Chapter II). For this purpose, we shall need to test the tenets of the Embodied metaphor theory against the data and assess whether they also characterize this type of metaphorical mapping. If we are able to show that those tenets cannot be applied, therefore our perspective (Propositionality-Linearity) cannot be used to

cover the metaphor wherein source and target domains are grounded in bodily-experienced phenomena. Consequently, this metaphorical mapping could not be explained in terms of the tenets of the Embodied Metaphor theory either. More importantly, we shall also be in the position to claim for a more complex classification of metaphor in terms of its typologies and consequently in terms of its structuring and processing.

2. Background

Our task in Chapter II was to propose a new perspective to better understand the tenets of the Embodied metaphor theory and to assess which metaphorical mapping typology they fit into. We claimed that Propositionality and Linearity of metaphorical mapping fits perfectly well into the theoretical framework of the embodied approach to metaphor.

So far in the thesis we have shown that these tenets cover the typology which draws on bodily and non-bodily-experienced phenomena as source and target domains, respectively. In this respect, we proved that metaphorical mapping could be looked at from a different perspective and while (still) sticking to the tenets of the Embodied Metaphor theory. Based on the data, these tenets seem to indicate that metaphorical mapping is propositionally and lineally constructed. Within Cognitive Linguistics (e.g. Gibbs 1994, 2011; Gibbs and Matlock 2008; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff and Johnson 1980, 1999; Szwedek 2011) and Cognitive Science (e.g. Feldman 2006; Feldman and Narayanan 2004), the tenets of the Embodied Metaphor theory are based on the core assumption that conceptual metaphor employs more concrete (that is, physical phenomena) as source domains and more abstract phenomena as target.

This view seems to be based on the fact that within the Embodied metaphor theory, it is assumed that there is “...a single type of representation [that] underlies knowledge.” (Barsalou, Santos, Simmons, and Wilson 2008:246).

Similarly, we demonstrated in Chapter I that since metaphor is based on a large variety of experience, it is not plausible to claim that figurative language follows a single set of patterns of mapping. As pointed out before, the only type of mapping which has been claimed to be operating in metaphor is the one which involves bodily and non-bodily-experienced phenomena as source and target domains, respectively. Accordingly, conceptual metaphor is viewed in terms of three main tenets:

- i. *Meaning transfer based on the experiential character of source domains,*
- ii. *Uni-directionality of metaphorical mapping, and*
- iii. *mapping bodily onto non-bodily-experienced phenomena.* In what follows we shall discuss these tenets.

2.1. Three Main Tenets Characterizing Metaphorical Mapping which fit Propositionality-Linearity perspective

2.1.1. Meaning transfer based on the experiential character of source domains

Within the theoretical framework of the embodied approach to metaphor, mapping across domains is based on the experiential basis of source domains. For instance Ungerer and Schmid (1996:121) argue that, “...people rely on models of the concrete world in order to understand abstract phenomena”.

In this regard, since source domains are bodily experienced, they are meaningful. In contrast, target domains lack conceptual structures because they are inaccessible to the sense organ. Accordingly, target domains are used metaphorically (Gibbs 1996:310). It follows from this that source and target phenomena are directly and indirectly meaningful domains, respectively (e.g. Lakoff and Turner 1989; Rakova 2003:19-21). In this respect, the experiential character of source domain is a double-edged component. First, it grants source domains with a conceptual structure. And second, it permeates meaning to target domain. In this setting, the conceptual structure (semantic topology) of source domains is imposed on target domains. The claim here is that the phenomena which take on the role of target domains are meaningless without being mapped in conceptual metaphor (e.g. Feldman 2006).

2.1.2. Uni-directionality of metaphorical mapping

Since being meaningful is attributed to being bodily-experienced, metaphorical mapping takes a given bodily-experienced phenomenon as source domain (e.g. Ungerer and Schmid 1996). In this respect, meaning transfer always goes "...from the concrete to the abstract and not the other way round" (e.g. Kövecses 2002:6).

A key question that arises here is why a bodily-experienced phenomenon cannot function as target domain. Is it that conceptual metaphor cannot engage two semantically independent phenomena, or it is because the experiential character of this type of domain does not allow acquiring the experiential character of other domains?

These questions, which touch upon the very foundations of the embodied approach to metaphor, have not been covered by scholars supporting this theory unless we consider some attempts which still need to be refined. For instance, Gibbs (1996:311) states that

“...the reason for this directionality in metaphorical mappings is that target domains tend to be more vague and incomplete than source domains.”

2.1.3. Mapping Bodily onto non-bodily experience phenomena

As stated before, only one pattern of mapping has been claimed to characterize conceptual metaphor (e.g. Gibbs 1996; Szwedek 2011). In this setting, bodily properties of source domains have been assigned the prime role in constructing and processing figurative meaning (e.g. Gibbs 2008, 2011; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff and Johnson 1980, 1999; Szwedek 2011). It is even held that these properties are the only operating constraints over metaphorical mapping. For instance, Szwedek (2011:360) assures that “...the object is the fundamental, ultimate source domain...”

In addition, these characteristics have been argued to be circumscribed to source domains. Accordingly, since the phenomena which belong to source domains are argued to be inherently primitive and concrete, then they should inherently fulfill the function of source domains (for contrasting views see Rakova 2003:27). These characteristics are assured to distinguish source from target domains (e.g. Szwedek 2011). The problem which arises here is how to classify source and target domains in terms of concreteness-abstractness –as inherent features- given that the metaphorical mapping that concerns us in this chapter engages two bodily-experienced phenomena.

Based on our discussion here, the embodied approach to metaphor has to rise to the challenge of applying these tenets to different metaphorical mapping typology such as the one which engages bodily-experienced phenomena in source and target domains. Since this approach relies heavily on the aforementioned tenets to explain conceptual metaphor (as a

homogeneous cognitive process), the main challenge is to fit them into different metaphorical mapping typologies.

Therefore, far from examining conceptual metaphor as a homogeneous cognitive process triggered by a closed set of mechanisms, we shall claim for a more complex classification of mapping typologies and their corresponding operating systems. In this chapter we are going to handle one metaphor type to demonstrate that a certain typology—the one which engages bodily-experienced phenomena as source and target domains—may need a different analysis. On this account, we shall demonstrate how this particular typology does not fit into the framework of the theory of embodiment. In particular, we shall show how the tenets of this theory are not viable in handling this mapping typology. This may invite a new direction in the approach of conceptual metaphor. In this respect, for this theory to encompass this particular mapping typology, we suggest a new consideration of the traditional view that metaphorical mappings (1) depend, by default, on bodily-experienced phenomena as source domains and abstract phenomena as target domains. And (2) our understanding of abstract phenomena is carried out through embodying target domains.

3. Data Analysis

In this section we shall explore the characteristics of metaphorical mapping which draws on bodily-experienced phenomena in source and target domains and assess whether our finding can fit into the Propositionality-Linearity perspective. While analyzing this type of metaphor, we shall be paying special attention to three main features that are argued to characterize metaphorical mapping; (1) Uni-directionality of metaphorical mapping; (2) Meaning transfer based on the experiential character of source domains; and (3) mapping

bodily-onto-bodily-experienced phenomena. Our primary purpose is to show how these tenets may not fit the current data.

3.1. Propositionality based on the experiential character of source domains

Two questions have yet to be addressed within the theoretical framework of Embodied Metaphor. The first one is whether all source domains are experienced in the same way. We addressed this question in Chapter I and demonstrated that source domains draw on different kinds of experience (see Table 1). As will be shown later, this differentiation will reveal that different mapping typologies follow different patterns and principles. Furthermore, Barsalou, Santos, Simmons, and Wilson (2008:219) argue that no single phenomenon is experienced via one mode. These findings might have strong impact on our understanding of the mechanisms that operate in different mapping typologies. In this respect, we might need to abandon the assumption that the principle of mapping concrete onto abstract phenomena is broad enough to underpin all the mechanisms that operate in metaphorical mapping.

The second question is whether there is any metaphor type where target domain may share (some of) the characteristics of source domains. Given that some domains function as source and target in different metaphorical mappings, the answer seems to be positive (see page 83). This entails that in certain mapping typologies, target domains could show the same characteristics of source domains. Importantly this could show that conceptual metaphor does not play a crucial role just in giving conceptual structures to target domains. In this setting, the propositional character of metaphorical mapping, which we outlined in Chapter II, may not be applied to some instances of metaphor. This is

particularly evident in the metaphorical mapping which engages bodily-experienced phenomena in source and target domains. This is due to the fact that the propositional aspect of cross-domain mapping is based on the general belief that source and target domains are based on bodily-experienced and non-bodily-experienced phenomena, respectively. Within this theory, bodily-experienced phenomena and non-bodily-experienced phenomena are indispensable to metaphorical mapping (e.g. Gibbs 1996; Lakoff and Turner 1989). While source domains are claimed to be inherently embodied and target domains are by default abstract, the data indicates that target domains may show some of the characteristics of source domains.

3.1.1. The Problem of Meaning Transfer Principle

3.1.1.1. Propositionality across domains

Metaphorical mapping is claimed to be based on transferring semantic features from source onto target domains (e.g. Gibbs 2008, 2011; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff and Johnson 1980, 1999; Szwedek 2011). Within this theory, this projection concerns certain elements of source domains; hence, this projection is partial (e.g. Tendahl and Gibbs 2008:1827; Lakoff and Johnson 1980:10-13; Lakoff and Johnson 1999: 70-71; see also Figure 4 on how partiality functions in conceptual metaphor from Propositionality-linearity perspective). This principle seems to fit the metaphorical mapping which engages bodily-experienced phenomena as source domains and non-bodily-experienced phenomena as target domains such as when we understand Justice, Love, or Democracy in terms of bodily-experienced phenomena (see Chapter II).

However, major theoretical problems arise when we try to apply this tenet to the metaphorical mapping typology where source and target domains are bodily experienced. This particular typology indicates that metaphor could also engage bodily-experienced phenomena as target domains. For instance,

Human Is Plant

The FBI planted informers in the Mafia.

Human Is Animal

Every education reform makes pupils guinea pigs.

Words/Language Is Human

The introduction is too long and the body is too short.

In order for this notion to be applied to these three examples, we need to assume that our understanding of target domains is exclusively grounded in our experience of source domains. That is, our understanding of target domains (Human and Words/Language) is rooted in our experience of source domains (Plant, Animal, and Human). That is, the propositional knowledge in this metaphorical mapping is acquired through experiencing the source domain Plant. In the second example, the propositional knowledge of Animal is extended to cover Human. In the third example, the propositional knowledge of Human is extended to, let us say, a *piece of writing*.

On the contrary, the embodiment theory holds that target phenomena have three inherent characteristics: abstract, complex, and, by the same token, they are indirectly accessed. Accordingly, the phenomena which function as target domain (Plant, Animal, and Human) would be complex, abstract and indirectly accessed; whereas, the phenomena which fulfill the role of source domain (Human and Language) would be concrete, literal, and bodily experienced. In addition, Human and Words/Language would not function as

target domains. This notion stems from the general assumption that the core process that governs all instances of metaphor is the fact that there is no other way to understand target phenomena except via this propositional process (Lakoff and Johnson 1980:19). This entails that all conceptual metaphors are based on combining two different phenomena in terms of bodily and non-bodily experienced features.

It turns out that none of these features characterizes the target domains in the three examples above. That is, though these domains function as target, they are neither abstract nor indirectly accessed. A piece of evidence for this claim is the fact that these domains are accessed (thus meaningful) independently of metaphorical mapping. Furthermore, we *do* reason about them without resorting to metaphorical mapping. Therefore, we assume that these characteristics are not inherent to target domains. Similarly, source domains are not inherently bodily-experienced because as the examples above shows Human takes on the role of source and target in different metaphorical mappings.

These findings indicate that being abstract and complex are not prerequisite conditions for phenomena to be engaged in metaphorical mappings as target domains. To illustrate, there is no reason why we should assume that the domain Human is more abstract than Plant when these domains are involved in metaphorical mappings. It is worth noting here that being complex means that target domains can afford further structuring in their organization (e.g. Szwedek 2011:341). In other words, they are eligible to incorporate the (propositional) knowledge of bodily-experienced phenomena.

Based on the data, being more abstract, more complex, and indirectly accessed seem to be irrelevant features to differentiate source from target domains in the metaphorical mapping that engages two bodily-experienced phenomena. Similar findings have been reported by Szwedek (2011:342-343), who points to this shortcoming within the theoretical

framework of the embodiment theory. For instance, he states that the distinction criterion lies at the number of physical components a domain has. He suggests that source domains have more “physical” participants than target domains (Szwedek 2011:342-343). He reached his judgment based on the analysis of Life Is Journey metaphor. His claim is that these two domains are abstract but the source domain (Journey) has more physical components than the target domain (Life) (for more details see Szwedek 2011:342-343). However, neither does this approach seem to be solid enough to be taken as a distinction criterion between source and target domains (see also Barcelona 2003:32-33). To illustrate, Human and Building do not show distinctive features to be viewed differently (see also page 73). It seems clear that we cannot attribute to a domain, in certain metaphorical mappings, the role of source or target based on the number of its physical components.

Another case where this criterion seems to be weak is that in some cases each component of the source domain has its counterpart in the target. To illustrate, let us consider the following metaphor.

Politics Is (chess) Game

Bush and Saddam play a chess game.

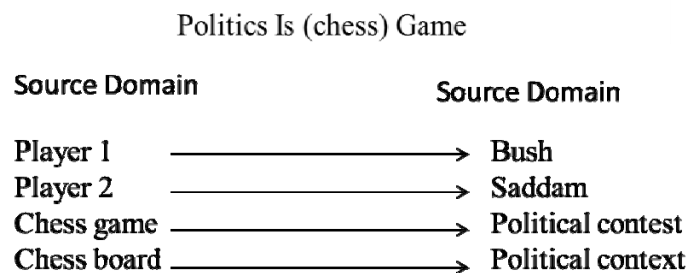


Figure 5 Physical components of source and target domains.

In order to assess this metaphor based on Szwedek’s criterion (2011:342), we need to assume that *chess game* has more “physical participants” than the political interaction

that engages Bush and Saddam in this metaphor. In contrast, in this metaphor we identify 4 main elements in each domain. This entails that having more or fewer physical participants is not a distinctive criterion which allows a given phenomenon to take on the role of source or target domain. As this figure shows, each physical component of the source domain has its counterpart in the target. In this setting, it becomes hard to justify why one of these domains is considered more abstract or more concrete (see also Rakova 2003:177).

From our discussion above, it becomes evident that since this criterion does not characterize this metaphorical mapping typology, the Embodied Metaphor theory has to explain why Propositionality does not fit the data while being in accordance with the tenets of the embodiment theory. In other words, being complex, abstract, and indirectly accessed are not inherent features to target domains. This is obvious because target domains in the present data share the same characteristics of source domains. Let us reconsider the following example:

Surgery Is Butchery

(1) My surgeon was a butcher.

Butchery Is Surgery

(2) My butcher was a surgeon (Lakoff 2008:33).

Again, to account for this metaphorical mapping typology from the embodied approach perspective is to assume that the elements of source domains correspond to their counterparts in the target (e.g. Gibbs 2011; Johnson 1987; Lakoff and Johnson 1980, 1999). Recall that the “elements” of source domains, following the embodiment theory, are different from their counterparts in target domains in the sense that the former are primitive, concrete, and directly meaningful whereas the latter are complex, abstract, and indirectly meaningful (see Chapter II).

However, this assumption is mistaken if we analyze this metaphor in terms of correspondence between elements of source and target domains. This is due to the fact that this “correspondences” between these elements presumably follows these tenets:

- i. Source domains are always bodily-experienced phenomena.
- ii. Target domains are always abstract phenomena.
- iii. There is Uni-directionality of metaphorical correspondence.

As pointed out previously, none of these characteristics are observed in the metaphorical mapping typology which engages bodily-experienced phenomena as source and target domains. Sticking to these tenets, this would mean that in (1), Butchery is bodily experienced but Surgery is abstract. The Embodied approach to metaphor has not explained why we should assume that Butchery is bodily experienced but Surgery is a non-bodily-experienced phenomenon. Consequently, based on this distinction, Butchery and Surgery presumably take the roles of source and target domains, respectively. In (2), the metaphorical mapping is reversed in the sense that the phenomenon which takes on the role of source domain in (1) now fulfills the role of target. And the phenomenon which performs the role of target domain in (1) now functions as source domain. In order to account for this metaphor, we have to assume that Surgery now is bodily-experienced and Butchery is a non-bodily-experienced phenomenon. A direct conclusion that one can draw from this analysis is that being *bodily experienced* and *non-bodily experienced* are not inherent to domains in metaphorical mapping. In this respect, the data shows that source and target domains are not inherently bodily-experienced and non-bodily-experienced phenomena, respectively.

3.1.1.2. Mapping across Bodily-experienced phenomena

In the previous section, we focused our attention on the characteristics of source and target domains. We showed that meaning-transfer principle cannot be applied when the same domain functions as source and target in different metaphorical mappings. We observed that in mapping across bodily-experienced phenomena, source and target domains share the experiential character. Recall that within the Embodied metaphor theory, this character, which has been exclusively attributed to source domains, has major entailments for both constructing and processing metaphorical mapping.

One of such entailments is that the experiential character of source domains is imposed on target domains; hence, the “Objectification” process (Szwedek 2011:346). In this respect, most of the explanation of metaphor is built around this assumption—that is, paying special attention to the constitutive nature of source domains.

Thereby, we are faced with another controversial assumption trying to apply the tenets of the embodiment theory to the data. For instance, if source phenomena are primitive and, by the same token, they are assumed to have conceptual structures, then target domains need a different treatment within this theory. In other words, to handle this issue, we need to bear in mind two distinctive features of source domains:

- i. the fact that being primitive legitimizes source domains to having conceptual structure (Lakoff and Turner 1989); and accordingly,
- ii. these domains do not allow further (re)structuring or –using Szwedek’s term– “metaphorization” (2011:341). That is, the domains that are bodily experienced cannot be understood in terms of other phenomena because they have “a pre-existing structure of their own” (Szwedek 2011:344).

Consistent with this affirmation, Lakoff and Turner (1989:59) states that, “Things that we think of being straightforwardly physical –rocks and trees and arms and legs—are usually

things that we have conceptualized not metaphorically but rather in terms of what we take to be our bodily experience.”

So far we have demonstrated that being bodily-experienced is not a feature that is circumscribed to source domains, as it is claimed in the embodied approach to metaphor. In the following section, we shall address the issue of how the components of source and target domains are viewed within the Propositionality-Linearity theory and how this situation may not characterize the mapping typology which draws on two bodily-experienced phenomena.

3.1.1.3. Propositionality and components of source and target domains

We showed in the previous section that the notion of differentiating source and target domains in terms of concreteness and abstractness does not stand on a solid basis. This finding is particularly noticed in the mapping typology which depends on bodily-experienced phenomena as source and target domains, respectively. As shown before (see Figure 5.), target domains also share some of the *presumably* inherent characteristics of source domains.

In this section we shall consider the components of source and target domains to see whether the entailments of the Propositionality-Linearity theory fit the data. In other words, to examine metaphorical mapping from this perspective, we need to assume that the components of source and target domains are of two different natures: primitive and complex, respectively (for an in-depth analysis of this issue see the previous chapter).

A particularly important entailment of this notion is that while primitive components cannot be understood in terms of other components, complex components are

reasoned about in terms of those primitive components. Let us analyze the following metaphors:

Human Is Animal

(1) *My husband turned out to be an animal.*

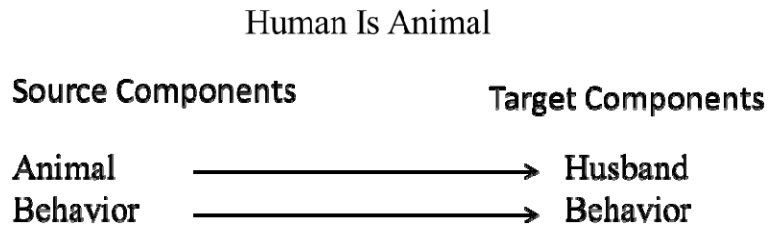


Figure 6 Components of source and target domains Human Is Animal

Money Is Food

(2) *The new car took a large bite out of our savings.*

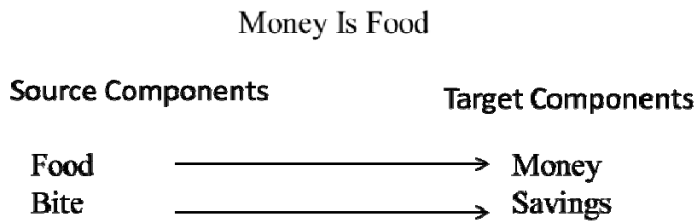


Figure 7 Components of source and target domains for Money Is Food

Human Is Army

(3) *When she opened the door there was an army of journalists waiting for her.*

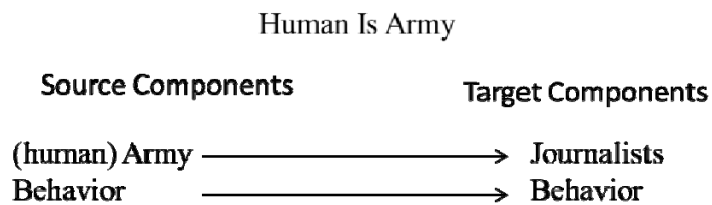


Figure 8 Components of source and target domains for Human Is Army.

To analyze the data in accordance with the Propositionality-Linearity perspective taking into account the tenets of the Embodied metaphor theory, we need to assume that the components of source domains are primitive whereas those of target domains are complex. More precisely, in (1), (2), and (3) the components of the domains Animal, Food, and Human are primitive as compared to their counterparts in the target domains Money, Building, and Human, which need to be considered as complex.

This metaphorical mapping typology reveals a theoretical problem within the embodied approach to metaphor. We notice in this set of metaphors that (1) source and target domains are bodily-experienced phenomena; and (2) the domain Human functions as source and target in different metaphorical mappings. In this respect, the embodiment theory needs to distinguish the components of the domain Human when it functions as source and when it functions as target domain. That is, if we assume that certain characteristics allow a given domain to perform the role of source or target, then, the challenge is to explain why a given domain can have the role of source and target in different metaphorical mappings. This means that we cannot rely on the complexity-primitiveness of components to assign domains the function they take on in metaphorical mappings.

In addition distinguishing the components of source from those of target domains in terms of primitiveness and complexity requires identifying how the elements of the domain Army and their counterparts in the domain Human differ. To do that, we need to assume that a given target domain takes on the characteristics of a bodily-experienced phenomenon, which functions as source. Similarly, these very characteristics are considered abstract and complex when the same domain functions as target. It seems implausible to make this differentiation since the components of Army are essentially

equivalent to the components of the target domain Human (see Figure 8). More specifically, Army may be considered as a subcategory of the domain Human, and consequently, some elements are common to both domains.

Mapping these two phenomena is based on these shared features. Due to the fact that conceptual metaphor hinges on the differentiation between components of source and target domains, a potential challenge to the Embodied metaphor theory is to explain why the components of Army should be considered different from their counterparts in Human. As stated before, Szwedek (2011:342) suggests that the domain which has more physical participants functions as source but the one which has less physical components functions as target. However, looking closely at the data, this criterion cannot explain why Army is considered to have more physical components than Human.

Another problem with this standpoint is how to reconcile the notion that elements from source domains have their corresponding elements in target domains and the notion that source domains have more physical participants, given that in some instances of metaphorical mapping, the same domain takes on the role of source and target domains. Let us consider Human Is Animal and Animal Is Human to illustrate this point.

In order for this criterion to hold, we need to assume that Animal in (1) has more physical participants than the domain Human but in (2) it has less physical participants. More importantly, we need to assume that Animal in (1) has more physical participants than in (2). Again, it seems that this criterion is not reliable to analyze this metaphorical mapping typology. As a result, the metaphorical mapping which engages bodily-experienced phenomena in source and target domains does not satisfy this criterion.

In order to address these contrasting assumptions within the theoretical framework of the embodiment theory, we suggest that source and target domains in this metaphorical

mapping typology are physical and by the same token, their constituents are experienced bodily. In this respect, we can draw two conclusions about this mapping typology: first, being primitive or complex is not inherent to the components of source and target domains. These features are irrelevant in that they do not seem to be operating in this type of metaphorical mapping because they do not constrain the role a given phenomenon takes on the role in conceptual metaphor. It is clear, then, from the data that this is not the level of analysis where we should build our generalization about the features that allow a given phenomenon to take on the role of source or target domain.

3.1.2. Is Literal-onto-Literal Mapping an Instance of Metaphor?

3.1.2.1. The Problem of Applying Uni-directionality Principle to this Type of Metaphorical Mapping

In the previous section we showed how the metaphorical mapping which engages bodily-experienced phenomena in source and target domains does not satisfy the basic tenets of the theory of embodiment. Because of its heavy reliance on the notion that source and target domains are primitive and complex, respectively; the principle of Uni-directionality presumably applies to all conceptual metaphors. It is worth noting here that in Chapter II, we observed that this principle particularly underlies the mapping typology which engages abstract phenomena as target domains (see pages 115,129). In this section, we shall pay special attention to this principle to assess whether it fits different mapping typologies.

In the metaphorical mapping which engages bodily-experienced phenomena in source and target domains, the entailments of Uni-directionality may reveal theoretical

problems within the Embodied Approach. This is due to the fact that, within this approach, the reason why source domains are mapped onto target domains is that the former are bodily experienced and, by the same token, they are eligible to have conceptual structures of their own (that is, they are directly meaningful domains).

One of the main characteristics of these domains, in this respect, is that they are “directly tied to structural aspects of experience” (Lakoff 1987:268). On the other hand, target domains are by default abstract and do not have conceptual structures; hence, they are indirectly meaningful.

It turns out that these characteristics are not observed in the metaphorical mapping which engages two bodily-experienced phenomena. The question which arises here is whether we are still dealing with cases of metaphor when source and target domains are bodily experienced. The answer seems to be positive according to Lakoff and Turner (1989), in that the only case where a concept is non-metaphorical is when it is “...understood and structured on its own terms without making use of structure imported from a completely different domain”(57).

Though in the metaphorical mapping which engages two bodily-experienced phenomena we still understand one domain in terms of another, the tenets of the embodied approach to metaphor do not fit. To illustrate, let us consider these examples:

Human Is Animal

(1)Every education reform makes pupils guinea pigs.

Human Is Liquid

(2)Crowds spilled out of the train over the platform.

Human functions as target in metaphors (1) and (2). On the other hand, Animal in (1) and Liquid in (2) take on the role of source. What is relevant to our discussion here is

that in this set of examples, target domains are also bodily-experienced. A direct conclusion that we can draw from this observation is that target domains in this mapping typology do have conceptual structures of their own (for a contrasting analysis of this type of metaphor, see Szwedek 2011:345-346). For this reason, source domains are claimed to be directly meaningful, both inside and outside metaphorical mapping. Our judgment here is based on the entailments of one of the tenets of the Embodied theory of metaphor which holds that if a phenomenon is bodily experienced, then it inherently has a conceptual structure. This means that source domains, being bodily-experienced, are eligible for including conceptual structures. In contrast, target domains do not show a pre-existing conceptual structure in metaphorical mapping, neither do they have *one* independently of it. Nonetheless, target domains in (1) and (2) do have conceptual structures because they function as source domains in other metaphorical mappings.

Again, in this type of metaphorical mapping, being directly and indirectly meaningful are not inherent features. These examples show that target domains are also directly meaningful. Therefore, the view that target domains lack conceptual structures contradicts the data. Our judgment is based on the fact that if these domains function as source in other metaphorical mappings, then they do have conceptual structures.

In order to solve this theoretical problem sticking to these assumptions, we need to assume that these phenomena—outside metaphorical mapping—do have conceptual structures of their own but when they are mapped they lose such conceptual structures. Another way to treat this problem is to accept that the conceptual structures of target domains in this particular metaphorical mapping typology are inhibited to allow the imposition of the conceptual structures of source domains.

At this point, we are faced with the following problem: the embodied approach to metaphor suggests that the need for metaphorical mapping is that target domains do not have conceptual structures of their own because they are *inaccessible* to our senses (Gibbs 1994, 1996; Lakoff 1987; Lakoff and Johnson 1980, 1999; Szwedek 2011). From this, it follows that our understanding of target domains depends on imposing on them conceptual structures of bodily-experienced phenomena.

Similarly, Embodied Simulation conjectures that target domains are endowed with meaning through simulating the physical action of source domains (Gibbs and Matlock 2008:162-165). Proponents of this approach argue that all conceptual metaphors show this characteristic (Feldman and Narayanan 2004:1-2). This means that having a conceptual structure is intrinsically related to the eligibility of phenomena for being experienced through the mechanisms of the body. On the account of Embodied Simulation, a physical action is needed to conceptually unify the two (source and target) phenomena (Barsalou 2003b; Barsalou and Wiemer-Hastings 2005; Gibbs and Matlock 2008). Henceforth, we always resort to bodily-experienced phenomena to understand and reason about target domains.

The question which arises here is that the phenomena of source and target domains are bodily experienced, and being so, target domains do have conceptual structures of their own because they are accessed through the senses. A piece of evidence for this claim is that target domains in this metaphorical mapping typology do have conceptual structures because they function as source in other metaphorical mappings.

However, following the tenets of Embodied theory of metaphor, Embodied Simulation, and the Propositionality-Linearity perspectives, there would be no need for conceptual metaphor to reason about these phenomena. This situation is due mainly to the

fact that target domains in this mapping typology are bodily experienced and, consequently, they *do* have conceptual structures. That is, we do not metaphorically understand bodily-experienced phenomena as they are not eligible to carry out the function of target domains—it is not necessary to embody these target domains using bodily-experienced phenomena as a prerequisite condition for them to be meaningful.

It is worth noting here that these findings run counter to the core assumption of Embodied Metaphor and Embodied Simulation because these approaches are based on the notion that conceptual structures of bodily-experienced phenomena are imposed onto the phenomena which lack these structures outside metaphorical mapping (Lakoff and Turner 1989:83). This view leads us to conclude that metaphorical mappings are not by default based on bodily-experienced phenomena, as source; and abstract phenomena, as target domains. The data is especially indicative of this point (see pages 73, 164).

So far we have shown how mapping across bodily-experienced phenomena does not satisfy the principle of Uni-directionality. We argued that this mapping typology target domains are bodily experienced and semantically independent. We further argued that the principle of mapping concrete onto abstract phenomena does not hold either. This finding may entail that the experiential basis of metaphor should not be drawn based only on the characteristics of source domains because in certain metaphorical mappings target domains also are bodily experienced.

3.1.2.2. Uni-directionality principle and cross-modalities mapping, the case of synaesthesia

We observed in the previous sections that some of the foundational assumptions of the embodied approach to metaphor and Embodied Simulation such as *uni-directionality*

and *concreteness-abstractness* criteria do not fit the data. In this section we shall focus our attention on another type of cross bodily-experienced mapping, synaesthesia metaphor (e.g. Caballero 2009; Marks 1974, 1975, 1978; Rakova 2003; Ramachandran and Hubbard 2001). Perhaps Galton (1880) was the first to report cases where numerals are understood in terms of visual imagery. His pioneering experiments indicate that some subjects conceptualize numerals in terms of shapes and colors (1880:89-92). Accordingly, he (1880) concluded that these subjects experience sensations within modalities in response to stimulation to other modalities. It is worth noting here that numerals and shapes are perceptual which means that conceptualizing phenomena in terms of others could concern two bodily-experienced phenomena (see page 155 for the entailments of this finding).

In metaphorical terms, Rakova (2003:48) argues that synaesthetic metaphor occurs when the perception of a stimulus from one sensory modality is accompanied by the perceptual experience from some other modality.

More recent experiments on synaesthetic metaphor have shown that this phenomenon is more common than it was believed to be previously (Caballero 2009; Cacciari 2008; Ramachandran and Hubbard 2001; Yu 2001). As the following table indicates, the phenomenon of synaesthesia reveals a different typology of mapping.

Source Modality	Target Modality	Examples
Vision	Audition	(1) Bright sounds
Audition	Vision	(2) Loud colours
Somatosensory	Taste	(3) Sharp tastes
Somatosensory	Smell	(4) Heavy smells
Force	Audition	(5) Raise voice

Table 5 Mapping across sensory modalities.

As this table shows, the mapping typology which characterizes synaesthetic metaphor may posit a potential challenge to the theory of the Embodied metaphor in that the tenets of this theory cannot account for the metaphorical mapping typology which is based on a sensory-modality in source and target domains. This metaphorical mapping typology engages two domains which are physiologically instantiated (Ramachandran and Hubbard 2001). Accordingly, synaesthetic metaphor is especially indicative of the wrong assumption that conceptual metaphor is based on a homogeneous cognitive process—engaging bodily-experienced and abstract phenomena as source and target domains, respectively. In this respect, Table 5 shows that the mapping typology which engages bodily-experienced phenomena may make use of sensory experience in source and target domains. For instance, this mapping typology includes ‘bright sounds’, ‘loud colors’, ‘sharp tastes’ and ‘heavy smells’.

Based on this type of conceptual metaphor, Rakova (2003) argues that the type of cognitive process which underlies these expressions cannot be analyzed within the theoretical framework of Embodiment. This is due to the fact that target domains in this kind of metaphorical mapping are bodily-experienced. For instance, she states that, “...there is more literalness in metaphor” (2003: 172-3).

In line with this quote, Table 5 indicates that the main feature which characterizes target domains and which is relevant to our analysis here is that they are accessed by our sensory system. It is worth noting that this metaphorical mapping typology (mapping physiological-onto-physiological phenomena) cannot be covered by the tenets of the embodied approach to metaphor. To illustrate, whereas all the tenets of this approach are based on one core assumption: mapping bodily-experienced onto abstract phenomena, in

synaesthesia-based metaphor, source and target domains make use of sensory modalities (see Table 5).

Analyzing this metaphorical mapping typology within the perspective of Propositionality and Linearity taking into account Uni-directionality principle, we observe that the tenets of the embodied approach to metaphor contradict the data. For instance, according to Lakoff and Johnson (1980, 1999), all source domains are experienced through sensorimotor mechanisms. While this affirmation seems to account for the data—source domains in the examples above are grounded in bodily experience—we also notice that target domains draw on bodily-experienced phenomena.

To illustrate, in example (1), the metaphorical mapping engages visual and auditory modalities as source and target domains, respectively. In (2), auditory modality functions as source domain, and visual modality, as target domain. In (3) the modality of somatosensory (Tactile) functions as source domain, while the Gustatory modality as target domain. And in (4), the modality of somatosensory (Force) functions as source domain whereas the modality of Olfaction carries out the role of the target domain. It is worth noting here that the first two pairings ('bright sounds' and 'loud colors') show that a given modality can function as source and target domains in different metaphorical mappings. This finding is particularly important because it indicates that bodily-experienced phenomena and sensorimotor modalities can function as source and target domains in different metaphorical mappings (see page 184).

Again, here we are faced with another problem regarding the tenets of the embodied approach to metaphor viewed from the perspective of Propositionality-Linearity. As pointed out before, scholars within the theoretical framework of Embodied metaphor claim that in metaphorical mapping there is always a projection of features from concrete

domains onto more abstract domains. It is obvious that the metaphorical mapping typology that draw on sensory modalities in source and target domains cannot be taken as an example of conceptual metaphor while sticking to the tenets of the embodiment theory (see also Rakova 2003).

An alternative explanation to this situation is that not all types of metaphor show a homogeneous mapping, namely concrete-onto-abstract mapping. Rather, the tenet which is ubiquitous in conceptual metaphor is that we reason about one phenomenon in terms of another. Whether conceptual metaphor engages bodily-experienced phenomena and non-bodily-experienced phenomena as source and target domains respectively may not be relevant to determine to disregard certain cognitive processes as cases of conceptual metaphor (for a contrasting analysis of this type of mapping see Rakova 2003:30). In fact, this type of metaphorical mapping has led some scholars, within other disciplines to call into question the embodiment theory of metaphor (e.g. Pinker 2003).

Thus, in order for the theory of embodiment to account for this metaphorical mapping typology, we need to assume that the experience within the modality which functions as source domain is bodily experienced, but the modality which fulfills the role of target is abstract. In other words, sensory modalities take on a by-default role in metaphorical mapping. As seen before, this differentiation between source and target domains also creates dependency of the phenomena which function as target domains on those which function as source domains (see pages 120-129). Applying this finding to the mapping typology which engages sensory modalities as source and target domains would entail that the modality which functions as target domain is dependent on its counterpart in source domain. This dependency is clearly noticed within the theory of embodiment in that our experience of target modalities is assumed to be shaped through source modalities.

In this respect, our data shows that this differentiation is rendered impossible (see Table 5). Therefore, we need to deal with certain kinds of metaphorical mapping in different ways. That is, one cannot draw a viable distinction between source and target modalities sticking to the premises of the Embodied metaphor theory. Yet, this approach can account for the conceptual metaphor which engages sensory-modalities as source and target domains (see Chapter IV; for contrasting views on this matter see e.g. Rakova 2003). In this setting, we propose that the Embodied metaphor theory needs to refine its tenets to address different mapping typologies (see chapters I and II). This is an extremely important step into making use of recent discoveries within other disciplines for adjusting the tenets of the theory to potentially different metaphorical mapping typologies.

3.1.2.3. The problem of Concreteness-Abstractness

Principle

The concrete-abstract criterion is not satisfied by the mapping typology which we are concerned with in this chapter. Let us consider the following examples to illustrate this point:

Human Is Animal, Human Is Bird

(1) a. *My husband turned out to be an animal.*

b. *He picked up this bird at a downtown disco.*

Human Is Army

(2) *When she opened the door there was an army of journalists waiting for her.*

Human Is Liquid

(3) *Crowds spilled out of the train over the platform.*

Human Is Building

(4) Amino acids are the building blocks of the proteins and these building blocks of muscles.

Human Is Plant

(5) a. The FBI planted informers in the Mafia.

b. We've finally rooted out all the traitors from the party.

Human Is Animal

(6) a. Every education reform makes pupils guinea pigs.

b. On holiday I pigged out and put on 3 kilos.

Words/Language Is Human

(7) The introduction is too long and the body is too short.

Money Is Liquid/Blood

(8) Most of my money is in stocks and shares not liquid assets.

Money Is Food

(9) He earned his daily bread as a music teacher.

Vehicle Is Animal/Human

(10) The torn body of the aircraft was finally found.

Quantity Is Size

(11) His complaints were out of all proportion.

Quantity Is Water (Flow)

(12) Microsoft has been pumping out many new products lately.

It is worth noting here that in this set of examples, source and target domains are bodily experienced. More importantly, some domains function as source and target in different metaphorical mappings (see pages 80, 83, 222). Based on these examples it becomes clear that conceptual metaphor can draw on bodily-experienced phenomena as

source and target domains. This finding is especially problematic for the tenets of the embodied approach to metaphor as they are based on the assumption that metaphorical mapping engages two different phenomena, namely, bodily-experienced and non-bodily-experienced phenomena.

To illustrate, one can hardly explain the present data following the tenets of the embodiment theory because target phenomena (as well as source phenomena) are bodily experienced (Table 3). In this respect, there is no reason to assume that concrete domains such as Human, Animal, Machine, Money, Food, and Plant should be considered differently in terms of the experiential character of conceptual metaphor. The domains which are engaged in the mapping typology which draws on bodily-experienced phenomena in source and target domains expose common characteristics. However, as argued before, the embodied approach to metaphor stands on a strict distinction between source and target domains in that being bodily and non-bodily experienced are inherent features to source and target domains, respectively.

More importantly, the data shows that apart from taking on the role of source, certain phenomena also function as target in different metaphorical mappings (see examples (1)-(12)). This data is especially supportive of the fact that source and target domains have common features. Furthermore, it shows that the reason for constructing metaphorical mapping between two phenomena is not the fact that we need metaphor as a *sine-qua-non* cognitive process to have access to abstract phenomena. This is because metaphorical mappings in (1)-(12) are based on phenomena which are concrete and bodily experienced.

Nonetheless, analyzing this typology within the framework of the embodiment theory potentially leads to the following assumptions. First, in order for the tenets of this

theory to encompass this mapping typology, we are required to assume that mapping bodily-experienced onto non-bodily-experienced phenomena is ubiquitous in conceptual metaphor. Notice that the bodily-based information that operates in conceptual metaphor is exclusively attributed to source domains (e.g. Johnson 1987; Szwedek 2011). In this respect, the fact that metaphorical mapping can engage two bodily-experienced phenomena casts serious doubt over the generally accepted assumption that we map one phenomenon onto another because target domains are abstract and meaningless. For instance, the metaphorical mapping in (1) engages Human and Animal/Bird. The question that arises here is whether we should assume that Animal is bodily experienced but Human is abstract, complex, and semantically dependent. That is, we map Human as an abstract phenomenon onto Animal as a bodily-experienced phenomenon since there is no other way to conceptualize the former. Accordingly, our understanding of Human depends on another domain which is (more) concrete and bodily experienced.

Another example which lends significant support to the claim that source and target domains expose identical features in the mapping typology which draws on bodily-experienced phenomena as source and target domains is example (2). The fact that Human fulfills the role of the target domain in this example would entail that it is complex, abstract, and semantically dependent on the domain Army. Accordingly, being complex, abstract, and semantically dependent are irrelevant features to the mapping typology which engages two bodily-experienced phenomena.

Thereby, we structure, for instance, Human in terms of other bodily-experienced domains such as Animal, Bird, Army, Plant and Vehicle; and Money in terms of Food and Blood *not* because the target domains in this case are abstract, complex, and semantically dependent. As argued before, target domains in certain metaphorical mappings are accessed

via the sensorimotor system (see Table 3). For instance, Blood, Food, Animal, Vehicle, Plant, and Liquid are all bodily experienced.

Following the tenets of the embodied approach to metaphor, this characteristic is inherent to source domains. On the other hand, target domains are abstract and do not have any conceptual structure of their own (e.g. Lakoff and Turner 1989:58).

To sum up, based on the data analysis, target phenomena in metaphorical mappings are not always abstract, complex, and semantically dependent. In contrast, the embodied approach to metaphor is based on the general assumption that cross-domain mapping engages two different domains in terms of bodily-experienced and non-bodily-experienced phenomena. In this setting, this approach limits the functionality of conceptual metaphor, as a cognitive tool, to transferring bodily-based features from semantically independent domains onto dependent domains (see Chapter II).

The problem here is that source and target domains in the mapping typology which we are concerned with in this chapter draw on bodily-experienced phenomena. Following the tenets of the embodied approach to metaphor, these domains show conceptual structures. This is another important feature that seems to match the tenets of the embodiment theory and the *Propositionality-Linearity* perspective but does not comport with the data. To illustrate this point, let us reconsider examples (4) and (11):

Human Is Building

(4) *Animo acids are the building blocks of the proteins and these building blocks of muscles.*

Vehicle Is Animal/Human

(11) *The torn body of the aircraft was finally found.*

It is widely accepted that all source domains in metaphorical mappings are primitive experiences, as opposed to target domains which are complex. This notion has two subsequent assumptions: (1) source domains have conceptual structures and (2) these conceptual structures cannot allow further (re-)categorization (Lakoff and Johnson 1989:111-112). That is, they cannot be understood in terms of other phenomena. On the other hand, target domains are abstract, complex, indirectly meaningful, and, as a result, they are dependent on other domains for acquiring meaning (Lakoff and Turner 1989:111-112; Ungerer and Schmid, 1996).

Accordingly, target domains have to meet at least three conditions: being abstract, complex, and meaningless. Being so, our reasoning about them requires the use of other embodied concepts; henceforth, the embodying process via conceptual metaphor is a *sine-qua-non* process for understanding these domains.

As stated before, the metaphorical mapping typology which is based on two bodily-experienced phenomena posits a challenge to the tenets of the embodied approach to metaphor. In particular, no significant difference has been observed among source and target domains in terms of these features. Indeed, in this mapping typology, source and target domains are concrete and bodily experienced.

In order for this notion to apply to the present data, we have to assume that a domain should be considered primitive or complex depending on whether the phenomenon in question functions as source or target domain. Since certain domains function as source and target in different metaphorical mappings (see page 80), being abstract or concrete depends on the role those domains fulfill in metaphor. In contrast, the data shows that primitiveness and abstractness seem to reside in a functional basis rather than being inherent features.

A general conclusion that can be made from our analysis of this set of metaphors is that the characteristics which have been taken to be exclusive to source domains are also observed in target domains. This finding stands in opposition to the main assumptions which are widely held within the theoretical framework of embodied metaphor; namely, attributing the embodied and abstract natures, as inherent features to source and target domains, respectively. Here, for example, we have shown that target domains in some metaphorical mappings have the same characteristics as source domains—they are bodily experienced and semantically independent. Yet, by no means do we intend to extend our conclusion to all metaphorical mapping typologies.

3.2. Lineal construction of Metaphorical Mapping

3.2.1. Linearity of projection based on uni-directionality

As shown before, the subordination of target domains to source domains can be observed in two aspects: *time* and *meaning construction* (see pages 120-130). In the following sections, we shall see how this notion is an immediate conclusion of the Uni-directionality principle and how it does not fit the mapping typology which we are concerned with in this chapter.

3.2.1.1. Linearity in Time of Metaphorical Mapping

Based on the analysis of the data in the previous chapter, we concluded that another criterion which characterizes metaphorical mapping within the theoretical framework of embodiment is Linearity in time (see also Ahrens 2002:275; Mouton 2012:55-62). In this respect, it is widely accepted that metaphorical mappings require a prior experience of source domains which, later, it is mapped onto target domains (e.g. Gibbs 1996: 310;

Johnson 1987: XV; Kovecses 2002:6; Ungerer and Schmid 1996:21). That is, each conceptual metaphor is an instance of mapping a previously experienced phenomenon onto a recently (and indirectly) experienced phenomenon.

Similar observations have been made by Ahrens (2002:275), who claims that, "...inferring information from a conceptual structure (such as journeys) is a process that can only occur after one has *accessed* that conceptual structure." This means that our conceptualization of target domains is highly determined by our experience of source domains.

Additionally, (Mouton 2012) suggests a "historically situated approach" which shows how our experience of certain domains such as DNA evolves through newly acquired knowledge and leads to significant modification of metaphorical mapping. A similar line of argumentation has been adopted by Tejada Caller and Guzmán Guerra (2012:38), who show that cognitive and cultural frames are not stable, rather they are evolving through history (see also Trim 2011).

Contrary to the embodiment theory of metaphor, these scholars have not suggested that this pattern is ubiquitous in all metaphorical mappings. Instead, they argue that conceptual metaphors in the context of biology, economy, and business are dynamic because these phenomena are all-time changing domains (Herrera Soler and White 2012: 3-4; White 2003: 133-134; White and Herrera Soler 2003).

Turning back to the tenets of the embodiment theory, the phenomena which do not meet this condition (linearity in time) are not engaged in metaphorical mapping. This means that metaphorical mapping always follows the same chronological order—mapping features from an older phenomenon onto a more recent one. For instance, Johnson (1987: xv) observed that, "...through metaphor, we make use of patterns that obtain in our

physical experience to organize our more abstract understanding. Understanding via metaphorical projection from the concrete to the abstract makes use of physical experience in two ways”.

This affirmation has two main entailments: (1) in metaphorical mappings, bodily experiences are previous to abstract phenomena. And subsequently (2) source domains are prior to target domains. Also, without abstract concepts there would be no need for metaphorical mappings.

This situation posits a problem to the theory in the sense that our reasoning about target domains cannot take place unless one has previously experienced source domain (for a detailed analysis of this point, see Yucha 2002:275-276). The question which arises here is to what extent the metaphorical mapping which engages bodily-experienced phenomena in source and target domains may break the tenets of the embodied approach to metaphor.

Let us consider Love is Journey (Lakoff 1993:206)

Look how far we've come.

It's been a long, bumpy road.

We can't turn back now.

We're at a crossroads.

In order for the tenets of Embodied Theory to hold, we need to assume that our experience of the phenomenon Journey took place before our understanding of Love. This assumption is based on the basic premise that source phenomena are presumably experienced previously to target ones. In this regard, Feldman (2006:8) assures that, “...abstract thought grows out of concrete embodied experiences, typically sensorimotor experiences. Much of abstract thought makes use of reasoning based on the underlying experience”.

In this setting, the embodiment theory is based on the assumption that without bodily-experienced phenomena there would be no access to target domains. In addition, source and target phenomena have to fit into a chronological order in which source domains are experienced previously to target domains.

Under these assumptions, this chronological order seems to determine the role certain phenomena take on in metaphorical mappings. This characteristic, together with other features (see pages 59), are claimed to determine the role which a phenomenon has to carry out in metaphorical mappings. That is, not only does the embodiment theory constrain the mapping in terms of concrete-abstract distinction but also it implies that the two phenomena which are engaged in metaphorical mapping are experienced in a chronological order. Namely, the phenomenon which is bodily experienced is experienced first and functions by default as source domain; but the non-bodily experienced phenomenon always takes on the role of target domain and our reasoning about it comes afterwards.

As seen in Chapter II, this *Linearity* creates an interdependence relationship between source and target domains in that (1) we need a bodily experience of a given phenomenon and (2) a more recent phenomenon whose semanticity is shaped via another concept. This notion is assumed to include also metaphorical mappings that are based on “correlation” of source and target phenomena such as

More Is Up

Less Is Down (e.g. Lakoff and Johnson 1989:83-84).

That is, even when two phenomena tend to co-occur, we should assume that source domains are experienced previously to target ones. This means that metaphorical mapping is lineal because source phenomena are processed before the target ones (see Chapter II).

According to the embodiment theory, all concepts are embodied (e.g. Feldman 2006; Johnson 1981, 1987; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Szwedek 2011), all source phenomena are grounded in our bodily experiences which take place before our experience of target domains. From here, it becomes clear that this approach suggests that we experience and process information concerning source phenomena and then we reason about target phenomena by projecting onto them the bodily-based information of the former. This, in turn, will lead us to another overgeneralization regarding metaphorical mapping—namely that it is lineal in time: source phenomena are previous to target phenomena.

This linearity is based on the assumption that mapping always engages bodily experiences as source domains and abstract phenomena as target domains. Notice that it is not plausible to affirm that our understanding of the domain Journey takes place before our understanding of the domain Love.

The question which arises here is whether this linearity of metaphorical mapping can be applied to conceptual metaphors where source and target domains are grounded in bodily-experienced phenomena. For instance,

Machine Is Human

(1) These sports utility vehicles are real gas guzzlers.

Human Is Machine

(2) a. I could never discover what makes Ann tick.

b. I started well, but later I ran out of steam.

Human Is Plant

(3) The FBI planted informers in the Mafia.

Human Is Animal

(5) *Every education reform makes pupils guinea pigs.*

Words/Language Is Human

(6) *The introduction is too long and the body is too short.*

Human Is Ship

(7) *She was rigged out in ballerina.*

A general conclusion that can be made here is that the characteristics which have been claimed to be exclusive to source domains are also evident in target domains. Target domains are, therefore, meaningful without being mapped. Again, this requires a chronological order in which, presumably, our experience of source and target domains can be captured. Since these instances of metaphor do not meet the concrete-abstract criterion, this linearity in time would not hold either in this particular metaphorical mapping typology. Indeed, Rakova (2003: 28) calls into question the chronological order of source and target phenomena, “Does it [metaphorical mapping] mean that without the concept of journey the concept of love would be meaningless?” (see also Guarddon Anelo 2005:303-4).

In contrast, the chronological order of metaphorical mapping seems to fit the tenets of the Embodied metaphor theory. For instance, Szwedek (2011:364) assures that, “...at the earliest stage of the development of mankind, communication must have concerned mainly, if not exclusively, the physical world”.

Another piece of evidence for this incongruity is reported by Steen (2011) where he asks why it is assumed within the embodied approach to metaphor that children first acquire the literal meaning of terms such as *defend*, *attack*, *win* etc. and then they figuratively project these meanings. In other words, why is it assumed that understanding the phenomena of source domains takes place first and then this understanding is extended

to target domains, given that there are cases where one may be exposed to target phenomena without having previously experienced source phenomena?

In this respect, Steen (2011:30-31) points out that we can reason about abstract concepts independently of our sensorimotor system. Based on Giora (2003, 2008), he further sustains that, “The metaphorical sense of many words may have become the most salient sense to the contemporary language user, so that the basic sense is not involved in the stage of concept activation” (Steen 2011: 50).

Additionally, there may be (an)other case(s) of metaphorical mapping where our experience of target phenomena may take place before source phenomena. This could be an interesting line of investigation to shed more light on linearity of metaphorical mapping.

To sum up, there is no cogent evidence that our experience of source domain should be first and our experience of target domain takes place later. On the contrary, we do have evidence to assume that this ‘chronological order’ standpoint is not suitable to account for the mapping typology which engages bodily-experienced phenomena as source and target domains. This is due to the fact that since source and target domains are grounded in bodily-experienced phenomena, there is no evidence for this chronological order. If these phenomena, in source and target domains, are bodily experienced, then the process of embodying is not crucial to our understanding of target domains. This seems to contradict the embodiment theory because, following Lakoff and Johnson (1980:19), “[...] no metaphor can ever be comprehended or even adequately represented independently of its experiential basis [...]”. It is worth noting here that the experiential basis of conceptual metaphor is fully attributed to source domains.

3.2.1.2. Linearity of metaphorical mapping based on meaning construction

The meaning which we achieve via metaphorical mapping is a lineally-based process. First, we process the meaning of the phenomena in source domains and afterwards, through this knowledge, we understand target phenomena. That is, source domains fulfill the chief role in both constructing and processing metaphorical mapping in that they impose their characteristics on target domains (e.g. Szwedek 2011). On this account, our reasoning about target domains is shaped by our understanding of source domains. For instance, Lakoff (2008:18-19) sustains that, "...if you cannot imagine someone picking up a glass, you cannot understand someone picking up a glass".

This assumption puts metaphorical mapping in two sequenced, though intrinsically linked, cognitive processes. Without processing the meaning of the phenomena in source domains, it is hard to process the ones in target domains. In this respect, the cognitive topology of target phenomena depends exclusively on the physical topology of source phenomena. Accordingly, the inference that we get out of metaphorical mappings is also lineally based.

3.2.2. Linearity of projection based on meaning transfer

3.2.2.1. Autonomous (source) domains and subordinate (target) domains

Within the embodied approach to metaphor, target domains are viewed as abstract, complex, and dependent on other domains for acquiring their meaning—that is, they are indirectly meaningful (Lakoff and Turner 1989:111). Any phenomenon which fulfills the

function of target domain has to meet at least two conditions: it has to be abstract and complex. Being so, our reasoning about it requires accessing it through the use of other embodied concepts (e.g. Feldman 2006). Consequently, embodying process –or using Szwedek’s “objectification” process (2011:346; see also Szwedek 2000, 2002, 2004, 2007a, 2010) is crucial to understanding abstract phenomena.

Metaphorical mapping, in this respect, has been argued to be indispensable to assign meaning to (meaningless) target phenomena. In this setting, source domains convey meaning to target domains via projecting into them bodily-based features alongside their semantic features. That is, target domains acquire those features only through being engaged in metaphorical mapping. Accordingly, the role of metaphorical mapping is to endow target phenomena, which are not accessible to the sense organ, with conceptual structures. For instance, Szwedek (2011:350) argues that, “The dependency of conceptualization of space and structure on concrete objects means that the fundamental, ultimate experiential basis is our experience of physical objects, the only entities directly accessible to our senses.”

This notion does not seem to characterize the case where metaphorical mapping engages two bodily-experienced phenomena. That is, if bodily-experienced domains are semantically independent because they have their own conceptual structures, then we can reason about them outside metaphorical mapping. Hence, there is no need for mapping them onto other phenomena. Again, this indicates that if the two domains are experienced via the sensorimotor system, there is no need for engaging them in metaphorical mapping since the objective of the latter is to access the phenomena which are not accessed otherwise.

The operating mechanisms of this metaphorical mapping typology may run counter to the tenets of the embodied approach to metaphor in that the two domains do have pre-existing conceptual structures outside the metaphorical mapping. If it is so, then conceptual metaphor would be merely a process of mapping the two domains without adding anything new to our understanding of target phenomena. Murphy (1988), for instance, embraces this view suggesting that metaphorical mapping is a pragmatic use of language, having nothing to do with conceptualizing and reasoning about phenomena in terms of others. In close connection to this notion, Rakova (2003) casts doubt over the inexistence of concepts regarding target domains outside metaphorical mapping. For instance, she (2003:27) sustains that we *do* have the concept of Love Relation before mapping it onto Journey but what we get after the metaphorical mapping which engages these two phenomena is a new grasp of the target domain, Love Relation.

However, Murphy's (1988) approach stands in opposition to our findings in the previous chapter because a certain mapping typology can be looked at from the Propositionality-Linearity perspective (see Chapter II). That is, metaphor is not merely a matter of pragmatics. Rather, it consists of transferring bodily-based features from source onto target domains alongside the semantic relation that these features maintain in the source domain. This means that metaphor is a matter of concepts construal (Lakoff and Johnson 1980, 1999).

On the other hand, Rakova's (2003:28) standpoint seems to fit the data. For instance, source and target phenomena are meaningful independently of metaphorical mapping. Interestingly, the embodiment theory argues that metaphorical mapping consists of drawing systematic correspondences between constituents of source and target domains (e.g. Johnson 1981, 1987; Lakoff 1987, 1990, 1993; Lakoff and Johnson 1980). Based on

this affirmation, Murphy (1996:177) states that source and target domains, then, do have conceptual structures independently of metaphorical mapping. He (1996:179) further suggests that conceptual metaphor "...arise out of the similarity of pre-existing conceptual structures..."

These affirmations are particularly supportive of our hypothesis that target domains in certain typologies are semantically independent. Though this notion actually fits the data, it runs counter to the general assumption within the theory of Embodied metaphor, which is based on the fact that metaphor is used to reason about certain phenomena which are not reasoned about otherwise.

In this setting, the phenomena that show pre-existing conceptual structures, following the embodied approach to metaphor, would not be engaged in metaphorical mapping as target domains (see Chapter II). Put differently, if these phenomena are semantically independent, then it would not be necessary to map them as target domains in order to reason about them. Furthermore, if these domains have their own constituents and inferences before the mapping is construed (Murphy 1996:179), then, following the embodied approach to metaphor (Lakoff and Turner 1989:111), metaphorical mapping would add nothing substantial to our conceptualization of target phenomena.

However, when cross-domain mapping involves two bodily-experienced phenomena, a theoretical problem arises within this approach. In the previous section we identified the reason why linearity of metaphorical mapping in time does not fit the data. As stated before, since source and target domains can equally be experienced bodily; there is no reason as to claim that our experience of source phenomena is prior to target phenomena.

In this section, we shall see that linearity across domains in terms of 'source components' and 'target components' does not fit either. Moreover, from the Linearity standpoint (see pages 120-130), source and target domains can be classified into two groups: semantically autonomous phenomena (source domain) and subordinate phenomena (target domains). This sense is also similar to that stated in Lakoff and Turner's (1989: 113-120) grounding hypothesis, in which they argue that the meaning of abstract phenomena is grounded in semantically autonomous domains. This autonomy-subordination-based metaphorical mapping becomes even clearer in the following statement: "Abstract thought grows out of concrete embodied experiences, typically sensorimotor experiences (Feldman 2006:7)." In order to address this issue we suggest a further analysis of the mapping typology which draws on bodily-experienced phenomena as source and target domains, for instance:

Machine Is Human

(1) These sports utility vehicles are real gas guzzlers.

(2) The air raid knocked out the enemy radar.

Human Is Machine

(3) I could never discover what makes Ann tick.

Within the theoretical framework of embodiment theory of metaphor, the notion that bodily-based features of source domains are transferred onto target domains is based on the experiential basis of source domains (see Chapter II). Since these domains are bodily-experienced, our cognitive system has a 'direct' access to them; henceforth, they are semantically autonomous (Lakoff and Turner 1989:113-120). On the other hand, target domains are abstract and their meaning is acquired indirectly via imposing bodily-based features of source domains onto them (Szwedek 2011:344). That is, they are by default

indirectly meaningful because they are not eligible for direct experience, which means that target domains are subordinate to source domains. In this setting, our understanding of source domains comes first and that of target domains is regarded as derivative of the former. For instance, Kövecses (2000:82) states that, "...The target domain inherits the main meaning focus (or foci) of the source."

Nonetheless, in the instances of metaphor where both phenomena are bodily experienced, such as (1), (2), and (3), the conditions that have led cognitive linguists to argue that we transfer features of bodily-experienced domains onto abstract phenomena are not observed. One such condition is the principle of mapping concrete and abstract phenomena in metaphorical mapping. To illustrate, (1), (2), and (3) engage bodily-experienced phenomena as source and target domains. In this setting, we understand Machine in terms of Human and Human in terms of Machine, respectively.

Therefore, analyzing these metaphors taking into account the tenets of the embodiment theory, we would be required to assume that the phenomena which function as target domains are semantically subordinate to source domains; whereas the latter are semantically autonomous. Again, applying this notion to (1), (2), and (3) would mean that in example (1), Human would be semantically autonomous both inside and outside metaphorical mapping. Being so, it is used as source domain. On the contrary, Machine would be semantically subordinate to Human and meaningless outside metaphorical mapping. Being so, it is indirectly meaningful. This implies that Human and Machine are directly meaningful domains, that is why they fulfill the role of source domains in the data.

Nonetheless, this seems not to be the case in (3), where Human now performs the function of source domain. In this example the aforementioned characteristics of source domains need to be reversed inasmuch as Machine now becomes semantically autonomous

(directly meaningful). Consequently, its features are transferred to the target domain Human. In contrast, Human now is semantically subordinate (indirectly meaningful) and so it receives features of the bodily-experienced domain, Human. However, this mapping typology excludes the assumption that Human (as target and as indirectly meaningful domain) is embodied via Machine (as bodily-experienced and directly meaningful domain).

Additionally, another aspect of this autonomy-subordinate relation between source and target domains, which needs further exploration is that the idea that being autonomous or subordinate entails that while the source domain Human imposes its features on target domain Machine, the former remains semantically autonomous in metaphorical mapping. To illustrate, the cognitive topology of the source domain does not undergo any semantic change when it is mapped (see page 264 on how source domains are also influenced in metaphorical mapping). Interestingly, this observation dismisses the assumption that there is a one-way-meaning transfer of features across domains based on bodily-experienced phenomena as (directly meaningful) source domains and non-bodily-experienced phenomena (indirectly meaningful) as abstract domains. The examples above do not reveal any substantial difference worth considering in terms of the characteristics (see Chapter I and II) that are believed to be unique to source domains.

To sum up, the assumption that one-way-meaning projection based on semantically independent and dependent phenomena is misleading when taken as an absolute pattern to all metaphorical mapping typologies. Thereby, the data suggests that the mapping typology which draws on two bodily-experienced phenomena cannot be accounted for as one-way-meaning transfer of features because target domains also are grounded in sensorimotor experience. Thereby, the notion that metaphorical mapping draws on semantically independent phenomena (as source domains) and semantically dependent phenomena (as

target domains) does not characterize the mapping typology which engages two bodily-experienced phenomena.

3.2.3. Linearity of Metaphorical Mappings vs. Synaesthesia-based mapping typology

As shown in the previous section, metaphorical mapping within the embodiment theory is based on a chronological order which characterizes source and target domains. We also noticed that this notion in particular reveals major theoretical problems within the embodied approach to metaphor if we take into account the metaphorical mapping typology where source and target domains are bodily-experienced.

In this section, we will assess whether this assumption also proves problematic in the case of synaesthetic metaphor. As this mapping typology engages sensory modalities as source and target domains, we are faced again with the problem of analyzing it in terms of the *concrete-abstract* distinction and *linearity of mapping across domains* perspective. We showed before how these two tenets do not match the data when source and target domains are bodily experienced (see pages 170-177).

In the following sections we shall show how the entailments of these tenets may not cover this metaphorical mapping typology. For this purpose, we shall focus our attention on the mapping that underpins synaesthetic metaphor and see whether the Linearity-Propositionality perspective fits this kind of mapping.

3.2.3.1. Mapping across sensory modalities and the chronological order of source and target domains

As shown before, the tenets of the embodied approach to metaphor implies that the two phenomena which are engaged in metaphorical mapping are processed in chronological order. Applying this assumption to synaesthesia-based metaphor would mean that the sensory experience which performs the function of source is prior to the sensory experience which takes on the role of target domain. Notice that we proved in the previous chapter that Linearity is based on the fact that source domains are experienced before target domains (see page 120). In synaesthetic metaphor, this would mean that source modality is experienced before target modality. Therefore, analyzing this mapping typology sticking to the tenets of the embodied approach to metaphor might show important incongruities within the theory which need further exploration. To illustrate this point, let us consider the following table:

Source Modality	Target Modality	Examples
Vision	Audition	(1) Bright sounds
Audition	Vision	(2) Loud colours
Somatosensory	Gustation	(3) Sharp tastes
Somatosensory	Olfaction	(4) Heavy smells
Force	Audition	(5) Raise voice

Table 6 Mapping Across Sensory Modalities

According to the tenets of the embodied approach to metaphor, the modality of vision should be assumed to be experienced before the auditory modality. The experience of source modality is prior to the target. Also, we are required to accept that the modality of somatosensory is experienced before the gustatory and olfactory modalities. A piece of evidence for the fact that this notion cannot be held to explain this mapping typology is that the visual modality is mapped onto the auditory modality in (1), but this mapping is reversed in (2). This makes it hard to argue that source modalities are prior to target

modalities. To our knowledge, there has been no study to address whether certain modalities are experienced before others and how our synaesthetic metaphor could fit into the chronological order which we explored in Chapter II.

3.2.3.2. Mapping across sensory modalities and lineal meaning transfer principle

In this section, we shall examine cross-modality mapping to assess whether Linearity in meaning construction can be applied to this typology. For this purpose, we need to reconsider Table 6 above. Our task here is to check whether source and target modalities can be differentiated in terms of the tenets of the embodied approach to metaphor (see 155). This time, however, we shall pay special attention on meaning transfer principle.

In order to explain this metaphorical mapping typology within the embodied approach to metaphor, auditory, visual, tactile, olfactory, and gustatory modalities should be classified according to the tenets of this approach. This means that we should differentiate them in terms of the following criteria:

- i. In terms of Uni-directionality: Mapping across these modalities would be unidirectional because if a modality functions as source domain, it cannot take on the role of target in other metaphorical mappings, given the inherent features that are attributed to source and target domains (see pages 116,118). Indeed, as the table above shows, there is a multi-directional mapping among these modalities. For instance, auditory, visual and gustatory modalities function as source and target domains in different metaphorical mappings.

- ii. In terms of subordination-autonomy relation between source and target domains: In metaphorical mapping, source modalities are autonomous in the sense that they are semantically independent. In contrast, the phenomena which are processed as target modalities are semantically dependent on source modalities. This incongruity is obvious in the fact that the experience of source modality would be semantically autonomous whereas the modality in the target domain is semantically subordinate. That is, following the tenets of the embodied approach to metaphor, target modality would be more complex and presumably another ‘bodily-experienced’ modality is required to cognitively access such modality.
- iii. In terms of concrete-abstract distinction: Based on our analysis of the metaphors in the table above, the tenets of the Embodied metaphor approach do not fit this criterion. Metaphors (1) and (2) above are especially indicative of this point in that we need to view certain modalities as concrete and abstract phenomena. In contrast, there is no reason why we should believe that source and target modalities are different in terms of this criterion.
- iv. In terms of chronological order: we observed how this criterion does not fit the mapping typology which draws on bodily-experienced phenomena (see page 184). That is, the mapping typology which draws on a sensory modality as source and target domain cannot be put in a chronological order.

To sum up, the metaphorical mapping typology which we have been concerned with in this chapter does not fit the tenets of the embodied approach to metaphor. This situation is due mainly to three key facts. First, this type of metaphorical mapping does not follow a chronological order of occurrence among source and target domains. Second, the concrete-abstract criterion cannot account for this mapping typology as source and target domains

are bodily experienced. Third, source and target domains cannot be differentiated in terms of dependent and autonomous domains.

Conclusion

The tenets of the embodiment theory cover a broad aspect of metaphorical mapping. However, the assumption that conceptual metaphor is instantiated in one mapping typology contradicts the data. In particular, adopting the view that all metaphorical mappings engage bodily-experienced phenomena (as source domains) and non-bodily-experienced phenomena (as target domains) raises major theoretical problems.

In this chapter, we have confirmed that while the assumptions of this approach can be applied to a certain metaphorical mapping typology (see Chapter II), the task becomes difficult when one tries to examine different mapping typologies sticking to the tenets of the theory of embodiment.

In this respect, the theory needs to be refined to be able to account for different mapping typologies. For instance, mapping across bodily-experienced phenomena has shown that most of the tenets of the embodied approach to metaphor fail to account for this typology. This refinement process requires the theory to start out with accepting that metaphorical mapping is *not* instantiated through a single mapping typology—namely, mapping concrete onto abstract phenomena. This is due to the fact that different metaphorical mapping typologies follow different operating mechanisms (see the following chapter).

In this chapter we have also shown that metaphorical mapping has a wider scope because it does not only engage bodily and non-bodily-experienced phenomena as source and target domains, respectively. Instead, the data indicates that metaphor operates also on

bodily-experienced phenomena as target. Importantly, in this case, metaphorical mapping may follow different patterns and processing. In this respect, we have shown that the metaphorical mapping typology which engages two bodily-experienced phenomena substantially differentiates from other typologies.

In line with this finding, our proposed perspective –Linearity and Propositionality of metaphorical mapping—*does* fit the data put forward in this chapter. Recall that this perspective fits perfectly well the tenets of the theory of embodiment (see Chapter II). Since not all metaphorical mapping typologies engage non-bodily-experienced phenomena (as target domains), we hypothesized that a certain type of metaphorical mapping would show potential incongruities within the embodiment theory—namely, the mapping typology which involves bodily-experienced phenomena in its source and target domains.

Accordingly, we tested the entailments of the tenets of this theory and showed that they cannot account for this type of metaphorical mapping. This is due to the fact that the theoretical framework of Embodied metaphor is based on the general assumption that bodily-experienced and abstract phenomena are inherently source and target domains, respectively. Conversely, the data indicates that source and target domains do not prove to have inherent features to perform a by-default function in metaphorical mappings. To illustrate, so far in this chapter we have demonstrated that target domains show some of the characteristics which are believed to be inherent to source domains.

One of those common features is that source and target domains are concrete and bodily-experienced. This means that target domains are not devoid of bodily-based information that were held—within the embodied approach to metaphor—to be circumscribed to source domains, and which are believed to be the only operating features

in metaphorical mappings. That is, within this approach, the experiential character of metaphor has been exclusively attributed to source domains.

Possibly, this notion is rooted in the fact that the analysis of conceptual metaphor has been carried out through the filter of the constitutive nature of source domains.

In contrast, since target domains in the typology we have been concerned with in this chapter are also bodily-experienced, there is no reason to believe that the features of source domains are the only operating features in metaphorical mapping. This is because in this typology both phenomena are concrete and bodily-experienced.

Taken together, these findings reveal two main entailments: first, target domains might be put at the same level as source domains in terms of their contribution to the experiential basis of metaphor. Second, metaphorical mapping also operate on bodily-experienced phenomena. In this respect, we have paid scant attention to the characteristics of target domains and their relation to source domains in terms of the “experiential basis” of conceptual metaphor. The characteristics that have been believed to be common to only source domains seem to be operating in target domains too.

Obviously, we did not intend to cover all the characteristics of target domains (see the following chapter). Rather, we only highlighted those that have been previously believed to be exclusive to source domains and which conceptual metaphor has been argued to endow conceptual metaphor with an experiential basis.

Of particular interest also is that the *primitive-complex* distinction does not prove reliable to assign phenomena the roles they take on in metaphorical mapping. Indeed, our analysis of the data shows that there is no cogent criterion to differentiate them because the two are shown to be grounded in bodily-experienced phenomena.

These findings open a new direction in our investigation regarding conceptual metaphor. Namely, if the phenomena which carry out the function of target domains can fulfill the role of source domains in certain mapping typologies, then they do not have *inherent* features that allow them to take on the role of source or target. It is worth noting here that since our focus falls only on mapping across bodily-experienced phenomena, some of our conclusions that have been drawn here may not be applied to other instances of metaphor (see Chapter II).

Based on these findings, target domains may well fulfill a vital function in metaphorical mapping than have been previously believed. The following step is to assess whether target domains carry out the same role as source domains in the sense that they also shape metaphorical mappings. This might mean that target phenomena are not ‘passive’ as it is held within the embodiment theory.

In this chapter, we demonstrated how mapping across bodily-experienced phenomena suggests a challenge to the theory. Accordingly, the embodiment theory might need to take into account also the characteristics of target domains which may be specific to some metaphorical mapping typologies. When a given metaphorical mapping engages bodily-experienced phenomena in source and target domains, the experiential basis of conceptual metaphor may not be fully attributed to source domains.

Interestingly, once source and target domains are put at the same level in terms of their experiential character, it is possible to make a hypothesis on the basis of the aforementioned findings that target domains also contribute to the embodied character of conceptual metaphor. This will lead us in the following chapter to suggest another way of looking at metaphor. That is, rather than imposing “recorded” experiences of source onto target domains, we shall hypothesize that the mapping typology wherein source and target

domains are grounded in bodily-experienced phenomena there is interaction between such domains. In this respect, we put forward another theory—domains interaction—to deal with this type of metaphorical mapping.

Chapter IV: From Projection to Interaction: a Further Step towards a more Embodied Approach to Metaphor

1. Introduction and Hypothesis

There is a vast amount of metaphor research in cognitive linguistics that has adopted the assumption that conceptual domains inherently include some features that legitimize them for taking on the role of source or target (see Chapter II). This theoretical framework assures that all the bodily-based information that we need to establish a metaphorical mapping between two phenomena exists in the source domain (e.g. Szwedek 2011).

It follows from this that proponents of this approach draw their assumptions concerning metaphor based exclusively on the experiential character of source domains. Consequently, the embodiment theory has dealt with metaphor primarily as a mechanism of representing abstract phenomena—which are not accessed otherwise (see pages 56-59).

As a result, research within this theory has been limited to identifying patterns and principles of representing abstract phenomena through the filter of the embodied character of source domains. By focusing on how we reason about abstract phenomena, this theoretical framework limits the scope of the investigation on metaphorical mapping. Recall that, in the previous chapter, we demonstrated that one of such constrains is that conceptual metaphor operates only on abstract phenomena (see pages 177-184).

In this setting, ascribing conceptual metaphor a (unique) role—that of bridging our reasoning system to abstract phenomena—also limits the methodology of doing research within Cognitive Linguistics. This focus has major impact on the theory insomuch that

metaphorical mapping is examined in terms of the mechanisms which operate in source domains. In particular, metaphorical mapping has been studied in terms of the conceptual structures such as *image schemas* (Grady 2005a; Lakoff 1990; Lakoff and Turner 1989) and Idealized Cognitive Models (1987); and Conceptual Frames (e.g. Feldman 2006).

In this respect, this theoretical framework classifies the two phenomena which are engaged in metaphorical mapping into two groups: abstract (and complex) target domains, which are not subjected to direct experience. The second group includes source domains, which are bodily-experienced phenomena and are subjected to direct experience (e.g. Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1987, 1990, 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Szwedek 2011).

However, we demonstrated in Chapter III that these assumptions are at variance with the current data. We showed that the mapping typology which engages bodily-experienced phenomena in source and target domains posits a challenge to the theoretical framework of the embodied approach to metaphor in two ways: first, target domains in this type of metaphorical mapping are bodily experienced. Second, certain domains function as source and target in different metaphorical mappings.

Based on these findings, we argued that source and target domains do not show any substantial difference in terms of their constitutive nature (see page 164). Indeed, the data indicates that the constitutive nature of these domains is virtually identical in that source and target domains are grounded in bodily-experienced phenomena.

These findings unveil an incongruity regarding the theoretical position within the embodied approach to metaphor in that source and target domains are strictly delimited in the sense that they are directly and indirectly meaningful phenomena, respectively. This

criterion, according to which source and target domains are distinguished, does not prove reliable (see Chapters I and III). On such view, we claimed that while these tenets are applicable to some types of metaphor (see Chapter II), they cannot be used to cover others (see Chapter III).

It is worth noting here that meaning projection has been attributed to the domains which are bodily experienced (e.g. Gibbs 1994, 2011; Gibbs and Matlock 2008; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff and Johnson 1980, 1992, 1999; Lakoff and Turner 1989; Szwedek 2011).

Interestingly, target domains in a certain metaphorical mapping typology are also bodily-experienced. This means that apart from the fact that the concrete-abstract distinction does not hold in the metaphorical mapping typology which is based on bodily-experienced phenomena as source and target domains, meaning projection may not be characterized by a-one-way transfer.

Taken together, these findings point to a more participating role of target domains in the metaphorical mapping which engages bodily-experienced phenomena as source and target domains. Given that target domains in this typology are bodily experienced, we hypothesize that target domains also project their conceptual structure onto source domains inasmuch that their features also contribute actively in the construal of metaphorical mapping.

Accordingly, we further hypothesize that this kind of metaphor has different mechanisms for mapping. In this respect, we put forward the following hypothesis: rather than attributing source domains a dominating role, we claim that target domains also might share with source domains the embodied character of metaphorical mapping. On this view, metaphorical mapping is not just setting correspondences between source and target

domains based on the experiential basis of the former. Instead, we hypothesize that in certain mapping typologies there might be an interface between two bodily-experienced phenomena which coordinate in shaping conceptual metaphor. Therefore, in such mapping typologies there might be an interactive process between source and target domains rather than one-way-meaning transfer.

To assess whether this type of metaphorical mapping is fundamentally different from other types, we need to show that target domains are more dynamic. By doing so, we shall be able to uphold our claim against the homogeneity of conceptual metaphor typology and its presumable closed set of tenets. That is, if conceptual metaphor *does* follow different principles and patterns, distinct mapping typologies may not satisfy certain tenets of the theory of embodiment.

Therefore, the aim of this chapter is to assess (1) whether the experiential basis of metaphor is due to bodily features of source and target domains and (2) whether there is interaction between source and target domains in mapping across bodily-experienced phenomena. In this respect, we propose that metaphorical mapping involves bodily features from both domains.

The approach to metaphor which we propose to analyze this metaphorical mapping typology is a dynamic process which encompasses:

- i. Attributing a more participating role to target domains;
- ii. Metaphorical mapping is interaction between source and target domains; and
- iii. This interaction is testable at three levels; language, cognition, and neural system.

Thereby, rather than being passive, target domains will be attributed a dynamic role in metaphorical mapping. Then we can call into question the notion of projecting features

of source onto target domains based exclusively on the bodily characteristics (and their entailments) of the former.

These hypotheses reside in the fact that source and target domains share the same characteristics that are believed to be inherent to source domains (see Chapter III). Notice that the embodiment theory draws its conclusions about metaphor putting major emphasis on two characteristics of source domains: *being bodily-experienced* and *being semantically autonomous*. It is worth noting here that all the patterns and principles of mapping are derived from these characteristics. More importantly, engaging semantically autonomous phenomena and semantically dependent phenomena is based on the assumption that there is features-transfer from source onto target domains. Henceforth, *meaning transfer*, *invariance principle*, and *mapping concrete-onto-abstract* patterns.

In contrast, no clear-cut distinction between source and target domains has been observed in the metaphorical mapping that engages two bodily-experienced phenomena (see Chapter III). In particular, we did not observe any substantial difference between source and target domains in terms of their constitutive nature. However, we do not claim that the metaphorical mapping which draws on bodily-experienced phenomena as source and target domains is rooted in literal similarity between such phenomena (for contrasting views, see e.g. Marks, Hammeal, and Bornstein 1987; McGlone 2003; Miller 1993; Murphy 1996).

In contrast, in Chapter III, we showed how target domains in some instances of metaphor are concrete and bodily experienced. This particular finding has led us to question some criteria that are proposed within the embodiment theory to explain all conceptual metaphors. One such criterion is that metaphorical mapping always engages more concrete and abstract phenomena as source and target domains, respectively. Since this pattern has

not been observed in a certain type of metaphorical mapping (see Chapter III), we suggested that in this case, metaphor is not analyzed at an adequate level within the embodiment theory given that target domains are concrete. Therefore, it is safe to argue that target domains also contribute to metaphorical mapping because they are bodily-experienced and directly meaningful.

Accordingly, our primary concerns were to show the incongruity that emerges from conceiving conceptual metaphor as based on a single mapping typology and to highlight the fundamental necessity of refining the tenets of the embodiment theory to cover the typology which engages bodily-experienced phenomena as source and target domains, respectively. Furthermore, we demonstrated that in this case source and target domains do not present any substantial difference in terms of how they are experienced (see page 164).

Based on these findings, we put forward the following hypotheses: since source and target domains are bodily-experienced in certain types of metaphor, the embodied character of conceptual metaphor should not be attributed exclusively to source domains. This could mean that one-way-meaning transfer might not characterize this metaphorical mapping typology. In this respect, we propose that the metaphorical mapping which engages bodily-experienced phenomena as source and target domains might draw on the exchange of semantic features of these domains.

Thereby, our tasks in this chapter are (1) to show that source and target domains are not substantially different when it comes to their embodied character. This might entail that the same mechanisms of experience operate in source and target domains. And (2) we suggest that there might be an interaction between source and target domains leading to their co-operation in metaphorical mapping.

2. Background

2.1. Interaction Theory (Richards 1936; Black 1962, 1981, 1993; Forceville 1996, 2006)

Interaction Theory (IT) was first brought forward by Richards (1936) to explain metaphorical statements. According to him, metaphor is a result of a system which is based on three principles:

- i. verbal interaction (Richards: 91-2);
- ii. borrowing between and intercourse of thoughts; and
- iii. a transaction between contexts (Richards: 94).

Based on these affirmations, IT rests on three aspects of domains of experience when they are engaged in metaphorical mapping: linguistic structure, as a manifestation of lexical interaction; cognitive structure, as interchange of concepts between semantic fields; and contextual relation, as transaction between experiences.

Notice that in number (i) Richards (1936) puts major focus on the “verbal interaction” of metaphor. However, this interaction acquires a deeper dimension in surpassing the linguistic level by claiming that, “In asking how language works we ask about how thought and feeling and all other modes of the mind’s activity proceed, about how we are to learn to live and how that ‘greatest thing of all,’ a command of metaphor...”. (Richards: 1936:95).

Interestingly, a more recent version of the Interaction approach to metaphor puts a special emphasis on the fact that in metaphorical statements we identify two different subjects: *the principal*; which is the focus of the metaphor; and *the subsidiary*. These two subjects interplay in metaphor in that,

“...the two subjects ‘interact’ in the following ways: (a) the presence of the primary subject incites the hearer to select some of the secondary subject’s properties; and (b) invites him to construct a parallel implication-complex that can fit the primary subject; and (c) reciprocally induces parallel changes in the secondary subject” (Black 1993:28).

Accordingly, rather than putting emphasis on how target domains are those which are changed, restructured, and partially understood; the two domains are claimed to be involved in a process of mutual influence. For instance, Richards (1936:93) argues that, “In the simplest formulation, when we use a metaphor we have two thoughts of different things active together...whose meaning is a resultant of their interaction...(and) depends on what the two ideas do to one another. ”

In addition, Kittay (1987:189) describes metaphorical mapping as a process of “adaptation” and “transformation” of domains of experience. A particular feature which characterizes this process is that it is based on pre-existing features that the two phenomena share (Forceville 1996:11; see also Murphy 1996).

These arguments seem to comport with our findings in the previous chapter in that target domains also include semantic features without being mapped onto other phenomena. That is, they are semantically independent because they do not need to be mapped as a sine-qua-non process to be understood and reasoned about. Thus, the cognitive topology of target domains in certain mapping typologies pre-exist the mapping (see page 177 for more details).

2.2. Conceptual Metaphor and Interaction Theory

The interaction theory has been claimed to be inadequate to analyze metaphor namely because conceptual metaphor is (1) a one-way-meaning transfer; and (2) concrete domains are mapped onto abstract domains (Lakoff and Johnson 1980, 1999). Johnson and Lakoff (2002: 245) further insist that,

“...meaning is grounded in our sensorimotor experience and that this embodied meaning was extended, via imaginative mechanisms such as conceptual metaphor, metonymy, radial categories, and various forms of conceptual blending, to shape abstract conceptualization and reasoning.”

There is a strong consensus within Cognitive Linguistics that target domains are by default far or initially isolated from the body and source domains fulfill the role of projecting semantic features onto them.

In this respect, a heavy emphasis has been put on source domains in the sense that their characteristics ‘constrain’ metaphorical mapping. This excessive focus on source domains (and their cognitive topology) has led scholars within this approach to analyze metaphorical mappings through the filter of the constitutive nature of source domains, hence, *embodied metaphor* (e.g. Feldman 2006; Gibbs 2011; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1987, 1990, 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Szwedek 2011).

Furthermore, being bodily experienced, a phenomenon has the following characteristics: being semantically independent and adequate to project conceptual structure onto other phenomena (e.g. Feldman 2006; Lakoff 1993; Szwedek 2011). On the contrary, target domains lack these two characteristics in that they are semantically dependent and,

consequently, have a passive role in metaphorical mapping—being the repository of the cognitive topology of source domains.

Proceeding on these assumptions, to be eligible for projecting semantic features in metaphorical mapping (that is, to function as a source domain), a given phenomenon needs to be bodily experienced. In other words, the bodily-based information which is required to carry out metaphorical mapping belongs exclusively to source domains (e.g. Feldman 2006; Szwedek 2011).

One of the major problems trying to accommodate the tenets of the embodiment theory in the data is that target domains in certain metaphorical mapping typologies are bodily experienced. This finding yields at least two important entailments:

First, following the tenets of the this theory—namely, if a given phenomenon is bodily-experienced, it is eligible for projecting semantic features onto other domains—thereby, these target domains may project semantic features in metaphorical mapping as well. For this reason, we postulate that in this type of the metaphorical mapping both source and target domains project onto each other bodily-based features, leading to semantic changes in both domains. That is, they interact (Black 1993).

2.3. Blending Theory

Approaching metaphorical mapping from an *interactionist* perspective stands in opposition to the cross-domain-mapping approach but not strictly so to Blending theory (Fauconnier and Turner 1996, 2002, 2007; Turner and Fauconnier 1995, 2000). This theory emerged as complementary to the conceptual metaphor theory whose mechanisms cannot cope with certain metaphors (Grady, Oakley, and Coulson 2007:422; Valenzuela,

2009:311-312). In this respect, it does not look at metaphor as cross-domain mapping. Instead, metaphor within this approach is based on conceptual integration.

According to Ruiz de Mendoza and Peña (2005:250-252), though mental space and cross-domain mapping theories are essentially complementary; they differ at least in two ways. First, meaning projection across domains is basically a theory of meaning representation; but Blending theory entertains meaning construction. Second, while the theory of meaning projection takes domains as the basic units of analysis, blending theory focuses on mental spaces.

Similarly, Grady, Oakley, and Coulson (2007) assure that the two frameworks address different aspects of metaphorical mapping. According to them (2007:436), the two frameworks are largely complementary in that Blending theory “seeks to model the dynamic evolution of speakers’ on-line representations”. In contrast, Conceptual Metaphor theory entertains “stable knowledge structures represented in long-term memory.”

One difference between one-way-meaning projection and blending theory which we will pay close attention to in the data analysis is that, the first approach argues that the set of features of source domains is maintained and projected onto target domains (e.g. Lakoff 1990:54). In contrast, the second approach holds that the two domains project semantic features onto mental spaces to construct conceptual metaphor. A piece of evidence for this claim is what Fauconnier and Turner (2007:366-368) refer to as *emergent structure*. That is, according to Fauconnier and Turner (1996, 2002, 2007) and Turner and Fauconnier (1995, 2000), a blended space may contain 'emergent' structure not found in any of the input spaces (see also Roldán-Riejos and Úbeda Mansilla 2013:109). To illustrate, the blended space in the metaphor ‘*They dug their own financial grave.*’ shows an *emergent*

structure that “*does not reside in any of the inputs.*”(Fauconnier and Turner 2007:362; Turner 2011: 12-16; Coulson 2008:181).

Furthermore, Fauconnier and Turner (2007:370) argue that this emergent structure is the outcome of cognitive activities such as *composition*, *completion*, and *elaboration* (for more details on these mental activities, see Fauconnier and Turner 2007:369).

Cross-domain mapping theory, on the other hand, sustains that metaphorical mapping keeps the same conceptual structure of the source domain. Accordingly, Lakoff (1990:54) argues that, “...metaphors in general preserve the cognitive topology (that is, the image-schematic structure) of the source domain.” (see also, Lakoff 1993:215).

Blending theory, on the other hand, suggests that the two conceptual inputs are projected to the blended space (Fauconnier and Turner 2007; Turner 2011). As shown in the previous chapter, within the embodied approach to metaphor, a major focus has been put on source domains, especially on its experiential basis. For instance, Lakoff and Johnson (1980:19) assure that, “[...] no metaphor can ever be comprehended or even adequately represented independently of its experiential basis [...]”.

In this respect, all the information we need to map two phenomena in a conceptual metaphor is grounded in source domains. As a result, the experiential basis of metaphor is fully attributed to source domains (e.g. Feldman 2006; Szwedek 2011).

This situation has led to a shallow understanding of target domains; and consequently, to a lack of understanding the potential paradigms of different metaphorical mapping typologies.

In the previous chapter, we noticed that the type of the metaphorical mapping which may follow different patterns and principles is the typology which draws on bodily-experienced phenomena as source and target domains. This, in turn, means that target

domains do have conceptual structures. They may not merely replicate the conceptual structure of source domains; instead, they may interact with them.

Based on our analysis of the data so far in the thesis, conceptual metaphor is not a cognitive phenomenon which can successfully be studied while marginalizing target domains. Source domains should not be the sole locus of the embodied approach to metaphor. Neither should be the embodied character of conceptual metaphor entirely attributed to source domains. In particular, in the mapping typology which engages two bodily-experienced phenomena, target domains also contribute to the embodied character of conceptual metaphor.

These findings lead us to question the assumption that metaphorical mapping always engages more concrete and more abstract domains as source and target, respectively (see chapter I and III).

2.4. Synaesthetic metaphor

Rakova (2003:48-54) reports a kind of metaphor that can hardly fit into the framework of Embodiment Theory. She claims that this group of metaphors is physiologically motivated. On the other hand, based on findings in neurophysiology (Ramachandran and Hubbard, 2001a, b), Rakova conducted a research on polyseme and word meanings. She observes that a polysemous adjective does not include one literal meaning and all the other meanings are metaphorically derivative (Rakova 2003:139). Rather, some polysemous adjectives reveal synaesthetic metaphors, where all the words in a semantic field bear information across sensory modalities.

In close connection with the notion that the meanings of a given polysemous adjective are literal, Kittay (1987:113) argues that, “For many, if not most terms, polysemy

cannot be reduced by appealing to a distinction between a primary and a derived meaning.” (for contrasting views on polysemy, see Barcelona and Valenzuela 2011: 21-22; Gibbs 1994:9-10).

Relevant to our discussion here, the experiential character of this metaphorical mapping typology is not exclusively grounded in source domains. Instead, this typology recruits information from source and target modalities (Rakova 2003:48). For instance, synaesthetic metaphor epitomizes a phenomenon that when we experience sensations in one modality, a second modality is stimulated giving rise to mapping two sensory experiences (Rakova 2003:48).

Rakova grounds her argument in the fact that in “synaesthetic metaphor” and “double function adjectives” there is no transfer of the conceptual structure of source onto target domains. Rather, this type of metaphor makes a direct association between different sensory modalities (Rakova 2003:40). Accordingly, the conceptual structures of target and source domains are literal; hence there is more “literalness” in metaphors than that is being suggested in Cognitive Linguistics (Rakova 2003:183).

As shown in Chapter III, within the embodied approach to metaphor, a major focus has been put on source domains, especially on its experiential basis. For instance, Lakoff and Johnson (1980:19) assure that, “[...] no metaphor can ever be comprehended or even adequately represented independently of its experiential basis [...]”.

In this respect, all the information that we need to map two phenomena in a conceptual metaphor is grounded in source domains; in particular, their bodily-based conceptual structure. Accordingly, the tenets of this approach have been elaborated in accordance with this theoretical position. As a result, the experiential basis of metaphor is fully attributed to source domains.

Due to the fact that target domains are also bodily experienced, we propose an alternative paradigm for features-transfer to examine the metaphorical mapping typology which is based on two bodily-experienced phenomena. We suggest that in this mapping typology there is exchange of bodily-based features between source and target domains.

A particular finding that lends support to our hypothesis is the fact that target domains in this metaphorical mapping typology show some of the characteristics of source domains (see Chapter III). In this setting, we demonstrated how this mapping typology does not follow some of the basic tenets that conceptual metaphor theory stands on. Namely, principles and patterns of mapping such as “Uni-directionality of metaphorical mapping”, “mapping concrete onto abstract domains” as the only typology characterizing metaphorical mapping, and “Meaning transfer based on the experiential character of source domains” are not observed (see Chapter III).

Furthermore, we observed in Chapter I how concrete-onto-abstract mapping is not the only pattern that characterizes metaphorical mapping. Another notion which is intrinsically related to this principle is meaning projection. Within the embodied approach to metaphor, this pattern hinges on the following two premises: (1) a bodily-experienced phenomenon which inherently functions as source domain and a non-bodily-experienced phenomenon which takes on its default role as target domain. And (2) mapping source and target phenomena is based on meaning projection: the phenomenon which takes on the role of source is the starting point of the projection process and the one which functions as target is the repository of this projection (e.g. Gibbs and Matlock 2008; Szwedek 2011).

Accordingly, the process of projection is engendered by the bodily-based information of source domains. The problem arises when the two phenomena do have bodily-based information, which is required to initiate the process of projecting features

from source onto target domains. Particularly, in the metaphorical mapping typology which engages two bodily-experienced phenomena both source and target domains are eligible to instigate this process because both *do* have this bodily-based information.

Being so, we hypothesize that the two phenomena project in metaphorical mapping. That is, since the bodily-based information is also observed in target domains in this mapping typology, one-way-meaning projection might not be observed. Furthermore, target domain does not need to be mapped as a *sine-qua-non* process to be understood and reasoned about. This is due to the fact that these domains are semantically independent (see Chapter III for more details).

Based on these findings, we suggest that this metaphorical mapping typology involves interaction between source and target domains. In the previous chapter, we demonstrated that the conditions that are presumably inherent to source domains also are observed in target domains. Accordingly, they,

- i. are bodily experienced,
- ii. do have conceptual structures prior to metaphorical mapping,
- iii. and are semantically autonomous.

These findings indicate that source and target domains do not have inherent features to legitimize them for fulfilling default roles in metaphorical mappings.

3. Data analysis

Meaning projection via metaphorical mapping requires a bodily-experienced phenomenon which both includes semantic features to be projected and is the initial point of the projection process (e.g. Feldman 2006; Szwedek 2011).

Our major hypothesis rests on the fact that since metaphorical mapping in the data employs couples of bodily-experienced domains, and given that target domains in this type of metaphorical mapping are also bodily experienced, we suggest that both domains project bodily-based features onto each other. Because this metaphorical mapping typology is different from mapping concrete onto abstract phenomena (see the previous chapter), its analysis may need a different approach. In particular, we need to take into account also the characteristics of target domains –namely, their experiential basis- which may be specific to this type of mapping.

In order to show that source and target domains share with source domains the experiential basis of conceptual metaphor, we need to prove that the constitutive natures of source and target domains are essentially identical. In the following section we shall analyze target domains paying special attention to their eligibility for projecting meaning onto other domains.

3.1. From projection to interaction

One of the main principles of one-way-meaning projection is that there is always feature transfer from source onto target domains. In addition, according to this approach, the operating features in (and leading to) metaphorical mapping are those features which inherently belong to source domains.

Due to the fact that target domains are also bodily experienced, we propose an alternative approach for one-way-features transfer to examine the data. We shall argue that source and target domains project bodily-based information onto each other in the metaphorical mapping typology which is based on bodily-experienced phenomena as source and target.

To claim for an interaction-based metaphorical mapping, we have to show that target domains also project their conceptual structure onto source domains. We suggest that in this type of metaphorical mapping there is interaction between source and target domains. Namely, we showed that the principles and patterns such as “Uni-directionality of metaphorical mapping”, “mapping concrete onto abstract domains” as the only typology which characterizes metaphorical mapping, and “Meaning transfer based on the experiential character of source domains” are not observed in all the instances of metaphor that we have analyzed so far in the data. Accordingly, the main finding in the previous chapter is that conceptual metaphors do not show these patterns and principles of mapping in some of its instances.

In addition, the experiential basis of metaphor should not be attributed only to source domains in the metaphorical mapping that engages two bodily-experienced phenomena. One way to support our claim is to demonstrate that target domains also project perceptual knowledge in metaphorical mapping. Because target domains also are experienced bodily, our hypothesis is that these domains also project when they are engaged in metaphorical mapping. In particular, we propose that target domains do not just replicate the conceptual structure of source domains.

Under these assumptions, the embodied character in metaphorical mapping which engages two bodily-experienced phenomena dwells on the (embodied) character of source and target domains.

In the following section, we shall show how this character should be equally attributed to source and target domains. In this respect, we shall attempt to demonstrate that an interactionist approach to metaphor will attribute an active role to target domains. For instance, given that source and target domains in this type of metaphorical mapping are

bodily experienced, metaphor here might be based on the interaction between the two phenomena rather than meaning transfer from source onto target domains.

3.1.1. On-line and off-line reasoning and meaning-transfer principle

Since the inception of the embodied approach to metaphor, a major focus has been put on source domains in that metaphorical mapping hinges exclusively on the experience of the latter. As a result, the experiential basis of metaphor is *fully* attributed to source domains (e.g. Szwedek 2011).

Meanwhile, target domains are believed to be inherently abstract and inaccessible to the sense organ; hence, they are not eligible for projecting meaning.

On-line and off-line reasoning may not be observed in the metaphorical mapping typology we are concerned with in this chapter. Let us examine how source and target domains are assumed to be processed within the embodied approach to metaphor and assess whether they are identically processed. This will help us assess whether the experiential basis of metaphor can be equally attributed to source and target domains. In this respect, we need to demonstrate that bodily features from both domains are active in the metaphorical mapping.

One of the direct assumptions of attributing source and target domains inherent features, which allow them to carry out their respective roles, is that source and target domains are processed differently. Whereas processing source domains (bodily-experienced phenomena) is claimed to be on-line, that of target domains is assumed to be inherently off-line.

It is argued within the embodied approach to metaphor (e.g. Lakoff 1987:303) that our experience of source domains consists of a direct involvement of the mechanisms of the body. To elaborate on this point, let us consider the following metaphor: Love Is Journey (Lakoff and Johnson 1980:44-45)

Look how far we've come.

We're at a crossroads

We'll just have to go our separate ways.

In this metaphor, we map our experience of Journey onto the domain Love. According to the embodied approach to metaphor, our reasoning of source and target domains is on-line and off-line, respectively. That is, our reasoning of the phenomena which are accessible to the sense organ is direct. On the other hand, reasoning about the phenomena which are inaccessible to the sense organ is indirect.

In this setting, the domain Love is processed off-line via the domain Journey. This again seems to be based on the notion that all target domains are abstract and indirectly meaningful (Lakoff and Johnson 1980:118).

Our initial step toward showing that *one-way-meaning transfer* does not characterize the mapping which involves two bodily-experienced phenomena, consists of assessing whether reasoning of target is identical to that of source domains. A piece of evidence which supports this claim is the fact that target domains, which are bodily experienced in this mapping typology, have conceptual structure, are directly meaningful, and are semantically independent (see page 177). That is, they do not need to be engaged in metaphorical mapping to be meaningful (see the previous chapter). This means that our reasoning about them is on-line too. Let us consider the following metaphor to illustrate this point:

Sound Is Touch

Her voice was always soft—an excellent thing in women.

In this metaphor, both source and target domains are bodily-experienced phenomena. Since we reason about them independently of each other—that is, our understanding of these domains takes place outside metaphorical mapping—it is safe to claim that our reasoning about them is on-line. It is worth noting here that in Chapter II we outlined the entailments which are intrinsically related to *one-way-meaning-transfer principle*. That is, if our reasoning about the target domain Sound pre-exists the metaphorical mapping Sound Is Touch, then, following the tenets of the embodied approach to metaphor, this mapping would not be necessary from a cognitive point of view. More precisely, in order to reason about the domain Sound, we do not resort to the cognitive topology of the domain Touch. If these domains have their own constituents and inferences before the mapping is built, then metaphorical mapping would add nothing to our conceptualization of the target domains.

Rakova (2003:26-28) anticipates this problem by suggesting that in metaphorical mapping, we reason about a phenomenon in a different way. Accordingly, these domains exist before their engagement in metaphorical mappings (for a detailed analysis of this point, see Chapter III).

In her analysis of Love Is Journey, she further observes that we do have the concept of Love before the two domains are mapped. Nonetheless, with the mapping, we get a new ‘grasp’ of the concept *love* (Rakova 2003:26). Therefore, the concepts of the two domains are meaningful outside metaphorical mapping. This finding upholds the claim that target domains are processed online because these domains are semantically independent as they have their own cognitive topology independently of metaphorical mappings.

In this respect, the cognitive topology of the target domain Love includes *lovers*, *love-relationship*, and *a (common) purpose*. This observation refutes the assumption that we cannot understand target domains without our understanding of source domains. Again, this would mean that our reasoning of target domains is not always off-line.

This observation becomes even more obvious when one takes into account synaesthetic metaphor (see page 184). That is, when two modalities are mapped (e.g. the auditory modality as source domain and the visual modality as target domain), it does not mean that our understanding of source modality (audition) precedes our understanding of target modality (vision), nor is this target modality semantically dependent on its counterpart (see the previous chapter).

It follows from this that we cannot differentiate source and target domains in terms of off-line and on-line reasoning. It is worth noting here that we demonstrated in the previous chapter that if target domains are bodily-experienced phenomena, then it means that they have literal meaning outside metaphorical mapping. If they have literal meaning, then they do have conceptual structure outside metaphorical mapping. Again, this further indicates that source and target domains in the metaphorical mapping which engages two bodily-experienced phenomena, the reasoning process is on-line.

In this section we have shown that our processing of source and target domains is identical in that it is on-line in both cases. In the following sections we shall focus on the cognitive mechanisms which operate when we process bodily-experienced phenomena.

3.1.2. Categorization process in interaction-based metaphor

Lakoff and Johnson (1980, 1999) and Johnson and Lakoff (2002) pursued the functioning of metaphor and demonstrated that this cognitive processing is part and parcel

of our reasoning system to categorize abstract phenomena. More importantly, this categorization process is carried out through embodying abstract phenomena (e.g. Szwedek 2011). In line with these findings Glucksberg and Keysar (1993:406-12) argue that metaphors are “assertions of categorization”.

However, based on the analysis of the data, conceptual metaphor seems to have a deeper function than have previously been postulated. Conceptual metaphor plays a crucial role not just in non-bodily-experienced phenomena (see pages 177-184) but also in assigning new conceptual categories to bodily-experienced phenomena. An example of this includes mapping across sensory modalities (see page 159); mapping across images (see page 266), and multi-mapping (see page 222).

Given that the phenomena which are engaged in this type of metaphorical mapping are bodily experienced, it is safe then to assume that they have semantic categories without being mapped (see the previous section). Therefore, we postulate that, through metaphorical mapping, the categorization process can be looked at in terms of three main cognitive functions: *categorizing*, *further-categorizing* or *re-categorizing* target phenomena.

These observations may have at least two related entailments: first, metaphorical mapping is not as crucial for our understanding of bodily-experienced phenomena as it is for abstract ones. A piece of evidence for this claim is that bodily-experienced phenomena can be processed independently of other phenomena. This is also evident in the linguistic and cognitive structures of these bodily-experienced phenomena in that our reasoning system does not require the linguistic and cognitive topologies of other domains as the only way to access such phenomena.

Second, the core cognitive function of conceptual metaphor is not only to categorize the target domains which lack semantic categories, but also those which are already categorized.

These findings contradict the general assumption that we resort to metaphor so as to reason about abstract phenomena. Instead, conceptual metaphor also plays a significant role in reasoning about bodily-experienced phenomena (see the previous chapter).

It is worth noting that when metaphorical mapping is based on two bodily-experienced phenomena, the categorization process shows a significant difference. We shall argue that in this case, using conceptual metaphor, we *further-categorize* or *re-categorize* bodily-experienced phenomena.

Therefore, from a functional point of view, the dynamics that operate in the metaphorical mapping which engages bodily-experienced phenomena as source and target domains can be captured under three main cognitive tasks: *categorizing*, *further-categorizing*, and *re-categorizing*. The classification of these processes highly depends on the type of the phenomena which take on the roles of source and target.

In the case of the metaphorical mapping which is based on two bodily-experienced phenomena, we observe three main cognitive activities: *categorizing*, *further-categorizing* and *re-categorizing*. In order to show how these cognitive tasks operate differently in metaphorical mapping, in the following section we shall explore in which typology each of these tasks may be observed.

3.1.3. Categorizing abstract phenomena through metaphorical mapping

According to Glucksberg (2008:80), when they are figuratively understood, certain phenomena maintain a class-inclusion relationship where “...the vehicle concept is an ideal exemplar of the category it represents.” We shall argue in this section that this process concerns mostly the metaphorical mapping which involves bodily and non-bodily-experienced phenomena as source and target domains, respectively. Recall that in the previous section we argued that target domains in this type of metaphorical mapping do not have bodily-based semantic categories. In this case, source domains do belong to a category whereas target domains acquire a given category via their mappings onto other (bodily-experienced) phenomena. This seems to be the case in the following metaphor:

Time Is Money (Lakoff and Johnson 1980:7)

You are wasting my time.

This gadget will save you hours.

While the source domain Money has an established category (commodity), the target domain Time—without being mapped onto other phenomena such as Money—goes uncategorized (though we do not necessarily claim that the concept of time does not exist before the mapping).

Mapping the domain Time onto different domains may be due to the fact that this domain does not have an established cognitive topology. For instance, Time is mapped onto (limited) Resource, and onto (valuable) Commodity (see Figure 4). As the two examples above indicate, the cognitive topologies of these source domains come to characterize the target domain, Time.

Other metaphorical mappings that show this pattern include Time Is a Changer (Lakoff and Turner 1989:40-43), Time Is a Destroyer (42), and Time Is Pursuer (64).

Based on this analysis, it becomes clear that unless the domain Time is mapped onto other bodily-experienced phenomena, it does not have a semantic category. The mapping, then, entails ascribing target domains—such as Time—a given category, which they would not acquire otherwise.

Unlike these examples, mapping across bodily-experienced phenomena involves source and target domains that do have semantic categories outside metaphorical mapping (see the previous chapter). This means that the categorization process in this case might be different. Therefore, we shall argue that in this case, target domains can be further or re-categorized.

3.1.4. Further-categorizing

This process is recurring in the mapping which engages two phenomena which are processed within the same modality. An example of such mapping includes,

My wife...whose waist is an hourglass (Lakoff and Turner 1989:91).

In this case, source and target domains are perceptual (see the section on *image metaphor*). More importantly, the two domains do have semantic categories independently of metaphorical mapping. Then, this mapping leads to *further categorize* a body-part (*waist*) in terms of the shape of Hourglass. That is, in this metaphorical mapping we focus on the visual characteristics (namely, shape) of this body part which—though it is categorized independently of metaphorical mapping—now it is *further-categorized* via metaphorical mapping.

This means that the two domains have their own categories before the two phenomena are engaged in metaphorical mapping (see the previous chapter). A piece of evidence is that *initially* we think of these two domains as different semantic categories. And through mapping them, our reasoning gets further in the categorization process concerning the target. Thus, when we map this domain onto other bodily-experienced phenomena, we get at a further level in the process of categorizing target phenomena.

Furthermore, this categorizing process might also be observed in the type of metaphorical mapping which engages bodily-experienced and non-bodily-experienced phenomena as source and target domains, respectively. Let us analyze the following metaphor to assess how further-categorization operates in this type of metaphorical mapping:

Give me time

In this metaphor, Time is viewed in terms of Commodity. Accordingly, it is transferable. We argue that initially, this metaphor did not include the property of transferability. This means that further-categorization is observed when a given phenomenon is categorized in terms of the aspects of the source domains which initially do not operate in metaphorical mapping (see page 130).

3.1.5. Re-categorizing

As shown in the previous section, target domains could be *further-categorized* within the same semantic category. We argued that this phenomenon is observed when the target domain is categorized within the same modality. On the contrary, we suggest that the *re-categorizing* process in metaphorical mapping is observed when the two phenomena are

processed initially in different modalities. To illustrate this point, let us consider the following examples:

(1) *Sharp taste.*

(2) *Heavy smell.*

In (1) and (2) we map modality of Tactile (sharp) onto Gustation (taste) and the somatosensory modality (heavy) onto the olfactory modality (smell), respectively. Because the target domains in these two metaphors are processed within different modalities, they acquire new semantic categories. This process is different from *further-categorizing* and *re-categorizing* processes in that the former is observed when we process an experience in a different modality. In contrast, *further-categorizing* and *re-categorizing* processes occur when target domains are semantically independent (see Table 5). That is, this process is observed when a given experience acquires a new category through mapping two modalities.

Rakova (2003:26) anticipates that when we use metaphor to conceptualize a given phenomenon, we do not gain a new fact, but a new way to grasp it. As a result, though (target) Gustatory and Olfactory modalities do have semantic categories without being mapped onto other phenomena, through metaphorical mapping they acquire a new ‘unconventional’ semantic category; hence, the *re-categorizing* process.

Based on the embodied approach to metaphor, we showed that the embodied character of source domains dwells on three major principles. First, source domains are processed on-line: they require a direct involvement of the sense organ. Second, because they are accessible to the sense organ, they include the information which is projected onto target domains. These two principles are met by all domains that function as source in metaphorical mappings. In this setting, target domains also satisfy these two principles as

they are bodily-experienced. It follows then, that target domains—when they are accessed by the sense organ and include the categorizing information—could also project meaning onto other domains.

Based on these findings, we propose an interactional approach to metaphor that engages bodily-based information from source and target domains. In what follows, we shall see how an interaction approach could fit this metaphorical mapping typology. First, we shall overview the Interaction theory, how it is opposed by the embodiment theory. Later, we shall outline how our proposal differs from Interaction Theory of metaphor proposed by Black (1962, 1981, 1993).

3.2. Interaction Theory

So far in this chapter we have been outlining the mechanisms that operate in bodily-experienced phenomena. In this respect, we identified three main cognitive tasks which are carried out in the mapping typology which draws on bodily-experienced phenomena as source and target domains.

In this section, we shall review the Interaction theory put forward by Richards (1936), Black (1962, 1981, 1993), and further developed by Kittay (1987) and Forceville (1996, 2006). Our purpose here is to show how metaphorical mapping is understood within this approach and how it is different from one-way-meaning transfer. Later, we shall propose two cognitive aspects which might characterize the interaction process between source and target domains— *bi-directionality based mapping* (see page 83) and *emergent structure* (Fauconnier and Turner 2002; Turner 2011). These two aspects could be taken as strong evidence that supports the notion that certain mapping typologies are based on interaction of source and target domains rather than on one-way-meaning transfer.

3.2.1. Bi-directionality of mapping as evidence of interaction

We demonstrated in the first chapter that *uni-directionality* is the core principle of metaphorical mapping. That is, meaning projection in metaphorical mapping is based on uni-directionality (see Chapter I). In Chapter II we explored how this principle is not observed in certain metaphorical mapping typologies. Accordingly, we argued that the entailments of this principle are not observed in those typologies (see Chapter III). In particular, bi-directionality-based metaphor is observed in the metaphorical mapping which engages bodily-experienced phenomena in source and target domains (perhaps further research could reveal that this is not always the case). Let us analyze the following example to show this point:

Man is a wolf (Forceville 1996:11).

Forceville (1996:11) argues that both source and target domains in this instance of metaphor undergo a certain semantic change. First, the two domains should be adapted to each other in the sense that some characteristics of Man are adapted to the domain Wolf. However, in order to make possible such mapping, there is also an adaptation process of the domain Wolf to the domain Man in that the former acquires some human features via this metaphorical mapping (1996:11). This means that the locus of this metaphorical mapping, as strictly understood by the term, does not fall on Man. Therefore, the metaphorical mapping in this case does not concern only projecting meaning from Wolf onto Man. Instead, conceptual metaphor in this case also causes semantic changes in the source domain Wolf.

As mentioned before there are two main principles that are met by phenomena to be eligible for fulfilling the function of source domain: being accessible to the sense organ (see

page 211) and including categorizing information (see pages 214-219). That is, both Wolf and Man satisfy the two principles. Consequently, they are eligible for projecting meaning in this metaphorical mapping typology. Relevant to this point, in the previous chapter we demonstrated that target domains share with source domains characteristics such as being bodily experienced and semantically independent.

Another piece of evidence for the fact that these domains project meaning in this mapping typology is that they exchange their roles in different metaphorical mappings. To illustrate, let us consider the following examples:

Building Is Human Being

(1) My flat looks out on Central Park.

Human Being Is Building

(2) Amino acids are the building blocks of the proteins and these building blocks of muscles.

Human Is Machine

(3) The Labour Party machine is running smoothly.

Machine Is Human

(4) These sports utility vehicles are real gas guzzlers.

Human Is Plant

(5) The FBI planted informers in the Mafia.

Plant Is Human

(6) No one realized that James was a KGB plant.

As the data shows, the two domains project meaning in metaphorical mapping. The fact that the mapping can be reversed is particularly indicative of this point. That is, we understand Human being in terms of Building, Building in terms of Human being, Human

being in terms of Machine, Machine in terms of Human being, Human being in terms of Plant, and Plant in terms of Human being. Similarly, Man is Wolf (Forceville 1996:11) could be reversed. It is worth noting here that Building, Human, Machine, and Plant function as source and target domains (see Chapter III for how this finding does not fit the tenets of the embodied approach to metaphor).

It is obvious that the inferences that we draw from each metaphorical mapping in the examples above are different. For instance, when we map Building onto Human and when we map Human onto Building lead to different inferences. That is, mapping Human onto Machine in (2) and Machine onto Human in (3) leads to different inferences. Moreover, (3) and (4) follow the same pattern of mapping in that the two metaphors are two instances of engaging two semantically independent and bodily-experienced phenomena.

Notice that when we map Building onto different domains, the inferences which are drawn may be different. For instance, let us compare these two metaphors:

Human Being Is Building

Amino acids are the building blocks of the proteins and these building blocks of muscles.

Activity Is Building

We can't stop the flooding that way so we have to go back to the drawing board.

In the two examples, Building interacts with Human and Activity via different constituents. In the first, the constituents that trigger the interaction are basic components of Building. However, in the second example, Human interacts with Activity via another element (*drawing board*) that is indirectly associated to Building.

From this, it becomes clear that a given domain does not interact with different domains in the same way. The same domain, when it interacts in different metaphorical mappings, the interaction involves different constituents. Consequently, different kinds of interaction induce different inferences and entailments (see the following chapter).

When a given domain is mapped onto various domains, leading to different inferences, is strong evidence for its interaction. Put differently, mapping a given domain does not consist of transferring the same bodily-based features onto target domains. Depending on the target domain, certain bodily-based information is transferred (see also Mouton 2012). This means that target domains actively participate in the construction of metaphorical mappings. Still, given that these inferences are different indicates that this mapping typology is not based on one-way-meaning transfer. Rather, there is an interface where target domains fulfill an active role in the construction of metaphorical mapping.

Based on the data, the interacting elements in a given domain are not the same whenever this domain interacts with others, which may explain why metaphorical mapping is always partial. That is, this set of elements is not fixed whenever a given domain is engaged in metaphorical mapping. The features which are salient are not always the same whenever a domain is engaged in metaphorical mapping (see also Giora 2003). For instance, when we reason about the domain Love in terms of Drug, Disease, Magic etc. we do not only focus on a closed set of inferences that is ready to be mapped onto such domains. Rather, the inferences are created in both domains in an interactive process between the two phenomena. Hence, the features of a domain are not inherently determined before the mappings.

These findings contradict the embodied approach to metaphor in that the latter is based on the fact that the features of a given phenomenon ascribe to the latter an inherent

role in metaphorical mapping (see the previous chapter). However, the data shows that this is not the case in certain metaphorical mapping typologies.

We insisted before on the necessity of taking bi-directionality-based metaphor as an interactive process where source and target domains interchange the role of source and target. In this type of metaphorical mapping, we need to take into account the two instances where these pairs interact. The instances (1), (2), (3), (4), (5), and (6) should not be dealt with as individual, isolated, and different metaphors. Instead, the two instances in each example shape our understanding source and target domains in the interaction process that engages the two phenomena. Accordingly, mapping across bodily-experienced phenomena is more productive from a cognitive point of view than other mapping typologies. Probably this may be due to the fact that bodily-experienced phenomena can easily exchange the roles they take on in metaphorical mapping (for instance, we map Building onto Human and Human onto Building).

This pattern is not frequent when one takes into account, for example, *literary metaphor* (see page 274). That is, if we map Juliet onto the Sun, we hardly find examples of metaphor where the domain Sun is mapped onto Juliet.

3.2.2. Emergent structure in metaphorical mapping: evidence of interaction between source and target domains

As stated before, Blending theory and Conceptual Metaphor Theory coincide in major aspects of the analysis of metaphorical mapping (see pages 202). However, *Emergent Structure* is an aspect where the two approaches differ: whereas meaning projection across domains is limited to transferring the *inherent* conceptual structure of source onto target domains (e.g. Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989;

Szwedek 2011), Blending Theory is not based only on the conceptual structure of source domains. Instead, conceptual metaphor engages inputs from both source and target domains (Fauconnier and Turner 2007; see also Roldán-Riejos and Úbeda Mansilla 2013:109-110).

As shown in the pervious chapter, the metaphorical mapping which is based on two bodily-experienced phenomena posits a challenge to the tenets of the embodied approach to metaphor. In this respect, we argued that when target domain is bodily experienced, it is eligible for projecting meaning in metaphorical mapping. These findings are at accordance with those reported within the Blending theory in that conceptual metaphor engages inputs from both domains (e.g. Fauconnier and Turner 2007).

Another significant difference which we observed while analyzing the data is that, "The projection of the structure to the blend is selective" (Fauconnier and Turner 2007:366). In contrast, cross-domain mapping theory assures that the mapping is unconscious (e.g. Johnson and Lakoff 2002; Kövecses 2000, 2002, 2005, 2010, 2011; Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999).

Moreover, the two theories do not agree on how the inference of a given metaphor is built. That is, the Blending theory sustains that the blend is not predictable taking into account the inputs from both domains (Fauconnier and Turner 2007:362). However, one-way-meaning transfer adopts the assumption that the mapping is predictable in some cases since some metaphorical mappings are based on resemblance and co-relation (e.g. Grady 2007).

To show how these different methodologies arise from theoretical differences taken in the two approaches, let us consider the following metaphor, *My surgeon was a butcher*, which is analyzed within the two approaches: first we consider the analysis within the Embodied Metaphor theory.

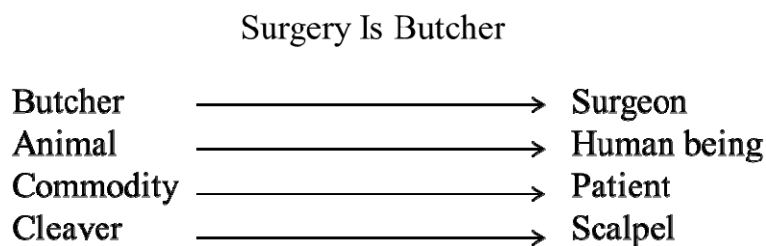


Figure 9 Interaction between two bodily-experienced phenomena

(To view how blending theory represents analytically this metaphor, see e.g. Grady, Oakley, and Coulson 2007:423).

Thus, according to cross-domain-mapping approach, the elements of source domain systematically correspond to their counterparts in the target domain (e.g. Gibbs 1994, 2011; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 2010, 2011; Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999). Correspondingly, meaning representation in this metaphor presumably makes use of the inherent features of the source domain Butcher. As Figure 9 shows, the features of the source domain Butchery which are mapped onto the target domain Surgery include *Animal*, *Commodity*, and *Cleaver*.

Though the Blending theory explains this metaphor differently, namely in terms of blending rather than cross-domain mapping, the inferences which are drawn from this metaphor are common to both approaches—*incompetence*, *carelessness*, and *sloppiness*. It is worth noting here that these characteristics do not belong to the source domain Butchery as inherent features (Grady, Oakley, and Coulson 2007:422).

More importantly, the ontological correspondence between the two domains does not show that the characteristic *incompetence* is active in the mapping. While this feature does not seem to be inherent to the source domain Butchery, cross-domain mapping

approach does not show how this characteristic becomes the focus of the metaphorical mapping.

On the contrary, Blending theory analyzes this metaphor in terms of mental spaces suggesting that in this metaphorical mapping there are four mental spaces. Source and target spaces, a generic space where the common features of source and target inputs are projected, and a mental space where the blend takes place (Fauconnier and Turner 2007:366).

However, this theory sustains that *incompetence* does not belong to either source or target domain; rather, it is an emergent structure which is due to the blended space which is made up of source and target inputs. On their view, Fauconnier and Turner (2007:366) and Turner (2011:15), the blend space may lead to an emergent structure whose content does not initially belong to either input. They further assure that this emergent structure is evident in the concept, *incompetence*, which does not necessary belong to either source or target input.

The fact that the Blending theory explains this phenomenon as an emergent structure, which incorporates a new way of conceptualizing target domain and which does not belong to either source or target domain, is questionable as this characteristic could fit perfectly well the two domains in that from a semantic point of view *incompetent surgeon* and *incompetent butcher* are equally acceptable (see the examples below).

In the previous chapter, we demonstrated that certain metaphorical mapping typologies do not follow the tenets of the embodied approach in that source and target domains do not consist of inherent features in terms of the *concrete-abstract* criterion (see the previous chapter). Cross-domain mapping assures that meaning transfer is based on mapping elements of the source domain onto their counterparts in the target. To further

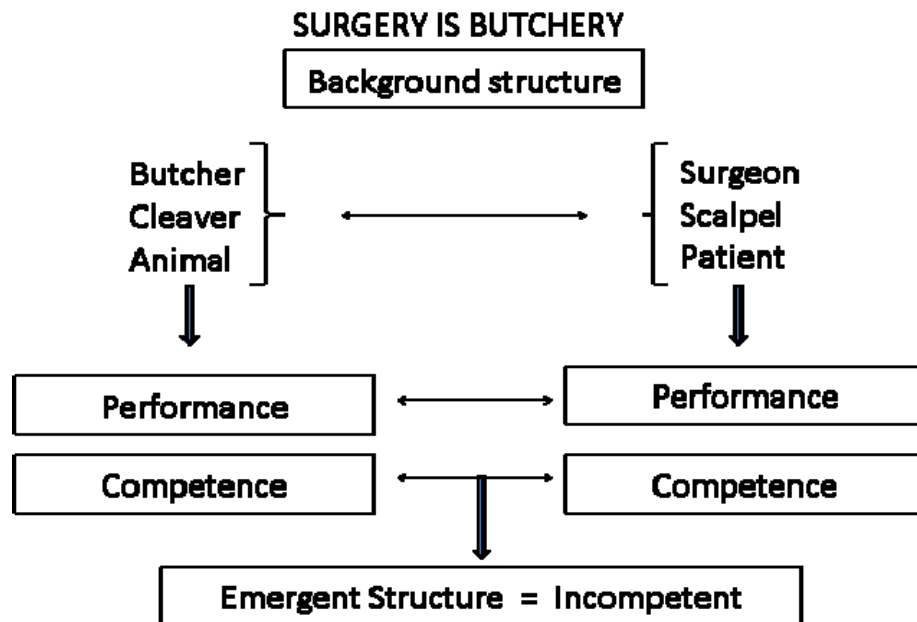
support the claim that this mapping typology does not fit into the tenets of the embodied approach to metaphor, we paid special attention to Surgery Is Butchery and Butchery Is Surgery (see on page 149 on page 149).

We observed that this typology does not fit into the cross-domain mapping approach mainly for two reasons. First, both Butchery and Surgery function as source and target domains in different metaphorical mappings. The feature *(in)competence* is operating in both metaphors. In (1), the focus is the incompetence of the surgeon while in (2), the inference concerns the competence of the butcher. This means that the two features are perceptual (see the previous chapter for the entailments of this observation).

In order to handle this theoretical inconsistency between Blending and Cross-domain mapping approaches, we suggest that source and target domains interact in the type of metaphorical mapping such as *My surgeon was a butcher*. Relevant to our discussion here, in the previous chapter, we identified how this metaphor supposes a challenge to the tenets of the embodied approach to metaphor. For our purpose now, we need to consider the hypothesis that we put forward in this chapter: given that source and target domains are bodily experienced, the bodily-based features from both domains may interact in metaphorical mapping.

So far, we tried to examine how Blending and cross-domain mapping theories differ regarding their analysis of Surgery Is Butchery. We demonstrated how the origin of the feature *incompetent* has been eluded in the analysis of this metaphor within the two approaches. That is, within the cross-domain mapping approach, *incompetence* is not an inherent feature to source domain. Similarly, Blending theory does not explain how *incompetence* becomes the focus of the metaphorical mapping given that this feature does not belong to either the source or the target domain.

In this regard, we propose to analyze this metaphor from an interactionist perspective. We insisted before on the necessity of analyzing *bi-directionality based metaphor* as an instance of interaction to have a wider perspective of the way this type of metaphor functions. We also suggested that this type of metaphor should be taken as two instances of the interaction between two phenomena. In this respect, we suggest that it is more fruitful to analyze Surgery Is Butchery and Butchery Is Surgery as two instances where the interaction between the two phenomena is manifested. In what follows in this section, we shall analyze these two metaphorical mappings from an *interactionist* point of view:



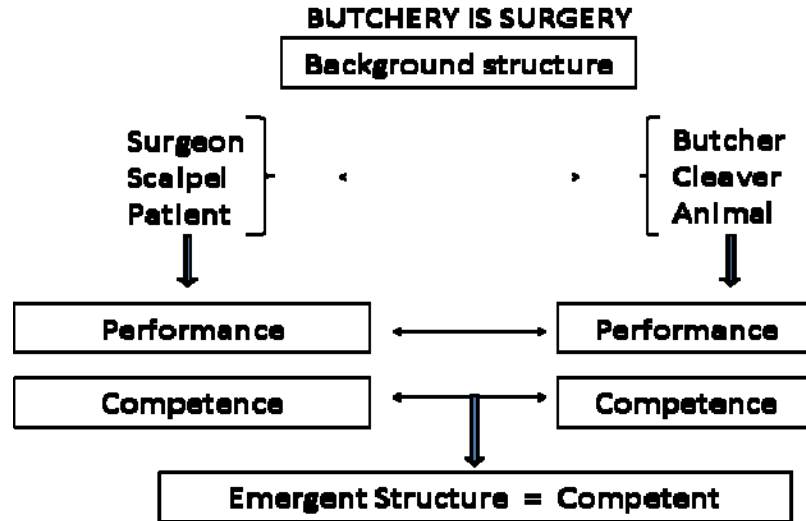


Figure 11 Interaction between Butchery and Surgery for *My butcher was a surgeon*.

As figures 10 and 11 indicate, the metaphors Surgery Is Butchery and Butchery Is Surgery consist of two strands. The first one, which is the background structure, includes the interacting elements of source and target domains (Butcher, Cleaver, Animal, Surgeon, Scalpel, and Patient). As noticed here in these two examples, the background structure contains an invariable set of features. The second strand, on the other hand, concerns the outcome of the interaction between the elements of source and target domains that constitute the background structure. In this case, the entailment of the two metaphors falls on *competence*. Our judgment is based on the fact that when this feature (competence) interacts with its counterpart in the other domain it acquires positive or negative attributes. It is worth noting here that we do not claim that the resulting change from the interaction exclusively concerns this element but it entirely affects source and target domains via attributing new characteristics to the interacting elements.

In the two figures above we attempted to show which elements hold the interaction between the two domains. As Figure 10 illustrates, the constituents of source and target domains can be divided into two groups: inherent constituents, which include *surgeon*,

scalpel, and *patient*. In the target domain, these constituents are *butcher*, *cleaver*, and *animal*. We shall call the second type of constituents which are separated from the Background Structure by a line *attributive constituent* because they functionally describe the inherent features of the source domain (cutting meat) after the interaction takes place. Hence, we read + or - *competence*. In addition, we shall call these attributive constituents in both domains *interacting elements* on which the inference of the metaphor rests.

Broadly speaking, competence is—by default—neutral in both domains. Butcher is not necessarily incompetent, any more than Surgeon is necessarily competent. But through the interaction between the two phenomena, this interacting constituent acquires or loses some of its characteristics in its respective domain. That is, this feature, outside this metaphorical mapping, may be positive or negative. But, when the two phenomena interact, competence shows substantial semantic changes.

Therefore, *high* or *low competence* is not inherent to the domains Surgery or Butchery. Nonetheless, by means of the interaction between the two domains, *competence* may be positive or negative depending on which domain takes on the role of source and which fulfills that of the target. Grady (2007:331) assures that, “...all these cases [resemblance, generic-is-specific and image metaphor] involve the projection of subtly different conceptual material depending on direction...”

Similarly, Kövecses (2011:14-15) claims that in the metaphor, *This surgeon is a butcher* (also discussed in the previous chapter) the characteristic of *carelessness* and *sloppiness* are not inherent to the domain Butchery. Rather, it emerges as a result of metaphorical mapping. In addition, Grady, Oakley, and Coulson (2007:422) argue that being careless is an “emergent structure” in metaphorical mapping. This means that a new cognitive structure emerges because of the interaction between the two domains.

A piece of evidence for this claim is that without engaging these domains in metaphorical mapping, they do not inherently have the feature *carelessness*. This is particularly important since it entails that the source domain in this case (but not just the target domain) goes through significant changes in the process of mapping. In this respect, the inference which we get from the two metaphors is highly determined by how the two domains interact and which the interacting constituents of these domains are involved in the construction of conceptual metaphor (see Figure 10 and Figure 11).

3.2.3. Semantic change of source and target domains

Another way to analyze how these two phenomena interact is to look at their respective semantic category after the interaction process. We argued before that the two phenomena undergo semantic changes when they interact in metaphorical mapping by adapting to each other. Moreover, we observed that in some cases, the inference of a given metaphor is not inherent to either source or target domain. In this respect, we argued that this inference emerges as a result of the interaction between such domains.

Another potential way to measure semantic changes is to look at the semantic categories of source and target phenomena inside and outside metaphorical mapping. Thus, we propose to look at them in terms of *continuity vs. discontinuity* of semantic categories. For instance, while the metaphor *Butchery Is Surgery* allows the butcher to continue in the category of *Butcher*, the competence (of Surgeon) disqualifies the surgeon as inadequate to carry out the profession of surgery—that is, he or she is outside the semantic category of surgery. Thus, the interaction between source and target domains through the element *competence* leads the source and target domains to acquire or lose some of their features which define them as categories, namely, the quality of competence.

This finding is especially supportive for the claim which we put forward in the first chapter that metaphorical mappings should not be looked at as a homogeneous cognitive process. To illustrate, while the embodied approach to metaphor conceives of metaphor as meaning transfer which consists of imposing a new semantic category on the target phenomena, the interaction theory which we are proposing in this chapter is based on a mutual influence between source and target domains (see also Richards 1936: 93).

Furthermore, when we conceptualize Love in terms of Journey, we reason about the latter via imposing the conceptual structure of the former. In so doing, the domain Love acquires a new semantic category. However, our analysis of Surgery Is Butchery and Butchery Is Surgery shows that this is not indeed the case.

Now consider Butchery Is Surgery used to describe the performance of an apprentice butcher spending too much time to cut up meat (Grady, Oakley, and Coulson 2007:424):

He's not a butcher, he is a surgeon.

According to Grady, Oakley, and Coulson (2007:424), the mapping between the source domain Surgery and the target domain Butchery highlights the negative evaluation of the butcher's competence. It is worth noting here that reversing this mapping does not lead to a change of its central inference. That is, the interaction between the source domain Surgery with Butchery in (1) above gives rise to a positive evaluation of the performance of Butcher. Here again we observe that high competence is not an absolute feature in these phenomena (see the previous chapter for a more detailed analysis of this characteristics). In this respect, we argue that *slowness* is not necessarily a negative feature of Surgery. Indeed, it might be the opposite in the sense that *surging slowly* denotes carefulness. One might

also look at this metaphor as irony in that a butcher does not need too much carefulness to cut up meat.

To sum up, the existence of *emergent structure* in the three examples above is a piece of evidence for interaction between source and target domains. The inference which is obtained in the interaction-based metaphor is the outcome of a mutual influence between two bodily-experienced phenomena. Our judgment is based on the fact that emergent structure is a characteristic which does not inherently belong to either source or target domain.

As mentioned before, mapping across bodily-experienced phenomena is based on pre-existing features from the two domains (see page 226). Accordingly, it is safe to argue that (1) *incompetence* is a perceptual feature that may operate in both phenomena, though it does not necessarily mean that its quality inherently belongs to them (Fauconnier and Turner 2002; Turner 2011:15); (2) inherent features of source domains do not always operate in metaphor Figure 1 and Figure 2.

So far we have demonstrated that "emergent structure" is the outcome of interaction between two bodily-experienced phenomena. This interaction might be held through components of source and target domains that are neutral outside metaphorical mapping. That is, through the interaction of these phenomena, these components acquire or lose some semantic features (see Figure 10 and Figure 11). In this respect, we have shown that *competence*, via its interaction with its counterpart in target domain, gives rise to a conceptual structure where this characteristic varies. In particular, *competence* oscillates between positive and negative qualities depending on which phenomenon functions as source and which as target domain. This seems to resonate with Grady's finding (2005) in

that this oscillation may be looked at from two different aspects: *discontinuity* and *continuity* (see page 234).

The first case is observed in the sense that the quality regarding how the Surgeon carries out his work does not legitimate him or her for holding this profession. The second case, *continuity*, can be documented when the interaction between these domains leads this Surgeon to be competent, which means that he or she continues in the same category.

Based on our analysis so far, it is safe to argue that not the physical structures of source domains that are imposed onto the target domains in this metaphorical mapping typology. Rather, the two domains *interact* in metaphorical mapping in the sense that metaphor in this case does not consist of meaning transfer.

3.2.4. One-way-meaning transfer vs. interaction

To analyze the examples above in terms of one-way-meaning transfer from source (Butcher) onto target domain (Surgeon) is to look at how we draw systematic correspondences between these domains. As Figure 10 and Figure 11 show, this mapping typology does not consist of drawing systematic correspondences between the components of Surgery and Butchery. To illustrate, the analysis of this metaphor from the one-way-meaning-transfer approach could be represented as follows:

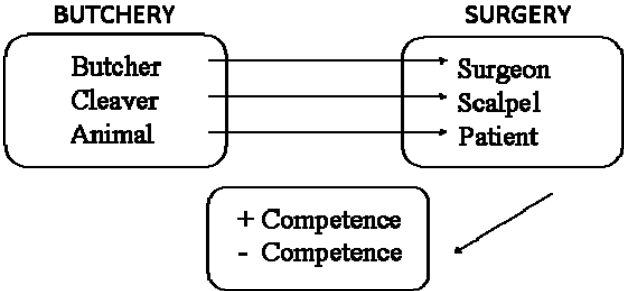


Figure 12: One-way-meaning transfer for Surgery Is Butchery.

This particular metaphorical mapping cannot be accounted for in terms of one-way-meaning-transfer perspective because *being competent* or *incompetent* is not an inherent feature to either source or target domain (see the previous section). To illustrate, these attributes are determined after the interaction between the elements of source and target domains takes place.

The Interaction approach to this metaphorical mapping typology has the advantage of being able to explain how *competence* in both domains is shaped. For instance, rather than assuming that there is a one-way-meaning transfer from Butcher to Surgeon, we argue that Butcher interacts with the components of the target (*scalpel* and *patient*). Because *butcher* now uses sophisticated tools in his job, we assume he or she is *competent*. In the same way, since *surgeon* interacts with *cleaver*, which is inadequate to carry out surgery on a human being, now he or she is *incompetent*.

The analysis of Surgery Is Butchery and Butchery Is Surgery raise certain incongruities within the embodied approach to metaphor. If we take into account the principle of *partial mapping* to account for this particular metaphor, certain theoretical problems arise. To start with, this principle is based on the fact that certain aspects of the target domains are hidden while others are highlighted. The problem is that *competence* is not an inherent feature of the source domain Surgeon or Butcher in the two metaphors above. Instead, it is an *emergent structure* which arises as a result of the interaction between source and target domains. More specifically, as we saw before, this structure depends on how Butchery and Surgery interact in Figure 10 and Figure 11.

As these figures indicate, the inference (+ competence or -competence) of these metaphorical mappings does not depend on which domain fulfills the function of source or target because being competent or incompetent is not an inherent feature to either domain.

To illustrate, let us consider the following conceptual metaphor uttered in a context to convey that Butcher is incompetent because he is too slow cutting up meat:

This butcher is a surgeon (Grady, Oakley, and Coulson 2007:424).

Taking into account this metaphorical mapping in this particular context, it becomes obvious that this metaphorical mapping typology depends on interaction between source and target domains rather than systematic correspondences between them. Therefore, being competent or incompetent is not inherent to either source or target domain. Instead, this characteristic is dynamic because it is highly shaped by the way the two domains interact.

Another way the *interactionist* approach to this particular conceptual metaphor is more fruitful than the embodied approach is the fact that it looks at metaphorical mapping as a dynamic interaction between two phenomena rather than a static mapping where all the elements which are active in the metaphorical mapping are grounded exclusively in source domains (see also Mouton 2012).

To sum up, the embodied approach cannot account for this metaphorical mapping because its tenets cannot explain how *competence* can be positive and negative in the two examples above. This is due to the fact that this approach is based on the assumption that conceptual metaphor consists of (1) unidirectional meaning-transfer and (2) drawing ‘fixed and static’ systematic correspondences between source and target domains (see also Mouton 2012; Tejada Caller and Guzmán Guerra 2012; Trim 2011).

As the data indicates, sticking to the tenets of the embodied approach, we cannot explain how Butcher is (in)competent after being mapped onto Surgeon because competence is neutral in the two domains. This is due to the fact that these tenets cannot explain how Surgeon is incompetent when it is mapped onto Butcher. In contrast, the *interactionist* approach allows us to postulate that being competent or incompetent is highly

determined by the interactive process that varies depending on contextual information but not on inherent features that the source domain could have.

Conclusion

In this chapter we outlined the situational conditions that pave the way to studying a certain metaphorical mapping typology from the Interaction perspective. We proposed this approach mainly for two reasons:

First, one-way-meaning transfer cannot account for the metaphorical mapping typology which is based on bodily-experienced phenomena as source and target domains. And second, we argued that being bodily experienced, target domains are also eligible for projecting semantic features in metaphorical mapping.

One of the main goals of this chapter has been to show that source and target domains are essentially identical in this metaphorical mapping typology in that they are bodily-experienced, semantically independent, and therefore, eligible for meaning projection.

From a functional point of view, we also argued that metaphorical mapping—as a categorizing tool—carries out three different cognitive tasks: *categorizing*, *further-categorizing*, and *re-categorizing*. We argued that the first task is particularly noticed in the metaphorical mapping typology where target domains do not have bodily-based semantic categories. The second cognitive task (*further-categorizing*) is observed when both source and target domains are processed within the same modality. In this case, we argued that both source and target domains do have semantic categories. When such domains interact, the target domain acquires a more extensive semantic category. And finally, the third task (*re-categorizing*) characterizes the interaction between two bodily-experienced phenomena

which are processed in different modalities. This case includes the interaction which leads target phenomena to cease to belong to a semantic category and instead acquire another one.

Furthermore, in this chapter we assessed one of the main characteristics that are claimed to differentiate source and target domains which concerns how they are processed. Because source domains are accessible to the sense organ, they are argued to be processed on-line. On the contrary, due to the fact that target domains are not bodily-experienced, they are assumed to be processed off-line (e.g. Johnson and Lakoff 2002; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989). However, as shown before (page 211), the metaphorical mapping typology which engages bodily-experienced phenomena in source and target domains does not reveal this differentiation (see for example synaesthesia-based mapping).

In this chapter, our concern also has been to show how conceptual metaphor may be analyzed in terms of interaction between source and target domains rather than in terms of one-way-meaning transfer. Accordingly, we argued that the metaphorical mapping typology which is based on bodily-experienced phenomena as source and target domains is based on recruiting bodily-based information from both source and target domains (see page 234). In this respect, we argued that *emergent structure* is one of the key aspects of this interaction. That is, because the *emergent structure* does not belong to either source or target domain (e.g. Turner, 2011), the conceptual metaphor needs to be analyzed in terms of interaction.

To illustrate this point, we analyzed Surgery Is Butchery and Butchery Is Surgery (see pages 226-237) and argued that this particular metaphorical mapping does not arise from a systematic correspondence between the elements of source and target domains.

Rather, this conceptual metaphor is based on the interaction between the two phenomena giving rise to features such as incompetence or competence (see page 222).

Taken together, these findings suggest that the experiential basis of the metaphorical mapping typology which engages two bodily-experienced phenomena should not be fully attributed to source domains. This is due to the fact that this mapping typology recruits bodily-based features from source and target domains. Consequently, the embodied character of conceptual metaphor is based on the bodily-based information of source and target domains.

In the following chapter we shall further explore the interaction process between source and target domains to assess its mechanisms and its typologies.

Chapter V: Interaction: Its Mechanisms and Typologies

1. Introduction and Hypothesis

In the previous chapter, we suggested that the experiential basis of metaphor should not be fully attributed to source domains in the metaphorical mapping which engages bodily-experienced phenomena in source and target domains. The data indicates that, given the constitutive nature of target domains (namely, being bodily experienced), the experiential basis and the 'embodied' character of conceptual metaphor should be equally attributed to source and target domains.

Accordingly, we argued that one-way-meaning projection is not observed in this metaphorical mapping typology. This is due to the fact that, within the embodied approach to metaphor, this principle is based on the bodily-based information of source and its projection onto target domains. Since one-way-meaning transfer does not fit this metaphorical mapping typology, we proposed an *interactionist* approach to analyze it.

While outlining potential mechanisms and typologies that underlie the metaphorical mapping which engages bodily-experienced phenomena in source and target domains, we shall also assess the contribution of target domains to the *embodied character* of conceptual metaphor.

Our concern in this chapter is to show how source and target domains interact in this type of metaphorical mapping. We hypothesize that source and target domains are mutually influenced in the mapping typology that engages two bodily-experienced phenomena.

We will need to (1) outline the mechanisms that underlie this interaction by examining the linguistic and cognitive structures that manifest them. Given that the two

domains are bodily experienced, we hypothesize that interaction originates when three main conditions of pair of domains of experience are met: *Co-occurrence*, *Co-relation*, and *Causality-and-Co-activation*.

We shall further examine whether this interaction is homogeneous to all metaphorical mapping typologies wherein source and target domains are experienced bodily. In this respect, we hypothesize that, given the enormous variety of experience which conceptual metaphor is based on (see Chapter I), interaction between source and target domains may follow different patterns.

In order to test this hypothesis, we shall assess whether the aforementioned mechanisms are observed in the data. This might mean that even within mapping across bodily-experienced phenomena the interaction is different. Correspondently, their analysis should be different too.

Our purpose in this chapter is to assess how the two experiences are interdependent and how their interaction in metaphor is marked. We shall argue that the two experiences show a sort of co-operation in metaphorical mappings. Still, we do not claim that target domains are semantically dependent on source domains.

To show how source and target domains interact we are going to pay special attention to conceptual and cognitive mechanisms⁹ that lead to the interaction of two phenomena in metaphor.

⁹ According to Ruiz de Mendoza (2005:258-259), though 'cognitive' and 'conceptual' are used in Cognitive Linguistics interchangeably, he suggests that the two might be differentiated in that the former may refer to 'mental processes' whereas the latter may refer to the 'outcome' of the former. This differentiation is crucial for our interest here in that we need to look at interaction in terms of its cognitive and conceptual mechanisms. Thus, this chapter might be divided into two parts: cognitive mechanisms, where we outline the bodily

Thus, this chapter will be organized as follows: in section 2, we shall closely look at the conceptual organization of metaphor and explain how this organization is fully attributed to source domains within the embodied approach to metaphor. In section 3 we shall analyze how source and target domains interact. In this respect, we shall outline the dynamics of interaction. Later we shall concentrate our analysis of the data on the interaction at physiological and cognitive levels. To assess whether interaction is identical to the metaphorical mapping that engages bodily-experienced phenomena, we shall also outline different typologies of interaction and see how they differ from other mapping typologies.

2. Background

2.1. Conceptual Organization of Metaphor

Broadly speaking, conceptual metaphor is claimed to be based on similarity (e.g. Grady 2007; Marks, Hammeal and Bornstein 1987; McGlone 2003; Miller 1993; Murphy 1996), analogy (e.g. Gentner and Bowdle 1999), and embodied simulation (e.g. Gibbs 2005; Gibbs and Matlock 2008; Kintsch 2008). However, all these approaches affirm that in metaphorical mapping, while target domains are influenced through highlighting some of their features, re-structuring their conceptual organization, source domains are assumed not to be influenced *at all* in metaphorical mapping. For instance, Lakoff and Núñez (2000:46) assure that, "...metaphor...introduces elements into the target domain that are not inherent to the target domain".

features operating in interaction; and conceptual mechanisms where the outcome of such mechanisms is observed.

To show that metaphor *does* introduce new elements in the target domains, Lakoff and Núñez (2000:46-47) analyze Love Is a Partnership metaphor. They argue that before these source and target domains are engaged in metaphorical mapping, target domain Love did not include elements such as *work, hard work, unrewarding, and effort*:

(1) *I'm putting all the work into this relationship and you're getting every thing out of it.*

(2) *It was hard work, but worth it.*

(3) *The relationship was so unrewarding that it wasn't worth the effort.*

Importantly, the cognitive topologies of the source domains do not undergo any change, hence the *invariance principle* (Lakoff 1990). These observations have led these scholars to affirm that metaphorical mapping strictly follows this principle—preserving the inferences of source and imposing them onto target domains (Lakoff and Núñez 2000:54). That is, source domains—and our understanding of them—are invariable inside and outside metaphorical mappings—because they are semantically independent (Lakoff and Turner 1989:116). On the contrary, target domains are the ones that are accessed and structured in the process of the mapping (e.g. Lakoff and Núñez 2000).

As stated before, these assumptions do not fit the metaphorical mapping which is based on bodily-experienced phenomena (see Chapter III). Therefore, within the Interaction approach to metaphor, we argued that source and target domains are influenced in the same way. Importantly, at least there are two ways to assess how source and target domains interact: *bi-directionality-based metaphors, emergent structure, and adaptation process* (see Chapter IV).

2.2. The experiential basis of conceptual metaphor

One of the basic insights of conceptual metaphor is that it is grounded in the bodily-based information of source domains (e.g. Boroditsky and Ramscar 2002; Gibbs 1994, 2011; Johnson and Lakoff 2002; Lakoff and Johnson 1980, 1999; Niedenthal, Barsalou, Winkielman, Krauth-Gruber, and Ric 2005; Szwedek 2011).

However, in the previous chapter, we demonstrated that the experiential basis of the mapping typology which engages bodily-experienced phenomena as source and target domains is based on the bodily-based information of source and target domains. Thereby, the embodied character of conceptual metaphor should be equally attributed to source and target domains. In this respect, we argued that since target domains meet two basic characteristics that are highly associated with meaning projection—namely, being bodily experienced and semantically independent (see page 149)—then these domains also project meaning in metaphorical mappings. In particular, we have shown that the bodily-based information of source and target domains is recruited to construct the metaphorical mapping which engages bodily-experienced phenomena as source and target domains (see page 226).

3. Data Analysis

3.1. Dynamics of interaction

3.1.1. Co-occurrence and co-relation of domains of experience

A certain amount of metaphors is based on co-relation of two phenomena. When source and target phenomena co-relate, they end up coupled in metaphorical mapping (e.g. Grady 1997, 1999, 2007). Primary metaphor such as More Is Up is a typical example of

this kind of metaphor (Grady 1997:41). Grady further outlines the situational conditions under which mappings in primary metaphor are constructed. For instance, he argues that when two phenomena tend to co-relate they conflate in our reasoning system (Grady 2007:321; for contrasting views see Rakova 2003:31). Furthermore, Grady assures that, “In this case [primary metaphor], the motivation is a straightforward correlation between the two concepts...” (Grady 2007:318; see also Valenzuela 2009).

Nonetheless, there are at least three reasons why *co-relation* is problematic to be applied only to primary metaphor. First, correlation does not characterize only primary metaphor. Rather, the data shows that the phenomena which are engaged in metaphorical mapping are based on co-relation (see pages 214-219). Second, there might be a previous stage to co-relation between source and target phenomena in primary metaphor which is *co-occurrence*. Third, though this correlation is the basis of mapping in this type of metaphorical mapping, source domains are attributed a more participating role than target domains within the embodied approach to metaphor (see Chapter II).

To illustrate that primary metaphor is not the only type of metaphor that is based on co-relation, let us consider the following:

Arguing/Criticizing Is Hitting/Punching

He lashed out at the minister for suggesting the legalization of cannabis.

Here the domains Arguing/Criticizing and Hitting/Punching co-relate in this metaphorical mapping in the sense that the two actions are identical in our reasoning system. However, this does not necessary mean that they co-occur.

As this example indicates, while *co-relation* is observed in metaphorical mapping, *co-occurrence* is not a prerequisite condition for phenomena to be mapped (see also Juliet

Is the Sun on page 278). Of particular interest here is that *co-relation* of domains is not a feature that exclusively characterizes primary metaphors.

As argued before, since source and target domains are bodily experienced, it is safe to argue that source and target phenomena in certain examples of primary metaphor co-occur before they co-relate. Accordingly, these two stages may be the initial conditions towards the interaction between the two phenomena in our reasoning system. Identifying *co-occurrence* as a basic mechanism in primary metaphor (e.g. Valenzuela 2009:238) is crucial to tracing how the interaction process is carried out between these phenomena. It also highlights the bodily character of target domains too. To further illustrate this point, we need to deeply look into the bodily-based information of source and target domains. Let us analyze the following examples:

Quantity Is Verticality

More Is Up

Less Is Down

(1) Property prices have probably bottomed out now.

Quantity Is Length

More Is Long

(2) Do you want alcohol or a long drink instead?

Less Is Short

(3) Retailers downtown often short change tourists.

In (1), via this metaphorical mapping we conceptualize Quantity in terms of Verticality in the sense that the increase and decrease of Quantity are understood in terms of Upward and Downward motions, respectively (see also Lakoff 1990:53). Similarly, in (2) Quantity is understood in terms of Length. While it is hard to differentiate the two

domains in terms of the concrete-abstract criterion, we argue that the mapping here follows a different pattern. For instance, it might be that metaphorical mappings which are based on co-occurrence require two bodily-experienced phenomena and an active participation from both source and target domains.

However, the embodied approach to metaphor assures that, “the experiential grounding” in the example (1) is our experience of the source domain Verticality (Johnson and Lakoff 2002:246). Similarly, in (2) the embodied character of this metaphor is fully attributed to the domain Length. Though such co-relation leads to neural connections between the two phenomena “(Neurons that fire together wire together!” (Lakoff 2008:19) (see also Feldman 2006; Feldman and Narayanan 2004), we still need to assume that the source has a dominating role in metaphorical mapping.

On the other hand, target domains within this approach are viewed as inaccessible to the sense organs. Since the target domain More is experienced bodily, it is plausible to suggest that there is interaction between the two domains. That is, rather than imposing features of source domain (Up) onto target domain (More), we argue that there is interaction between bodily-experienced phenomena (Quantity and Verticality; Length and Quantity).

It is worth noting here that we are not claiming that metaphorical mapping is reductively constituted by co-occurring phenomena. Rather, there might be other mechanisms which operate in the metaphorical mapping that engages bodily-experienced phenomena (e.g. see pages 272-274). In the following sections we shall identify them and assess how they operate in metaphorical mapping.

3.1.2. Causality and Co-activation in Metaphorical mapping

3.1.2.1. Causality

In the previous section, we observed that though co-relation is a crucial feature in primary metaphor, it is not the initial stage in this type of metaphorical mapping. Instead, we identified in the data a previous stage which is co-occurrence of source and target domains. We also observed that co-occurrence might characterize other types of metaphorical mapping. Furthermore, we demonstrated that primary metaphor (1) is based on two bodily-experienced phenomena and (2) is rooted in the interaction between source and target domains.

In this section, we shall see how the co-occurrence and co-relation of phenomena lead to a causality-and-co-activation-based metaphorical mapping. For this purpose, we shall outline the mechanisms that operate in this type of metaphorical mapping. To do that, we suggest reconsidering Quantity Is Verticality and Quantity Is Length, mentioned above.

As these examples indicate, we conceptualize Quantity in terms of Verticality and Length. According to Lakoff and Johnson (1980, 1999) and Lakoff (1990:53), the mapping between the two phenomena is rooted in their co-relation in our everyday experience. For instance, we all share the experience of the increase of Quantity of water as being accompanied with its moving upwards (Lakoff and Johnson 1980, see also Lakoff 1990).

Co-occurrence of these phenomena leads to develop a causality-based mapping in the sense that target domain (Quantity) causes the activation of source domain (Verticality e.g. moving up). The interaction between these phenomena is rooted in a causality-based mapping because target phenomena trigger source phenomena through stimulating them—

which explains why conceptual metaphor is not random in this type of mapping. Notice that in this metaphorical mapping typology, source and target domains are bodily experienced.

Furthermore, the two phenomena co-activate in the neural system (e.g. Gallese and Lakoff 2005). For instance, stimulating a given phenomenon leads to the activation of another (Lakoff 2008:20-30). Accordingly, when a given conceptual metaphor engages Quantity and Verticality, this metaphor leads to activating two different neural structures in the brain. That is, the co-occurrence of two bodily-experienced phenomena leads to constructing certain neural networks which become active whenever source domains are stimulated (Lakoff 2008:19-20). In order for the brain to metaphorically process a given phenomenon which functions as target domain and which co-occur with its counterpart in the source domain, certain neural networks must be stimulated (Lakoff 2008:18; see also the following chapter).

This causality-based mapping involves interaction between two phenomena in terms of the sensorimotor experiences and the linguistic labels that denote these experiences (see page 297). More precisely, it is between sensorimotor stimuli and linguistic labels that are used to stimulate these neural structures. These linguistic labels—when perceived by the brain—the brain areas which are responsible for the execution of the motor actions denoted by such labels become active (Lakoff 2008:19). Accordingly, this gives rise to the construction of metaphorical mappings and their later activation.

In this setting, the interaction of Quantity with Verticality is also marked cognitively in the sense that the resulting inferences in this metaphorical mapping are derived from the two phenomena—but not just from source phenomena. These inferences are molded in such a way that those of the target phenomena are also operating in metaphorical mapping.

This notion is problematic since it cannot be reconciled with the one-way-meaning transfer approach. This is due to the fact that this approach draws on two principles: (1) that metaphor is embodied because of the bodily-based information of source phenomena; and (2) the mapping consists of transferring constituents from source onto target domains.

**3.1.2.1.1. Synaesthesia: a causality-based
metaphorical mapping**

Following Ramachandran and Hubbard (2001:53), this metaphorical mapping typology evokes sensory reaction associated with source modality. Let us consider the following table:

Source Modality	Target Modality	Examples
Vision	Audition	(1) Bright sounds
Audition	Vision	(2) Loud colours
Somatosensory	Taste	(3) Sharp tastes
Somatosensory	Smell	(4) Heavy smells
Taste	Somatosensory	(5) Sweet touch
Force	Audition	(6) Raise voice

Table 7 Interaction between source and target modalities.

Applying this finding to the table above entails that Bright sound activates the same sensory reaction in the Visual modality as if it were conventionally processed within the visual modality. And Loud color evokes sensory reaction in the auditory modality. Similarly, processing the metaphorical expression, Sharp tastes, elicits response in somatosensory modality.

Accordingly, Ramachandran and Hubbard (2001:53) sustain that one modality causes the activation of another. In connection with this line of argumentation, Rakova

(2003:40) argues that source and target domains in this type of metaphor are physiologically associated.

In the thesis so far, we have demonstrated that the mapping typology which is based on bodily-experienced phenomena in source and target domains may be based on interaction. Given that mapping across sensory modalities involves activating source and target domains, approaching this metaphorical mapping typology from the interactionist perspective would allow us to understand how causality operates in this typology.

In synaesthetic metaphor, the mapping takes place not because target domains are abstract and being so, there is no other way to have access to them. Rather, target domains are mapped onto other domains because they evoke the perception of the experience in the source modality—because they are physiologically connected (Ramachandran and Hubbard 2001; Cacciari 2008). This means that this type of metaphorical mapping is based on stimulation. As will be shown in the following chapter, source and target modalities are also interconnected via the linguistic system that contributes to the stimulation process (see page 295).

So far, we have argued that in order for the interaction to take place, it is necessary that target phenomena are perceptual. The activation of source modality is not completely detached from its counterpart in the target domain. In this respect, target modality is the first to become active. In this respect, conceptual metaphor is not a purely-imaginative structure as it is held within the framework of the embodied approach to metaphor (Chomsky 1975; Fodor 1975). In the case of synaesthetic metaphor, the experience of a given sensory modality triggers another (Ramachandran and Hubbard 2001).

In the table above, “Bright Sound” can be analyzed as an interaction between visual and auditory phenomena. Our judgment is based on the fact that the two linguistic terms that reveal this synaesthesia-based metaphor belong to two modalities, vision and audition.

The question which arises here is why this phrase should activate visual modality instead of auditory modality or both simultaneously given that the expression *bright sound* draws on linguistic terms that belong to two modalities. In other words, why does the term *bright* stimulate the visual modality, given that it is combined with a term which is associated with another sensory modality?

One possible answer to this question is that the perception of a *sound* which is “*bright*” is not processed fully within the visual modality. Otherwise, the domain Sound would have no contribution to the metaphorical mapping which engages visual and auditory modalities as source and target phenomena, respectively. Based on this observation, perceiving this particular sound would stimulate the two modalities.

Accordingly, the term *bright*, when used metaphorically, includes not only the inferences of visual modality which are activated when the concept *bright* is activated, but also the inferences from other modalities. The terms in synaesthetic metaphor—in source, as well as in target—are highly sensory (see Table 7). This may support the notion that words are not devoid of experience and they are not formal symbols representing concepts (see the following chapter for a more elaborated discussion on this point). Accordingly, this term is highly sensory in the sense that this phenomenon is originally processed in the auditory modality.

Though in Table 7 we focused on the interaction which concerns individual modalities which are mapped in metaphor, Luria (1968) reported a special case where a subject in some cases experiences a simultaneous activation of five senses. This seems to

be consistent with Barsalou's (1999) finding that, no experience is processed in a single modality.

What is relevant here to our discussion not only is the fact that sensory modalities interact to reason about a given phenomenon, but also source and target phenomena influence each other in metaphorical mapping. This is because the stimulus is operating in the same way for both modalities (e.g. Ramachandran and Hubbard 2001). Therefore, metaphorical mapping is based on causality in that (1) source and target phenomena mutually activate each other through neurons which fire as a response to a given stimulus (Giora 2008:146). And (2) the target phenomena—being bodily experienced—include words that are directly grounded in a given sensory experience. These linguistic labels inherently belong to target phenomena because they are also operating in these domains outside metaphorical mapping.

These linguistic expressions are intrinsically related to sensorimotor phenomena not just when they function as source but also when they do as target domains. This means that a given modality may be stimulated in two ways: (1) by a stimulus which operates conventionally within the modality in question; and (2) by a linguistic (or extra-linguistic) stimulus. These domains are based on a stimulus-driven process (Giora 2008:146).

The direction of the mapping is from target to source phenomena in the sense that the target is activated first. What we perceive first is the target domain and then the latter leads to the activation of source domain.

The premise that we resort to more concrete (bodily-experienced phenomena) to structure more abstract concepts can imply that bodily experience triggers metaphorical mappings. Nevertheless, it has not been reported in the literature of the embodied approach to metaphor (e.g. Lakoff 1987; Lakoff and Johnson 1980, 1992, 1999; Lakoff and Turner

1989) that target domains become active first as the general assumption within the theory is that all target domains are abstract and inaccessible to the sense organ. But, image metaphor is the process of metaphorical mapping which is based on the perception of the target image. This, in turn, leads to interaction between source and target images. To illustrate, let us consider the following example:

My wife...whose waist is an hourglass. (Lakoff and Turner 1989:91)

This metaphorical mapping needs to be analyzed differently because it includes two perceptual domains: Hourglass and Human (body) as source and target domain, respectively. Since the target domain in this case is accessible to the sense organ, it is the first domain to be activated. Notice that this type of metaphorical mapping is different from the one which is based on bodily and non-bodily-experienced phenomena as source and target domain, respectively. In particular, this type of mapping does not fit into the Propositionality-Linearity perspective (see chapter III).

Similarly, in the case of synaesthesia, the first modality which becomes active is the first to be processed—that is, the target modality. Source modality becomes active after the experience of the target modality has taken place. Let us re-consider the following example from the table above:

Sharp taste.

In this example, the first modality which is perceived and becomes active is the gustatory modality. This metaphorical mapping typology is a piece of evidence that processing an experience within a modality leads to the activation of another modality (Rakova 2003). Again this typology cannot be accounted for by the embodied approach to metaphor namely for two reasons. First, this approach does not take into account the fact

that conceptual metaphor may be based on different mapping typologies in which target domains are not always abstract and inaccessible to the sense organ (Rakova 2003). Second, as seen in Chapter III, this approach is highly based on Propositionality-Linearity of metaphorical mapping. Since the two domains are bodily experienced, the target domain is active first. Then, the experience of the target domain leads to the activation of the source domain. It is not that the first (and the only process) which is involved in conceptual metaphor is projecting features from source onto target domains as concrete and abstract domains, respectively. But, in situations where source and target domains are experienced bodily, the first to be active in metaphorical mapping processing is the experience which functions as target.

However, in the previous chapter we argued against *Linearity* of metaphorical mapping (see pages 170-177). Here again, metaphorical mapping is not lineal though its activation *is* lineal in the sense that the activation of the two modalities occurs in a chronological order. First, a given phenomenon is perceived within a given modality(ies). Then, source modality is activated. The two phenomena interact in our reasoning system through shared stimuli. However, it is worth noting that this order characterizes the activation of the two modalities but not our experience of these modalities and reasoning about them.

From our discussion above, it becomes clear that the interaction process is not random. Rather, it stands on these mechanisms: *Co-occurrence*, *Co-relation*, *Causality*, *Co-activation*, and *Inferentiality*. More importantly, these mechanisms are observed in the metaphorical mapping which engages two bodily-experienced phenomena. It is worth noting here that these mechanisms might also be observed in other types of metaphorical

mapping (see the following chapter). However, Causality and Co-activation might be the main differentiating operating mechanisms in the interaction-based metaphorical mapping.

An additional question which will be relevant to assess here is whether the interaction process is identical to all of metaphorical mapping typologies (see page 259-261). The metaphorical mapping that characterizes synaesthesia is unconscious and automatic. In other words, we do not selectively map one modality onto another in this typology. Instead, the interaction is instantiated in the physiological system combining the experience of two different modalities. One of the remarkable insights within the embodiment theory is that conceptual metaphors “...are used unconsciously, effortlessly, and automatically...that is, they are part of the cognitive unconscious.” (Lakoff and Nuñez 2000:41; see also Valenzuela 2009:238). This type of metaphorical mapping can be contrasted to literary metaphor (see pages 274-279) in the sense that the latter is mostly deliberate and conscious (Steen 2010, 2011).

In the following sections, we shall focus our attention on these two mechanisms to explore how interaction between source and target phenomena differs. For instance, they might not be observed in other types of metaphor. In order to do this, first we need to outline the characteristics of these mechanisms. This will allow us to further assess whether the interaction is identical to the metaphorical mapping that engages bodily-experienced phenomena as source and target domains.

3.1.2.2. Co-activation

Another characteristic which needs to be considered in the interaction between bodily-experienced phenomena—namely, synaesthetic metaphor—is co-activation. This mechanism is particularly evident in the type of mapping where the two modalities co-

activate as a response to stimulation (Rakova 2003 41:43). When the two modalities are mapped in this typology, this stimulation process does not necessarily occur in the modality that is activated. In addition, the stimulating agent in this case does not, by default, operate on this target modality (Rakova 2003:41). Rather, the activation of a given modality may lead to the activation of another modality and the stimulating agent may be of different natures. To illustrate this point, let us consider the following synaesthetic metaphors:

(1) *Bright sound.*

(2) *Loud shirt.*

In (1), the interaction takes place between visual and auditory modalities as source and target modalities. In (2), the auditory modality takes on the role of source domain; whereas the visual modality fulfills the role of target.

In the first example, the operating stimulus is a *sound* (auditory stimulus) but in the second example it is visual (e.g. an image of *a shirt*). What is relevant here to our discussion from the *interactionist* approach to metaphor is that a given modality (source modality) is stimulated via another modality (target modality).

Equally interesting, the stimulating agent which operates in this metaphorical mapping does not operate on this modality otherwise. On the contrary, outside synaesthesia, sensory modalities activate as a response to their corresponding stimuli (e.g. Ramachandran and Hubbard 2001).

More importantly, since these two modalities map onto each other in different ways, we argue that they interact at least in two ways. The two examples above show that these two modalities may interact when the stimulus is visual or auditory. From a physiological point of view, the two modalities are active (Ramachandran and Hubbard 2001). This means that synaesthetic metaphor leads to an on-line processing of at least two modalities

at the same time (for an in-depth analysis of how certain types of conceptual metaphor are accessed on-line, see Valenzuela and Soriano 2009). Then, it is safe to conclude that the two modalities are engaged in an interaction that recruits features from both modalities.

3.2. Interaction at Physiological and Cognitive Levels

In the previous section, we showed how the metaphorical mapping which is based on interaction is also based on inferences from source and target phenomena. This type of mapping is based on the fact that two phenomena constitute somehow a unified semantic field that is made up of inferences from source and target phenomena. We also showed how the interaction is not random; rather, it is causal in that target domains trigger source domains. The mapping is between source and target phenomena which share the same stimulus. As shown before, the interaction in metaphorical mapping is based on stimulus-response pattern (see also Giora 2008).

3.2.1. Synaesthesia metaphor, inputs from different modalities

Analyzing the data, we identified *synaesthetic metaphor* as another mapping typology wherein source and target domains are experienced bodily (see page 184). More precisely, this type of mapping engages sensory modality in source and target domains. Hence, the phenomenon is "...a genuine sensory phenomenon (Ramachandran and Hubbard, 2001a, b)". This is due to the fact that cross-modalities mapping causes a sensory effect when it is activated (Ramachandran and Hubbard 2003:54). In their research, the focus falls on the number-color synaesthesia. They claim that this metaphorical mapping typology is based on cross-domain activation. This activation is unidirectional in that a

number evokes a color but a color cannot evoke a number (Ramachandran and Hubbard 2003:51).

These findings have been replicated not just with number-color synaesthesia but also with *smell* and *taste* and other sense-related metaphorical associations such as ‘warm hue’, ‘loud shirt’, ‘sharp cheese’, and ‘fruits taste and smell sweat’(Ramachandran and Hubbard 2003:52). According to these scholars (2001, 2003), these findings indicate that this kind of metaphorical mapping is based on physiological connection between different modalities (see also Rakova 2003:58). On the whole, synaesthetic metaphor is a cognitive and physiological processing (e.g. Ramachandran and Hubbard 2001; Rakova 2003).

Consistent with these findings, we demonstrated how this type of metaphorical mapping poses a potential challenge to the embodied approach to metaphor in that, since source and target modalities are experienced via the sense organ, it is implausible to attribute to a given modality an inherent source or target role based on the concrete-abstract criterion (see pages 155, 222). Our analysis of the data suggests, instead, that the two modalities contribute equally to metaphorical mapping (see the previous chapter).

Another piece of evidence for this view is the fact that a given modality can function as source and target in different metaphorical mappings (see Table 7). Henceforth, this kind of metaphorical mapping cannot be covered by the tenets of the embodied approach to metaphor without a major refinement of the tenets (see Chapter I).

In particular, we argued that it is implausible to conceive of target modalities as abstract and indirectly meaningful as opposed to their counterparts in source domains. There is no reason to differentiate sensory modalities in terms of concreteness-abstractness criterion, much less to assign them inherently different roles in metaphorical mappings. As

a result, we should not assume that we experience target modality via source modalities which are more concrete and directly meaningful.

Since in this type of metaphorical mapping both domains are bodily experienced, we claim that there is an interactive process rather than imposing features of more concrete onto more abstract domains.

In this section, we shall see how the interaction between source and target modalities is carried out and identify the underlying mechanisms. Let us consider the following table:

Source Modality	Target Modality	Examples
Vision	Audition	(1) Bright sounds
Audition	Vision	(2) Loud colours
Somatosensory	Taste	(3) Sharp tastes
Somatosensory	Smell	(4) Heavy smells
Taste	Somatosensory	(5) Sweet touch
Force	Audition	(6) Raise voice

Figure 13 Interaction between source and target modalities.

(1) and (2) show that sensory-modalities are engaged in metaphorical mapping at least in two different ways: in (1), the visual modality functions as source and the auditory as target. On the other hand, in (2), the visual modality takes on the role of target and the auditory modality fulfills the role of source.

More interestingly, (2) indicates that the two modalities can interact in two ways: the visual modality interacts with the auditory modality as source and as target. This finding seems to contradict Ramachandran and Hubbard (2001, 2003), who claim that *unidirectionality* also operate in synaesthetic metaphor (see the section above). In chapters I

and II, we demonstrated that this principle is not absolute. As Table 7 illustrates, this pattern holds for some cases of synaesthetic metaphor, but does not characterize all other instances of cross-modality mapping.

These metaphors are based on linguistic terms from two modalities Bright (visual modality) and Sound (auditory modality). Similarly, Sharp (somatosensory modality) and Taste (Gustatory modality). Examples such as (1) *Bright Sound* and (2) *Loud Color* seem to support this point. For instance, in the first example, the stimulus Bright is processed within the visual modality whereas in (2) the stimulus Loud is processed within the auditory modality. This entails that processing the language of a given modality leads to the stimulation of another (Cacciari, 2008; Rakova 2003). Another finding in the data is that both *bright sound* and *bright light* activates visual modality.

3.3. Interaction in Cognitive system

3.3.1. Do mapping typologies follow the same patterns of interaction?

In this section, we shall assess whether the interaction process is identical to all metaphorical mappings which engage bodily-experienced phenomena in source and target domains. So far in this chapter, we have been outlining the mechanisms operating mapping across bodily-experienced phenomena. To show whether the interaction process is identical to all metaphorical mapping typologies, we need to consider the following mapping typologies:

- i. Love Is Journey
- ii. Human Is Machine
- iii. Juliet Is the Sun

- iv. Understanding Is Grasping (see the following chapter for an elaborated discussion on this type of metaphorical mapping).

Before we get deeper in the analysis of the examples of such typologies, we propose over-viewing some preliminary findings reached so far in the thesis. As argued before, the first metaphorical mapping manifests itself through a rich systematic use of linguistic metaphors. Conceptualizing Love relationship in terms of Journey is conventional, unconscious, and automatic (Lakoff 1987, 1990, 1993; Lakoff and Johnson 1980, 1999; Kövecses 1988). In the second case, the two domains can exchange the roles in different metaphors. However, in the third metaphor, the metaphorical mapping is selective, conscious, and deliberate (see our analysis of this metaphor in the section below). According to Gentner and Bowdle (1999:92), another important difference that characterizes these metaphorical mappings is that novel metaphor involves *sense creation* whereas conventional metaphor entails *sense retrieval*.

Still, synaesthetic metaphor shows another difference in its mapping. We argued before that this type of metaphorical mapping, though it is conventional, it does not show itself through a rich systematic use of linguistic metaphors. Another difference to be reported here is that the metaphorical mapping is held through physiological and cognitive systems (Ramachandran and Hubbard 2001). Also, the mapping here is causality-based metaphor.

To sum up, different bodily-experienced phenomena interact differently. This type of mapping follows different mechanisms. We shall turn to the last case of metaphorical mapping (Understanding Is Grasping) in the following chapter. Now, it suffices to note that though this metaphorical mapping typology engages bodily-experienced and non bodily-

experienced phenomena as source and target domains, respectively, it might be based on interaction too.

3.4. Typologies of interaction

Ruiz de Mendoza and Otal (2002:43-50) argue that analyzing metaphor in terms of its typology (this might include issues such as the ontological nature of domains and the complexity of metaphoric operation) is a major inroad into understanding its function and patterns of mapping.

In connection with this line of investigation, we shall show in this section that analyzing interaction in terms of its typologies might reveal the rich variety of the nature of interaction between source and target domains. We argued before against the assumption that metaphor is a homogeneous cognitive process. So far in this chapter we have outlined the mechanisms which operate in interaction-based metaphorical mappings.

Now, it is time to take our analysis of the data a step further. This will concern assessing how different typologies of mapping may show different modes of interaction. In the following sections, we shall consider interaction within one modality and within cross-modalities.

3.4.1. Interaction within one modality

Metaphorical mapping within the visual modality:

More Is High

He ran around the field at high speed.

Following Lakoff and Turner (1989:89), not all conceptual metaphors follow the strict patterns of imposing the conceptual structure of a given domain onto another. Rather,

there are “image metaphors” which map images instead of conceptual structures¹⁰ (see also Lakoff 1990:53). Image metaphor seems to be based on mapping across experiences within the visual modality. This means that both source and target images are experienced within the visual modality. Let us consider the following example:

(1) *My wife...whose waist is an hourglass.* (Lakoff and Turner 1989:91)

Here, perceiving the size and shape of the image of the target domain leads to the activation of the corresponding image with which it interacts in this example.

This type of metaphorical mapping is based on mental images: the image of Hourglass functions as source domain and the image of Waist as target. Though both domains are concrete, we argue that the interaction between these domains is different from the one reported in other types of metaphorical mapping (see page 264-266). Therefore, the interaction process—in this type of metaphorical mapping—needs different analysis.

In this respect, we document three main aspects where this difference might be noticed:

First, this type of interaction is not instantiated in a systematic use of linguistic metaphors. To illustrate, whereas *Love Is Journey* is linguistically marked through the use of expressions that belong to the same conceptual structure—such as

(1) a. *We can't turn back now;*

¹⁰ “Mental image” and “conceptual structure” –applied to metaphorical mapping—seem to be used differently in Cognitive Linguistics (e.g. Lakoff and Turner 1989) and Cognitive Science (e.g. Feldman 2006; Feldman and Narayanan 2004). However, there is no clear-cut explanation of a potential difference between the two. It is assumed that metaphorical mappings may include either images or conceptual structures. The former case is when source and target domains include images and the latter is when source domain is based on experience rather than images (Lakoff and Turner 1989: 89-91). In the literature, it is not clear why an image-based domain could not have a concept, or why a concept (or a conceptual structure) could not have an image.

b. *We're at a crossroads;*

c. *We may have to go our separate ways* (Lakoff and Johnson 1980:44);

(2) *Juliet is the sun.*

One difference between (1a, b, c) and (2) is that the former belongs to the type of metaphorical mapping which does not manifest itself through a group of linguistic expressions. A similar observation has been made by Lakoff and Turner (1989:91), who refer to this kind of mapping as “one-shot” mapping (see also Lakoff 1990:67-68).

Second, the interaction between the two domains is not strongly held through the neural system as compared to the metaphorical mapping typology which is based on synaesthesia. It also differs from the typology which draws on Understanding and Grasping (for an in-depth analysis of this type of metaphor, see the following chapter).

Our judgment is based on the fact that, in the metaphorical mapping typology which is based on synaesthesia, the two modalities co-activate. In contrast, it is implausible to assume that the same pattern of mapping would occur when we think of Waist in terms of Hourglass. In other words, thinking of Waist does not necessarily activate the image of Hourglass. Accordingly, the interaction between the two domains lacks the causality-pattern that characterizes other metaphorical mapping typologies.

And third, this typology seems to be the result of our creative imagination rather than unconscious reasoning that is found in synaesthesia metaphor and in typologies such as Understanding Is Grasping. Consistent with this finding, Lakoff and Turner (1989) affirms that, “Life Is Journey” is used unconsciously and automatically over and over again in reasoning about our lives. But one-shot image-mappings are not involved in daily reasoning” (91).

3.4.2. Interaction in Cognitive system

3.4.2.1. Adaptation and Transformation processes in metaphorical mapping

Another way to trace how certain metaphorical mappings are based on interaction between source and target domains is to closely look at their cognitive topologies and assess whether they undergo semantic changes. In this section, we will consider, as our initial example, *Man is a wolf* (Forceville 1996:11) and see how the cognitive topology of source and target domains in this metaphorical mapping are transformed.

First, based on (Forceville 1996:11), let us sketch out the components of the cognitive topology of each domain Man Is Wolf:

Wolf	Man
Living Being	Living Being
Aggressive	Aggressive
Cruel	Cruel

Table 8 Components of source and target domains.

Based on our analysis of this mapping typology—concrete-onto-concrete mapping—we observed that the two phenomena which are engaged in this case are semantically independent (see page 177). It has thus been suggested that such domains consist of cognitive topologies without being mapped (see page 149).

Putting these findings together with the fact that this metaphorical mapping can be reversed (see page 83), we get the following entailments:

First, both Wolf and Man consist of components that bear certain semantic features that individually characterize each cognitive topology. That is, though source and target

domains in this metaphorical mapping partially overlap in their linguistic systems (for instance, *living being, aggressive, cruel* are components of both topologies; see also page 295), these components belong to different semantic fields. To illustrate, the features *living being, being aggressive* are semantically different when characterizing the cognitive topology of Man and when denoting that of Wolf. For example, the component *being aggressive* in the cognitive topology of Man does not denote the same behavior as in that of Wolf.

Second, the cognitive topologies of Man and Wolf, before being mapped, include components which are not recruited to construct this metaphorical mapping. For instance, *four legs, two feet, tail, clothes etc.* are not included in the mapping.

Thereby, source and target domains go through adaptation and transformation processes in metaphorical mapping. In particular, both source and target domains in this metaphorical mapping undergo significant semantic changes. Findings reported by Forceville (1996:11) appears to endorse this scenario when he suggests that in metaphorical mapping there is "...a kind of mutual adjustment between properties..." of source and target domains. More specifically, these domains adapt to each other in the sense that some characteristics of Man are adapted to the domain Wolf. Likewise, the domain Wolf has to adapt to the domain Man in that the former acquires some human features via this metaphorical mapping (Forceville 1996:11-12).

Third, as stated before, one of the recurring patterns in the metaphorical mapping which engages bodily-experienced phenomena as source and target domains is the fact that the mapping can be reversed. Take, for example, Man Is Wolf. This metaphorical mapping can be reversed because we may think of Wolf in terms of Man as well (Forceville 1996:12), attributing some human features to Animal. Again, in this case, the cognitive

topology of the domain Man needs to adapt to the domain Wolf. It is obvious that if we reverse the mapping, we get a different metaphor but this means that the two domains interact differently and their cognitive topologies are adapted and transformed when the two domains interact. That is, Man Is Wolf and Wolf Is Man should not be dealt with as two isolated metaphors. Instead, we suggest that the two domains are involved in an interaction which is instantiated in different cognitive processes. When we map Wolf onto Man, this metaphorical mapping represents an instance of the interaction of the two domains, and when we map Wolf onto Man it is another instance of their interaction.

These observations support our view that the two domains that are engaged in this mapping typology *do* have their own conceptual structures outside metaphorical mapping; and thus, they are semantically independent (see pages 177).

The argument that the cognitive topologies of source and target domains are engaged in mutual influence applies with equal force to the mapping typology which engages sensory modalities in source and target domains. Let us consider the following examples:

Bright sounds

Loud colors

Heavy smells

Sharp tastes

The interaction between *Sound* and *Bright* can be looked at in terms of adaptation and transformation processes of the two modalities in the sense that the adjective *bright* loses some of its attributes and acquires others from the concept *sound*. That is, the term

bright, when used with *light* (that is, its conventional use) is not any more the same when it is used to modify the concept *sound*.

Similarly, the domain Sound loses some of its features and acquires others which originally belong to the domain Light. Forceville (1996:21), in this case, would claim that the two domains are engaged in “adaptation” and “transformation” processes.

One further implication that follows from this situation is that target domains in the conceptual metaphors analyzed in this section play a basic conceptual structuring role in metaphorical mapping. This means that the assumption that target domains are the only domains that are reorganized (e.g. Lakoff and Johnson 1980; Szwedek 2011) does not seem to hold in this metaphorical mapping. In conjunction with the potential participation of target domains and the possible semantic changes that source domains may undergo in certain metaphorical mappings. Mouton (2012:68) argues that changes in our understanding of target domains necessarily lead to significant modifications of the organization of source domains.

3.4.3. Interaction among sensory modalities

3.4.3.1. Synaesthesia

We largely covered synaesthesia as an example of interaction between sensory modalities. So far in the data, we have outlined how sensory modalities such as audition, vision, olfaction interact. However, based on the fact that these modalities are of different natures, we hypothesize that the dynamics of the interaction process vary depending on the sensory modalities in question. As a general feature, we argued that synaesthetic metaphor is unconscious, physiological, and automatic. The question which arises here is whether the

interaction between these modalities is homogeneous. To assess this question, let us consider the following metaphors:

Fear Is Cold

(1) a. *The howling of the wolves made my blood freeze.*

b. *The thought of AIDS brought me out in a cold sweat.*

Sight Is Touch

(2) *The dog fastened her eyes on my every movement as soon as she knew I had food for her.*

Sound Is Sight

(3) a. *He had a dark bass voice, very suitable for the ghost in Don Giovanni.*

b. *The volume fell as the band marched further away.*

Emotion Is High

(4) *If he flies off the handle once again, I'm going to quit the job.*

Emotion Is Touch/Control

(5) *He never quite seemed to hit it off with his head of department.*

BAD Emotion Is Hurt/Injury

(6) *Your unkind remark really hurt her.*

Listening Is Eating/Understanding Is Eating (for a different analysis of this metaphor, see the following chapter)

(7) *He swallowed my story hook line and sinker.*

Emotion /Idea Is Smell

(8) *As they entered the narrow pass the sheriff smelt danger.*

Examples (1)-(8) are instances of mapping across sensory modalities. They indicate that metaphorical mapping could be the result of interaction between different modalities

without giving rise to the phenomenon of synaesthesia—a phenomenon which is based on the fact that the experience within a given modality leads to stimulation of another (e.g. Ramachandran and Hubbard 2001).

While much research has demonstrated that in expression such as *sharp taste* and *heavy smell* there is co-activation (e.g. Ramachandran and Hubbard 2001; Rakova 2003), synaesthesia theory is not mature enough to trace whether this co-activation occurs in (1)-(8). To illustrate, to our knowledge there has been no experiment to assess whether the conceptual metaphor in (7) Listening and Eating co-activate.

In order to cover this gap, the theory needs to experimentally show that source and target modalities in (1)-(8) are based on causality-and-automaticity-based interaction. These metaphors might be different from synaesthesia-based metaphor in that they do not draw on *co-activation* and *causality*. In addition, in these metaphors the mapping process is selective. For instance, in these examples we purposely choose to map target onto source modalities. Based on the analysis of the data above, it becomes clear that different typologies in metaphorical mapping typologies lead to different modes of interaction.

3.4.3.2. Literary metaphor: how it does not fit the interaction approach

So far in this chapter, we have dealt with metaphorical mappings which are based on phenomena that are bodily-experienced and draw on stimulus-response pattern (e.g. Synaesthesia). To show how these metaphorical mapping typologies differ from others, we propose analyzing literary metaphor. Our task here is to identify the underlying mechanisms of literary metaphor and juxtapose them with those which operate in other mapping typologies such as synaesthetic metaphor.

Literary metaphor is instantiated through a mapping typology which might be based on different mechanisms. Within the framework of the Interaction approach to metaphor we have proposed that this typology can be juxtaposed with others in the sense that it does not follow the same process of mapping. Literary metaphor¹¹, in this respect, substantially differs from the typology which is based on bodily-experienced phenomena as source and target domains. This difference is mainly observed in four ways:

3.4.3.2.1. The mapping process is conscious and deliberate

Generally speaking, conceptual metaphor is argued to be unconscious cognitive processing (Gibbs 2005: 228). Within the embodied approach to metaphor this characteristic has been adopted as an absolute feature of all types of metaphorical mapping (e.g. Lakoff and Johnson 1980; Lakoff and Turner 1989). One of the major characteristics which have been recurring in metaphor research is that conceptual metaphor is used unconsciously. However, we need to constrain this overgeneralization since literary metaphor seems to be consciously constructed (see page 278). To illustrate, first let us consider the following metaphor Time Is Commodity or Money (Lakoff and Johnson 1980:7-9)

I don't have time to give you.

How do you spend your time these days?

That flat tire cost me an hour.

¹¹ Here we refer to literary metaphor that (1) is not based on conventional mapping between source and target phenomena; and (2) is based on bodily-experienced and non-bodily-experienced phenomena as source and target, respectively.

While it seems that these expressions are the result of an unconscious metaphorical mapping, literary metaphor—e.g. Juliet Is the Sun seems to be a deliberate mapping. Our judgment is based on the fact that target domains in this type of metaphorical mapping, can be purposely mapped onto other domains. This means that in the example *Juliet is the sun*, the speaker could likewise choose to map Juliet onto another domain to perform the same cognitive function which is pursued in using this metaphor. In contrast, other cases of metaphorical mapping are not arbitrary (see Figure 13).

Of particular interest in our discussion here is to consider "affordances" (Gibson 1966, 1979; Glenberg and Kaschak 2002), a term proposed to describe a myriad of possible actions when a subject processes visual information. This phenomenon might also characterize metaphorical mapping in the sense that a subject may choose which experience to use to conceive of a target phenomenon. For instance, according to (White 2011:97), "this is the characteristic headline pattern whereby metaphor motivation does not immediately derive from a well-known conceptual metaphor but is triggered by the subject matter being dealt with in the ensuing article".

This is especially the case of literary metaphor where the mapping between source and target phenomena is conscious. This happens, for instance, when we *purposely* choose to understand one domain in terms of another. That is, this metaphorical mapping is conscious as compared to other metaphorical mapping typologies such as that involved in synaesthetic metaphor.

However, "affordances" may characterize also metaphorical mapping in non-literary contexts. For instance, in the first chapter we analyzed the following metaphors and argued that they are based on multi-mapping across phenomena (Reversal Mappings):

Machine Is Animal

(1)The murder weapon appears to have been a monkey wrench—shades of the Rue Morgue.

Machine Is Animal

(2)She's never at home—she's a real party animal.

Animal Is Human

(3)Property developers in Hong Kong are a bunch of fat cats.

Machine Is Human

(4)These sports utility vehicles are real gas guzzlers.

Human Is Machine

(5) a. It was a high octane performance that left the audience stunned.

b. I could never discover what makes Ann tick.

These metaphors are also relevant to our analysis here in that they are consciously constructed, though their use might not be. For instance, the domain Machine could have been mapped onto another domain and carries out the required cognitive function. Similarly, the domain Human could be understood in terms of another domain rather than Machine.

This deliberate use of metaphor has also been documented in Steen (2010). According to him, (Steen 2010:60), one of the aspects that differentiates deliberate and non-deliberate metaphors is the cognitive processing which underlies them. He argues that the former is, by-default, a comparison based process. That is, it requires a more conscious mapping between source and target domains as opposed to non-deliberate metaphors. According to Steen (2010:43),

“This [deliberate use of metaphor] typically occurs for all metaphors that are expressed directly, such as extended non-literal comparisons and similes. Indirect metaphors can also be used deliberately, but this does not occur very frequently”.

In this respect, Steen (2010:44) identifies two aspects in which metaphorical mapping should be looked at in terms of deliberateness: the use of metaphor and the metaphorical mapping construction (deliberate vs. non-deliberate).

The question that arises here is how deliberate and non-deliberate use of metaphor would contribute to the *interactionist* approach to metaphor. If source and target domains interact in literary metaphor, at least this interaction is not as obvious as in the case of synaesthetic metaphor. Since the latter is causality-and-co-activation-based mapping, we argued that it is based on interaction between source and target domains rather than on one-way-meaning transfer principle (see page 237).

3.4.3.2.2. Literary metaphor does not normally manifest itself in a rich systematic use of linguistic expressions

Another feature which is worth noting here about literary metaphor¹² is that it is not manifested conventionally in metaphorical linguistic expressions¹³. This characteristic does not mean that they are not embodied, since they still depend on the bodily-based information of source domains (Burke 2011). However, our concern here is to show that literary metaphor differs from other types in its linguistic manifestation. To illustrate, Juliet

¹² Literary metaphor should not be opposed to conventional metaphors since sometimes the former *is* based on the latter (Lakoff and Turner 1989). In this section we have chosen the literary metaphor which is not normally used in everyday language and reasoning.

¹³ According to Kövecses (2002:4), conceptual metaphor should be distinguished from metaphorical linguistic expressions. Whereas the former refers to conceptual mapping between source and target domain, the latter arises exclusively from source domain (for a contrasting view on this issue, see the following chapter).

Is the Sun, for instance, is not conventionalized in such a way that the elements of the source domains are organized in different ways to highlight different aspects of the target domain Juliet.

In contrast, metaphors such as Purposes Are Destinations, States Are Locations and Events Are Actions are expressed linguistically in a systematic use of metaphorical linguistic expressions (for an elaborated discussion of this point see Lakoff and Turner 1989:52-56). On the other hand, literary metaphor such as *Juliet is the sun*, is not instantiated through this systematic use. One possible way to explain such lack is to argue that the two phenomena have a “very partial projection” (Grady 2007:319).

Possibly, the most obvious evidence for this systematic use of metaphor is Reddy's (1993) Conduit Metaphor. In particular, the metaphorical mapping between the domains Sending and Communication is held through a systematic use of linguistic expressions and cognitive structures:

Try to get your thoughts across better.

None of Mary's feelings came through to me with clarity.

You still haven't given me any idea of what you mean (Reddy 1993:166).

According to Pinker (2007:241) this type of metaphor is “generative” because “people easily generate new tropes that belong to a family” such as Communicating Is Sending. So far, we have shown that the linguistic evidence suggests that if there is interaction in literary metaphor between source and target domains, it is not strongly held in our linguistic system.

**3.4.3.2.3. There is no co-occurrence or co-activation
of the two phenomena**

Metaphorical mapping in the case of literary metaphor which is not used conventionally is not based on co-occurrence between two phenomena. In the previous section argued that literary metaphor such as *Juliet is the sun* is consciously built. This is due to the fact that the two domains in this conceptual metaphor do not systematically co-occur in our domain of experience—they are not part of an ongoing co-occurrence of domains of experience. This may explain the lack of a possible systematic use in linguistic and cognitive systems. In other words, the two domains are not cognitively processed as parallel domains of experience (see More Is Up on page 98).

A similar finding has been reported by Grady (2007:318-319) in that the metaphorical mapping in this case is not based on experiencing the two domains as being associated. To illustrate this point, Grady considers the metaphor, “[D]eath robbed him of his life” (Grady 2007:318; see also, Turner 1991:44). Therefore, according to Grady (318-319), the phenomena Death and Thief are not associated in our domain of experience. Thereby, linguistic evidence suggests that if there is interaction between these phenomena, it is not strongly held through our linguistic system. Moreover, there is no evidence as to assume that in *Juliet is the sun*, the domain Juliet activates the domain Sun. The same is true for, *death robbed him of his life*.

These observations indicate that the interaction approach to metaphor may not be applied to this type of metaphorical mapping. Still, if we look at this type of metaphorical mapping from the interactionist, we need to assume that the interaction between source and target phenomena is not strongly held in our reasoning system. While mapping across bodily-experienced phenomena shows converging evidence which indicates that the two domains interact (e.g. see synaesthetic metaphor), literary metaphor seems to fit the pattern

of features-transfer from source onto target domains (see Chapter II). Therefore, the process of metaphorical mapping construction in this type of metaphor is selective.

Though the inferences of metaphorical mapping are fully grounded in bodily experiences, the embodied character of conceptual metaphor should not be exclusively attributed to source phenomena as target domains in the mapping typology which concerns us in this chapter also are embodied. As pointed out before, target domains in this mapping typology are eligible for projecting meaning. Therefore, the embodied character of conceptual metaphor which is based on two bodily-experienced phenomena is equally rooted in source and target domains.

To sum up, based on the analysis above, we notice that being bodily-experienced—as a feature of source and target domains—does not necessarily permeate their interaction. That is, we did not observe the mechanisms of interaction such as co-occurrence and co-activation, which we documented in other cases (e.g. synaesthesia metaphor). Though in the metaphor *Juliet is the sun*, both domains are accessible to the sense organ, we claimed that they do not interact in this metaphorical mapping because they do not satisfy *co-occurrence, causality, and co-activation*. It might be that interaction is carried out differently (see the following chapter).

It follows, then, the way the mapping is constructed is more decisive on the nature of the interaction. Yet we noticed that when those dynamics and mechanisms are observed, the mapping is constructed unconsciously (More Is Up). That is, mechanisms such as *co-occurrence* and *co-activation* are not observed when source and target domains are mapped consciously (*Juliet is the sun*). It seems then, constructing consciously or unconsciously metaphorical mapping is the differentiating feature between interaction and one-way-meaning projection.

Conclusion

Our primary concern in the present chapter has been to outline the dynamics, mechanisms, and typologies of interaction. One of the core features that characterize the domains which interact in metaphorical mapping is that they are processed on-line. In this chapter, we have shown that when source and target domains are bodily experienced, they interact in metaphorical mapping. Since they are bodily experienced, our reasoning system does not necessarily resort to metaphorical mapping to categorize them. However, we claim that the case wherein the two domains are bodily experienced, the metaphorical mapping is a result of interaction between the two phenomena.

Second, we aimed at identifying which metaphorical mapping typology is likely to show those dynamics and mechanisms. We noticed that they recur in the metaphorical mapping which engages bodily-experienced phenomena in source and target domains. Nonetheless, our hypothesis needed to be further formulated since being bodily-experienced does not necessarily permeate the interaction between source and target domains. Accordingly, though the focus should have been put more on whether the mapping is carried out consciously or unconsciously, our framework shows that certain mechanisms—such as *co-occurrence* and *co-activation*—prevail in the mapping typology that engages bodily-experienced phenomena.

In addition, it seems that these mechanisms operate when the mapping is constructed unconsciously and when source and target domains are bodily experienced. Recall that, in this chapter we focused our attention on the metaphorical mapping that engages two bodily-experienced phenomena.

The third issue in this chapter has been to assess whether the interaction is identical to this metaphorical mapping typology. As expected, within this typology, there are also subgroups of metaphorical mapping. Therefore, the interaction process is not homogeneous to all metaphorical mappings that engage bodily-experienced phenomena in source and target domains.

In this setting, we have shown that metaphorical mapping reveals different levels and modes of interaction by means of which source and target domains are mapped in our cognitive system. Importantly, different typologies of mapping follow different patterns of interaction.

To show this point, we focused our attention on the mechanisms that are operating in *cross-sensory mapping* (Synaesthesia), *image-based mapping*, and *bi-directional mapping*. Then, we juxtaposed these three types of metaphorical mapping with *literary metaphor* to assess whether the latter shows any substantial difference regarding these mechanisms. Indeed, the latter differs from the former (see pages 274-279). For instance, while *synaesthetic metaphor* is a causality-based mapping, *literary metaphor* is purposefully constructed. In addition, *synaesthetic metaphor* is dynamic in the sense that it is stimulus-response-based pattern (e.g. Cacciari 2008; Rakova 2003; Ramachandran and Hubbard 2001). In this respect, we demonstrated that the interaction process across bodily-experienced phenomena is not identical. Thus, in some types of interaction, the metaphorical mapping is *causality* and *co-activation* based. In others, such as literary metaphor, these mechanisms are not observed, though the two domains are bodily experienced.

Accordingly, the interaction process follows different patterns and is initiated through different typologies. This finding is especially indicative of the rich variety of

metaphorical mappings and the wrong theoretical basis to analyze metaphor as homogeneous figurative processing. On such a view, analyzing mapping across bodily-experienced phenomena has revealed that different mechanisms operate in different mapping typologies.

However, our theory addresses only the metaphorical mapping which engages bodily-experienced phenomena in source and target domains. As noted before, due to the remarkable variety of metaphorical mapping typologies (see the Chapter I and IV), conceptual metaphor should not be treated as a homogeneous cognitive process—namely, as mapping concrete onto abstract domains.

These findings further corroborate our hypothesis that the interaction process is not identical in the metaphorical mapping typology which engages bodily-experienced phenomena in source and target domains. Accordingly, the interaction substantially varies depending on the constitutive nature of source and target domains and also on their mapping typology—e.g. *Synaesthesia* vs. *Literary metaphor*.

We hypothesized that this interaction can be traced mainly at three levels: linguistic, physiological, and cognitive. Of particular interest at this point was to assess how the bodily-based information from source and target domains is recruited to carry out the interaction process. For this purpose, we proceeded to analyze this type of metaphor in terms of its typologies. Having done this, we were able to show that different typologies show different modes of interaction.

On the whole, the interaction process in metaphor seems to be operating when the two domains are bodily-experienced phenomena. Because target domains in this metaphorical mapping typology are processed first, we argue that this interaction is initiated by target domains, which in turn, leads to the stimulation of source domains.

So far in the thesis we have shown that the interactionist approach to metaphor is applicable to the metaphorical mapping that engages bodily-experienced phenomena. The question which arises here is whether being bodily-experienced is a prerequisite condition for target domains to initiate the process of interaction. We claim that interaction is based on the features which those phenomena have independently of metaphorical mapping. In the metaphorical mapping which engages two bodily-experienced phenomena, the two domains interact based on bodily-based information. One core feature in the interaction between these phenomena is *Causality*. Possibly, *Causality* is the main operating mechanism in the interaction-based metaphorical mapping.

In the following chapter, we shall assess whether being bodily-experienced is a prerequisite condition for source and target domains to interact. In other words, should source and target phenomena be of the same nature—namely, embodied—to interact?

In this respect, we shall see whether this characteristic is observed in other types of metaphorical mapping and whether it is intrinsically limited to the typology which is based on bodily-experienced phenomena in source and target domains. Recall that, source and target domains in certain mapping typologies interact because they are interconnected via three main strands: cognition, neural system, and language.

The question which still needs deep consideration is whether the mechanisms of interaction can operate in the metaphorical mapping which does not engage two bodily-experienced phenomena. Such case might include the metaphorical mapping which engages physical activities (as source domains) and mental activities (as target domains). Pursuing this question will be our task in the next chapter.

Chapter VI: A Bio-cognitive Model for Metaphorical Mapping: Bringing Cognitive and Biological Systems together in the Framework of Interaction

1. Introduction and Hypothesis

So far, we have demonstrated that the interaction process in metaphor operates when source and target domains are bodily experienced. This interaction is initiated by target domains which stimulate the sensorimotor experience of source domains (see chapter IV and V). In this respect, *causality*, *co-activation*, *automaticity* and *systematicity* are core features of the interaction process.

In the present chapter, we hypothesize that if these mechanisms work in other types of metaphorical mapping such as concrete-abstract typology, then this will mean that the interaction process may characterize this case as well. The main focus in this chapter is whether being bodily-experienced is a prerequisite condition for target phenomena to interact in metaphorical mapping.

Our hypothesis in the previous chapter predicts that being bodily experienced is a fundamental feature that allows source and target domains to interact. In this respect, we outlined the mechanisms which underpin the interaction process in metaphorical mapping and argued that such mechanisms are observed when target domains are bodily experienced.

Therefore, certain typologies—such as cross-modality mapping e.g. Somatosensory onto Gustation (Sharp onto Taste)—fit perfectly well into the theoretical and empirical frameworks of Interaction. For instance, we observed that stimulation is important as it

brings source and target modalities to interact in our cognitive and physiological systems (see chapter V). This entails four main characteristics of interaction: (1) recruiting features from both source and target domains (Coulson 2008:181); (2) this type of metaphorical mapping is not “random” but it is physiologically and cognitively motivated; (3) source and target modalities are activated regardless of whether the stimulating agent is conventional within a given modality or not. To illustrate, synaesthetic metaphor is based on cognitive and physiological processes through which the brain maps the phenomena that share a given stimulus (Ramachandran and Hubbard 2001; see also Chapter V); and (4) metaphorical mappings are not limited to the sensorimotor experiences of the source domains.

In addition, the data indicates that the interaction process between source and target domains is not homogeneous to all metaphorical mapping typologies inasmuch that different typologies show different mechanisms of mapping (see chapter IV). Furthermore, we have observed that, even within a specific typology of mapping—let us say the one that engages two bodily-experienced phenomena—the interaction process follows different patterns and principles (see Chapter V).

These findings lead us to the following step, which will focus on how cognitive and sensorimotor systems interact in metaphorical mapping typologies given that in concrete-abstract typology, the target domain is not bodily experienced. However, we have shown that the interaction process markedly varies depending on how the metaphorical mapping is built between source and target domains (see chapter III, IV, and V). For instance, we have noticed that the interaction between sensory modalities in synaesthetic metaphor is different from multi-mapping-based metaphor, though, on the whole, those properties reveal

interaction between source and target domains at different levels: cognition, language, and physiology.

These findings stand in opposition to the foundational assumption adopted within the embodied approach in that metaphorical mapping is based on a unidirectional features-transfer.

Our theoretical framework, which we suggested to be applicable to the metaphorical mapping which engages two bodily-experienced phenomena, may also account for the metaphorical mapping which engages physical actions (e.g., *grasping*) and mental processes (e.g., *thinking*) as source and target domains, respectively. Our hypothesis is based on the fact that source and target domains in this type of mapping share the same linguistic system (e.g. *She grasps a pen* and *She grasps the concept*).

Our task in this chapter is to identify the potential situational conditions of this type of mapping and assess whether they lead to the interaction between physical and mental activities.

In this chapter, we postulate that the motor and cognitive systems interact in the metaphorical mapping typology which engages motor actions and mental activities as source and target domain, respectively. We shall argue that this mapping typology dwells on features from both domains. That is, there is a set of conditions that instigates a motor-cognitive interaction between source and target domains. One such condition is that the stimulation process leads to cognitively map physical and mental actions. Instead, our cognition has to fit into the potential sensorimotor experiences which function as source domains. For instance, Lakoff (2008:18-19) assures that, "...if you cannot imagine someone picking up a glass, you cannot understand someone picking up a glass".

In this respect, understanding a mental activity is motorically derivative (Boroditsky and Ramscar 2002; Talmy 2000). The question that we are concerned with in this chapter is whether certain terms which are associated with motor actions can initiate the interaction process with mental activities. It is worth noting here, that one of the basic conditions which have to be met by source and target domains for their interaction is that they have to be bodily experienced (see Chapter IV and V).

To show whether this mapping typology is based on interaction, we need to be able to show that mental processes trigger motor actions. Our task here is to assess whether the mechanisms of interaction among bodily-experienced phenomena operate in the mapping typology which engages physical actions and mental activities as source and target domains respectively.

Our hypothesis predicts that motor and cognitive systems interact: they may combine features from both cognitive and sensorimotor systems in the construction of this typology. If this hypothesis holds up, we shall be able to show how this interaction is marked and then outline its mechanisms.

Importantly, we observed that mapping action domains onto mental activities such as Understand is another kind of metaphor that does not fit into the embodiment theory in the sense that not all the tenets of this theory are observed in this mapping typology. It is important to look at this type of metaphorical mapping in terms of interaction between motor and cognitive systems because this type of mapping follows certain patterns and principles of interaction such as *automaticity* (see Chapter V).

However, in order for the Embodiment Theory to account for this type of mapping, it needs (1) incorporating major insights found in the studies of the brain, mainly, in Neuro-

imaging experiments (e.g. Mahon and Caramazza 2008). And (2) re-interpreting the data combining findings within the two frameworks.

In line with these two assumptions, in this chapter, we propose a bio-cognitive model approach to metaphorical mapping which engages physical actions and mental activities as source and target domains, respectively.

2. Background

2.1. Uni-directionality of metaphorical mapping

In the previous chapter, our concern had been to pursue the mechanisms that operate in mapping across bodily-experienced phenomena (see pages 247-264). Based on these mechanisms, we have shown that the metaphorical mapping which engages two bodily-experienced phenomena substantially differ from other types of mapping such as mapping concrete onto abstract phenomena (see the previous chapter for more details). In what follows we shall highlight those findings:

- i. the experiential basis of the embodied metaphor should not be *fully* attributed to source domains;
- ii. rather than imposing features from one domain onto another, we have shown that in the metaphorical mapping which engages two bodily-experienced phenomena, there is an interactive process between source and target domains;
- iii. mapping across bodily-experienced phenomena (in source and target domains) is an interaction between two semantically independent domains. This means that the two domains do have conceptual structures independently of metaphorical mapping;

- iv. the conceptual metaphor which is based on bodily-experienced phenomena as source and target domains involves bodily features from both;
- v. the interaction process in metaphorical mapping can be articulated mainly at three levels of complexity: cognitive, linguistic, and neurally;
- vi. the interaction between source and target domains is based mainly on four mechanisms: *co-activation*, *causality*, *automation*, and *systematicity*;
- vii. and, finally, the interaction process between source and target phenomena is instantiated through different typologies.

2.2. Motor modalities and conceptual frames

In the following two sections, we shall discuss the pattern of activity in motor modalities and conceptual frames which may pave the way for the analysis of the metaphorical mapping which engages physical actions and mental activities from an *interactionist* point of view.

2.2.1. Patterns of activity within motor modality

A motor action consists of a definite topology where an *agent* exerts *force* to interact with an *object*. This is known within Cognitive Science as *x-Schemas* (Feldman and Narayanan 2004) and as *causative structures* within Linguistics (Talmy 1988:49-50). Importantly these schemas are neurally instantiated in that they automatically get active whenever their corresponding motor actions are active (Coulson 2008; Feldman 2006; Feldman and Narayanan 2004; Gallese and Lakoff 2005; Lakoff 2008).

Furthermore, Talmy (1988:50) further demonstrates that the linguistic system which captures motor actions shows the same patterns of those motor actions.

In line with these findings, recent experiments have addressed the issue of whether the neural structures of *x-Schemas* are active when such schemas are used to reason about abstract phenomena such as *Understanding, Thinking etc.* (e.g. Feldman 2006; Feldman and Narayanan 2004).

Interestingly, these studies point out that the patterns of activity within motor modalities are highly automatized in that the execution, observation, and imagination of physical actions follow identical patterns of activation in certain brain areas (e.g. Gallese and Lakoff 2005; Gallese, Fadiga, Fogassi, and Rizzolatti 1996). This characteristic is possible mainly because the brain is gifted with *mirror neurons* which “...respond to either self-produced or observed actions (Urgesi, Moro, Candidi, and Aglioti 2006: 7948)”.

2.2.2. Patterns of activity within conceptual frames

According to Fillmore (1982, 1985), information regarding our ongoing experience is captured in terms of conceptual frames. What is relevant here in this chapter is that the set of features that constitutes a given conceptual frame becomes active whenever a given feature is processed. To illustrate, conceptual frames fulfill a primary role in organizing knowledge regarding our interaction with the physical world Lakoff and Johnson (1999:358).

Furthermore, Lakoff and Gallese (2005) state that these conceptual frames are captured in brain structures that fire whenever they are stimulated, giving rise to the activation of the corresponding frames.

One way to stimulate these brain structures, which is extremely important for our purpose to address in the present chapter, is via the linguistic system. Therefore, there is a

certain amount of automaticity to patterns of activity in conceptual frames. In this setting, the patterns of activity within motor actions show close parallels with cognitive processing.

In line with these findings, research in Psychology (e.g. Barsalou 2005, 2007), Physiology (e.g. Gallese 2003), Neuroscience (Rizzolatti and Arbib 1998; Rizzolatti, Fadiga, Fogassi and Gallese 2002) have addressed the issue of whether motor modality and cognitive processing work in parallel.

Consequently, they demonstrated that processing metaphorical mapping of abstract concepts using source domains that are directly grounded in motor actions leads to the activation of the neural and semantic substrates of such actions (e.g. Coulson 2008; Gallese and Lakoff 2005; Gibbs and Matlock 2008; Lakoff 2008). These studies reveal that cognitive processing such as that involved in *understanding* activates motor modalities such as *grasping*. The question here is whether the automaticity observed within motor modalities and within conceptual frames could lead to their interaction when these modalities and frames are mapped.

To sum up, our findings in the previous chapters—taken together with the above mentioned experiments provide practical assistance for approaching the metaphorical mapping which engages motor actions and mental activities as source and target domains, respectively from the *interactionist* framework.

3. Data Analysis

In the previous chapter, we argued that the interaction between phenomena in metaphorical mapping is based mainly on four mechanisms: *co-activation*, *causality*, *automaticity*, and *systematicity*. We observed that these mechanisms chiefly operate in the metaphorical mapping which is based on two bodily-experienced phenomena.

Broadly speaking, interaction-based metaphorical mappings are those which engage two bodily-experienced phenomena. Because bodily-experienced phenomena are semantically independent, they include bodily features that are potentially projected in metaphorical mapping (see Chapter V).

Our hypothesis is that, if the mechanisms of interaction also operate in the metaphorical mapping which involves bodily and non-bodily-experienced phenomena as source and target domains, respectively, then this type of mapping also is based on interaction. In this respect, the scope of the Interaction approach to metaphor which we propose in this thesis can be extended to account for the type of metaphorical mapping which engages physical actions and mental activities as source and target domains, respectively.

In this respect, the interaction process may characterize not only the metaphorical mapping which engages two bodily-experienced phenomena but also the mapping typology which involves bodily-experienced phenomena and non-bodily-experienced phenomena as source and target domains, respectively.

A vast body of research within Neuroscience concerns how physical actions and their respective metaphorical use are represented neurally (e.g. Feldman 2006; Feldman and Narayanan 2004; Gallese and Lakoff 2005; Lakoff 2008). Interestingly, Neuro-imaging experiments have demonstrated that processing both literal and metaphorical meaning of certain physical actions can be tracked in the same brain area (Aziz-Zadeh, Wilson, Rizzolatti, and Iacoboni 2006; Gallese and Lakoff 2005). In particular, studies within this field agree that certain properties of physical actions are activated whether they are used literally or metaphorically (Coulson 2008; Feldman and Narayanan 2004; Gallese and Lakoff 2005; Lakoff 2008).

Based on these findings, in this chapter we shall assess this type of metaphorical mapping from the *interactionist* point of view. To do so, we need to gauge the mechanisms of interaction against the data to assess whether they operate in this type of metaphorical mapping. In this setting, we shall focus on how mental processes which function as target domains may actively participate in the construction and processing of metaphorical mapping.

3.1. The situational conditions observed in this metaphorical mapping typology

In the following sections, we shall assess whether physical actions and cognitive processes—when they are engaged in this mapping typology—show common features in their patterns of activity. In this section, we shall identify the situational conditions in metaphorical mapping which might lead to the interaction between physical actions and mental processes.

3.1.1. Source and target domains share the same lexical repertoire

Conceptual metaphor is a primary source of polysemy (Gibbs 1994; Lakoff 1978; Lehrer 1990; Miller 1993; Nunberg 1979; Sweetser 1990; Tendahl and Gibbs 2008). This characteristic is mostly salient in the conceptual metaphor which maps motor actions onto mental activities because we tend to conceptualize mental activities as motor actions (e.g. Talmy 1988, 2000).

Importantly, the two phenomena come to share the same linguistic repertoire inasmuch that the linguistic system of the motor action in the source domain comes to

underlie our reasoning about the mental activities in the target domain. For instance, Richards (1936:93) assures that, "...when we use a metaphor we have two thoughts of different things active together and supported by a single word, or phrase..."

Relevant to this point, in Chapter III, we showed how the notion of polysemy within the embodied approach to metaphor is based on Propositionality in the sense that the bodily-based meaning of a word is extended to other abstract phenomena. In this respect, Gibbs (1994:9-10) argues that "...the meanings of many polysemous words can be explained in terms of basic metaphors that motivate [...] the transfer of English vocabulary from the domain of physical motion and object manipulation and location [...] to various social and mental domains [...]."

Importantly, we also observed in Chapter IV that the metaphorical mapping which engages two bodily-experienced phenomena, polysemous terms combines bodily-based information from source and target domains. We argued that since source and target domains are bodily experienced, they have independent conceptual structures which are recruited to construct and process this mapping typology. Additionally, we observed that when these phenomena are mapped, they are engaged in a mutual influence contributing their respective bodily-based features to the construction of metaphorical mapping through using a shared linguistic system. Consider the following metaphor:

Understand Is Grasp/Hold

(1)I am given to understand that there will be no pay cuts this year.

(2)She finds even the easy concepts difficult to get hold of.

(3)Half the class got hold of the wrong end of the stick and put the metal in the acid.

In this set of metaphorical expressions, both the mental activity Understand and the motor action Grasp are represented in the following terms: *grasp* and *get hold of*. Both source and target domains in these examples share the terms which inherently belong to the motor action in the source domain, Grasping.

It is worth noticing here that the mental activity which is involved in Understanding is reasoned about without resorting to metaphorical mapping (e.g. *She understands your argument*). Still, this mental activity is not grounded in a bodily-experienced phenomenon. Therefore, it is safe to argue that this mental process is semantically independent.

However, in the metaphorical mapping above, this mental process is represented via linguistic terms, which are grounded in the sensorimotor information of the domain Grasping. According to Boroditsky and Ramscar (2002), the brain has access to abstract phenomena through using perceptual structure of bodily-experienced phenomena. As the examples above are meant to indicate, this access is linguistically manifested via the expressions that inherently label sensorimotor experiences. Accordingly, these terms represent sensorimotor actions and (metaphorically) mental activities. This entails that target domains are embodied through the use of linguistic terms, which make direct reference to motor experience. This has major entailments for the interaction approach to metaphor (see page 308).

3.1.2. Certain source and target domains share the same neural network

Perhaps the most irrefutable aspect of the embodiment theory is its neural basis. According to Raichle (2008:118), using functional magnetic resonance (fMRI) and positron emission tomography (PET), Roy and Sherrington (1890) were the first to document an

intrinsic relationship between brain function and blood flow in the brain, in that cognitive processes parallel blood flow to certain brain areas. Though these techniques need further applications in the realm of the embodiment theory to explore potential neural function during metaphorical mapping construction and processing, they have opened new avenues for the research on how to empirically test the tenets of such theory (Coulson 2008:191). For instance, studies within Neuroscience aim to identify the neural representation of action verbs such as *grasp, kick, hold etc.* (e.g. Grafton, Arbib, Fadiga, and Rizzolatti 1996; Urgesi, Moro, Candidi, and Aglioti, 2006) and explore whether these areas of the brain are active as well when we process the motor semantic of linguistic expressions which are used literally and figuratively (e.g. Rapp, Mutschler, and Erb 2012). These experiments detected neural activities in the motor cortex which are associated with the hands and which are active either when the literal or figurative meaning of such motor words is processed (see also Gallese and Lakoff 2005).

Similar observations have been made by Feldman (2006:38) that, “...*mental structure parallels active neural structure*—connected concepts are neurally connected.” In the same way, other scholars, for instance, Chang, Feldman and Narayanan (2005:4) argue that, "Neurobiological evidence centers on experiments showing that areas of motor and pre-motor cortex associated with specific body parts are activated in response to motor language referring to those body parts."

Therefore, one of the major findings of such studies which strongly suggests that cognition is embodied, is that the execution, perception, and imagination of a given motor action are neurally processed by much of the same neural network(s) (Gallese, Fadiga, Fogassi, and Rizzolatti 1996; Gallese and Lakoff 2005; Grafton, Arbib, Fadiga, and

Rizzolatti 1996; Pulvermuller, Hauk, Nikulin, and Ilmoniemi, 2005; Rizzolatti, Fogassi, and Gallese 2001).

Accordingly, these areas activate both when a subject actually carries out a given physical action and when this subject perceives an image or a word referring to the same action (e.g. Aziz-Zadeh, Wilson, Rizzolatti, and Iacoboni, 2006; Gallese and Lakoff 2005; Phillips, Humphreys, Noppeney and Price 2002).

Relevant to our discussion here, in the previous section, we observed that certain motor actions and mental activities which are potentially engaged in metaphorical mappings such as *grasping* and *understanding* are largely represented by the same linguistic system.

(1)*She grasps a paper.*

(2)*She grasps the idea.*

Based on the findings discussed above, along with the imaging results reported by di Pellegrino, Fadiga, Fogassi, Gallese, and Rizzolatti (1992), understanding the statement (1) would involve activating the neural structure which is responsible for the execution of the action Grasping. Moreover, processing the figurative meaning of the verb *grasp* in (2) would also engage both the topological properties of the action *grasping* and its neural instantiation (see page 317 , for more details).

In this respect, these studies show that linguistic expressions which can be used both literally and metaphorically elicit the same response from the brain. When a given action word, such as *grasp*, is used figuratively, it activates the very neural network that is responsible for motor experience (see also Lakoff 2008). It follows, then, that words such as *grasp*, *hold*, *kick*, *touch* activate the brain area which is directly responsible for the corresponding motor actions even when these expressions are used metaphorically (e.g. di

Pellegrino, Fadiga, Fogassi, Gallese, and Rizzolatti, 1992; Gallese and Lakoff 2005). This means that processing mental activities such as Understanding also recruits neural structures that go active when the motor action of the source domain is actually carried out.

Simulation theory has another significant entailment. At least, linguistic expressions activate the same brain areas independently whether the meaning in question is metaphorical or literal. This notion is particularly indicative of the fact that both sensorimotor and cognitive systems function in parallel at least in the case of the metaphorical mapping which engages motor actions and mental activities as source and target domains, respectively. This type of mapping is neurally instantiated (e.g. Feldman 2006; Feldman and Narayanan 2004; Gallese and Lakoff 2005; Lakoff 2008).

Obviously, these entailments do not necessarily characterize all the instances of the typology which is based on motor actions and mental activities as source and target domains, respectively. Instead, we have focused our attention on one particular metaphorical mapping—Understanding Is Grasping.

To sum up, then, it is safe to claim that both cognitive and motor systems work in parallel when mental activities are processed metaphorically via the motor topology of source domain such as Grasping.

3.1.3. Different stimulus formats leading to identical response

In the previous section, we explained how motor actions and mental activities which are mapped come to share the same neural network. One of the major findings within the field of Neuro-imaging is that a given brain area is active when either the literal or metaphorical meaning of an action is processed.

In this section, we shall argue that it is important to notice that a given brain area fires as a response to different kinds of stimulus. This characteristic is known in Neuroscience as the 'plasticity' of the brain (Damasio 1994).

We postulate that the link between the two phenomena is made through shared stimuli. Source and target domains share a stimulus that unifies the two phenomena at a bio-cognitive level. A piece of evidence for this claim is the fact that the linguistic term *grasp* links both the conceptual frame of Understanding and the motor action of *grasp*. We claim that the biological aspect of the brain prevails in cognition too—namely in metaphorical mappings.

Accordingly, not only does the sensorimotor system need a sensorimotor stimulus to categorize phenomena, but also the cognitive system requires stimulation to activate conceptual frames. Therefore, this stimulus-response pattern is common to both sensorimotor and cognitive systems leading to the construction and activation of motor and cognitive topologies. In the sensorimotor system, the motor topology such as the one involved in *grasp*, responds to a sensory motor stimulus (Coulson 2008; Gallese and Lakoff 2005; Lakoff 2008).

In parallel, in the cognitive system there are conceptual frames that are retrieved through a stimulation process (e.g. Feldman 2006). The brain responds to different types of stimulus in the same way: neurons fire when a stimulus is perceived. This occurs whether the stimulation is ignited by (1) the observation of a phenomenon; (2) by the actual execution of the motor action in the source domain; or (3) by the mere imagination of a given motor action (Feldman 2006; Gallese and Lakoff 2005).

As these studies indicate, the stimulus does not need to be sensorimotor in order to activate motoric information. In particular, the third case shows that a stimulus could be

cognitive because the brain is gifted with cells that are sensitive to linguistic and extra-linguistic stimuli (see page 317). Accordingly, this type of stimulus is inferred from the target domains that are able to evoke the sensorimotor information of the source domain.

Metaphorical mappings, thus, draw on different kinds of stimulus: linguistic and extra-linguistic. The metaphorical mapping typology such as the one that engages motor actions and mental activities—as source and target domains, respectively—draws on different kinds of stimulus. This means that this mapping typology recruits information from the sensorimotor and cognitive systems through shared stimuli. We suggest that this type of mapping, for its construction and activation, requires a given motor modality and its corresponding conceptual frame.

In the set of metaphorical expressions above, the stimuli are linguistic. Accordingly, source and target phenomena are biologically hard-wired and cognitively interconnected through shared linguistic stimuli. Accordingly, metaphorical meaning is motorically derivative in that the target domain in this type of mapping—though being abstract—it draws on motoric information in the source domain. Notice that in this case, the stimulation is carried out via the linguistic systems (Caballero 2009; Forceville 1996, 2006). Similarly, conceptual frames are represented neurally in the brain and linguistic expressions function as stimuli of these conceptual frames (Feldman 2006; Fillmore 1982; Lakoff 1987). This explains how target phenomena evoke the perception of sensorimotor activities. This means that mental processes such as *Understand* lead to the activation of the same neural area which is responsible for the physical action it is mapped onto (e.g. Aziz-Zadeh, Wilson, Rizzolatti, and Iacoboni, 2006).

Accordingly, action words stimulate the neural network which is responsible for the execution of a given action (Gallese, Fadiga, Fogassi, and Rizzolatti, 1996). Because the

stimulus which operates in a given motor modality (e.g. *Grasping*) also activates the conceptual frame of a given mental activity (e.g. *Understanding*), we claim that the sensorimotor and cognitive systems work in parallel. In this case, the metaphorical mapping is triggered by the same stimulus, which operates in a given motor modality and in target domains. On this view, the perceptual properties that stimulate the sensorimotor system in source domain (*Grasping*) also stimulate the conceptual frame in the target domain (*Understanding*) leading to their interaction. This means that metaphorical mapping between physical actions and mental activities is the result of their interaction.

This also means that cognitive system responds to stimulation in the metaphorical mapping which engages physical actions and mental processes as source and target domains, respectively. In this mapping typology, we cognate in terms of conceptual frames which draw on a linguistic system that potentially stimulates sensorimotor experiences. The interaction between source and target domains resides in the fact that linguistic and extra-linguistic stimuli can similarly activate the motor topology of source domains and the cognitive topology of the target domains. Apparently, the metaphorical mapping which engages motor actions and mental activities fits the tenets of the embodied approach to metaphor. However, a deep analysis of this type of mapping reveals a substantial difference from other types of mapping. Namely, it shows a more participating role of target domains.

Analyzing this type of mapping as based on interaction between two phenomena differs from the way metaphorical mapping is analyzed within both Blending and Embodied theories of metaphor. As we saw in the previous chapter, in the first case, metaphorical is based on systematic correspondence between source and target domains (e.g. Glucksberg and Keysar 1993; Lakoff and Turner 1989; Valenzuela, 2009). Within Blending theory, metaphorical mapping is based on the integration of elements from source

and target inputs (for a more detailed analysis of the difference between the two theories, see the previous chapter and Ruiz de Mendoza and Peña 2005). In this respect, this finding contradicts the metaphor approach which claims for a symbol-manipulation based mapping (Chomsky 1975; Fodor 1975; Searle 1975). Similarly, this finding does not fit the metaphor approach that analyzes metaphor as propositions (see chapter II), as *similarity*-based (Marks, Hammeal, and Bornstein 1987; McGlone 2003; Miller 1993; Ortony 1993) or as *analogy* based (e.g. Gentner and Bowdle 1999).

Conceptual mapping has been argued to be propositional in Cognitive Linguistics (see Chapter II)—transferring bodily-based features from more concrete onto more abstract domains. The metaphorical mapping which engages physical actions and mental processes is bio-cognitively motivated. We do not pretend to reduce metaphorical mappings to a biological task Chapter 0), since other factors such as culture (e.g. Bernárdez 2005, 2013; Ruiz de Mendoza and Peña 2005; Geeraerts, Kristiansen, and Peirsman 2010) can significantly shape the patterns and principles of interaction.

These three situational conditions are crucial to understanding the process of interaction between physical actions and mental processes as source and target domains, respectively. In this setting, *causality* and *co-activation* might lead motor actions and mental activities to interact in metaphorical mapping. However, before we deal with this issue, we need to further outline certain aspects which, added to the above mentioned situational conditions, could give rise to interaction.

To sum up, in the metaphorical mapping which engages motor actions and mental activities as source and target domains, respectively, both motor and cognitive systems work in parallel. Metaphorical mappings which include physical actions such as *grasp*, *kick*, and *hit* are processed cognitively and motorically in the sense that this type of

metaphorical mapping recruits the motoric information of the source domains (e.g. Grasping) and the cognitive topology of the target domains (e.g. Understanding). Furthermore, the neural network which is responsible for a given motor action is active also when a term referring to that action is processed either metaphorically or literally.

3.1.4. Conceptual frames and motor modalities: cognitive topology vs. motor topology

To analyze the metaphorical mapping which engages physical actions and cognitive processes from the *interactionist* approach, first we need to differentiate between primitive structure (motor modality) and complex structure (conceptual frame). To identify this difference and how it is crucial to our understanding of this type of metaphorical mapping, let us analyze a motor action when it is used literally, as in (a) and metaphorically, as in (b):

(a) *She grasps a pen.*

(b) *She grasps the concept.*

In (a), the physical action includes a motor topology where *an agent* carries out the action of *grasping an object*. This action is primitive as compared to its counterpart in (b). The latter encompasses a more complex topology where the corresponding inferential elements are added to the primitive action of the source domain Grasping. For instance, since the term *grasp*, apart from its default motor topology, it also acquires the cognitive topology of the target domain Understanding. In this respect, the inferential features of the physical action and cognitive topology are retrieved. It is not only the motor inferences of *grasp* which operate in the mapping in (b).

Notice that we do not reduce the physical topology to a meaningless motor modality, since certain inferences are drawn from (a)—for instance, the subject is going to

use the pen to write a letter etc. Still, these inferences are not metaphorically retrieved. The main point which we need to focus on here is how the motor topology of a given action within a given modality changes from a primitive structure to a more complex one when it is used metaphorically.

Perhaps, one way to handle this issue is to assume that the motor action in (*a*) is processed by the brain via responding to the operating stimulus in this motor modality (Feldman 2006). Consequently, the inference of this mapping is molded in such a way that it fits into the motor topology of the source domain. For instance, if the mental activity (understanding) is paired with the motor modality (grasping), then the stimulus arguably activates the properties of such modality. This means that the way the mapping is constructed is maximally governed by the mechanisms of such modality. To illustrate, if this modality draws on physical actions, then the mental activities which fulfill the function of target are categorized in terms of the motor topology of the physical action of the source domain.

On the other hand, metaphorical mappings consist of mapping the motor information of the source domain onto the conceptual frame of the target domain. Even when the literal meaning is the case, we do not process meaning in terms of individual words but in terms of conceptual frames (Feldman 2006; Fillmore 1982, 1985). This type of metaphorical mapping recruits information from sensorimotor and cognitive systems. It needs sensorimotor phenomena and conceptual frames to construct metaphorical mappings such as *she grasps a pen* and *she grasps the concept*. Accordingly, conceptual frames and sensorimotor features are activated thanks to the stimulation of certain brain areas which are highly associated with motor actions. In this respect, source and target phenomena are hard-wired biologically and cognitively. Cognitive processes in the case of metaphorical

mappings are not based on computational processes isolated from sensorimotor system. Rather, they are grounded in the sensorimotor experience that fulfills the function of source domains (e.g. Boroditsky and Ramscar 2002). However, this does not mean that mapping physical actions onto mental activities is a one-way-meaning transfer. Instead, it is based on the interaction between the two phenomena where target domains also project their semantic features.

To sum up, literal and metaphorical meanings activate sensorimotor information and conceptual frames. This situation entails that linguistic expressions, which draw on motor actions, could function as a stimulus to motor modalities and conceptual frames in certain metaphorical mappings. Accordingly, processing this mapping typology requires retrieving and activating the information of the corresponding motor modality of the source domain and the cognitive topology of the target domain. Mental activities which function as target domains in this mapping typology are not devoid of sensorimotor information. When we understand one domain in terms of another, the cognitive process is not mapping between the two domains at an abstract level. Rather, these source domains are directly grounded in sensorimotor experience.

However, this characteristic is not circumscribed to source domains (see the sections above). It follows from this that the process of understanding one phenomenon in terms of another is neither propositional nor lineal. Instead, it is interactional (see Chapter III). In this case, source and target domains are deeply connected to each other, first, through mapping the motor topology of the source domains onto the cognitive topology of the target. Second, this connection is also triggered by linguistic and extra-linguistic stimuli, which equally activate the two topologies. The type of interaction between source and target domains on which we are focusing on in this chapter is an example of the

metaphorical mapping where we experience sensorimotor phenomena through cognitive activities.

As argued before, there must be a stimulus from the target domain in order for the brain to use sensorimotor information to map the two phenomena. The problem which we need to deal with at this point is that target domains in this mapping typology are not accessible to the sense organ. Because the latter is abstract, the challenge that we face here is to show how a target domain such as Understanding evokes the sensorimotor experience (Grasp) in metaphorical mapping. This entails that these domains are not eligible to activate the motor topology of source domains. In the following section, we shall assess whether processing metaphorically certain mental actions in this mapping typology will lead to the activation of the motor topology of source domains.

3.1.5. Conceptual frames and Linguistic Stimuli

Feldman (e.g. 2006) argues that a word activates a conceptual frame. This means that a linguistic expression could function as a stimulus too (White 2004:78). Hence, the functionality of conceptual frames and motor topologies depends on stimulation. In this section, we shall discuss how this characteristic might also be inherent to cognitive system in that conceptual frames are activated via stimulation. This step is a major inroad into understanding how the activation of source and target domains in this type of mapping leads to their interaction.

Since the brain areas that respond to a given sensorimotor stimulus become active also when a subject is exposed to a word, then we could conclude that source domain is a stimulus-driven domain (Caballero 2009). Therefore, if we take the example of *grasp a paper* and *grasp an idea*, the same brain area in both cases is activated. This entails that the

tie-in between linguistic expressions and the sensorimotor experiences they denote is instantiated in neural networks. It is important to note here that, this activation occurs whether we are processing the literal or the metaphorical meaning of *grasp*. Again, this means that the brain responds to linguistic and extra linguistic stimuli in the same way when linguistic expressions convey literal and metaphorical meanings. Accordingly, the same neural network becomes active as a response to sensorimotor stimuli and when the brain processes linguistic expressions which denote sensorimotor phenomena (e.g. Aziz-Zadeh, Wilson, Rizzolatti, and Iacoboni 2006; Grafton, Arbib, Fadiga, and Rizzolatti, 1996). As pointed out before, linguistic expressions potentially activate conceptual frames. Therefore, it is safe to argue that the linguistic terms which draw on sensorimotor experience can stimulate both sensorimotor and cognitive systems. For instance, target domains in this mapping typology—namely, because they draw on sensorimotor phenomena (Grasp, hold, etc.)—potentially evoke the motor topology of such phenomena.

Possibly, these linguistic expressions become conventional stimuli to the neural networks that are inherently responsible for sensorimotor experience because their processing requires activating the motor topology they are associated with.

Thus, when we reason about a mental activity (e.g. *Understanding*) using a linguistic term (e.g. *grasp*), the neural network which is responsible for the execution of the motor action (Grasping) becomes active.

As argued before, processing sensorimotor phenomena can be captured under a stimulus-response pattern (Caballero 2009). Based on our discussion so far, this pattern also prevails when such phenomena are mapped onto others. For instance, synaesthesia metaphor is based on stimulus-response pattern to the extent that the experience of a given modality stimulates another (Caballero 2009; Cacciari 2008; see also Chapter III for how

these findings led us to approach conceptual metaphor from a different perspective). Importantly, in this chapter, we demonstrated that the mapping which engages physical actions and mental activities as source and target domains, respectively, are also based on stimulation.

In chapter III, we argued that target domains also stimulate the brain when they are bodily experienced. Therefore, in order for a mapping to take place, there must be stimulation from the target domain. In addition, in this type of metaphor, it is the stimulus that helps the brain constrain which domains should be mapped onto which ones.

In the metaphorical mapping which dwells on physical actions and mental activities, the stimulus could be of two natures: sensory, as in the case of motor actions such as *grasp* and *hold* when these terms are used literally; or cognitive as in the case of mental activities such as *understand* when used metaphorically.

Stimulating the neural network which is responsible for the action *grasp* occurs when this domain shares certain features with another one. This might mean that the cognitive topology of a given mental activity evokes the perception of the motor topology of the source domain. In this case, when the sensorimotor stimuli are associated with linguistic expressions, they become stimuli to the cognitive topology of the target domain. These (sensorimotor and linguistic) stimuli, expose an internal structure that consists of a set of features that form a domain.

In cognitive Linguistics, the suggestion is made that cognition is highly structured in terms of conceptual frames, which are activated by linguistic terms (e.g. Feldman 2006). The fact that motor verbs such as *grasp*, when are used metaphorically, activate sensorimotor information is particularly suggestive that the metaphorical mapping which engages physical actions and mental processes is bio-cognitively motivated (e.g. Feldman

2006). In this setting, linguistic expressions function as stimulus because perceiving action words activates the corresponding motor areas (Pulvermuller, Hauk, Nikulin, and Ilmoniemi 2005:1).

Accordingly, the conceptual mapping depends on a stimulating agent that is associated with a given sensorimotor experience. As argued before, the same stimulus may operate taking different forms; yet the outcome of such stimulation is identical (Gallese, Fadiga, Fogassi, and Rizzolatti, 1996).

In line with these findings, Lakoff (2008:11-15) argues that cognitive system is structured in terms of conceptual frames in that when the corresponding linguistic terms are processed, those frames become active. These frames are instantiated neurally in the brain (e.g. Feldman 2006; Lakoff 2008). This can mean that in order for a conceptual frame to activate, it needs stimulation and a neural response. In this respect, action words—when they metaphorically—they activate both the corresponding conceptual frame and the brain area which is responsible for such motor modality. Accordingly, in the metaphorical mapping which engages physical actions and mental activities, as source and target domains, linguistic terms can acquire the role of stimulus to cognitive and motor systems. When a given metaphorical mapping engages a sensorimotor experience as source domain, the neural network which is responsible for such experience becomes active (Aziz-Zadeh, Wilson, Rizzolatti, and Iacoboni 2006).

To sum up, so far we have outlined the situational conditions that may pave the way for approaching the mapping typology which draws on motor actions and mental activities as source and target domains from an *interactionist* point of view. We focused our attention on Understanding Is Grasping and observed that in this mapping typology, source and

target domains share the same lexical repertoire in that the action word *grasp* also denotes the corresponding mental activity.

Furthermore, neurophysiological studies sustain the idea that action words stimulate the neural network which is responsible for the execution of the corresponding actions. Therefore, we postulate that processing metaphorically mental activities such as Understanding by using action words such as *Grasp* activate the same neural network(s). Accordingly, different stimulus formats elicit identical response in the brain. Later, we addressed the question of how conceptual frames and motor modalities follow identical patterns of activation. In particular, studies within Cognitive Linguistics support the idea that our cognition is organized in terms of conceptual frames which go active through linguistic stimulation (e.g. Feldman 2006; Lakoff 1987).

In the following sections, we will assess how these situational conditions may lead to interaction between motor and cognitive topologies in the metaphorical mapping typology which engages motor actions and mental activities as source and target domains, respectively.

3.2. Interaction

So far, we have been explaining how motor actions and mental activities, such as *grasping* and *understanding* respectively, respond to a common linguistic stimulus and are represented in the same brain area. It follows from this that those physical actions and mental activities work in parallel when they are mapped. As seen before, neurobiological findings support the notion that perceptual and motor systems are activated during processing action words (e.g. Pulvermuller, Hauk, Nikulin, and Ilmoniemi 2005).

3.2.1. Semantic features exchange between motor and cognitive topologies

Based on evidence from Neuro-imaging experiments, we argued in the previous section that the cognitive and motor systems work in parallel when we process the mapping typology which draws on motor actions and mental activities as source and target domains, respectively. Our main task now is to show whether they interact in metaphorical mapping or they fit the *one-way-meaning-transfer* approach. It might be the case that though these systems work in parallel in processing this mapping typology, they do not interact—there might be no semantic features exchange between the two systems.

Nevertheless, the aforementioned situational conditions (see pages 295-308) hint at a potentially interactive process between cognitive and motor systems in this mapping typology. The fact that the two phenomena share neurological and linguistic systems paves the way for approaching this type of metaphorical mapping from an *interactionist* point of view.

Importantly, the fact that neurophysiological studies (e.g. Aziz-Zadeh, Wilson, Rizzolatti, and Iacoboni 2006; Grafton, Arbib, Fadiga, and Rizzolatti 1996; Rizzolatti, Fogassi, and Gallese, 2001) when physical actions and cognitive processes are mapped, the two phenomena are interfunctional (sharing the same brain area, same linguistic terms, and same stimulus). However, to sketch out how this type of metaphorical mapping is based on interaction, we need to further analyze the aforementioned metaphorical expressions to assess whether they show the mechanisms of interaction which have been outlined in the previous chapter. In this case, the interaction between the two phenomena might be shaped

by the motor topology of the physical action (in the source domain) and the cognitive topology of the conceptual frame (in the target domain).

Claiming for an interaction-based approach to metaphorical mapping between motor action and cognitive processes requires exploring how the cognitive topology and the motor topology of source and target domains, respectively, are engaged in a mutual influence.

We shall argue that this interaction proceeds in two major stages—through recruiting semantic features from source and target domains and allowing them to adapt to each other. Importantly, these two mechanisms were observed in the mapping typology which engages two bodily-experienced phenomena (see page 226-234).

The key fact here is that since source and target phenomena are semantically independent—having a conceptual structure independently of metaphorical mapping, their respective bodily-experienced features are active in such mapping typology. As seen before, a crucial feature, which is recurrent in this type of metaphorical mapping, is that the interaction between semantically independent phenomena gives rise to *emergent structure* (see page 234).

The problem which we are faced with in analyzing the metaphorical mapping which engages physical actions and mental activities, is that the latter is not bodily experienced (e.g. Lakoff and Nuñez 2000). Recall that we proposed an interactionist approach of conceptual metaphor based on the fact that source and target domains in certain metaphors are bodily experienced. Accordingly, in Chapter IV we claimed for a more embodied approach to metaphor since target domains also project their semantic features in metaphorical mapping. Nonetheless, this argument supposes a theoretical problem to account for the metaphorical mapping which engages physical actions and mental actions

as source and target domains, respectively. The domain Understanding is not bodily experienced, yet we do not necessarily resort to conceptual metaphor to reason about it. That is, expressions such as *She understands the concept/theory etc.*, shows that Understanding—though it is abstract—it is semantically independent.

This finding seems to fit into our fundamental assumption that conceptual metaphor is not governed by a single core cognitive process. Instead, given the hybrid nature of the bodily-experienced phenomena and the different typologies of metaphorical mapping, the interaction process may vary significantly. Then, analyzing the metaphorical mapping which engages motor actions and mental actions, might suppose another variety of interaction-based mapping typology.

We map motor actions onto mental activities using a linguistic system which is grounded in motor experience (e.g. Boroditsky and Ramscar 2002). The lexical items of such system, when used to reason about abstract phenomena, lead to the stimulation of both sensorimotor and cognitive systems. As pointed out before, based on neurological studies (e.g. Gallese, Fadiga, Fogassi, and Rizzolatti, 1996), processing information concerning motor modality requires the activation of the corresponding neural network.

Importantly, in Cognitive Linguistics our cognition is made up of conceptual frames and one way to activate such frames is via linguistic word or expressions (e.g. Feldman 2006; Fillmore 1982, 1985; Lakoff 2008). In this respect, a conceptual frame is delineated and its linguistic components function as stimulus to their respective conceptual frames.

Since these (linguistic) stimuli (action words) are directly grounded in a given motor modality and mapped onto the cognitive topology of a target domain, we argue that both cognitive topology and motor topology interact via these linguistic expressions. Given

that a stimulus operates on source (physical action) and target domains (mental activities), then the two phenomena include features from both domains.

The interaction between motor action (as source domains) and mental activity (as target domains) is evoked by motoric stimuli. Target domains, though, in some types of metaphorical mapping are abstract; metaphor is an instance of interaction between our cognitive and sensorimotor systems. This type of metaphorical mapping does not consist of drawing stable systematic correspondences between features of source and target domains. Instead, it is dynamic because it draws on the sensorimotor system and its patterns of activation (see pages 291, 297).

In other words, within this framework, target domains are dynamic in that they take on a more active role than has been argued within Cognitive Linguistics (for contrasting views see Szwedek 2011). Since the cognitive function of metaphorical mapping is to categorize phenomena, then it does not matter whether the latter is more concrete or more abstract (see Chapter I). A piece of evidence for this claim is the fact that there are different mapping typologies (see pages 73). As demonstrated before, target domains also contribute actively in constructing the concrete-abstract typology. Abstract and sensorimotor phenomena which come to form a conceptual metaphor share the same stimulus. The brain area which is responsible for both topologies fires whether the stimulus is biological or linguistic (Gallese and Lakoff 2005; Lakoff 2008; Pulvermuller, Hauk, Nikulin, and Ilmoniemi 2005).

To sum up, constructing conceptual metaphor is not fully rooted in the source domain because target domains in this mapping typology also are active. Though the latter are abstract in this case, the two domains interact through sharing common mechanisms (see pages 295, 297). Therefore, the embodied approach to conceptual metaphor needs to

account for the motor topology and the cognitive topology of source and target domains, respectively.

3.2.2. Mirror Neurons and the interaction theory

3.2.2.1. Automaticity in metaphorical mapping

So far we have seen how the motor topology of the source domain and the cognitive topology of the target domains become active in metaphorical mapping. In the following two sections we shall address the mechanisms of the activation of these topologies. We shall focus our attention on two main mechanisms: *implied motor topology* and *implied stimulus*. These two mechanisms help experience the cognitive topology of the target domains as if it were a sensorimotor experience.

3.2.2.1.1. Implied motor and cognitive topologies in conceptual mapping

In the previous sections, we looked at conceptual metaphor as mapping the motor topology of a given motor action onto the cognitive topology of a mental activity. We argued that though the target domain is abstract in this type of mapping, it is semantically independent (e.g. *she understands the concept*). From these observations, we can now look at metaphorical mapping as a cognitive process that merges two different topologies.

Within the embodied approach, conceptual metaphor is shaped by the embodied character of the source domain (see Chapter II and for how a certain type of mapping is at variance with the embodied theory of metaphor, see Chapter III). However, the metaphorical mapping which engages bodily-experienced and abstract phenomena as source and target domains, respectively, seems to fit into the tenets of the embodied

approach because presumably the target domain in this case is not bodily experienced (e.g. Gibbs 1994, 2011; Gibbs and Matlock 2008; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Szwedek 2011).

We argued that this type of mapping is based on interaction between cognitive and sensorimotor systems. Recall that in order to account for conceptual metaphor from the *interactionist* point of view, we need to outline how features from two different phenomena interact to shape meaning in this mapping typology.

In this section, we shall argue that this interaction is carried out through Mirror Neurons, which according to Rizzolatti (1998); Rizzolatti, Fadiga, Gallese (1996a); Rizzolatti, Fogassi, Gallese (2001); and Craighero (2004), activate sensorimotor information when a given phenomenon evokes the perception of these sensorimotor experiences. It carries out this task through stimulating the brain area which is responsible for motor action (e.g. Gallese and Lakoff 2005; Lakoff 2008; Rizzolatti 1998; Rizzolatti, Craighero 2004; Rizzolatti, Fadiga, Gallese 1996a; Rizzolatti, Fogassi, Gallese 2001). In addition, it is noteworthy here, that these neurons “...respond to either self-produced or observed actions” (Urgesi, Moro, Candidi, and Aglioti 2006: 7948).

This stimulation can also be done by using linguistic expressions. We hypothesize that mirror neurons carry out this task using two main mechanisms: *implied motor topology* and *implied stimulus*.

Let us consider the motor and cognitive topologies in the following examples:

a. She understands the concept.

b. She grasps a paper.

c. She grasps the concept.

As example a. indicates, though the mental activity which is involved in Understanding is abstract, it is semantically independent. Accordingly, the cognitive topology which underlies this activity is as follows:

An agent (= *thinking being*); a mental model (= *an idea/concept*); a mental activity (= *understanding*). It is important to notice here that though the phenomenon *understanding* is not bodily experienced, it still has an independent cognitive topology.

Utterance b. shows a motor topology which includes:

An agent (= capable of *grasping*); an object (= *graspable*); and a physical action (= *grasping*).

However, in c. the cognitive topology of a. and the motor topology of b. interact in that both the construction and processing of the metaphorical mapping involved in *she grasps the concept* dwells on the two topologies. Features from both topologies are recruited to reason about the phenomenon *Understanding*. Notice that one-way-feature transfer cannot account for this conceptual metaphor in the sense that the cognitive topology in this mapping is also active. More precisely, though Neuro-imaging experiments (e.g. Coulson 2008; Gallese and Lakoff 2005; Lakoff 2008) demonstrate that when the term *grasp* is used metaphorically, it activates the brain area which is responsible for the corresponding brain area, these experiments yet need to explore the neural structure of the cognitive topology of the target domain. We suggest that the term *concept* in *she grasps the concept* projects onto the metaphorical mapping the semantic attributes of the conceptual frame to which it belongs.

Though the motor modality of the action *Grasping* determines how the mapping is carried out, the cognitive topology of *Understanding* is still active in this metaphorical

mapping. A piece of evidence for this claim is the fact that the conceptual metaphor *she grasps the concept* is semantically identical to *she understands the concept*.

Another aspect of this metaphor which needs a deep analysis here is how the *implied motor topology* and *implied cognitive topology* of the source and target domain, respectively, operate in metaphorical mapping.

To assess this issue, we shall briefly review some of the key findings regarding the functional features of Mirror Neurons (e.g. di Pellegrino, Fadiga, Fogassi, Gallese, and Rizzolatti, 1992; Rizzolatti 1996b) and then identify their relevance to the interaction theory of conceptual mapping.

So far in this section, we have outlined the features of the motor topology of Grasping and argued that this motor action consists of *an agent; a (graspable) object; and the action of grasping*. However, mirror neurons do not fire when a subject is exposed to the elements of the motor topology as being isolated. For instance, the mirror neurons which are responsible for the action of *grasping* would not fire if a subject is exposed to a *graspable object* and *an agent* as separate elements of this motor topology (Gallese, Fadiga, Fogassi, and Rizzolatti, 1996:595-596). That is, she or he needs to be exposed to those elements as constituting a unified topology so as to (1) infer a cognitive model from such motor topology and (2) stimulate the mirror neurons which are responsible for the motor action of *grasping*.

Accordingly, the cognitive topology of a target domain plays a major role in metaphorical mapping by imposing semantic features onto the motor topology of the source domain. Now, let us examine how the motor topology of the source domain contributes to the construction and processing of a conceptual metaphor. Because much research has been devoted to explore how bodily-experienced domains 'embody' abstract ones (e.g. Gibbs

1994, 2011; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Szwedek 2011), we shall limit ourselves to those features which operate in the interaction process between motor actions and mental activities in metaphorical mapping.

As seen before, the phenomenon *understanding* in *she understands the concept* is semantically independent. This entails that it consists of a cognitive topology without being engaged in metaphorical mapping (for a contrasting view on this issue see e.g. Lakoff 1993; Lakoff and Johnson 1980; Lakoff and Turner 1989). To illustrate, the cognitive topology of this phenomenon is constituted by a *thinking being*; a *mental activity*; and a *cognitive model* (a concept). Again, this topology signifies that target domains, though in some cases they are abstract, they do have conceptual structures.

This finding does not comply with the tenets of the embodied approach, which are grounded in the assumption that conceptual metaphor is based on drawing a systematic correspondence between directly and indirectly meaningful domains.

Importantly, when this domain is mapped onto the motor action *grasping*, it becomes parameterized through the filter of this motor action. For instance, both the entailment and the nature of the mapping are shaped by the mechanisms of such modality. To illustrate, if this modality includes the physical action of *grasping* such as in this case, then the abstract knowledge is categorized in terms of the parameters of this action. This includes mainly three components: *an agent exerting power on an object*.

3.2.2.1.2. Implied stimulus

Previously, we argued that one pattern of activation within cognition is virtually identical to that which operates within motor modality inasmuch as linguistic terms

function as stimuli to conceptual frames. In the data, one common feature to the metaphorical mapping which engages motor actions and mental activities is that the same lexical terms are used to convey both literal and metaphorical meanings. By literal, not only do we refer to the motor topology of the source domain but also to the cognitive topology of the target (see for example, *she understands the concept*). Words which are derived from the motor topology of the source domain are highly grounded in sensorimotor experiences (e.g. *grasp, hold, touch*). Neuro-imaging experiments have demonstrated that these verbs activate the neural network which is responsible for their respective motor actions whether the meaning is literal or metaphorical (Gallese, Fadiga, Fogassi, and Rizzolatti 1996).

In this setting, the same stimulus operates in both domains; in the source domain it is sensory and in the target it is cognitive. The linguistic term *grasp*, when used metaphorically, includes features from both motor and cognitive topologies. In this respect, the metaphorical mapping does not consist of transferring inferences from one domain onto another, but it *does* consist of mapping the motor topology (and its semantic features) of the source domain and the cognitive topology of the target. More precisely, action verbs such as *grasp*—when used in metaphorical mapping—not only do they bear the motor topology of the source domain; but also features of the cognitive topology of the target domain. Therefore, the way the cognitive topology is processed determines the stimulus together with its features which are involved in the metaphorical mappings. For instance, if the cognitive topology is processed in terms of a given sensorimotor modality, then the linguistic stimulus should deploy the properties of this modality. Accordingly, the entailments and the nature of the mapping are governed by the mechanisms of such modality. To illustrate, if this modality draws on a given motor action, then the cognitive topology of the target domain is categorized in terms of this particular action. This means

that the basis of conceptual mapping is not transferring inherent inferences of the source domain. Instead, the metaphorical mapping which engages motor actions and mental activities as source and target domains, respectively, is based on semantic and motoric features.

In this type of metaphorical mapping, we use a linguistic system which directly draws on sensorimotor experience to reason about mental activities such as *Understanding*. The lexical terms of this system, when used metaphorically to conceptualize mental activities, become stimuli to both sensorimotor and cognitive systems through activating the motor topology of the source domain and the cognitive topology of the target domain.

These findings can also be a piece of evidence of how target domains evoke the perception of sensorimotor activities. Particularly, in metaphorical mappings, this activation is based on simulating a stimulus together with its inference(s) in the target domain. The linguistic metaphors which underlie conceptual mapping reveal this simulation (Feldman 2006: 214-17). The cognitive topology of the target domain *Understanding*, when it draws on the linguistic system of the source domain *Grasping*, leads to the stimulation of the motor topology of this motor action. This observation runs counter to the tenets of the embodied approach to metaphor in that target domains are the repository of the bodily-based information of source domains. In other words, expressions which are inherently associated with a stimulus in the source domain, they lead to the stimulation of the cognitive topology of the target. In this respect, the linguistic system which captures the motor topology of the source domain is used in metaphorical mapping to simulate this topology in the target domain. It is important to bear in mind that the same neural network which is responsible for a given sensorimotor task becomes active when we process both cognitive and sensorimotor topologies. On this view, neural networks, before firing, there

might be a prior stimulation from the target domain. This observation seems to be in accordance with the idea that choosing a given linguistic expression to convey a conceptual metaphor is not arbitrary; but it is determined, though this is not always the case (see page 275).

Accordingly, the mapping between motor topology and cognitive topology is held through “implied simulation”. In this respect, the categorization process that characterizes motor actions is mirrored in the target domain.

To sum up, the metaphorical mapping which engages motor actions and mental activities as source and target domains, respectively, does not consist of transferring only the inferences that are claimed to be inherent to source domains. Rather, these inferences are created after the mapping is built based on the interaction between the motor topology of the source domain and the cognitive topology of the target. In this respect, this mapping typology is not based on one-way-meaning transfer.

3.2.3. Co-activation in mapping motor actions onto mental activities

In the previous chapter, we demonstrated that *co-activation* is a mechanism that characterizes the metaphorical mapping which engages bodily-experienced phenomena as source and target domains. This seems to be based on two main factors: both source and target domains need to be bodily experienced and be connected in our physiological, cognitive, and linguistic systems (e.g. see synaesthetic metaphor on page 272). Interestingly, the interaction process may differ in certain metaphorical mapping typologies (see Chapter V). Because target domains in the mapping typology which we are concerned with in this chapter is abstract, it is safe to rule out the possibility of its interaction with the

source domain via the physiological system, this being the main factor responsible for mechanisms the of interaction such as *causality* (see pages 251, 253) and *co-activation* (see page 259). It is worth noting here, that the interaction approach that we proposed in Chapter IV is basically observed when the metaphorical mapping engages two bodily-experienced phenomena. Nonetheless, we hypothesize that if certain mechanisms of interaction such as *causality* and *automaticity* are observed in the mapping typology which draws on motor actions and mental activities as source and target domains, respectively, then this typology is based on interaction too. Let us consider the following examples:

Understand/Know Is See

I could never figure out why he left his first wife.

I can't make out why he wants to go to Spain.

"We talked for an hour, but couldn't make her see reason."

Do you see what I mean?

Influence Is Pressure/Hold

He brought pressure on the minister to resign.

He pushed me into applying for the job.

Don't think you can push me around; I have my own opinions!

Since he once loved her passionately, she still has a hold on him.

Continue (IDEA) Is Go on

Uganda will have to push ahead with destructive World Bank policies.

Solution Is Way Round/Over/Through

The election result will enable the Prime Minister to push through tough policies.

Purposeless Is Directionless

Career-wise studying Latin at university might be a road to nowhere.

Arguing/Criticizing Is Wounding/Cutting

“‘Don’t contradict your father,’ was the sharp reprimand”

Arguing/Criticizing Is Shooting/throwing

I’m not inviting questions: if you have any just shoot.

The proposal to build a swimming pool was shot down.

Make Known Is Show/Draw

The latest reports show that man-made global warming is a reality.

Conflicting Purpose Is Opposite Direction.

The movie explored the tension between public duty and personal loyalty.

Verbal Communication IS (Ball) Game

Could I just bounce a couple of ideas off you about the department’s strategic plan?

As the above examples indicate, the mental activity *Understanding* is represented metaphorically via the following physical actions: *grasp, fall out, hold, go, shoot, throw,* and *control*. According to (Mahon and Caramazza 2008: 60),

“...the motor system is automatically activated when participants (a) observe manipulable objects; (b) process linguistic stimuli (e.g., action verbs) the meanings of which imply bodily action; and (c) observe the actions of another individual.”

A potential *co-activation* between motor actions and mental activities may occur when a subject is exposed to lexical terms which are grounded in motor modality such as *grasping*.

The question which arises here is whether concrete and abstract phenomena interact via the other two systems (cognitive and linguistic). That is, could source and target domains in this mapping typology exchange semantic and motoric features without meeting the situational conditions that lead to *co-activation* and *co-occurrence* in synaesthetic metaphor?

In the previous chapter, we observed that one of the recurring features that characterize the metaphorical mapping which is based on interaction is that source and target domains are semantically independent. To approach the metaphorical mapping which engages mental processes and physical actions from an *interactionist* point of view, we need to prove that target domains are semantically independent. Though being semantically independent does not assure that metaphorical mapping is based on interaction, this characteristic raises the possibility to look at target domains as independent cognitive topologies. This is crucial to approaching this mapping typology from an *interactionist* point of view in that (1) target domains—though they are abstract—they include semantic features; and (2) they are eligible to project meaning in metaphorical mapping. Let us consider the following metaphor:

Understand Is Grasp/Hold

I am given to understand that there will be no pay cuts this year.

She finds even the easy concepts difficult to get hold of.

Half the class got hold of the wrong end of the stick and put the metal in the acid.

I managed to grasp the main points of the lecture.

Mental activities such as Understanding are reasoned about in two ways: metaphorically and literally. The first case is evident in the metaphorical expressions above inasmuch that this mental activity is understood via other phenomena, Grasping and Holding. According to Feldman and Narayanan (2004:1),

“...the meaning of the word grasp involves the motor action of grasping in some way.” They further assure that, “...the complex synergy that supports grasping is the core semantics of the word.”

Taken together with *image schema* (Grady 2005a; Lakoff 1990; Lakoff and Turner 1989), these components shape the experiential basis of the motor action involved in *grasping* and its cognitive topology. For instance, Feldman and Narayanan (2004:1-2) assure that,

“The action of grasping has both a motor component (what you do in grasping) and various perceptual components (what it looks like for someone to grasp and what a graspable object looks like) and somato-sensory component (what it feels like to grasp something and to be grasped yourself).” (See also Gallese and Lakoff 2005).

On the other hand, as seen before, the phenomenon *understanding*—though being abstract—it consists of an independent¹⁴ cognitive topology which allows us to reason about this phenomenon without resorting to metaphorical mapping. Importantly, this cognitive topology can also be reasoned about using a conceptual mapping (see the examples above).

Strictly speaking, however, *co-activation* may not be applied to explain the interaction between these two phenomena. That is, while neural experiments (e.g. Gallese and Lakoff 2005; Rizzolatti and Arbib 1998; Rizzolatti, Fadiga, Fogassi, and Gallese 2002) show that the term *grasp* activates the brain area which is responsible for the actual execution of the action, it does not necessarily activate the target. In particular, we do not conceptualize Grasping in terms of Understanding. Hence, the domain, Grasping does not activate the domain, Understanding. Thereby, co-activation is not fully met by this metaphorical mapping.

¹⁴ Though the term "*literal*" is widely used within the embodied approach to metaphor to denote that a given phenomenon inherently functions as source domain, here we resort to the expression *semantically independent* since the former may give the impression that the phenomenon Understanding has a literal meaning, and being so, it is bodily experienced.

3.2.4. Causality in mapping motor actions onto mental activities

In the previous chapter, we saw that target domains have a more participating role in the metaphorical mapping which is based on bodily-experienced phenomena as source and target domains. In this mapping typology, the interaction between source and target domains includes mapping bodily-based features from both phenomena. We also traced the mechanisms and typologies of this interaction and observed that they substantially differ in the data. Therefore, we argued that the interaction process—because it draws on different mechanisms—is not homogeneous to the metaphorical mapping which engages bodily-experienced phenomena as source and target domains.

Nonetheless, one of the most important characteristics which characterize interaction is *causality*. On this view, causality-based mapping such as synaesthetic metaphor proves to be automatic and unconscious (for more details see e.g. Hubbard and Ramachandran 2001). In addition, in this type of metaphor, the target domain causes the activation of the source (see Chapter III).

Furthermore, we have demonstrated in the section above that the mental activity which is involved in the concept Understanding as target domain fulfills at least one of the mechanisms that endows target domains with a more participating role in metaphorical mapping—projecting semantic features into the mapping.

Being semantically independent, a sentence such as *she understands the lesson* supports the claim that the domain Understanding can be reasoned about without resorting to other phenomena. This finding is important in two ways: first, *being bodily experienced* is not a prerequisite condition for a given phenomenon to be meaningful. Second, the process of embodying target domains is not an indispensable process in metaphorical

mapping to project meaning onto (meaningless) phenomena. Importantly, the embodied approach to metaphor advocates meaning to phenomena, provided they are bodily experienced (Gibbs 1994, 2011; Feldman 2006; Feldman and Narayanan 2004; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Ruiz de Mendoza 2005; Szwedek 2011).

In the two sections above, the data indicates that *even* abstract phenomena can be directly meaningful. Though this finding corroborates our finding in the previous chapter, in that conceptual metaphor does not only operate on abstract phenomena (to endow them with bodily-based features, thereby give them meaning) the embodied approach to metaphor stands in strong opposition to both findings. To illustrate, the framework of the embodied approach is based on a straightforward assumption that only bodily-experienced phenomena are directly meaningful (see the previous chapter). However, as the data shows, abstract phenomena –such as *know*, *think*, *make known*, *obey*, *understand* are meaningful without being engaged in metaphorical mapping. The following examples support this claim:

Thinking/Believing Is Walking/Traveling

My mind was racing after the news of my promotion.

“I don’t think GM food crops will solve food shortages anyway, whether they are safe or not”

It’s difficult to keep track of who’s playing who and when.

Make Known Is Open

Mary found that people were willing to open out to her.

Opinion/Fashion Is Current

Godard was a new wave director.

Obey/Imitate Is Follow

Apple led the way with Windows on computer screen design.

Understanding Is Penetration/Sharpness

He writes on Shakespeare with great penetration.

“He’s quite handsome, but with a sharp mind too.”

It is worth noting here that the motor actions such as *open*, *wave*, *race*, and *follow* in these examples, should not be treated from an *interactionist* point of view as *grasp*. This is due to the fact that the motor action *grasping* is delimited both cognitively and neurally. In the first case, our judgment is based on the fact that this motor topology, by default, includes definite components—namely, the action of an agent grasping an object. In the second case, the neural network which is responsible for this motor action fires both when the action is executed and when it is used metaphorically to reason about the mental activity *understanding* (e.g. Gallese and Lakoff 2005). This finding entails that, this motor action is also neurally delimited in that the neural network which fires when this action is executed also fires when the motor action *grasping* is used in metaphorical mappings. Nevertheless, the motor topologies of other motor actions such as *opening*, *waving*, *racing*, and *following* cannot be treated as *grasping* as they lack a closed set of motor topologies. In addition, these motor topologies also lack a delimited neural representation which becomes active both when these actions are executed and when they are used metaphorically. Possibly, this lack may be due to the fact that these motor actions allow ‘affordances’ (see the previous chapter).

Another piece of evidence for the fact that these motor actions should not be treated as *grasping* is the fact that these motor actions are not represented neurally in the same way

across all their uses. For instance, *open the book*, *open your mouth*, *open the door* might reveal different motor topologies in that in each case there might be a specific motor topology that operates. That is, *open your mouth* and *open the door* might engage different neural networks.

The question which arises here is which motor topology is active when the action word *open* is used metaphorically such as *Mary found that people were willing to open out to her*. For the same token, action verbs such as *follow*, *race*, *keep track of* etc. cannot be treated as *grasp*. Again, we postulate that these motor actions are not held via a certain neural network when the action is carried out and when they are used metaphorically.

Accordingly, we rule out that using such terms literally and metaphorically would trigger identical neural networks. However, to look at metaphorical mapping between motor actions and mental activities as a causality-based mapping is to assess how these motor actions and mental activities such as *understanding* are engaged in mutual causation.

As seen before, the linguistic terms which are grounded in the motor topology of the source domain are causal in that they activate the corresponding neural network which also becomes active when the corresponding motor action is executed.

Therefore, this type of metaphorical mapping is based on causality which is triggered by the motor topology. The linguistic terms which refer to a given motor action stimulate the cognitive topology of the target domain; hence, this type of metaphorical mapping is causal and inferential. It is causal because in this type of metaphorical mapping, one domain causes the activation of the other. Moreover, it is inferential because we infer the motor topology and its corresponding conceptual frame from the cognitive topology of the target domain.

Furthermore, the target domain is causal too because it activates the same brain areas responsible for the execution of a given sensory motor activity. This means that metaphorical mappings are causal and inferential. This means that the metaphorical mapping which engages motor actions and mental activities as source and target domains respectively is based on recruiting information from the motor topology of the source domain and from the cognitive topology of the target. Importantly, these phenomena interact through a mutual transfer of features. In this respect, the cognitive topology of the target domains acquires certain features of the motor actions of the source domain. Similarly, the motor topology of a sensorimotor of the source domain in this type of metaphorical mapping too acquires certain features from the cognitive topology of the target.

As argued before, even cognitive processes are triggered by stimuli which activate both the corresponding conceptual frames and the neural network which is responsible for the corresponding motor action. These are biological dynamics that hold together motor phenomena and cognitive processes in causality-based metaphorical mappings. These biological dynamics make possible the interaction between sensorimotor and cognitive systems.

Within the embodied approach to metaphor, linguistic expressions have been the objective of the investigation and then the metaphor type Love Is Journey is deduced (e.g. Gibbs 1994; Grady 1998; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff and Johnson 1980; Lakoff and Turner 1989; Reddy 1993). A more embodied approach to metaphor, which we claim for in this thesis, includes a mutual transfer of motor and semantic features between two phenomena. Within this framework, the focus *equally* falls on source and target domains. The linguistic system which evokes a conceptual mapping

between source and target domains (within the embodied approach to metaphor) comes to take on a transcendental role in metaphor—namely, engaging the two phenomena in a stimulus-response pattern. In this setting, this system triggers the interaction between source and target domains. In the following sections, we shall assess other aspects of interaction between motor actions and mental activities when they are engaged in metaphorical mapping.

3.2.5. Adaptation of cognitive and motor topologies in metaphorical mapping

3.2.5.1. Abstracting source domains and embodying target domains

Much research has been devoted to the embodying process of target domains (e.g. Gibbs 1994, 2011; Gibbs and Matlock 2008; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Szwedek 2011). This process has been advocated the ultimate goal of conceptual metaphor for making abstract phenomena accessible to our reasoning system. For this reason, in this section, we shall concern ourselves only with the abstracting process.

The embodying process has been claimed to be the main goal of conceptual metaphor to allow our cognitive system to reason about target domains. Accordingly, the bodily-experienced phenomenon of a given source domain is necessary to categorize abstract phenomena. However, we demonstrated in Chapter III that the conceptual metaphor which engages two bodily-experienced phenomena posits a theoretical problem to the theory of embodiment. Given that, in this type of metaphorical mapping, target

domains are bodily experienced, we argued that the embodying process in this case does not seem to operate. More importantly, the embodying process is not the only process which is involved in this type of conceptual metaphor. Instead, we suggest that this metaphorical mapping includes mapping phenomena in a different way—namely, recruiting bodily-based features from source and target domains (see Chapter III).

In this section we hypothesize that the conceptual metaphor which engages a motor action and a mental activity draws on abstracting the motor activity. It follows from this that embodying and abstracting processes are two core mechanisms which characterize the interaction between source and target phenomena in this mapping typology. Because there are different ways and mechanisms of interaction, *co-activation* might not be observed in certain types of metaphorical mapping. Recall that *co-activation* may necessary imply that the source domain activates the cognitive topology of the target. Also, the latter is assumed to activate the motor topology of the source domain. The problem with this assumption is that the cognitive topology of the mental activity *Understanding* does not necessarily trigger the motor modality which is involved in *grasping*.

However, this does not necessarily mean that the mental activities and physical actions do not interact. Instead, we shall see in the following sections that the process of interaction in this type of metaphorical mapping can be pursued by assessing how the two domains are engaged in *embodying* and *abstracting* process in metaphorical mapping.

In line with this finding, Indurkha argues that,

“There is little ‘oscillation’ between the two domains, the mutual adaptations between the (domains of the) two subjects necessary for the metaphor to work posing little difficulty...” (Indurkha 1991:11-16). For more details see also Forceville (1996: 24).

We propose that one way to gauge the process of adaptation is to look at the motor topology of the source domain and the cognitive topology of the target inside and outside conceptual mappings. This adaptation process is carried out via two mechanisms: embodying process of target domains and abstracting source domains. Abstracting process concerns source domains whereas embodying process concerns target domains. In this respect, source and target domains adapt to each other through interaction in metaphorical mapping.

3.2.5.2. Abstraction of the motor topology of source domains

In order to assess how the physical topologies of source domains adapt to the cognitive topologies of the target, let us analyze the following examples:

Activity Is Board Game

(1) *A game of chess is being played out by Saddam Hussein and G. W. Bush.*

Development Of Idea/Emotion Is Growth

(2) *Economic growth will likely slow this fall.*

In these examples, the source domains (Growth and Board Game) can be juxtaposed with their target domains (Activity and Idea) in the sense that source phenomena are taken to a higher level of abstractness in metaphorical mapping (for a similar analysis of this type of metaphorical mapping, see Barsalou 1999; Pinker 2007:338). For instance, when we compare this mapping typology to the one that involves the action of *grasping* and the mental activity *understanding* as source and target domains, respectively, we observe the following differences:

First, whereas in *Understanding Is Grasping*, the motor topology of the source domain is still active, in *Activity Is Board Game*, the physical topology of the source domain is not active. Our judgment is based on the fact that in the first case, the source domain is grounded in a delimited physical action which goes active even when the term *grasp* is used metaphorically. In the second case, we suggest that the linguistic expression *a game of chess board* may not activate any determined physical topology which could be highly associated with this game in the same way that the physical topology which is associated with grasping. This situation is due to the fact that, unlike grasping, a game of chess board does not stand on a specific motor topology.

Second, experiments within neuroscience have discovered that there is a neural area which is responsible for the action *grasping* (e.g. di Pellegrino, Fadiga, Fogassi, Gallese, and Rizzolatti, 1992) and which goes active when this motor topology is used to reason about abstract phenomena such as *Understanding* (e.g. Gallese and Lakoff 2005). However, it would be hard to identify a specific neural area which becomes active when a given subject plays a game of chess, much less to trace such neural activity when such game is used metaphorically to reason about other phenomena.

In the metaphorical mapping which engages two bodily-experienced domains, the two modalities interact with each other incorporating features from both modalities. From a cognitive point of view, when we understand a modality in terms of another, each modality is abstracted by assigning to it a conceptual frame (Barsalou 1999, 2003). Metaphorical mapping does not influence only target domains in the sense that they are embodied through acquiring the physical topologies of source domains but source domains also acquire some features from the cognitive topologies target domains.

Following the embodied approach to metaphor, mapping one domain onto another entails that the concept in the target domain is embodied (e.g. Johnson 1987; Boroditsky and Ramscar 2002). However, other studies (Barsalou 2003; Tejada Caller and Guzmán Guerra 2012:29,38) suggest that in metaphorical mapping the sensorimotor experience which functions as source domain is abstracted or taken to a higher level of abstraction. Accordingly, the mapping typology which we are concerned with in this chapter involves embodying process in that these mental activities are embodied via their combination with physical actions. Also, constructing this mapping typology consists of abstracting physical actions of source domains.

Importantly, as seen before, linguistic labels which are grounded in motor modalities come to function as stimuli to motor modalities and to mental activities as well. That is, both abstracting and embodying processes are necessary to reason about mental activities.

Here we need to follow two lines of investigation: (1) what is mapped onto the mental activity is not the sensorimotor experience *per se* (for an opposing view, see Embodied Simulation). Or (2), the same stimulus functions in both domains in the same way but in different formats. To illustrate, the stimulus which operates in motor modality also operates in mental actions, though in the second case, the stimulation is achieved via a different mechanism. In this respect, conceptual metaphor does not dwell only on the embodying process of target domains (for more details on this issue, see chapter I).

This process is based on a stimulus-response pattern that equally characterizes the cognitive and sensorimotor systems. Obviously we do not intend to claim that this pattern governs all metaphorical mappings but at least this type of mapping obeys this pattern. Accordingly, these mental activities are embodied via coupling them with physical actions.

However, it is not a one-way-transfer of features because there must be an abstraction of sensorimotor experiences. Particularly, the abstraction concerns sensorimotor experiences. More precisely, the abstraction process affects the sensorimotor stimuli and their inferences.

As a result, not only do conceptual metaphors consist of embodying the cognitive topology of the target domain, but they also consist of abstracting the motor topology of the source domain. Cognitive processes, at least, in the metaphorical mapping, draw on abstracting the physical action in source domains. Cognition is embodied in the abstract phenomena, but in order for the latter to be embodied there must equally be abstraction of sensorimotor format information. This is evident when we take into consideration the way we use a linguistic expression that denotes figurative meaning. For instance, we argued that linguistic expressions function as stimuli to both cognitive and sensorimotor systems. At this stage, these terms function as a stimulus of certain conceptual frames. Then, these linguistic expressions evoke the simulation of the motor modality of *grasping* in the target domain Understanding. If the abstract knowledge of the target phenomenon is embodied, then there must be a process of abstraction in order to make the mapping possible. We argued that the motor topology of the source domain has to adapt to the cognitive topology of the target domain. A piece of evidence for this claim is the fact that we do not think of the literal meaning of a metaphor (Caballero 2009; Gentner and Bowdle 2008:116).

To sum up, in this type of metaphorical mapping, the mental activity which functions as target domain evokes the motor topology of the source domain through the linguistic system. In this respect, the cognitive topology (conceptual frame) is stimulated by the linguistic system which represents such cognitive topology (see for example Lakoff 1987). This is evident when we take into consideration the way we use a linguistic

expression that denotes figurative meaning. Neurological experiments demonstrated how the linguistic expressions such as *grasp* activate the motor information also when they are used to categorize cognitive processes such as *understand* (Aziz-Zadeh, Wilson, Rizzolatti, and Iacoboni 2006).

As argued before, the two systems show common features in their pattern of activation—namely, they are stimulus-response based phenomena when they are engaged in this type of metaphorical mapping. On this view, target domains actively participate in this type of metaphor because they trigger the interaction between physical actions and mental actions. Accordingly, conceptual mapping is not just about embodying concepts but also about abstracting the sensorimotor experiences of the source domain. Transforming sensorimotor information includes abstracting this information through abstracting the stimulus (Barsalou 2003a).

Therefore, the data indicates that not all instances of metaphor show this abstraction of source domains. Furthermore, these two metaphorical mappings can be juxtaposed with the ones analyzed before in terms of concreteness-abstractness criterion.

Conclusion

To assess whether other types of mapping dwell on the interaction between source and target domains, we focused our attention in this chapter on the metaphorical mapping which engages physical actions and mental activities as source and target domains, respectively. In chapter V, we outlined the mechanisms and parameters of interaction and argued that the interaction substantially varies in the metaphorical mapping which engages bodily-experienced phenomena as source and target domains. Therefore, in this chapter we hypothesized that if the mapping typology which is based on motor actions and mental

activities as source and target domains respectively follows the patterns and mechanisms of interaction such as *co-activation* and *causality*, then meaning construction in this type of metaphor is based on the interaction between source and target domains rather than one-way-meaning transfer.

It is worth noting here that the data indicates that metaphorical mapping cannot be studied as a homogeneous cognitive process given the remarkable variety of the bodily-experienced phenomena (see chapter I). In line with this claim, the interaction process should not be studied as a homogeneous process either. This hybridity is also observed in the metaphorical mapping which is based on interaction between source and target domains in that this interaction proves to be different depending on the typology of the mapping, the mechanisms of the interaction, the constitutive natures of source and target domains, and the system which is exploited (cognitive vs. physiological, for instance).

On the whole, those mechanisms reveal that the interaction in metaphorical mapping can be articulated at different, but interconnected, levels: cognition, language, and physiology. Our findings, in this respect, point out that this mapping typology is based on interaction too. Though not all the mechanisms of interaction are observed in this typology, we have shown that this type of metaphor is based on mutual influence between the motor topologies of source domains and the cognitive topologies of target. For instance, we disregard *co-occurrence* as a mechanism of interaction because target domains are not experienced bodily. Yet, other mechanisms of interaction-such as *co-activation*-are observed in this type of metaphor.

These findings have significant entailments for the research on conceptual metaphor. For instance, we argued that the mapping typology which concerns us in this chapter is not based on a one-way-meaning transfer from source onto target domains, but

the latter also actively participate in metaphorical mapping. Furthermore, analyzing the data shows that our cognitive and motor systems interact in processing mental activities such as *understanding*. In particular, the metaphorical mapping which engages physical actions and mental actions as source and target domains, respectively, fits into the interactionist proposal in that certain types of metaphorical mapping are based on interaction rather than on a one-way-features transfer.

In particular, this finding corroborates the major hypothesis that we put forward in this chapter which pursues whether being bodily experienced is a prerequisite condition for target phenomena to interact with their counterparts in the source domains. The data suggests that this condition is not necessary since the stimulus-response pattern operates in certain mapping typologies which draw on physical actions and mental actions as source and target domains, respectively. It is worth noting here that this typology can be included within the one which we covered in Chapter II to demonstrate that certain mapping typologies are based on Propositionality-linearity of mapping.

Based on our findings in this chapter, it is safe to argue that not all metaphorical mappings which engage bodily-experienced and abstract phenomena as source and target domains are based on Propositionality-linearity. As shown in this chapter, certain mapping typology which engages physical actions (source domains) and mental actions (target domains) are based on interaction.

Additionally, we argued in Chapter III that target domains in the mapping typology which is based on interaction actively participate in the construction and activation of metaphorical mapping. In conjunction with this finding, the mapping typology which we analyzed in this chapter shows that target phenomena evoke the perception of sensorimotor experiences of the source domains through the linguistic and sensorimotor system.

The data shows that the interaction between source and target domains is also observed when target domains draw on mental activities. This again suggests that the interaction process between source and target domains may arise from different conditions, and follow different patterns.

Equally important, while the embodied approach focuses on the embodying process as the only process underlying metaphorical mapping, we have shown in this chapter that abstracting is as important as the embodying process. Therefore, this type of metaphorical mapping should be looked at in terms of interaction between physical actions and mental activities rather than a uni-directional meaning transfer. In this respect, the interaction approach to this type of metaphorical mapping substantially differs from the embodied approach to metaphor in that the sensory motor information which is processed and clustered in the source phenomena is not the only one that is active in the metaphorical mapping. This type of metaphorical mapping recruits semantic features from both motor actions and mental activities. Metaphorical mappings show that in the case of using metaphorically action words, cognitive and sensorimotor systems are not encapsulated in carrying out their respective tasks. In this respect, cognitive and sensorimotor systems contribute to the construction and processing of this type of mapping.

We have shown in this chapter that sensorimotor experiences are inferred from mental activities via activating the motor topology of source domains. Both the processes of inferring meaning and activating the motor topology occur in this mapping typology because the sensorimotor stimuli are inferred from mental activities such *understanding*. Similar to the metaphorical mapping which engages two bodily-experienced phenomena, target domains in this type of metaphorical mapping are not the only domains which are influenced. Instead, the motor topology of the source domain has to adapt to the cognitive

topology of the target domain. In this respect, the two domains interact in this type of metaphorical mapping.

It is important here to notice that even though the target domains are not bodily-experienced phenomena, they potentially interact with source domains. Though it is not bodily-experienced, it is semantically autonomous. Being autonomous is the feature which legitimates the mental activities to interact with physical actions.

In the data we saw that this type of mapping engages two semantically and cognitively independent domains. For instance, we argued that the phenomenon Understanding is both cognitively and semantically independent. In the first case, we mean that we do not resort to other phenomena to reason about the phenomenon it. In the second case, we mainly refer to the fact that though this phenomenon is abstract, it includes semantic features that are potentially projected onto the metaphorical mapping.

In the previous chapter, we demonstrated that the interaction between source and target domains recruit bodily-based features from source and target domains. In this chapter, the interaction process is different. Given that the mental activities which function as target domain are not bodily experienced, we assumed that one bodily-experienced phenomenon operates in source and target domains. We argued that in order to instigate the interaction process, source domains need to be bodily experienced.

In this chapter, we have shown that target domains in this type of mapping share with source domains the embodied character of source domains via including a common linguistic system, common stimuli, and common neural networks. Reasoning about mental actions requires retrieving the motor topology of source domains. This retrieval is carried out via linguistic and extra-linguistic stimuli.

In this setting, it has been important to assess how the target domains in this type of mapping interact with the source domains and to identify which features of the target domains are used to contribute to the construction of this type of mapping. In this setting, we argued that though the target domain in this type of mapping is abstract, they are semantically independent. Therefore, the question was how the semantic features of these domains help construct the metaphorical mapping.

In this chapter we demonstrated that the interaction between source and target domains is not limited to the metaphorical mapping which engages two bodily-experienced phenomena. In Chapter IV, we observed that the mechanisms and typologies of interaction particularly operate in this typology. Importantly, in this chapter we demonstrated that target domains which include mental activities, , in some cases, interact with the physical actions as source domains. It might be important to see whether other types of abstract phenomena interact with physical actions.

Therefore, mapping certain physical actions onto mental actions is based on interaction which can be analyzed in terms of *causality*, *co-activation*, and *automaticity*. In this chapter we focused on the mapping typology which draws on motor actions and mental activities as source and target domains, respectively, to show that the interaction process could also cover the mapping typology which is based on abstract phenomena as target domains. Notice that we do not claim that all instances of this typology are based on interaction.

Chapter VII: Summary and Conclusions

1. Summary and General Conclusions

The inception of Embodied Metaphor Approach laid down the foundations of a theory which accounts for metaphor not merely as a linguistic phenomenon but as a conceptual tool that manifests itself cognitively through engaging directly and indirectly meaningful phenomena—source and target domains, respectively. Being directly and indirectly meaningful are intrinsically related to whether a given phenomenon is bodily-experienced or abstract. Given that source domains are bodily experienced (therefore, they are directly meaningful), the experiential character of conceptual metaphor is fully attributed to source domains whose structures emerge as a result of the interaction of our body, mind, and environment. That is, the foundational assumption within this approach is that the constitutive nature of source domains plays a dominating role in conceptual metaphor inasmuch that their topology is imposed on the target.

The fact that it is widely accepted within the embodiment theory that metaphorical mapping is a homogeneous cognitive process—namely, it is based on one-way-meaning transfer—has yielded two overarching principles. First, conceptual metaphor is instantiated through one mapping typology—concrete-onto-abstract phenomena. Second, this typology is governed by the following set of tenets: uni-directionality, invariance principle, and partial mapping.

Based on these assumptions, we formulated the following hypotheses: because our interaction with the environment is carried out via different modalities (vision, audition, motor, tactile etc.) and conceptual metaphor exploits this heterogeneous bodily-based information to reason about target domains, the embodiment theory may have obscured

potential patterns and principles that operate in different mapping typologies. First, we expected that the source domains which are grounded in different modalities would lead to significant variations regarding the mechanisms that underpin in metaphorical mapping. We further expected that looking at the constitutive natures of target domains would reveal that conceptual metaphor is instantiated through different mapping typologies. Taken together, these two hypotheses predicted that (1) different mapping typologies are underpinned by distinct cognitive operations and patterns of mapping. And, with a view to showing that examining conceptual metaphor in terms of its typologies is not merely a classificatory approach, (2) certain mapping typologies would posit a challenge to the tenets of the embodiment theory.

To test these hypotheses, first we needed to explore the constitutive natures of source and target domains to identify potentially different mapping typologies (see Chapter I). Then, it was necessary to assess whether these typologies draw on different cognitive operations and patterns of mapping.

The main goal of this thesis was to bridge this gap by claiming for a more complex classification of these typologies and their respective cognitive operations. We argued that the tenets of the embodiment particularly fit the mapping typology which engages bodily-experienced and non-bodily-experienced phenomena as source and target domains, respectively (see Chapter II).

Based on the data from Metalude, we gauged those tenets in different metaphorical mapping typologies to get a better understanding of the hybrid constitutive nature of the latter paying special attention to their underlying cognitive operations. Moreover, in order to assess how different metaphorical mapping typologies may elicit different analyses, we introduced two additional perspectives: Propositionality-Linearity (Chapter II) and

Interaction (Chapter IV). Our primary concern at this point was to demonstrate that the tenets of the embodiment theory may not be generalizable to metaphorical mapping typologies that do not draw on bodily-experienced phenomena and abstract phenomena as source and target domains, respectively.

In this respect, we demonstrated how certain metaphorical mapping typologies fit into the proposed approaches and how others—such as the one which engages bodily-experienced phenomena in source and target domains—posit a challenge to the tenets of the embodiment theory. In pursuing our goal to show that metaphorical mapping draws on a hybrid cognitive process, we postulated that this mapping typology is better looked at from an interactionist perspective. As expected, this work potentially provides a solid setting for the claim that conceptual metaphor draws on different mapping typologies. In this respect, we proposed how a major refinement process is required within the embodiment theory to account for such typologies.

The main goal of this thesis was to test the hypothesis that because we interact with the environment via different modes (vision, audition, motor, sensory, etc.) and conceptual metaphor exploits bodily-based information to reason about physically inaccessible domains, mapping certain phenomena which are processed in different modes may be underpinned by different cognitive operations. Therefore, it was important to (1) check whether metaphorical mapping is instantiated in different typologies and (2) scrutinize these typologies to assess whether they reveal different cognitive operations. That is, we expected a larger variety of these operations depending on the typology in question (e.g. concrete-onto-concrete vs. concrete-onto-abstract). Conceptual metaphor, then, would not draw on one type of cognitive process—one way meaning transfer from more concrete onto more abstract domains.

We further expected that certain metaphorical mapping typologies such as mapping across sensory phenomena would posit a serious challenge to the tenets of the embodiment theory in that its tenets (*uni-directionality*, *invariance principle*, *partial mapping*, and *embodied simulation*) have been developed according to the foundational assumption that conceptual metaphor is based on a single mapping typology—mapping concrete onto abstract phenomena. Henceforth, the tenets of this theory have been laid down paying full attention to the cognitive operations that are observed in such typology. The main conclusion from the analysis of the data is that the foundational assumption that the tenets of the embodiment theory are generalizable to all conceptual metaphors is false. As expected, while these tenets cover a particular mapping typology (concrete-onto-abstract phenomena), they could not account for other typologies found in the data.

The theoretical framework of this thesis has been based on a general hypothesis that it is misleading to analyze conceptual metaphor as a homogeneous cognitive process (see chapter I). It follows from this that studying different typologies of mapping would give substantial support to our theoretical framework inasmuch that if those typologies do not fit the tenets of the embodied approach, then research within this theory needs to take into account the variability of metaphorical mapping typologies.

Therefore, we started Chapter I by asking how a generalization over conceptual metaphor can be made within Embodiment Theory, given that metaphorical mapping draws on different kinds of bodily-experienced phenomena and is instantiated through a rich variety of typologies. To explore this theoretical problem, first, we outlined various kinds of experience on which conceptual metaphor dwells in the data (e.g. motor, sensory, state, location, orientation, etc). Later, we sketched out different mapping typologies that may not be captured by the tenets of Embodied Theory and hence need a different analysis. In

particular, the data indicates that though these source domains are grounded in bodily-experienced phenomena, metaphorical mapping may not be captured under a homogeneous cognitive process. Accordingly, we further postulated that these findings are of deep interest for Cognitive Linguistics because they could reveal a greater variability and complexity of conceptual metaphor.

In this respect, we showed how certain mapping typologies cannot be accounted for by either Embodied metaphor or Embodied Simulation. Furthermore, major theoretical problems arise when certain mapping typologies are analyzed taking into consideration the tenets of the two enterprises (see Chapter III). To solve these theoretical problems, we postulated a broad classification of the experiential character of source domains, on the one hand, and proposed a deeper analysis of the mapping typologies that characterize metaphorical mappings. To illustrate, in our attempt to apply the tenets of the two approaches to the data, we observed that though the experiential character of conceptual metaphor can be traced back to *sensorimotor* experience, it is misleading to classify all metaphor types in one group in terms of the patterns and principles of mapping. For instance, the data indicates that *partial mapping* and *uni-directionality* operate on certain types of mapping but not on others (see pages 90, 96). In this respect, we demonstrated that (1) the Concrete-Abstract criterion, while it is viable to account for one specific typology—namely mapping bodily-experienced onto non-bodily-experienced phenomena as source and target domains, respectively—it fails to explain other mapping typologies (see page 80).

And (2), Embodied Simulation theory is at odds with Embodied metaphor inasmuch that we cannot reconcile the *partial mapping* principle and one of the core tenets of

Embodied Simulation—*entirely simulating* the motor action of certain source domains in target domains (see page 90).

We have further shown that certain types of metaphorical mapping engage two primitive phenomena such as More Is Up and Up Is More where neither *partial mapping* nor *uni-directionality* is applicable (see page 96). This entails that these two criteria are not absolute features to all metaphorical mappings.

These findings present a challenge to the tenets of Embodied Theory—namely, there is no core process which potentially governs all the typologies of metaphorical mapping. Consequently, this theory needs further exploration for a more complex classification of metaphor typologies in terms of their patterns and principles of mapping.

To further support our hypothesis that the framework of Embodied Theory needs to avoid the widely-held assumption that metaphorical mapping is essentially a homogeneous cognitive process, it was necessary to juxtapose different metaphorical mapping typologies to examine how this overgeneralization might obscure patterns and mechanisms of mapping that might operate in certain types of mapping.

Therefore, in Chapter II, we focused our attention on the metaphorical mapping typology which engages bodily and non-bodily-experienced phenomena as source and target domains, respectively. To test whether the tenets of this approach may characterize only this typology (concrete-onto-abstract mapping), we proposed a new perspective, *Propositionality and Linearity of Meaning Projection*, to closely look at *partial mapping*, *meaning transfer across domains*, and *uni-directionality*. In this respect, we hypothesized that analyzing the data from this perspective would raise potential incongruities within Embodied Theory. In particular, in its attempt to address all conceptual metaphors as essentially homogeneous cognitive process, this theory obscures the enormous variety of

metaphorical mapping typologies and their various patterns and principles of mapping which (see page 113).

In line with this hypothesis, we observed in the data that the tenets of Embodied Theory fit perfectly well *Propositionality-Linearity* perspective because both approaches rest on the assumption that meaning construction via metaphorical mapping always consists of transferring semantic features from more concrete onto more abstract domains. In particular, “meaning transfer being based on the experiential character of source domain”, “uni-directionality of metaphorical mapping”, and “mapping bodily-experienced phenomena onto abstract phenomena” seem to also fit our perspective because both approaches assume that meaning construction via metaphorical mapping is *propositional* (see page 113) and *lineal* (see page 126).

In the first case, we have shown how the principle *one-way-meaning transfer* particularly sustains the notion that conceptual metaphor is propositional—namely, we understand a given phenomenon in terms of another without any significant participation from the target domain. That is, the inference of a given conceptual metaphor is fully attributed to the bodily-experienced phenomena which function as source domains. Because target domains import the cognitive and motor topologies of source domains, metaphorical mapping is argued to be based on one-way-meaning transfer.

In the second case, *Linearity* of metaphorical mapping is instantiated in the fact that meaning construction through metaphorical mapping proceeds in two phases:

(1) *Linearity in time*:

Meaning construction requires that source and target domains be processed in a chronological order where the bodily-experienced phenomena of source domains always precede their counterparts in the target.

(2) *Linearity of meaning-transfer process:*

This is evident in the fact that, within Embodiment Theory, without the cognitive and motor topologies of source domains, most abstract phenomena go uncategorized. In this respect, this type of phenomena is not endowed with meaning unless it is mapped onto other bodily-experienced phenomena (e.g. Lakoff and Turner 1989).

While the two perspectives seem to fit the data where metaphorical mapping dwells on bodily-experienced phenomena and abstract phenomena as source and target domains, respectively, the issue which we needed to handle at this point was whether the two perspectives could also fit the metaphorical mapping which engages two bodily-experienced phenomena.

Accordingly, in chapter III we further took the *Propositionality-Linearity* perspective together with the tenets of Embodied Theory to assess whether these approaches can address other mapping typologies. For this purpose, we focused our attention on the typology where bodily-experienced phenomena are involved in source and target domains.

Since not all instances of metaphor engage abstract phenomena as target domains, we hypothesized that this type of metaphorical mapping would show some incongruity within the theory. Namely, the mapping typology which involves bodily-experienced phenomena in its source and target domains cannot be addressed sticking to the tenets of Embodied Theory. This situation is due to the fact that this theoretical framework is based on the general assumption that source and target domains are inherently bodily-experienced and abstract, respectively. While this perspective can be applied to a certain type of metaphorical mapping (see Chapter II), it falls short when it comes to mapping across bodily-experienced phenomena.

To illustrate, the data suggests that source and target domains do not prove to have inherent features that legitimate them to carry out a by-default role in metaphorical mappings. Interestingly, we have found that target domains in certain typologies are not devoid of bodily properties, which are held within Embodied Theory to be circumscribed to source domains and which are believed to independently construct metaphorical mappings. Therefore, the widely held assumption within Embodied Metaphor that there is always one-way-projection of features seems to be inapplicable to this typology (see page 144).

Another aspect where the data conflicts with Embodied Theory is that the experiential character of metaphor has been exclusively attributed to source domains. Since in this type of conceptual metaphor, target domains are also experienced through the sensorimotor system, it becomes difficult to uphold the notion that (1) the experiential basis of metaphorical mapping is exclusively attributed to source domains; and (2) meaning construction via this mapping typology is also based on one-way-meaning transfer.

These findings corroborate our hypothesis which we put forward in Chapter I. Namely, metaphorical mapping might not be underpinned by a homogeneous cognitive process. In this respect, we showed that the metaphorical mapping which engages two bodily-experienced phenomena substantially differentiates from the typology which engages bodily-experienced phenomena as source and target domains. Consequently, we argued that the experiential basis of this type of metaphorical mapping can be also traced in target domains.

Later in this chapter, we focused our attention on the bodily-based characteristics of target domains such as—*being concrete and primitive, consisting of image schemas*, and

*being bodily-experienced*¹⁵—and on a potential contribution of target domains to the “experiential basis” of metaphorical mapping. In this respect, these *characteristics*, which have been believed to be common to only source domains, seem to be operating also on target domains.

Of particular interest, therefore, was to show how the *concrete-abstract* criterion is not reliable to distinguish source from target domains (see page 164). Relevant to this point, the data shows that this situation is due to the fact that (1) source and target domains in this type of metaphorical mapping are grounded in bodily-experienced phenomena; and (2) certain phenomena function both as source and target in different metaphorical mappings (see page 151). Because a given phenomenon can fulfill the role of either target or source in different metaphorical mappings is particularly indicative of the *looseness* of the *concrete-abstract* criterion (see page 149).

Given that target domains also include the bodily-based information that legitimates source domains to project meaning, we argued that they may well play wider roles in metaphorical mapping than have been previously believed. Therefore, the experiential basis of the conceptual metaphor should not be fully attributed to source domains if target domains are bodily experienced.

The following step was to trace the contribution of target domains to the experiential character of conceptual metaphor. Therefore, in Chapter IV, we hypothesized that since target domains in this type of conceptual metaphor are also bodily experienced, they potentially project their bodily-based features. Our initial step in testing this hypothesis concerned highlighting the features of target domains which might offset the

¹⁵ It is worth noting here that these characteristics, following the embodied approach to metaphor (e.g. Lakoff and Johnson 1980; Szwedek 2011), are indispensable for a given phenomena to be semantically independent (see also Chapter I and for contrasting views, see Chapter VI).

absolute dominance of source domains in metaphorical mapping. In particular one of the features which presumably differentiate source and target domains in other metaphorical mapping typologies such as mapping bodily-experienced phenomena onto abstract phenomena is that source domains are processed *on-line*, but target domains are processed *off-line* (Lakoff and Johnson 1989). However, we demonstrated in this chapter that when source and target domains are bodily-experienced, they are processed *online* (see page 211). A major entailment of this finding is that target domains in this type of mapping are semantically independent which means that they both include and project bodily-based features in metaphorical mapping.

The following step was to assess whether target domains carry out the same role as source domains in that they also carry out a participating role in metaphorical mapping. In this respect, we hypothesized that this might mean that target phenomena are not ‘passive’ as is held within Cognitive Linguistics (Lakoff and Johnson 1980, 1999; Szwedek 2011) and Cognitive Science (Feldman 2006; Feldman and Narayanan, 2004).

In this chapter we demonstrated how the metaphorical mapping typology which is based on two bodily-experienced phenomena posits a challenge to Embodied Theory—namely, the one-way-meaning-transfer criterion does not apply to this typology (see page 237). Accordingly, we argued that this approach needs to take into account also the characteristics of target domains which may be specific to certain metaphorical mapping typologies.

Once source and target domains are proved to be identical in terms of their bodily-based characteristics and their functional entailments (namely, target domains project their semantic features to construct metaphorical mapping (see page 234), we hypothesized that this particular typology could be looked at in terms of exchange of semantic features

between source and target domains. In this setting we proposed to examine this mapping typology from an *interactionist* perspective. Our concern, at this point, was to show how conceptual metaphor may be analyzed in terms of interaction between source and target domains rather than one-way-meaning transfer.

For this purpose, we outlined the situational conditions that pave the way for studying this type of mapping in terms of interaction. One particular feature that lends a significant support to our hypothesis is the fact that target domains in this type of mapping consist of the same characteristics which are circumscribed to source domains.

Based on these findings, we argued that target domains have a more participating role in this mapping typology (see page 177). Since target domains in this case have an active participation, we hypothesized that source and target domains project their bodily-based features in metaphorical mapping. Therefore, we claimed for an *interactionist* approach to this typology instead of one-way-meaning-transfer approach.

Taken together, these findings suggest that the experiential basis of conceptual metaphor should be equally attributed to source and target domains. Importantly, these findings conflict with Embodiment Theory insomuch that source domains have been claimed to play a dominating role in metaphorical mappings—because only their features shape the experiential character of conceptual metaphor.

Crucial to the interaction model also has been the notion of *emergent structure*. Because the *emergent structure* of this metaphorical mapping typology does not belong to either source or target domain, we argued that this cognitive topology is brought about as a result of an ongoing interaction process between source and target domains. More specifically, this metaphorical mapping does not arise from a systematic correspondence between elements that are inherently found in source or target domains. We took the

metaphorical mapping typology which engages two bodily-experienced phenomena as a metaphor type that supports our hypothesis that certain metaphorical mappings are based on interaction between features from source and target domains. To illustrate, we observed in the metaphorical mapping Butchery Is Surgery that being *incompetent* or *competent* does not inherently belong to either source or target domain. Rather, these characteristics arise from the interaction between the elements of the domains Butchery and Surgery (see page 226).

To show how our model differs from Richards' (1936) and Black's (1962, 1981, 1993), we further pursued the interaction process between source and target domains. Therefore, in chapter V, our primary concern was to outline the mechanisms, parameters, and typologies of interaction with a view to identifying which type of metaphorical mapping is likely to draw on interaction between source and target domains. We noticed that these mechanisms recur in the metaphorical mapping which engages bodily-experienced phenomena in source and target domains. As pointed out before, one of the core features which characterize the phenomena which interact in metaphorical mapping is that they are processed on-line. Recall that being processed on-line is intrinsically related to being semantically independent—they are meaningful without being mapped onto other phenomena. Since they are bodily experienced, our reasoning system, in principle, categorizes them without resorting to metaphorical mapping. Accordingly, we argued that the categorization process in this mapping typology shows major differences which can be captured in three different cognitive processes: *categorizing* (see pages 214-217), *further-categorizing* (see page 218), and *re-categorizing* (see pages 219-221).

Therefore, we further hypothesized that this interaction can be traced mainly at linguistic, physiological, neural, and cognitive levels. Target domains, in this respect,

interact because they are interconnected via these strands (see page 261). Of particular interest at this point was to assess whether these levels manifest a homogeneous interaction in metaphorical mapping that engages two bodily-experienced phenomena. For this purpose, we suggested to analyze this type of metaphor paying special attention to its typologies.

We observed that the interaction process substantially varies in the metaphorical mapping which engages bodily-experienced phenomena in source and target domains. In this respect, we observed that there are different metaphorical typologies within the typology which is based on bodily-experienced phenomena in source and target domains (see page 266).

Therefore, the interaction process is not homogeneous to all metaphorical mappings that engage bodily-experienced phenomena in source and target domains. To illustrate this point, we focused our attention on the mechanisms that operate in *cross-sensory-modality mapping* (Synaesthesia), *image-based mapping*, and *bi-directional mapping*. Then, we contrasted these three types of metaphorical mapping to *literary metaphor* to see whether the latter shows any substantial difference regarding these mechanisms. Indeed, the latter differs substantially from the former. For instance, while *synaesthetic metaphor* is a causality-based metaphorical mapping, *literary metaphor*¹⁶ is deliberately constructed. In addition, *synaesthetic metaphor* is dynamic in the sense that it is a stimulus-response based pattern. Importantly, this interaction is initiated by target domains, which in turn, leads to the stimulation of source domains.

In this respect, we demonstrated that the interaction process between bodily experienced-phenomena is not identical. Thus, in some types of interaction the

¹⁶ For an opposing view, see Lakoff and Turner (1989).

metaphorical mapping is causality-and-co-activation based (see page 251-259). However, these mechanisms do not operate in other types such as literary metaphor. In this setting, we have shown that metaphorical mapping reveals different levels and modes of interaction by means of which source and target are involved in a mutual influence. One core feature of this interaction is *Causality*. Possibly, this mechanism chiefly operates in interaction-based metaphorical mapping.

These findings are especially indicative of the systematic variety of metaphorical mappings and the wrong theoretical basis to analyze metaphor as homogeneous figurative processing. On such a view, analyzing mapping across bodily-experienced phenomena has exposed to view that interaction is carried out through different mechanisms and principles. Nonetheless, our hypothesis needed to be further formulated since being bodily-experienced does not necessarily permeate the interaction between source and target domains. Accordingly, though the focus should have been put more on whether the mapping is carried out consciously or unconsciously, our framework shows that certain mechanisms—such as *co-occurrence* and *co-activation*—prevail in certain metaphorical mapping typologies that engage bodily-experienced phenomena. In addition, it seems that these mechanisms operate when the mapping is unconsciously constructed and when source and target domains are bodily experienced (see page 275).

These findings further demonstrate that the interaction varies largely depending on the relationship that source and target domains maintain in metaphorical mapping—e.g. *synesthetic metaphor* vs. *literary metaphor*. We argued that interaction is based on bodily features which source and target phenomena have independently of metaphorical mapping. In the metaphorical mapping which engages two bodily-experienced phenomena, the two domains interact through bodily-based features. In this chapter we have shown that when

source and target domains are bodily-experienced, they interact by projecting their respective bodily-based semantic features in metaphorical mapping.

In this chapter, we have shown that the *interactionist* model is applicable to the metaphorical mapping that engages bodily-experienced phenomena. Yet, the question which needed a deep consideration is whether the above mentioned mechanisms of interaction can operate in metaphorical mappings that do not engage two bodily-experienced phenomena. We hypothesized that such case might include the metaphorical mapping which engages physical activities (as source domains) and mental activities (as target domains). The question which arose here is whether being bodily-experienced is a prerequisite condition for target domains to initiate the process of interaction. In other words, should source and target phenomena be bodily experienced to interact?

To show whether this pattern is observed in other types of metaphorical mapping and whether it is intrinsically limited to metaphorical mappings which are based on bodily-experienced phenomena in source and target domains, in Chapter VI, we proposed to closely look at the metaphorical mapping typology which engages motor actions such as *grasp* and *hold* and mental actions such as *think* and *understand* as source and target domains, respectively.

Recall that in the previous two chapters, we have demonstrated that (1) the mechanisms of interaction operate in the metaphorical mapping which engages two bodily-experienced phenomena; and (2) this interaction is manifested in different typologies. Accordingly, in this chapter we hypothesized that if the mechanisms of interaction-such as *co-activation*, *causality*, and *automaticity*-operate in other metaphorical typologies, then it is possible to analyze them from an *interactionis* perspective.

To assess whether other types of mapping dwell on interaction between source and target domains, we focused our attention in this chapter on the metaphorical mapping which engages motor actions and mental activities as source and target domains, respectively. Our findings, in this respect, point out that this type of mapping is based on interaction too. Though not all the mechanisms of interaction are observed in this type of metaphorical mapping, we have shown that it is still based on mutual influence between the motor topology of the source and the cognitive topology of the target domains (see page 295). For instance, we disregard *co-occurrence* as a mechanism of interaction in this case due to the fact that target domains are not experienced bodily. Yet, other mechanisms and characteristics that lead to interaction -such as the fact that *target domains are semantically independent, co-activation between source and target domains, and Automaticity of mapping*-are observed in this type of mapping typology (see page 317).

Therefore, meaning construction in this type of metaphor, when certain conditions are met (see page 295) is also based on interaction between source and target domains rather than one-way-meaning transfer. We further hypothesized that these mechanisms may operate differently in different mapping typologies (see page 324).

Furthermore, analyzing the data shows that our cognitive and motor systems interact in the metaphorical processing of mental activities such as *understanding*. In particular, the metaphorical mapping which engages motor actions and mental actions as source and target domains, respectively, fits into the *interactionist* perspective in that there is exchange of semantic features between source and target domains.

In this chapter we demonstrated that the interaction process between source and target domains is not limited to the metaphorical mapping which engages two bodily-experienced phenomena.

These findings corroborate the major hypothesis that we put forward in this chapter which pursued whether being bodily experienced is a prerequisite condition for target phenomena to interact with their counterparts in the source domains. Analyzing the data shows that this condition is not necessary for the target domain to project its semantic features in metaphorical mapping.

One way to track how interaction is optimal in this typology was to analyze how the stimulus-response pattern operates in this type of mapping. In this respect, we argued that the cognitive topology of the target phenomena evokes the topology of the sensorimotor experience of the source domain. To illustrate, the interaction in this type of mapping is triggered via a shared linguistic system between the motor and cognitive system (see page 295). In particular, based on neurological experiments (e.g. Aziz-Zadeh, Wilson, Rizzolatti, and Iacoboni 2006), the physical topologies of action words such as *grasp* can be traced neurally. Together with other studies (e.g. Coulson, 2008; Gallese and Lakoff 2005), it has been argued that such physical topologies also become active when action words, which are inherently associated with the motor topology of the source domain (e.g. Grasping), are used metaphorically. These findings have been crucial to our study of the mapping typology which draws on physical actions and mental actions as source and target domains, respectively. That is, we argued that there is cooperation between the sensorimotor and cognitive systems to give rise to such mapping typology. Specifically, we suggest that there is semantic exchange between the motor topology of source domains and the cognitive topology of target domains.

Similarly, the metaphorical mapping which engages two bodily-experienced phenomena, the target domains in this type of metaphorical mapping are not the only domains which are influenced. Instead, the motor topology of the source domain has to

adapt to the cognitive topology of the target domain (see page 334). This particular finding indicates that the interaction process differs too. Recall that in chapter V, we showed how the interaction substantially varies in the metaphorical mapping which engages bodily-experienced phenomena as source and target domains. The hybridity of the constitutive nature of source and target domains and the way these domains are mapped are also observed in the metaphorical mapping which is based on interaction in that this process varies depending on the mapping typology in question, the mechanisms of the interaction, the constitutive nature of source and target domains, and the system which is exploited (cognitive vs. physiological, for instance). On the whole, those mechanisms reveal that the interaction in metaphorical mapping can be articulated at different, but interconnected, levels: cognition, language, and physiology. Accordingly, the process of interaction should not be studied as a homogeneous process either.

This finding again indicates that the interaction process between source and target domains may arise from different conditions and follow different patterns. In chapter IV, we demonstrated that the interaction between source and target domains recruits bodily-based features from source and target domains. In this chapter, the interaction is manifested differently. That is, given that the mental activities, which function as target domains are not bodily experienced, the interaction process cannot be based on recruiting bodily-features from both phenomena. Notice that even though the target domains in these metaphorical mapping typologies are not grounded in bodily-experienced phenomena, they potentially interact with source domains insomuch that the interaction process recruits bodily-based features from the motor topologies of source domains and semantic features from the cognitive topology of the target.

In this setting, it has been important to assess how the interaction process recruits this information to highlight which features (of the target domains) contribute to the construction and processing of this type of mapping. In particular, the data shows that when action words such as *grasp* are mapped onto mental activities such as *understand*, the cognitive and sensorimotor systems are not encapsulated in constructing metaphorical meaning. In contrast, the cognitive and sensorimotor systems contribute to the construction and processing of this type of mapping. We have shown in this chapter that sensorimotor experiences are inferred from mental activities via activating the motor topology of source domains. This activation is carried out via the sensorimotor stimuli which are inferred from mental activities such *understanding*.

As the data indicates, cognitive processes are not devoid of sensorimotor information. Therefore, when we understand a mental activity in terms of a motor action, this cognitive process is not mapping between the two domains at an abstract level. Rather, this mapping typology still makes allusion to the motor topology of source domains. However, this does not entails imposing the motor topology on target domains without any considerable participation from target domains (see page 234). So, both constructing and processing this type of mapping engage the topologies of source and target domains. A piece of evidence for this assumption is that we noticed that this type of mapping engages two semantically independent domains. For instance, we argued that Understanding is both cognitively and semantically independent. In the first case, we mean that we do not resort to other phenomena to reason about the phenomenon of Understanding. In the second case, we mainly refer to the fact that though this phenomenon is abstract, it includes semantic features that are potentially projected into the metaphorical mapping.

Taken together, the findings in this chapter indicate that target domains in this type of mapping also contribute to the embodied character of conceptual metaphor via sharing common linguistic system, common stimuli, and common neural networks with the motor topology of source domains (see page 297).

2. Summary of Contributions

2.1. Overgeneralization within Embodied Metaphor Theory and the need for a more complex classification of metaphorical mapping typologies

The tenets of Embodiment Theory address a broad aspect of metaphorical mapping. However, the assumption that metaphor is based on one mapping typology has given rise to significant incongruities within the theory. As the thesis has demonstrated, adopting the view that all metaphorical mappings engage bodily-experienced phenomena (as source domains) and non-bodily-experienced phenomena (as target domains) raises major theoretical problems that can be addressed avoiding overarching metaphorical mapping typologies using a closed set of tenets. Therefore, conceptual metaphor cannot be studied as a homogeneous cognitive processing because,

- i. conceptual metaphor is instantiated through different mapping typologies;
- ii. target domains in certain types of mapping are bodily-experienced, semantically independent, and have their own conceptual structures;
- iii. the concrete-abstract criterion fails to explain the metaphorical mapping which engages two bodily-experienced phenomena;
- iv. the experiential basis of the embodied metaphor should not be *fully* attributed to source domains;

- v. this metaphorical mapping typology involves bodily-based semantic features from source and target domains;
- vi. metaphorical mapping in this case is based on interaction rather than one-way-meaning transfer;
- vii. target domains are not passive because they influence source domains; therefore, they actively participate in the construction of metaphorical mapping;
- viii. the *Uni-directionality* criterion does not characterize this metaphorical mapping typology;
- ix. the *Partial Mapping* criterion is not in line with Embodied Simulation Theory;
- x. the interaction process in metaphorical mapping can be articulated mainly at different levels of complexity: cognitive, linguistic, and neural;
- xi. the interaction between source and target domains is based mainly on *co-activation, causality, automation, and systematicity*;
- xii. the interaction process between source and target phenomena follows different typologies.

Taken together, these findings indicate that, while the tenets of Embodied Metaphor Theory can fit into a certain type of metaphor—namely, the mapping typology which is draws on bodily-experienced phenomena and abstract phenomena as source and target domains, respectively—the task becomes difficult when one tries to apply these tenets to different metaphorical mapping typologies. In this respect, the theory needs to be refined to be applied to, let us say, the mapping which engages two bodily-experienced phenomena.

2.2. The Embodied Approach vs. the Interactist Model

These aforementioned findings lead us to call for a more complex classification of conceptual metaphor in terms of its typologies and their respective cognitive operations. In this respect, throughout the thesis, our concern has been to urge this necessity since certain metaphorical mapping typologies posit theoretical problems to the embodied approach to metaphor. This situation is due to the fact that mapping across bodily-experienced phenomena cannot be covered either by the tenets of Embodied Simulation Theory or by those of the Embodied Approach to metaphor (see Chapter I). Accordingly, we claimed that different types of metaphorical mapping require different analyses. In particular, we demonstrated that certain metaphorical mapping typologies follow a system of their own (see for example mapping *across bodily-experienced phenomena*, *multimodal-based mapping*, and *synesthesia* based mapping).

Based on these findings, we argued that (1) metaphorical mapping typologies are far too complex to be captured in a single type of cognitive processing; and (2) the tenets of the Embodied Approach to metaphor fit certain metaphorical mapping typologies which engage bodily-experienced and non-bodily-experienced phenomena as source and target domains, respectively.

For the same token, the *interactionist* approach covers the metaphorical mapping typology which engages bodily-experienced phenomena in source and target domains and certain metaphorical mapping typologies which engage motor actions and mental activities as source and target domains, respectively. In this respect, our model also differs from the Embodied Approach to metaphor in that the latter is based on the assumption that in metaphorical mapping there is always one-way-meaning transfer and the only operating

information in metaphorical mapping is rooted in source domains. In contrast, our model accounts for conceptual metaphor as a two-way-input transfer. The sensory motor information which is processed and clustered in the source phenomena is not the only one that is active in constructing and processing the metaphorical mapping which is based on interaction. Instead, this metaphorical mapping typology recruits features from both motor actions and mental activities (see Chapter VI). As a consequence, the inference of this particular metaphorical mapping typology is not shaped only through the filter of source domains. Rather it is the result of an ongoing interaction process between two phenomena.

In this setting, mapping motor actions and mental activities is based on interaction which can be analyzed in terms of *causality*, *co-activation*, and *automaticity*. Furthermore, while the embodied approach to metaphor focuses on the *embodying process* as the only process in metaphorical mapping construction (e.g. Gibbs 1994, 2011; Gibbs and Matlock 2008; Johnson 1981, 1987; Johnson and Lakoff 2002; Kövecses 1988, 2000, 2002, 2005, 2010, 2011; Lakoff 1990, 1993; Lakoff and Johnson 1980, 1999; Lakoff and Turner 1989; Szwedek 2011), the data shows that *abstracting* is as important as the *embodying process* in certain types of metaphorical mapping.

These particular findings seem to support our model in that due to the rich variety of experience and the different metaphorical mapping typologies outlined in the thesis (see Chapter I), it is necessary to deal with each metaphorical mapping typology as a different cognitive processing.

2.3. Black's Interaction Model (1962, 1981, 1993) vs. Ours

Though the two models coincide in the fact that (1) the construction and processing of conceptual metaphor recruit features from source and target domains; and (2) source and

target domains are engaged in mutual influence, the two models differ in the following aspects:

First, Black's approach aims to cover all metaphorical mapping typologies making no difference between, let us say, the metaphorical mapping which is based on two bodily-experienced phenomena and the mapping which is based on bodily and non bodily-experienced phenomena as source and target domains, respectively. Our model particularly characterizes the conceptual metaphor typology which is based on two bodily-experienced phenomena (see Chapter III) and certain metaphorical mapping typologies which engage motor actions and mental activities as source and target domains, respectively (see chapter VI).

Second, whereas the interaction process within Black's approach is identical to all conceptual metaphors, our model outlines different patterns and mechanisms of interaction which substantially vary depending on the metaphorical mapping typology (e.g. deliberate vs. unconscious mapping; and co-activation-based mapping. Indeed, this variation is not accounted for by scholars who support the Interaction Model (Black 1962, 1981, 1993; Forceville 1996; Kittay 1987; McGlone 2001, 2003).

Third, whereas Black's model claims that the inference of conceptual metaphor is limited to the features which inherently exist in source and target domains, our model takes emergent structure (Coulson 2008; Fauconnier and Turner 2007) as a crucial characteristic to the interaction process in certain metaphorical mapping typologies.

To sum up, our model endorses the hypothesis that we put forward in Chapter I that conceptual metaphor cannot be studied as a homogeneous cognitive processing. Instead, as the data indicates, different metaphorical mapping typologies show different patterns and principles.

3. Future Research

Embodiment Theory is still under refinement process in the sense that it is taking successive approximations towards a more accurate understanding of the cognitive operations underlying the conceptual metaphor construction and processing. It still needs to take further steps in this direction.

Possibly, our thesis has established the first step toward establishing a more complex classification of metaphorical mapping typologies and their respective patterns and principles. Yet, we still need, for instance, further experimental testing to show to what degree *co-activation* and *automaticity* operate in the metaphorical mapping which is based on interaction. Recall that, in some of the instances of Building Is Human, the mapping occurs within the same modality, namely, vision. This might need further studies to determine whether there is a difference in terms of *causality*, *co-activation*, and *automaticity* between metaphorical mapping which is based on one modality and the one which is based on different modalities.

Similarly, further studies in this direction could focus on other kinds of source domains (e.g. *state*, *orientation*, *spatial*, and *location*) to see whether their interaction with target domains show different patterns others than *co-activation* and *automaticity*.

In the thesis (Chapter VI), we outlined the mechanisms and typologies of interaction and demonstrated that target domains which include mental activities interact with the phenomena which include physical actions. In this respect, it might be important to see whether other types of abstract phenomena interact with physical actions as source domains in different ways.

Another factor that can be considered in future research regarding metaphorical mapping typologies and their respective patterns and principles is the cultural construal of conceptual metaphor that may influence the interaction process between source and target domains. For instance, it might be important to address the question whether the fact that certain source and target domains are experienced differently across cultures could lead to different mechanisms and patterns of interaction.

To sum up, the assumption that conceptual metaphor is based on a homogeneous cognitive process—one-way-meaning transfer from more concrete onto more abstract domains is false. Therefore metaphorical mapping has a wider scope that cannot be captured under one core cognitive process. Accordingly, we suggest that the embodied metaphor approach requires a refinement process which accounts for conceptual metaphor as a heterogeneous cognitive process which is instantiated in different mapping typologies that dwell on various cognitive operations and patterns and mechanisms.

Bibliography

- Ahrens, K. (2002) When Love Is Not Digested: Underlying Reasons for Source to Target Domain Pairings in the Contemporary Metaphor. Found in Yuchau E. Hsiao *Proceedings of the Cognitive Linguistics Conference*, pp273-302. Taipei: Cheng-Chi University.
- Aziz-Zadeh, L., Wilson, S., Rizzolatti, G., and Iacoboni, M. (2006). Congruent Embodied Representations for Visually Presented Actions and Linguistic Phrases Describing Actions. *Current Biology*, 16, 1-6.
- Bailey D. (1997). When push comes to shove: A computational model of the role of motor control in the acquisition of action verbs. PhD thesis, UC Berkeley.
- Barcelona, A. (Ed.). (2003). *Metaphor and Metonymy at the Crossroads: A Cognitive Perspective*. Mouton de Gruyter.
- Barcelona, A. (2003). On the Plausibility of Claiming a Metonymic Motivation for Conceptual Metaphor. En A. Barcelona, *Metaphor and Metonymy at the Crossroads: A Cognitive Perspective* (págs. 31-58). Mouton de Gruyter.
- Barcelona, A., & Valenzuela, J. (2011). An Overview of Cognitive Linguistics. In M. Brdar, S. Gries, & M. Zic Fuchs, *Cognitive Linguistics: Convergence and Expansion* (Vol. 32, pp. 17-44). Amsterdam/Philadelphia: John Benjamins Publishing Company.
- Barnden, J.A. (2006). Artificial intelligence, figurative language and cognitive linguistics. In G. Kristiansen et al. (Eds.), *Cognitive Linguistics: Current Applications and Future Perspectives* (pp. 431–459). Berlin: Mouton de Gruyter.
- Barsalou, L. W. (1999). Perceptual symbol systems. *Behavioral and Brain Sciences*, 22, 577-660.
- Barsalou, L. W. (2003a). Abstraction in perceptual symbol systems. *Philosophical Transaction of the Royal Society of London: Biological Sciences*, 358, 1177-1187.
- Barsalou, L. W. (2003b). Situated simulation in the human conceptual system. *Language and Cognitive Processes*, 18, 513-562.
- Barsalou, L. W., and Wiemer-Hastings, K. (2005). Situating Abstract Concepts. In D. Pecher, and R. Zwaan, *Grounding Cognition: The role of perception and action in memory, language, and thought* (pp. 129-163). New York: Cambridge University Press.
- Barsalou, L.W. (2007). Continuing themes in the study of human knowledge: Associations, imagery, propositions, and situations. In M.A. Gluck, J.R. Anderson, and S.M. Kosslyn (Eds.). *Memory and mind: A Festschrift for Gordon H. Bower* (pp. 209-227). New Jersey: Lawrence Erlbaum Associates.
- Barsalou, L. W. (2008). Grounded Cognition. *Annual Review Psychology*, 59, 617-645.
- Barsalou, L.W., Santos, A., Simmons, W.K., and Wilson, C.D. (2008). Language and simulation in conceptual processing. In M. De Vega, A.M. Glenberg, and A.C. Graesser, A. (Eds.). *Symbols, embodiment, and meaning* (pp. 245-283). Oxford: Oxford University Press.
- Belliveau, J.W. et al. (1991) Functional mapping of the human visual cortex by magnetic resonance imaging. *Science* 254, 716–719.
- Benczes, R., Barcelona, A., & Ruiz de Mendoza, F. J. (2011). *Human Cognitive Processing. Defining Metonymy in Cognitive Linguistics: Towards a Consensus View*. (Vol. v). Amsterdam: John Benjamins V.B.
- Bergen B., Chang N., Narayan S. (2004). Simulated Action in an Embodied Construction Grammar. Proc. 26th Cognitive Science Society Conference. (pp.108-113).
- Bergen, B., Lindsay, S., Matlock, T., and Narayanan, S. (2007) Spatial and linguistics aspects of mental imagery in language comprehension. *Cognitive Science*, 31, 733-764.

- Bergen B., Chang N. (2003). Embodied Construction Grammar in Simulation-Based Language Understanding. In Östman J.-O. and Fried M. (Eds.), *Construction Grammar(s): Cognitive and Cross-language dimensions*. Amsterdam: John Benjamins.
- Bernárdez, E. (2004). *¿Qué Son las Lenguas?* Madrid: Alianza Editorial.
- Bernárdez, E. (2005). Social Cognition: Variation, Language, and Culture in Cognitive Linguistic Typology. In F. J. Ruiz de Mendoza, and M. S. Peña, *Cognitive Linguistics: Internal Dynamics and Interdisciplinary Interaction* (pp. 191-222). Berlin: Walter de Gruyter.
- Bernárdez, E. (2008). *El Lenguaje como Cultura: Una Crítica del Discurso el Lenguaje*. Madrid: Alianza Editorial.
- Bernárdez, E. (2013). On the Cultural Character of Metaphor: Some Reflections on Universality and Culture-specificity in the Language and Cognition of Time, Especially in Ameriindian Languages. In *Review of Cognitive Linguistics*, 11, 1-35). John Benjamins Publishing Company.
- Black, M. (1962) *Models and Metaphors: Studies in Language and Philosophy*. Ithaca: Cornell University Press.
- Black, M. (1981) *Metaphor*. In M. Johnson, ed., *Philosophical Perspectives on Metaphor*. Minneapolis: University of Minneapolis Press.
- Black, M. 'More about Metaphor', in A. Ortony (ed.) *Metaphor and Thought*, 2nd (Cambridge: Cambridge University Press, 1993), pp. 19-41.
- Boroditsky, L., and Ramscar, M. (2002). The roles of body and mind in abstract thought. *Psychological Science*, 13(2), 185-189.
- Bowdle, B. F. and Gentner, D. (1999) *Metaphor Comprehension: From Comparison to Categorization*. Processings of the Twenty First Annual Conference of Cognitive Science Society, 90-95.
- Bowdle, B. F., and Gentner, D. (1995). The career of metaphor. Poster session presented at the Thirty-Sixth Annual Meeting of the Psychonomic Society, Los Angeles, CA.
- Bowdle, B. F., and Gentner, D. The Career of Metaphor in *Psychological Review* 2005, Vol. 112, No. 1, 193-216 the American Psychological Association.
- Brandt, L. and Brandt, P.A. (2005). Making sense of a blend. *A cognitive-semiotic approach to metaphor*. *Annual Review of Cognitive Linguistics*, 3, 216–249.
- Bretones C. C., (2001) 'Synaesthetic Metaphors in English' (on-line Publication, <http://www.icsi.berkeley.edu/ftp/pub/techreports/2001/tr-01-008.pdf>.)
- Burke, M. (2011) *Literary Reading, Cognition and Emotion: an Exploration of the Oceanic Mind*. New York: Taylor and Francis.
- Caballero, R., (2009) Cutting across the Senses: Imagery in Winespeak and Audiovisual Promotion. In: Forceville and Urios-Aparisi, eds, pp. 73-94.
- Caballero, R., & Díaz-Vera, J. (2013). Metaphor and culture: A Relationship at a Crossroads? *Intercultural Pragmatics*, 10(2), 205 – 207.
- Cacciari, C. (2008). Crossing the Senses in Metaphorical Language. In R. Gibbs, *The Cambridge Handbook of Metaphor and Thought* (pp. 426-443). Cambridge: Cambridge University Press.
- Chang N., Felman J., Narayanan, S. Structured Connectionist Models of Language, Cognition and Action. *PROGRESS IN NEURAL PROCESSING* 2005, VOL 16, pp 57-68 *WORLD SCIENTIFIC* Great Britain.
- Chang N. (2005). *Constructing Grammar: A Computational Model of the Emergence of Early Constructions*. Ph.D. thesis, UC Berkeley.

- Chang N., Feldman J., Porzel R., Sanders K. (2002). Scaling Cognitive Linguistics: Formalisms for Language Understanding. Proc. SCANALU.
- Chomsky, N. (1957) Syntactic Structures. The Hague/Paris: Mouton.
- Chomsky, N. (1975) The Logical Structure of Linguistic Theory. New York, Plenum Press.
- Chomsky, N. (1984) *Modular Approaches to the Study of the Mind*. San Diego: State University Press.
- Correa-Beningfield, M., Kristiansen, G., Navarro-Ferrando, I., & Vandeloise, C. (2005). Image Schemas vs. Complex Primitives in Cross-cultural Spatial Cognition. En G. Hampe, R. Dirven, R. Langacker, & J. Taylor (Edits.), *From Perception to Meaning: Image Schemas in Cognitive Linguistics* (pp. 343-366). Berlin. New York: Walter de Gruyter.
- Coulson, S. (2008). Metaphor Comprehension and the Brain. In G. Raymond, *The Cambridge Handbook of Metaphor and Thought* (pp. 177-194). Cambridge: Cambridge University Press.
- Coulson, S., and Pagán Cánovas, C. (2013) Understanding Timelines: Conceptual Metaphor and Conceptual Integration. *Cognitive Semiotics* 5, (1-2).
- Croft, W. (2001). Radical Construction Grammar. Oxford: Oxford Univ. Press. Feldman J.A., Ballard D.H. (1982). Connectionist models and their properties. *Cognitive Science*, 6, 205-254.
- Day, S., (1996) Synaesthesia and Synaesthetic Metaphors. *Psyche* 2 (32). Online document. Accessed at www.users.muohio.edu/daysa/types.htm.
- di Pellegrino, G., Fadiga, L., Fogassi, L., Gallese, V., & Rizzolatti, G. (1992). Understanding Motor Events: A Neurophysiological Study. *Experimental Brain Research*, 91, 176-180.
- Fauconnier, G. and Turner. M. (1996). "Blending as a central process of grammar". Conceptual Structure, *Discourse, and Language* ed. by Adele Goldberg. Stanford, CA: CSLI.
- Fauconnier, G. and Turner, M. (2002). *The Way We Think*. New York: Basic Books.
- Fauconnier, G., and Turner, M. (2007). Conceptual Integration Networks. In V. Evans, B. Bergen, and J. Zinken, *The Cognitive Linguistics Reader* (pp. 360-419). London: Equinox Publishing Ltd.
- Fauconnier, G., and Turner, M. (2008). Rethinking Metaphor. In R. Gibbs, *The Cambridge Handbook of Metaphor and Thought* (pp. 53-66). Cambridge: Cambridge University Press.
- Feldman, J. (2006). From Molecule to Metaphor: a Neural Theory of Language. London, England
- Feldman J., Lakoff G., Bailey D., Narayanan S, Regier T, Stolcke A. (1996). L0—The First Five Years of an Automated Language Acquisition Project. *AI Review*, 10, 103-129.
- Feldman, J. and Narayanan, S. (2004) Embodied Meaning in a Neural Theory of Language. *Brain and Language* (89) (2): 385-392.
- Fillmore, C. (1982) Frame Semantics. In *Linguistics in the Morning Calm*. Seoul: Hanshin. 111-137.
- Fillmore, C. (1985) Frames and the Semantics of Understanding. *Quaderni di Semantica*: VI, 2. 222-254.
- Fodor, J. A. (1975) *The Language of Thought*. Cambridge, MA: Harvard University Press.
- Forceville (1996) *Pictorial Metaphor*. London and New York: Routledge.
- Forceville (2006) Non-Verbal and Multimodal Metaphor in a Cognitivist Framework: Agendas for Research. In G. Kristiansen, M. Achard, R. Dirven, and F. Ruiz de Mendoza (Eds.), *Applications of Cognitive Linguistics: Foundations and Fields of Application* (pp.). Berlin and New York: Mouton de Gruyter.
- Fogassi L., Ferrari P.F., Gesierich B., Rozzi S., Chersi F. and Rizzolatti G. (2005) Parietal Lobe: from Action Organization to Intention Understanding. *Science*, 308: 662-7.

- Gallese, V., and Lakoff, G. (2005). The Brain's Concepts: The role of the sensorimotor system in conceptual knowledge. *Cognitive Neuropsychology*, 21.
- Gallese, V., Fadiga, L., Fogassi, L., and Rizzolatti, G. (1996). Action Recognition in the Premotor Cortex. *Brain*, 119, 593-609.
- Gallese V., Goldman A. (1998) Mirror neurons and the simulation theory of mind-reading. *Trends in Cognitive Sciences*, 12:493-501,
- Gallese V., Keysers C. and Rizzolatti G. (2004) A unifying view of the basis of social cognition. *Trends in Cognitive Sciences*, 8: 396-403.
- Galton, F. (1880) Visualised Numerals, *Nature*, 22, 494-5.
- Geeraerts, D., Kristiansen, G., & Peirsman, Y. (2010). *Advances in Cognitive Sociolinguistics. Cognitive Linguistics Research*. Berlin/New York: Walter de Gruyter.
- Gentner, D., and Bowdle, B. (2008). Metaphor as Structure-Mapping. In R. Gibbs, *The Cambridge Handbook of Metaphor and Thought* (pp. 109-128). Cambridge: Cambridge University Press.
- Gibbs, R. (1993). Process and products in making sense of tropes', in A. Ortony (ed.), *Metaphor and thought: Second edition*. Cambridge: Cambridge University Press: 252–276.
- Gibbs, R. (1994). *The Poetics of Mind: Figurative Thought, Language and Understanding*. New York: Cambridge University Press.
- Gibbs, R. (1996). Why concepts are metaphorical. *Cognition*, 61, 309-319.
- Gibbs, R. (2005). Embodied Action in Thought and Language. In F. I. Ruiz de Mendoza, and M. S. Peña Cervel, *Cognitive Linguistics Internal Dynamics and Interdisciplinary Interaction* (225-247). Berlin: Walter de Gruyter.
- Gibbs, R. (2006). *Embodiment and cognitive science*. New York: Cambridge University Press.
- Gibbs, R. (ed.). 2008. *The Cambridge Handbook of Metaphor and Thought*. Cambridge: Cambridge University Press.
- Gibbs, R. (2011). Evaluating Conceptual Metaphor Theory. *Discourse Processes*, 48(8), 529-562.
- Gibbs, R., and Matlock, T. (2008). Metaphor, Imagination, and Simulation. In R. Gibbs, *The Cambridge Handbook of Metaphor and Thought* (pp. 161-176). Cambridge: Cambridge University Press.
- Gibbs, R. and Tendahl, M. (2006). Cognitive effort and effects in metaphor comprehension: Relevance theory and psycholinguistics. *Mind and Language*, 21(3), 379–403.
- Giora, R. (2002). Literal vs. Figurative Language: Different or Equal? *Journal of Pragmatics*(34), 487-506.
- Giora, R. (2003) *On our mind: Salience, context, and figurative language*. New York: Oxford University Press.
- Giora, R. (2008). Is Metaphor Unique? In R. Gibbs, *The Cambridge Handbook of Metaphor and Thought* (143-160). Cambridge: Cambridge University Press.
- Glenberg A. and Kaschak M. (2002). Grounding language in action. *Psychonomic Bulletin and Review*, 9, 558-565.
- Glucksberg, S. (2008). How Metaphors Create Categories-quickly. In R. Gibbs, *The Cambridge Handbook of Metaphor and Thought* (pp. 67-83). Cambridge: The Cambridge University Press.
- Glucksberg, S. and Keysar, B. (1993). How metaphors work. In A. Ortony (Ed.), *Metaphor and Thought* (second edition) (pp. 401–424). New York: Cambridge University Press.
- Goldberg A. (1995). *Constructions: A Construction Grammar Approach to Argument Structure*. Chicago: University of Chicago Press.

- Grady, J. (1997a) Foundations of Meaning: Primary metaphors and primary scenes. (Unpublished doctoral dissertation). University of California, Berkeley.
- Grady, J. (1997b). THEORIES ARE BUILDINGS Revisited. *Cognitive Linguistics*, 8 (4).
- Grady, J. (1998). The "Conduit Metaphor" Revisited: a reassessment of metaphors for communication. In J.-P. Koenig, *Discourse and Cognition: Bridging the Gap* (pp. 205-217). Stanford, California: CSLI.
- Grady, J. (2007). A Typology of Motivation for Conceptual Metaphor: Correlation vs. Resemblance. In V. Evans, B. Bergen, and J. Zinken, *The Cognitive Linguistics Reader* (pp. 316-334). London: Equinox Publishing Ltd.
- Grady, J. (2005a) Image schemas and perception: Refining a definition. In B. Hampe (Ed.), *From perception to meaning* (pp. 35-55). Berlin/New York: Mouton de Gruyter.
- Grady, J. (2005b). Primary metaphors as input to conceptual integration. In: *Journal of Pragmatics*, 37, pp 1595-1614.
- Grady, J., Oakley, T., and Coulson, S. (2007). Blending and Metaphor. In V. Evans, B. Bergen, and J. Zinken, *The Cognitive Linguistics Reader* (pp. 420-440). London: Equinox Publishing Ltd.
- Grady, J., Taub, S., and Morgan, P. (1996). Primitive and Compound Metaphors. In A. Goldberg, *Conceptual Structure, Discourse, and Language*. Stanford: CSLI.
- Grafton, S., Arbib, M., Fadiga, L., and Rizzolatti, G. (1996). Localization of Grasp Representations in Humans by Positron Emission Tomography. *Exp Brain Res*, 112, 103-111.
- Guarddón Anelo, C. (2005). Prepositional Semantics and Metaphoric Extensions. *Annual Review of Cognitive Linguistics*, 3(1), 300-324.
- Guarddón Anelo, C. (2003). Spatial Metaphors as Mental Space Builders. In M. White, H. Herrera, & M. C. Alonso Vázquez, *Cognitive Linguistics in Spain at the Turn of the Century (II) (Metaphor and Metonymy)*. *La Lingüística Cognitiva en el Cambio de Siglo (II) (Metáfora y Metonimia)* (pp. 53-64). Madrid: Universidad Autónoma de Madrid.
- Hauk O., Johnsrude I., Pulvermüller F. (2004). Somatotopic representation of action words in human motor and premotor cortex. *Neuron*, 41(2), 301-7.
- Herrera-Soler, H. (2006). Conceptual metaphors in press headlines on globalisation. *Annual Review of Cognitive Linguistics*, 4(1), 1-20.
- Herrera-Soler, H. (2006). Globalisers' and anti-globalisers' forums from a cognitive perspective. En A. M. Hornero Corisco, & M. A. Ruiz Moneva, *Metaphor, blending and their application to semantic analysis* (págs. 61-80). Zaragoza: ANUBAR Ediciones.
- Herrera-Soler, H. (2008). A metaphor corpus in business press. (AELFE, Ed.) *Ibérica*, 15, 51-70.
- Herrera Soler, H., & White, M. (2012). *Metaphor and Mills: Figurative Language of Business and Economics*. New York: Mouton De Gruyter.
- Iacoboni M., Molnar-Szakacs I., Gallese V., Buccino G., Mazziotta J.C., Rizzolatti G. (2005) Grasping the intentions of others with one's own mirror neuron system. *PLoS biology*, 3, e79.
- Ibarretxe-Antuñano, I. (2013). The relationship between conceptual metaphor and culture. *Intercultural Pragmatics*, 10(2), 315 – 339.
- Johnson, C., (1997) 'Metaphor vs. Conflation in the Acquisition of Polysemy: The Case of SEE', in M.K. Hiraga, C. Sinha and S. Wilcox, eds, *Cultural, Topological and Psychological Issues in Cognitive Linguistics*, *Current Issues in Cognitive Linguistics Theory* 152 (Amsterdam: John Benjamins, 1997a), pp. 155-69.
- Johnson, M. (1981). *Philosophical Perspectives on Metaphor*. Minneapolis: University of Minnesota.

- Johnson, M. (1987) *The Body in the Mind: The Bodily Basis of Meaning, Imagination, and Reason*. Chicago: Chicago University Press.
- Johnson, M. (2008). Philosophy's Debt to Metaphor. In R. Gibbs, *The Cambridge Handbook of Metaphor* (pp. 39-52). Cambridge: Cambridge University Press.
- Johnson, M. and Lakoff, G. (2002) Why Cognitive Linguistics Requires Embodied Realism. *Cognitive Linguistics* 13-3 (2002), 245-263.
- Kay P., Fillmore C.J. (1999). Grammatical constructions and linguistic generalizations: The What's X doing Y? construction. *Language*, 75/1, 1-33. Lakoff G. (1987). *Women, fire, and dangerous things*. Chicago: Univ. of Chicago Press.
- Kristiansen, G., Achard, M., Dirven, R., & Ruiz de Mendoza, F. (2006). *Cognitive Linguistics: Current Applications and Future Perspectives*. Berlin/New York: Mouton de Gruyter.
- Kintsch, W. (2008). How the Mind Computes the Meaning of Metaphor: A Simulation Based on LSA. In R. Gibbs, *The Cambridge Handbook of Metaphor and Thought* (pp. 129-142). Cambridge: Cambridge University Press.
- Kittay, E. F. (1987) *Metaphor: Its Cognitive Force and Linguistic Structure*, Oxford: Clarendon Press.
- Kövecses, Z. (1988). *The Language of Love: The Semantics of Passion in Conversational English*. Associated University Press Inc.
- Kövecses, Z. (2000). The Scope of Metaphor. In A. Barcelona (Ed.), *Metaphor and Metonymy at the Crossroads* (pp. 79-92). Berlin: Mouton de Gruyter.
- Kövecses, Z. (2002/2010). *Metaphor: a Practical Introduction*. Oxford: Oxford University Press.
- Kövecses, Z. (2005). *Metaphor in Culture: Universality and Variation*. Cambridge: Cambridge University Press.
- Kövecses, Z. (2011). The Contemporary Theory of Metaphor: Revisions and Recent Development. Recent development in metaphor theory: are the new views rival ones? (J. B. Company, Ed.) *Review of Cognitive Linguistics*, 9:1, 11-25.
- Lakoff, G. (1987) *Women, Fire, and Dangerous Things*. University of Chicago Press.
- Lakoff, G. (1990) The Invariance Hypothesis: Is Abstract Reason Based On Image-Schemas? *Cognitive Linguistics* 1-1 (1990), 39-074 Walter de Gruyter.
- Lakoff, G. (1993). The neural theory of metaphor. In A. Ortony (Ed.), *Metaphor and Thought* (second edition). New York: Cambridge University Press.
- Lakoff, G. (2002) *Moral Politics: How Liberals and Conservatives Think*. Chicago: The University of Chicago Press.
- Lakoff, G. (2008). The neural theory of metaphor. In R. Gibbs, *The Cambridge Handbook of Metaphor and Thought* (pp. 17-38). New York: Cambridge University Press.
- Lakoff, G., and Johnson, M. (1980). *Metaphors We Live by*. Chicago: University of Chicago Press.
- Lakoff, G., and Johnson, M. (1999) *Philosophy in the Flesh in the Flesh: The Embodied Mind and its Challenge to Western Thought*. New York: Basic Books.
- Lakoff G., and Núñez, R. (2000) *Where Mathematics Comes from*. New York: Basic Books
- Lakoff, G., and Turner, M. (1989). *More than Cool Reason: A Field Guide to Poetic Metaphor*. Chicago: The University of Chicago Press.
- Lakoff, G. and Turner, M. (1989) *More than Cool Reason: A field Guide to Poetic Metaphor*. Chicago: The University of Chicago.
- Lamb S., (1999) *Pathways of the Brain: The Neurocognitive Basis of Language* Amsterdam/Philadelphia: John Benjamins Publishing Company.

- Leezenber, M., (2013) From Cognitive Linguistics to Social Science: Thirty Years After Metaphors We Live By Cognitive Semiotics. 5, 1-2, (pp 140–152).
- Losonsky, M. (2006) *Linguistic Turns in Modern Philosophy*. Cambridge University Press.
- Lowenthal, F., ‘Can Handicapped Subjects Use Perceptual Symbol Systems?’, *Behavioral and Brain Sciences*, 22 (1999), 625-6.
- Luria, A. (1968). *The Mind of a Mnemonist: A Little Book about a Vast Memory*. Harvard University Press.
- Mahon, B.Z., and Caramazza, A., (2005) The Orchestration of the Sensorimotor Systems: Clues to from neuropsychology. *Cognitive Neuropsychology* 22, 480-494/
- Mahon B., Z., and A. Caramazza (2008) A Critical Look at the Embodied Cognition Hypothesis and a New Proposal for Grounding Conceptual Content. *Journal of Physiology – Paris* 102 (2008) 59-70.
- Marks, L.E., (1974) ‘On Association of Light and Sound: the Mediation of Brightness, Pitch and Loudness’, *American Journal of Psychology*, 87, 173-88.
- Marks, L.E., (1975) ‘On Colored-Hearing Synesthesia: Cross-Modal Translations of Sensory Dimensions’, *Psychological Bulletin*, 82, 303-31.
- Marks, L.E., (1978) *The Unity of the Senses: Interrelations among the Modalities*. New York: Academic Press
- Marks, L.E., (1982b) ‘Synesthetic Perception and Poetic Metaphor’, *Journal of Experimental Psychology: Human Perception and Performance*, 15-23.
- Marks, L.E., R. J. Hammeal, and M. H. Bornstein, (1987) *Perceiving Similarity and Comprehending Metaphor*. Chicago, IL: University of Chicago Press.
- McGlone, M. S. and Manfredi D. A. (2001) Topic-Vehicle in Metaphor Comprehension. *Memory and Cognition* 2001, 29 (8), pp. 1209-1219.
- McGlone, M. S. (2003) Metaphor. In Nadel, L. (Ed.), *Encyclopedia of Cognitive Science*. Macmillan Nature Publishing Group, London, pp. 15-19.
- Melara, R. D., (1989) ‘Dimensional Interactions between Color and Pitch’, *Journal of Experimental Psychology: Human Perception and Performance*, 15, 69-79.
- Melara, R. D., and L.E. Marks, (1990) ‘Processes Underlying Dimensional Interactions: Correspondences between Linguistic and non-linguistic Dimensions’, *Memory and Cognition*, 18, 477-95.
- Miller, G. A. (1993) Images and Models, Similes and Metaphors. In A. Ortony (Ed.), *Metaphor and Thought* (second edition). New York: Cambridge University Press.
- Moreno L., M^a Ángeles (2005). La metáfora conceptual y el lenguaje periodístico: Configuración, interacciones y niveles de descripción. Tesis Doctoral de la Universidad de la Rioja.
- Mouton, N. (2012). Metaphor and Economic Thought: A Historical Perspective. In H. Herrera, & M. White, *Metaphor and Mills: Figurative Language in Business and Economics* (pp. 49-76). Mouton de Gruyter.
- Murphy, G. (1988) Comprehending Complex Concepts. *COGNITIVE SCIENCE* 12, 529-562.
- Murphy, G. (1996). On metaphoric representation. *Cognition*, 60, 173-204.
- Narayanan, N. (1987) *Embodiment in Language Understanding: Sensorimotor Representations from Metaphoric Reasoning about Event Descriptions*. Unpublished Ph.D. Dissertation, Department of Computer Science, University of California, Berkeley.
- Narayanan S. (1999). Moving Right Along: A Computational Model of Metaphoric Reasoning about Events. Proc. AAAI. (pp. 121-128) Narayanan S., Jurafsky D. (1998). Bayesian Models of Human Sentence Processing. Proc. 20th Cognitive Science Society Conference. (pp. 84-90).

- Niedenthal, P., Barsalou, L., Winkielman, P., Krauth-Gruber, S., and Ric, F. (2005). Embodiment in Attitudes, Social Perception, and Emotion. In *Personality and Social Psychology Review*, 9(3), 184-211.
- Nunberg, G. (1979) The Non-Uniqueness of Semantic Solutions: Polysemy, Linguistics and Philosophy, vol. 3, pp. 143-84
- Otorny, A., (1993) The Role of Similarity in Similes and Metaphors. In A. Ortony (Ed.), *Metaphor and Thought* (second edition). New York: Cambridge University Press.
- Pawelec, A., (2013) CMT and the 'Work' of Metaphor. *Journal of Cognitive Semiotics*, V(1-2): 153-178.
- Phillips, J. A., Humphreys, G.W., Noppeney, U., and Price, K.J. (2002) The Neural Substrates of Action Retrieval: An Examination of Semantic and Visual Routes To Action. *Visual Cognition*, 9, 662-684.
- Pinker, S. (1997) *How the Mind Works*. New York: W.W. Norton.
- Pinker, S. (2007) *The Stuff of Thought. Language as a Window into Human Nature*. Penguin Books.
- Pinker, S. (2003) *The blank slate*. NY: Penguin
- Pinker, S. (2006) Block that Metaphor. *THE NEWREPUBLIC ONLINE*
- Pulvermüller F., Haerle M., Hummel F. (2001). Walking or Talking? Behavioral and Neurophysiological Correlates of Action Verb Processing. *Brain and Language* 78, 143–168.
- Pulvermüller, F., Hauk, O., Nikulin, V., & Ilmoniemi, R. (2005). Functional Links between Motor and Language Systems. *European Journal of Neuroscience*, 21, 793-797.
- Pylyshyn, Z. H., (1973) What the Mind's Eye Tells the Mind's Brain: A Critique of Mental Imagery. *Psychological Bulletin*, 80, 80, 1-24.
- Rakova, M. (2003) *The Extent of the Literal: Metaphor, Polysemy and Theories of Concepts* Palgrave Macmillan
- Ramachandran, V., and E. Hubbard (2001) Synaesthesia—A Window into Perception, Thought and Language. *Journal of Consciousness Studies* 8 (12):3-34.
- Ramachandran, V., and E. Hubbard (2003) The Phenomenology of Synaesthesia *Journal of Consciousness Studies*, 10, No. 8, 2003, pp. 49–57.
- Rapp, A., Mutschler, D., and Erb, M. (2012). Where in the Brain is Nonliteral Language? A Coordinate-based meta-analysis of Functional Magnetic Response Imaging Studies. *NeuroImage*, 63, 600-610.
- Reddy, M. (1993) The Conduit Metaphor: A Case of Frame Conflict in our Language about Language. In Ortony, Andrew (Ed.) *Metaphor and Thought*. Cambridge: University Press.
- Regier T. (1996) *The Human Semantic Potential*. Chicago: University of Chicago Press.
- Richardson D.C., Spivey M.J., McRae K., Barsalou L.W. (2003). Spatial representations activated during real-time comprehension of verbs. *Cognitive Science*, 27, 767-780.
- Richards, I. A. (1950) *The Philosophy of Rhetoric*. New York: Oxford University Press
- Rizzolatti G, Arbib MA. (1998) Language Within our Grasp. *Trends in Neuroscience*. 21:188-94
- Rizzolatti G., Craighero L. (2004) The Mirror-Neuron System. *Annual Rev. Neuroscience*. 27 169-19.
- Rizzolatti G., Fogassi, L., and Gallese, V. (2001). Neurophysiological Mechanisms Underlying the Understanding and Imitation of Action. *Nature Reviews Neuroscience*, 661-670.
- Rizzolatti G, Fadiga L, Fogassi L, Gallese V. 1996a. Premotor Cortex and the Recognition of Motor Actions. *Cogn. Brain Res*. 3:131-41.

- Rizzolatti G, Fogassi L, Gallese V. 2001. Neurophysiological Mechanisms Underlying the Understanding and Imitation of Action. *Nat. Rev. Neuroscience*. 2:661-70.
- Roldán-Riejos, A., & Úbeda Mansilla, P. (2013). Metaphor in the ESP Engineering Context. *Ibérica*, 107-126.
- Ruiz de Mendoza, F.J. (1998). On the Nature of Blending as a Cognitive Phenomenon. *Journal of Pragmatics*, 30, 259–274.
- Ruiz de Mendoza F. J. (2002) Patterns of Conceptual Interaction. In *Metaphor and Metonymy in Comparison and Contrast*, René Dirven and Ralf Porings (eds.), 489-352. Berlin: Mouton de Gruyter.
- Ruiz de Mendoza, F.J. (2009). Review of Rosa E. Vega: Creativity and Convention. The Pragmatics of Everyday Figurative Speech. Amsterdam: John Benjamins. *Journal of Pragmatics*, 41,193–196.
- Ruiz de Mendoza, F. J. and Otal J. L. (2002) Metonymy, Grammar, and Communication. Granada: Comares.
- Ruiz de Mendoza, F., and Peña, M. S. (2005). Conceptual Interaction, Cognitive Operations, and Projection Spaces. In F. Ruiz de Mendoza, and M. S. Peña, *Cognitive Linguistics Internal Dynamics and Interdisciplinary interaction* (pp. 249-280). Berlin: Walter de Gruyter.
- Ruiz de Mendoza, F.J. and Pérez, L. (2003). Cognitive Operations and Pragmatic Implication. In K. Panther and L. Thornburg (Eds.), *Metonymy and Pragmatic Inferencing* (pp. 23-50). Amsterdam: John Benjamins.
- Ruiz de Mendoza Ibañez, F. J. (2011). The Contemporary Theory of Metaphor: Myths, Developments and Challenges. *Metaphor and Symbol*, 26, 1-25.
- Shastri, L., Grannes D., Narayanan S., Feldman J. (1998). A Connectionist Encoding of Parameterized Schemas and Reactive Plans. In Kraetzschmar G.K. and Palm G. (Eds.), *Hybrid Information Processing in Adaptive Autonomous vehicles*. Berlin: Springer-Verlag.
- Steen, G.J. (2007). Finding Metaphor in Grammar and Usage: A Methodological Analysis of Theory and Research. Amsterdam and Philadelphia: John Benjamins.
- Steen, G. J. (2008). The Paradox of Metaphor: Why We Need a Three-dimensional Model of Metaphor. *Metaphor and Symbol*, 23(4), 213–241.
- Steen, G. J. (2010). When is Metaphor Deliberate? In N.-L. Johannesson, C. Alm-Arvius and D. C. Minugh (Eds.), *Selected papers from the Stockholm 2008 Metaphor Festival* (pp. 43–63). Stockholm: Acta Universitatis Stockholmiensis.
- Steen, G. J. (2011). The Contemporary Theory of Metaphor—Now New and Improved! *Review of Cognitive Linguistics*, 9(1), 26-64.
- Steen, G. J. (2013) Deliberate Metaphor Affords Conscious Metaphorical Cognition. *Cognitive Semiotics*. 5, 1-2,179–197.
- Szwedek, A. (2000) The Ontology of Metaphors: the Sense of Touch in Language Formation. *Scripta Periodica*, 4, 193-199.
- Szwedek, A. (2002) Objectification: From Object Perception to Metaphor Creation. In B. Lewandowska-Tomaszczyk and K. Turewicz (Eds.), *Cognitive Linguistics To-day* (pp. 159-175).
- Szwedek, A. (2004) Objectification in Metaphorical Processes—Some Philosophical Issues. *Lingua Posnaniensis*, 46, 121-130.
- Szwedek, A. (2007a) An Alternative Theory of Metaphorization. In M. Fabiszak (Ed.), *Language and Meaning* (pp. 313-327). Frankfurt am Main: Peter Lang.

- Szwedek, A. (2010) What Is Concrete and What Is Abstract in LOVE IS A JOURNEY metaphor. In A. Szwedek (Ed.), *Points of View. Studies in Culture, Literature and Language* (pp. 97-110). Bydgoszcz: Wydawnictwo Kujawsko-Pomorskiej Szkoły Wyższej.
- Szwedek, A., (2011) The Ultimate Source Domain. *Review of Cognitive Linguistics* 9:2 (2011), 341-366: John Benjamins Publishing Company.
- Talmy, L. (1988) Force Dynamics in Language and Thought. *Cognitive Science* 12, 49-100.
- Talmy, L. (2000). *Toward a Cognitive Semantics*. Cambridge, MA: MIT Press.
- Tejada Caller, P., and Guzmán Guerra, A. (2012). From Barter to Coin: Shifting Cognitive Frames in Classical Greek Economy. In H. Herrera, & M. White, *Metaphor and Mills: Figurative Language in Business and Economics* (pp. 27-48). Mouton de Gruyter.
- Tendahl, M., & Gibbs, R. (2008). Complementary perspectives on metaphor: Cognitive linguistics and relevance theory. *Journal of Pragmatics*, 40, 1823-1864.
- Trim, R. (2011). *Metaphor and the Historical Evolution of Conceptual Mapping*. Palgrave Macmillan.
- Turner, M. (2011). The Embodied Mind and the Origins of Human Culture. (M. Ana, Ed.) *Cognition and Culture: An Interdisciplinary Dialogue*, 13-27.
- Ungerer, F. and Schmid, H. J., (1996) *An Introduction to Cognitive Linguistics*. London: Longman.
- Urgesi, C., Moro, V., Candidi, M., and Aglioti, S. (2006). Mapping Implied Body Actions in the Human Motor System. *The Journal of Neuroscience*, 26(30), 7942-7949.
- Valenzuela, J. (2009). A psycholinguist's view on cognitive linguistics. An interview with Ray W. Gibbs. *Annual Review of Cognitive Linguistics*(7), 301-317.
- Valenzuela, J. (2009). What Empirical Work Can Tell Us about Primary Metaphors. *Quaderns de Filologia. Estudis Linguistics*, XIV, 235-249.
- Valenzuela, J., & Soriano, C. (2009). Are Conceptual Metaphors Accessible On-line? Is Control Really Up? A Psycholinguistic Exploration of the CONTROL IS UP Metaphor. (J. Valenzuela, J. Rojo, & C. Soriano, Edits.) *Trends in Cognitive Linguistics: Theoretical and Applied Models*, 31-50.
- Valera, F., Thompson, E., and Rosch, E. (1991) *The Embodied Mind*. MA: MIT Press.
- Yu, N., (2001) Synesthetic Metaphor: A Cognitive Perspective. *Journal of Literary Semantics* 32: 19-34.
- White, M. (1998). A cognitive linguistic view of the use of metaphor in headlines, leads and news stories stories. En A. Downing Rothwell, J. I. Albentosa Hernández, & C. Moya, *Patterns in discourse and text = Ensayos de análisis del discurso en lengua inglesa* (págs. 31-62). Ediciones de la Universidad de Castilla-La Mancha.
- White, M. (2003). Metaphor and economics: the case of growth. *ESP Journal*, 22(2), 131–151.
- White, M. (2004). Turbulence and Turmoil in the Market or the Language of a Financial Crisis. *Ibérica*, 7, 71-86.
- White, M. (2011). Cracking Code of Press Headlines: From Difficulty to Opportunity for the Foreign Language Learner. *International Journal of English Studies*, 11(1), 95-116.
- White, M., and Herrera, H. (2003). Metaphor and Stereotype in Reporting Business Takeovers. In M. White, H. Herrera, & C. Alonso Vázquez, *Cognitive Linguistics in Spain at the Turn of the Century (II) (Metaphor and Metonymy)*. *La Linguística Cognitiva en España en el Cambio de Siglo (II) (Metáfora y Metonimia)* (pp. 135-144). Madrid: Universidad Autónoma de Madrid.

- White, M., and Herrera Soler, H.(2009). How Business Press Headlines Get Their Message across: a Different Perspective on Metaphor. *Metaphor and Discourse* pp. 135-152. Cambridge: Palgrave-Macmillan.
- White, M., and Soler, H. (2003). Metaphor and Ideology in the Press Coverage of Telecom Corporate Consolidations. En *Cognitive Linguistics Research* (pp. 277-323). Berlin-New York: Mouton de Gruyter.

Subject Index

A

abstract concepts 43, 44, 48, 64, 65, 122, 172, 176, 256, 293
Abstracting process 336
adaptation process 222, 246, 336
affordances 34, 276, 331
analogy 245, 304
and multi-mapping 215
attributive constituent 233

B

Background Structure 232, 233
bi-directional mapping 283, 359
bi-directionality-based metaphors 246
Blending theory 202, 203, 226, 227, 228, 229, 230, 303
Blending Theory 202, 203, 204, 227
bodily-experienced phenomena 43, 50, 51, 52, 60, 103, 106, 108, 109, 112, 114, 116, 119, 121, 125, 134, 137,
141, 142, 144, 146, 149, 155, 156, 158, 161, 173, 174, 176, 180, 188, 189, 190, 191, 192, 194, 195, 197,
198, 205, 207, 209, 210, 211, 212, 213, 214, 215, 216, 218, 219, 221, 222, 224, 227, 236, 240, 241, 243,
245, 246, 247, 250, 251, 254, 258, 259, 265, 266, 270, 275, 281, 282, 283, 284, 285, 287, 289, 290, 293,
294, 296, 297, 315, 329, 330, 340, 350, 352, 353, 354, 355, 356, 358, 359, 360, 361, 364, 366, 367, 368,
370

C

categorization process 215, 216, 218, 219, 324
Causality 244, 251, 258, 285, 329, 360
chronological order of metaphorical mapping 175
co-activation 52, 251, 259, 274, 278, 279, 281, 282, 283, 286, 291, 293, 304, 324, 326, 328, 335, 341, 345,
360, 361, 362, 367, 369, 370, 371
Co-activation 244, 251, 258, 259, 324
cognition 43, 44, 47, 57, 59, 65, 106, 109, 196, 285, 288, 301, 310, 315, 321, 341, 364, 377
cognitive mechanisms 214, 244
cognitive processing 43, 45, 46, 58, 130, 214, 275, 277, 280, 293, 366, 368, 369, 370
cognitive structure 199, 233
cognitive system 159, 283, 301, 303, 308, 311, 363
cognitive topology xv, 71, 104, 105, 111, 113, 114, 116, 117, 118, 126, 129, 131, 132, 177, 183, 200, 202, 204,
213, 214, 217, 269, 271, 303, 305, 307, 310, 313, 314, 315, 317, 318, 319, 320, 321, 322, 323, 324, 328,
332, 335, 336, 339, 341, 344, 357, 362, 363, 364
conceptual categories 215
conceptual metaphor xiii, 43, 44, 46, 47, 49, 50, 54, 55, 58, 59, 61, 63, 85, 96, 104, 105, 107, 110, 116, 118,
119, 121, 129, 132, 134, 135, 138, 139, 141, 154, 155, 164, 171, 179, 188, 190, 191, 193, 198, 201, 202,
204, 205, 206, 207, 209, 215, 216, 227, 239, 241, 243, 244, 245, 247, 252, 258, 275, 278, 281, 284, 291,
295, 315, 316, 317, 318, 319, 320, 321, 324, 330, 334, 335, 338, 341, 349, 350, 352, 354, 355, 356, 357,
366, 369, 370, 371
conceptual structure . 48, 58, 59, 71, 84, 104, 105, 107, 111, 127, 140, 150, 157, 158, 168, 171, 195, 201, 204,
205, 206, 210, 212, 214, 226, 235, 236, 266, 267, 314

conceptual structures.....	118, 119, 121, 140, 150, 156, 157, 158, 159, 169, 194, 205, 206, 208, 267, 271, 290, 296, 366
concrete-abstract criterion.....	45, 75, 82, 83, 86, 109, 125, 175, 187, 195, 229, 250, 262, 355, 366
concrete-abstract typology	286, 287
<i>continuity vs. discontinuity of semantic categories</i>	234
<i>co-occurrence</i>	52, 70, 71, 72, 100, 101, 248, 249, 250, 251, 252, 279, 280, 281, 282, 326, 341, 360, 362
<i>Co-occurrence</i>	98, 244, 247, 251, 258
co-operation in metaphorical mapping.....	198
<i>Co-relation</i>	244, 258
D	
directly meaningful domains.....	156, 182
disembodied approach.....	43, 47
Disembodied cognition theory.....	43
dynamics of interaction.....	245
E	
embodied character	110, 115, 191, 193, 195, 198, 205, 210, 220, 242, 243, 247, 250, 281, 317, 344, 366
<i>embodied character</i> of conceptual metaphor.....	205, 281
embodied simulation.....	23, 44, 49, 63, 86, 87, 89, 90, 94, 96, 101, 245
Embodied Simulation ..	43, 48, 54, 62, 66, 79, 86, 90, 93, 95, 96, 97, 98, 99, 108, 110, 158, 159, 160, 338, 350, 367, 368
Embodiment theory	43, 45, 48, 49, 61, 82, 101, 145, 148, 164, 168, 173, 188, 191, 193, 289
embodying process	111, 169, 178, 334, 336, 338, 339, 343, 369
emergent structure	xv, 203, 204, 221, 229, 233, 236, 238, 241, 246, 314, 357, 370
experiential basis.....	50, 78, 106, 119, 137, 139, 159, 176, 178, 181, 190, 191, 196, 204, 206, 209, 210, 211, 242, 243, 247, 290, 328, 354, 355, 357, 366
experiential basis of metaphor.....	50, 159, 190, 196, 204, 206, 210, 211, 243
F	
<i>further-categorizing</i>	215, 216, 240
G	
<i>grasp</i>	55, 62, 63, 90, 95, 98, 179, 213, 220, 297, 299, 301, 304, 305, 308, 309, 310, 312, 319, 322, 326, 327, 328, 331, 332, 340, 365, 381
grounding hypothesis.....	113, 181
I	
<i>image metaphor</i>	218, 233, 257
<i>image-based mapping</i>	283, 359
indirectly meaningful domain	183
interacting elements	225, 232, 233
<i>Interaction</i>	xv, 193, 199, 201, 221, 243, 261, 264, 266, 269, 272, 286, 294, 312, 368, 369, 370, 382
interactionist approach	210, 239, 243, 260, 278, 285, 305, 314, 357
<i>invariance principle</i>	xiii, 54, 197, 246, 346, 349
L	
linearity of metaphorical mapping	129, 134, 138, 174, 176, 180, 258
literal meaning.....	44, 65, 87, 89, 96, 113, 125, 175, 205, 214, 306, 328, 339
literary metaphor	226, 259, 274, 275, 276, 278, 279, 280, 283, 359, 360
M	
mapping across images	215

mapping across sensory modalities.....	215
mapping concrete onto abstract domains	207, 210, 284
Meaning projection	208
meaning representation.....	203, 228
mental activities	204, 285, 288, 289, 291, 293, 294, 295, 300, 302, 303, 304, 306, 307, 310, 311, 312, 316, 321, 322, 323, 324, 326, 335, 338, 340, 342, 343, 344, 345, 361, 362, 364, 365, 368, 370, 371
mental space	203, 229
metaphorical mapping paradigms.....	204
metaphorical mapping typologies... xv, 49, 80, 98, 142, 153, 155, 183, 188, 189, 191, 204, 222, 226, 229, 244, 259, 264, 268, 276, 287, 351, 352, 356, 360, 364, 366, 367, 368, 369, 370, 371	
metaphorical mapping typology50, 74, 85, 98, 99, 105, 124, 126, 137, 138, 141, 145, 148, 149, 153, 154, 155, 157, 175, 176, 179, 184, 186, 187, 188, 189, 195, 196, 198, 206, 207, 208, 209, 211, 223, 237, 239, 240, 241, 243, 252, 253, 257, 261, 265, 268, 282, 283, 284, 288, 289, 302, 351, 354, 356, 357, 361, 367, 368, 369, 370	
motor action.....	98, 108, 288, 289, 291, 293, 295, 297, 301, 305, 306, 309, 313, 314, 318, 320, 321, 327, 332, 333, 343, 365
motor topology.. xv, 301, 303, 305, 306, 307, 308, 309, 310, 313, 314, 315, 317, 318, 319, 320, 322, 323, 324, 332, 335, 336, 339, 341, 343, 362, 363, 364, 365, 366	
N	
neural network	62, 63, 95, 244, 297, 300, 302, 305, 309, 310, 311, 315, 322, 332, 333
O	
off-line reasoning	211
one-way-meaning projection	183, 203, 208, 209
one-way-meaning transfer	183, 212, 221, 225, 227, 237, 238, 240, 241, 243, 278, 307, 324, 341, 352, 357, 362, 368
on-line reasoning.....	214
P	
<i>partial mapping</i>	49, 54, 66, 71, 94, 96, 100, 101, 103, 133, 238, 350, 351
patterns and principles of mapping	xiv, 47, 56, 60, 61, 68, 72, 73, 108, 119, 197, 210, 350, 351, 352
polysemous adjectives	44, 205
polysme	44
<i>Propositionality-Linearity</i>	51, 108, 111, 139, 162, 352
propositionality-linearity perspective	105, 136, 142, 153, 168, 179, 257, 353
R	
reasoning process.....	113, 214
reasoning system.....	44, 58, 65, 114, 193, 215, 248, 249, 258, 280, 282, 334, 358
<i>re-categorizing</i>	215, 216, 240
S	
semantic categories.....	215, 216, 217, 218, 219, 220, 234, 240, 358
semantic change.....	183, 222
semantically dependent	48, 51, 167, 168, 183, 187, 197, 201, 214, 244
sensory modalities.....	184, 205, 206, 256, 262, 272, 287
similarity	180, 197, 245, 304
Synaesthesia	44, 45, 159, 160, 184, 205, 220, 253, 261, 272, 274, 283, 284, 359, 360, 376, 381
synaesthetic metaphor44, 45, 160, 161, 184, 185, 186, 206, 214, 254, 255, 259, 260, 261, 262, 263, 265, 272, 274, 276, 278, 280, 283, 287, 324, 326, 329	
systematic correspondence.....	113, 130, 241, 303, 321, 357

T

tenets of the Embodied approach.44, 47, 51, 156, 161, 162, 186, 187, 213, 224, 227, 229, 230, 262, 303, 318, 321, 349

U

Uni-directionality.....60, 79, 80, 96, 97, 106, 108, 114, 115, 116, 129, 137, 139, 140, 142, 149, 155, 159, 162, 170, 186, 207, 210, 290, 367