# METAPHORS AND ACTIONS

## AN IMAGE-SCHEMATIC APPROACH TO THE ANALYSIS OF ITALIAN ACTION VERBS' SEMANTICS

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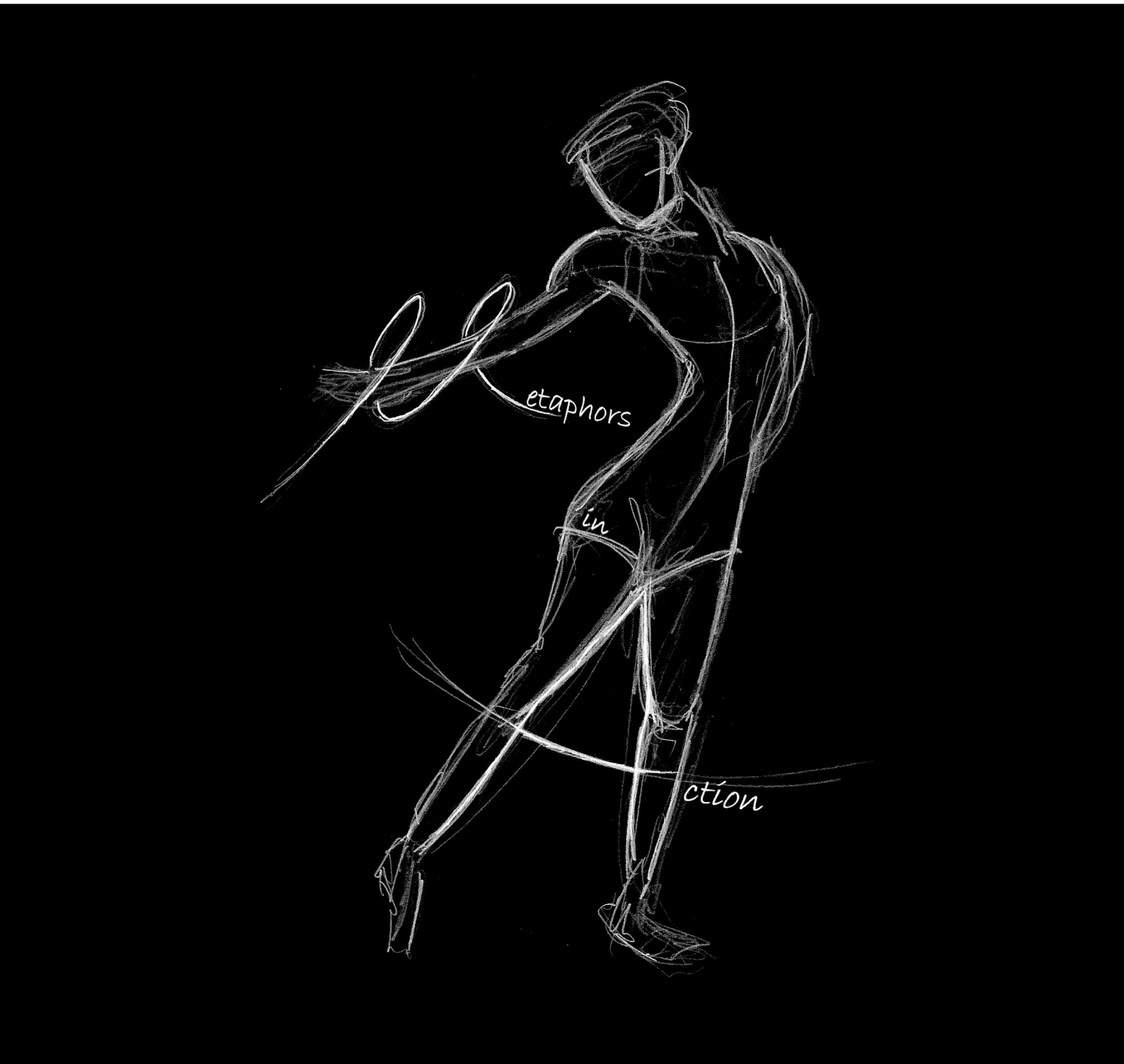

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# Metaphors and actions:
# an image-schematic approach to the analysis of Italian action verbs' semantics

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# Abstract

Action verbs encode typologically different action concepts and events (e.g., *primary variation*: Panunzi & Moneglia 2004). They may, in fact, refer to a large array of actions, each one of which is defined by specific motor schemas, perceptual properties, and spatial relationships. Yet, action verbs are also pervasively used in non-strictly action contexts, to express abstract concepts and convey figurative meanings (e.g., *marked variation*: Brown 2014). These predicates, thus, contain a significant amount of information not only about how action concepts and events are linguistically categorized, but also about the way metaphorical processes are represented in natural language.

The exploration of the role that action verbs play in the representation of abstract thinking and, more in particular, in the encoding of metaphorical contents is the immediate aim of this thesis. From this point of view, the description of the kind of bond that ties together concrete and metaphorical uses of a given action verb stands as a first step toward a greater understanding of how sensory-motor information is re-used, in language, to shape highly abstract domains of knowledge. Moreover, the observation of action verbs' behavior in metaphorical contexts enhances the understanding of how conceptual metaphors (Lakoff & Johnson 1980) may be encoded through language. Finally, the exploration of the semantic structure of single action verbs may shed light on the metaphorical potential of verbs that recur in the same linguistic and pragmatic contexts to encode the same events (e.g., local equivalent verbs).

The analysis of the metaphorical variation of action verbs was limited to two internally cohesive groups of Italian verbs, one clustering together verbs that refer to vertically oriented actions (*alzare,* 'to raise'; *abbassare,* 'to lower'; *salire,* 'to rise'; *scendere,* 'to descend'; *sollevare,* 'to lift') and the other clustering verbs that refer to force patterns (*premere,* 'to press'; *spingere,* 'to push'; *tirare,* 'to pull'; *trascinare* 'to drag'). The annotation was started with the extraction of about 11,000 occurrences from Italian spoken corpora, such as IMAGACT and Opus (Italian subtitles). From these, a smaller set of sentences (about 600) was selected and annotated in detail. For each verb, metaphorical uses were gathered in classes organized by similarity, with respect to the meaning and the concept denoted. Each metaphorical class was associated to at least one conceptual metaphor (Lakoff et al. 1991) and to salient differential traits, presented in the form of image-schematic components (Johnson 1987; Lakoff 1987). Finally, the metaphorical variation of each action verb was

evaluated and compared to that of the other verbs included in the same group (e.g., *alzare* vs. *sollevare*).

Overall, this thesis offers a potential approach to the analysis of those phenomena that seem to systematically operate in the processes of sense extension within the semantic variation of action verbs, taking Italian as a case study. In this frame, the image-schematic investigation of the semantic mechanisms that are involved in processes of meaning construction and conveyance stands as an attempt to motivate, on a purely semantic level, the apparent discrepancies existing between the axes of the semantics of action and of metaphorical extension of a given action verb.

# Samenvatting

Handelingswerkwoorden coderen, typologisch gezien, verschillende handelingsconcepten en gebeurtenissen (b.v. *primary variation:* Panunzi & Monoglia 2004). Zij kunnen refereren aan een breed scala aan handelingen, waarvan elke handeling door middel van specifieke motorische schema's, perceptuele eigenschappen en ruimtelijk relaties wordt gedefinieerd. Toch worden handelingswerkwoorden duidelijk ook in contexten die strikt genomen geen handeling betreffen gebruikt om abstracte concepten uit te drukken en figuurlijke betekenissen over te brengen (b.v. *marked variation*: Brown 2014). Deze predikaten bevatten dus veel belangrijke informatie, niet alleen over de wijze waarop handelingsconcepten en gebeurtenissen linguistisch worden gecategoriseerd, maar ook over de wijze waarop metaforische processen in natuurlijk taalgebruik worden gerepresenteerd.

Onderzoek naar de exploratie van de rol van handelingswerkwoorden in de representatie van abstract denken en in het bijzonder in de codering van metaforische begrippen is het onderwerp van dit proefschrift. Vanuit dit gezichtspunt vormt de beschrijving van de aard van de verbinding tussen concreet en metaforisch gebruik van een bepaald handelingswerkwoord een eerste stap naar een beter begrip van het her-gebruik van sensomotorische informatie om zeer abstracte domeinen van kennis vorm te geven. Bovendien verdiept de observatie van het gedrag van handelingswerkwoorden in metaforische contexten het begrip van de wijze waarop conceptuele metaforen (Lakoff & Johnson 1980) kunnen worden gecodeerd in taal. Tenslotte kan de exploratie van de semantische structuur van afzonderlijke handelingswerkwoorden inzicht geven in het metaforisch potentieel van werkwoorden die in dezelfde linguistische en pragmatische contexten dezelfde gebeurtenissen coderen (bijv. lokale equivalente werkwoorden).

Ik heb de analyse van de metaforische variatie van handelingswerkwoorden beperkt tot twee intern samenhangende groepen van Italiaanse werkwoorden, één die werkwoorden clustert die refereren aan verticaal georienteerde bewegingen en één die werkwoorden clustert die verwijzen naar de uitoefening van fysieke kracht. Ik ben de annotatie gestart door ongeveer 11.000 voorkomens te kiezen uit gesproken corpora in het Italiaans zoals IMAGACT and Opus (Italiaanse ondertiteling). Hieruit is een kleiner aantal zinnen (ongeveer 600) geselecteerd en gedetailleerd geannoteerd. Voor elk werkwoord zijn metaforische gebruiksgevallen geclassificeerd op grond van gelijkenis naar betekenis en naar aangeduid begrip. Elke metaforische klasse is geassocieerd met tenminste één conceptuele metafoor

(Lakoff et al. 1991) en met opvallende onderscheidende eigenschappen weergegeven, in de vorm van visueel-schematische componenten. (Johnson 1987; Lakoff 1987). Tenslotte is de metaforische variatie van elk handelingswerkwoord geëvalueerd en met die van andere werkwoorden, die tot dezelfde groep behoorden (bijv. *alzare* vs. *sollevare*), vergeleken.

In het algemeen biedt dit proefschrift een mogelijke benadering van de verschijnselen, die systematisch lijken voor te komen in processen van betekenisuitbreiding binnen de semantische variatie van handelingswerkwoorden. Er is uitgegaan van een Italiaans corpus.

In dit kader fungeert het visueel-schematische onderzoek van de semantische mechanismen, die een rol spelen in processen van betekenisconstructie en - overdracht als aanzet om, bij een gegeven handelingswerkwoord, op puur semantisch niveau de gebleken discrepanties te motiveren tussen de assen van de semantiek van de handeling en die van de metaforische extensie.

# Riassunto

I verbi azionali codificano concetti ed eventi azionali tipologicamente diversi tra loro (es. *variazione primaria*: Panunzi & Moneglia 2004). Essi, in fatti, possono riferirsi a una serie ampia di azioni, ognuna delle quali è definita da specifici schemi motori, proprietà percettive e relazioni spaziali. Tuttavia, I verbi azionali sono estremamente pervasivi anche in contesti non strettamente azionali, dove sono utilizzati per rappresentare concetti astratti e veicolare significati figurati (es. *variazione marcata*: Brown 2014). Tali predicati, dunque, contengono una grande quantità di informazioni riguardante non solo il modo in cui concetti ed eventi azionali sono categorizzati linguisticamente, ma anche il modo in cui i processi di costruzione metaforica sono rappresentati nel linguaggio naturale.

L'esamina attenta del ruolo che i verbi azionali svolgono nella rappresentazione del ragionamento astratto e, più nello specifico, nella codifica di contenuti metaforici è l'obiettivo primario della presente tesi. Da questo punto di vista, la descrizione del tipo di relazione intercorrente tra usi concreti e metaforici di uno stesso verbo azionale si pone come il primo passo verso una maggiore comprensione di come le informazioni di tipo sensori-motorio sono reimpiegate per la modellazione linguistica di domini di conoscenza astratti. L'osservazione del comportamento che i verbi azionali assumono in contesti metaforici permette inoltre di comprendere come diversi tipi di concettualizzazioni metaforiche (Lakoff & Johnson 1980) possano essere codificate attraverso il linguaggio. Infine, l'analisi della struttura semantica di singoli verbi azionali può far luce sul potenziale metaforico di verbi che ricorrono negli stessi contesti linguistici e pragmatici per la codifica dello stesso tipo di eventi (es. verbi localmente equivalenti).

L'analisi della variazione metaforica dei verbi azionali è stata ristretta a due gruppi di verbi italiani internamente coesi, l'uno contenente verbi che si riferiscono ad azioni verticalmente orientate (*alzare, abbassare, salire, scendere, sollevare*), l'altro contenente verbi che si riferiscono a schemi di forza (*premere, spingere, tirare, trascinare*). L'annotazione ha preso avvio con l'estrazione di circa 11000 occorrenze da corpora di italiano parlato, quali IMAGACT e Opus2. Tuttavia, solo un piccolo set di frasi (circa 600) è stato selezionato e annotato nel dettaglio. Per ciascun verbo, gli usi metaforici sono stati raccolti in classi organizzate per similarità concettuale e di significato. Ad ogni classe metaforica è stata associata almeno una metafora concettuale (Lakoff et al. 1991), nonché tratti differenziali salienti, presentati sotto forma di componenti schematiche (Johnson 1987; Lakoff 1987).

Infine, la variazione metaforica di ciascun verbo è stata valutata e comparata con quella dei verbi inclusi nello stesso gruppo (es. *alzare* vs. *sollevare*).

In generale, questa tesi intende offrire un possibile approccio per l'analisi di quei fenomeni che sistematicamente operano nei processi di estensione del senso all'interno della variazione semantica di verbi azionali italiani. In tale prospettiva, l'esamina dei meccanismi semantici coinvolti nei processi di costruzione e veicolazione del significato, condotta per mezzo dell'impiego di componenti semantiche schematiche, si pone come un tentativo per motivare, a livello puramente semantico, le apparenti discrepanze esistenti tra l'asse di variazione azionale e metaforica di un medesimo verbo azionale.

# Aknowledgements

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# Introduction

## Preparing the ground

One of the few things that I learned by working on this thesis is that actions are ubiquitous, representing sources of information essential not only for the modulation of physical responses to mundane inputs, but also for the modeling of human cognitive processes and linguistic representations. An enlightening discovery is that action knowledge does not strictly belong to the realm of kinesis, bodily experience or subject-object interaction. Action knowledge constantly feeds abstract reasoning, also being a crucial tool in the operation of meaning construction.

Much of human thinking is characterized by being largely metaphorical, that is, by being structured via cognitive associations, under which knowledge is moved from domain to domain (Lakoff & Johnson 1980 and work deriving therefrom). Yet, metaphorical thought is not a completely abstract and mental process, but is rather grounded in perceptual experience, responses to sensory inputs, and motor activity (Narayanan 1997; Lakoff & Johnson 1999; Gallese & Lakoff 2005; Gibbs 2006; Barsalou 2008). The idea that bodily features and experiences actively participate in abstract reasoning also has an effect on the way we project the output of this reasoning onto language. The hypothesis that embodiment is an essential actor in the operation of metaphorical meaning construction and representation is the starting point for this thesis (Pulvermüller 2005; Aziz-Zadeh & Damasio 2008); as is the hypothesis that this operation also takes place through the projection of skeletal preconceptual structures, i.e., image schemas, that are thought to be frequently recurring in bodily functioning and human interaction with the external world (Johnson 1987; Lakoff 1987).

This thesis is an exploration into the semantics of those words that play a pivotal role in the linguistic representation of action knowledge, concepts and schemas. Action verbs are among the early words to appear in children's vocabulary (Tomasello 2003) and among the most pervasive linguistic items in everyday oral communication (Moneglia 2014). Their relevance within the verb lexicon primarily derives from their tight connection to perceptual and motor inputs but can be also explained by making reference to their extreme semantic plasticity, by means of which they are able to represent the action space in a myriad of different ways. Action verbs are of considerable significance with respect to the linguistic

expression of abstract concepts. They, in fact, recur not only in primary contexts to express concrete actions, but are also extensively involved in the encoding of figurative meanings. What is important to investigate is the peculiar function that action verbs have, on a very semiotic level, in the construal of metaphorical scenarios, as well as the kind of metaphorical contents they may produce, by virtue of their basic, action semantic core.

### Setting objectives and research questions

As outlined above, the primary objective of this thesis is that of exploring the semantics of Italian action verbs apart from the kind of syntactic characteristics or tense/aspect and argument structure construction types that could be involved in the semantic representation of a given predicate (Fillmore et al. 1988; Fillmore & Kay 2005; Goldberg 1995, 2006, 2010; Croft 2012)[1]. This goal is pursued through the simultaneous comparison of these predicates' actual applications in both physical action and metaphorical contexts. The observation of their linguistic behavior suggests that the kind of uses that these predicates produce can all be localized along two different axes of semantic variation (e.g., primary and marked variation: Panunzi & Moneglia 2004; Brown 2014), and that, despite the different contexts of application, the reference to action and to its basic schematic components is what holds these uses together. Action has a twofold function, being at the same time the convergence point for the myriad of different uses of action verbs; and, also, being a kind of access point to those abstract domains of knowledge that need more concrete elements to be delineated and represented.

In this frame, action verbs are deemed to be the anchors which link, on the level of language, the domain of sensory-motor experience to that of highly abstract thought. These predicates incorporate (and linguistically label) fundamental information about, for example, spatial vectors, motion patterns, force dynamics, and object manipulations. The interesting fact is that this action imagery is coherently re-used to model metaphorical scenarios. In this sense, the analysis of the metaphorical variation of action verbs helps us to better understand how pre-existing information is mapped to make new and figurative meanings emerge. In particular, this thesis rests on the idea that the analysis of the schematic structure of the

[1] The focus is not on the interplay (or symbolic link) between syntactic structure and semantic interpretation of a grammatical form. On the contrary, the thesis focus is on a higher level of analysis, i.e. on cognitive similarities between action types, motor schemas construal, and semantic representation of action events.

semantics of these predicates may offer important details on the representation of abstract concepts in natural language.

The research questions this thesis poses are directly connected to this very short preamble and can be spelled out as follows:

1) What is the link between the concrete and the metaphorical uses of a given action verb?
2) Which semantic features of the action verb determine the metaphorical potential of the verb? That is, how do we know which action verb can allow us to access[2] which metaphorical concept, domain or meaning?
3) Strictly connected to the previous question: how can we explain divergent metaphorical potentials of action verbs involved in the encoding of the same type of action events? In other words, given two verbs with partially similar primary variation, how do we motivate the ways in which the metaphors that are derived from them diverge?

The data discussed in this study pertain to the semantic variation of two different groups of Italian action verbs[3]: a) a group gathering vertically oriented action verbs (e.g., *alzare,* 'to raise'; *abbassare,* 'to lower'; *salire,* 'to rise'; *scendere,* 'to descend'; *sollevare,* 'to lift'); b) a group gathering force patterns verbs (e.g., *premere,* 'to press'; *spingere,* 'to push'; *tirare, 'to pull';* and *trascinare,* 'to drag'). The work started with the extraction of action verb uses from two corpora (IMAGACT and Opus2) and consisted in the classification of almost 600 metaphorical occurrences connected to the metaphorical production of 9 action verbs[4]. The annotation procedure was organized in four main phases. As a first step, a general evaluation of the primary variation of each verb has been given on the basis of the action categorization in IMAGACT (Ontology of actions). A second step was that of evaluating the metaphorical variation of each predicate and gathering similar metaphorical uses (e.g., similar meaning,

[2] I mean the term *access* on a purely semiotic level (e.g. association between word and meaning). I do not mean to imply that the metaphorical use of action verbs is necessarily cognitively processed by the speakers.

[3] The decision to analyze verbs from Italian (as opposed to other languages as, say, English) was conditioned by the fact that the semantic analysis of action verbs (especially when their non-literal uses are considered) requires a deep semantic competence in the language being scanned. From this it follows that, since Italian is my native language, the verb usage can be discussed most authoritatively.

[4] The decision to select a small set of verbs is consistent with the nature of the analysis that is presented in the dissertation. As the main aim was that of adopting mainly a qualitative approach to the annotation procedure, as well as that of validating the application of a theoretically motivated methodology to the analysis of action verbs, the collection of a large amount of empirical data was of secondary interest.

same concept) in distinct classes or metaphorical types. Once the classes were formed, at least one conceptual metaphor (Lakoff et al. 1991; Dodge et al. 2013) was associated to each of the metaphorical types found in the production of a given action verb. Finally, for each verb and each metaphorical class, differential image-schematic components (Johnson 1987; Lakoff 1987; Mandler & Canovas 2014) were identified and used as differential traits to motivate the metaphorical production of each action verb analyzed.

**Building the structure**

The thesis consists of two parts and is divided into seven chapters.

Part 1 contains an in-depth discussion of the theoretical framework within which this thesis is developed. Chapter 1 focuses on the action lexicon and its pervasiveness in language. Action verb semantics is explored in detail and represented on the basis of the action categorization system proposed within the IMAGACT Ontology. Chapter 2 introduces the Embodied Cognition framework, which posits that human cognition must be addressed by reference to the interaction between the physical body and its external world. Chapter 3 presents the main ideas developed within the framework of Conceptual Metaphor Theory (Lakoff & Johnson 1980, 1999), according to which metaphor is a conceptual phenomenon based on cross-domains mapping operations. Chapter 4 aims to give a general introduction to the concept of image schema (Lakoff 1987; Johnson 1987; Lakoff & Johnson 1999), that is: to imaginative structures of understanding, deemed to be directly emerging from bodily experience sensory-motor processes.

Part 2 consists of three main chapters and represents the empirical part of the thesis. Chapter 5 contains the first experimental case study. It focuses on the investigation of the metaphorical production of five vertically oriented action verbs, i.e., *abbassare, alzare, salire, scendere*, and *sollevare*. In Chapter 6 I analyze the metaphorical variation of four action verbs encoding force, i.e., *premere, spingere, tirare,* and *trascinare*. Finally, Chapter 7 stands as a summary of the main findings, presented in the light of the theoretical framework illustrated in Part 1. It also addresses the limitations of the study and suggests future directions for research.

# Part I. Theoretical background

# Chapter one:
# Action, language, and semantic representation

## 1.1. Introduction

Actions represent a paramount part of human everyday experience. Since the earliest stages of life, we move in a world where we have to constantly deal with other entities (e.g., people, animals, or objects). Infants start familiarizing themselves with the external world by crawling on surfaces, manipulating tangible objects, putting things in contact, encountering forces, and experiencing gravity. Cognitive and linguistic development takes place through the internalization of these very concrete experiences, based on perceptual, motor and bodily inputs. A large literature, indeed, confirms that the first events conceptualized by infants are formed from spatial and motion information and that this information is only later enriched and combined with more complex concepts (Mandler 2004, 2006; Pulverman et al. 2006; Mandler & Canovas 2014). Moreover, the myriad of different activities we are engaged in does not go on in an isolated fashion, but rather in a flow, whose boundaries are not always clearly defined. Every single day is punctuated by a sequence of actions whose conceptual and linguistic segmentation depends on a number of different factors which vary across languages and cultures (Bowerman 2005; Radvansky & Zacks 2011; Narasimhan et al. 2012; Sakarias & Flecken 2018). What does not significantly vary, though, is the importance that the action lexicon has in the encoding of these very basic activities.

The main challenge of the present work is that of clarifying the role that the action lexicon, i.e., action verbs, plays in our daily life. The main questions I would like to pose are:

a) How do we linguistically encode actions?
b) How do we linguistically segment action events we are engaged in?
c) Which kind of semantic features and properties do action words have?

This chapter aims to partially answer these questions and make more explicit how we pervasively use action words to express both concrete and abstract concepts. With no pretense of completeness, I will use the following pages to give a very general introduction

to those actions words that are used more frequently in everyday communication[5]. In particular, action verbs are among the most pervasive linguistic tools used in oral communication, due to their ability not only to predicate action events but also to express highly abstract concepts, stemming from largely metaphorical processes.

In the following Sections, I will try to spell-out the motivations behind their pervasiveness in language, by adopting a corpus-based perspective to their analysis (Sec. 1.2.); Another important step will be that of distinguishing between different kinds of action verbs, that is, the general ones and the activity ones (Sec. 1.3.); In the development of the chapter; I will also focus on the separation that needs to be made between the different levels of semantic variation of action verbs, i.e., primary and marked variation (Sec. 1.4.). Finally, I will draw attention to what has been the main reference point in the present analysis on the action lexicon, that is: the IMAGACT Ontology (Sec. 1.5.).

## 1.2. Why do we care about action verbs?

Action verbs are extremely pervasive linguistic tools in everyday communication, recurring frequently in spoken language. The interest in investigating action verbs rests on two main reasons. The first reason is semantic. Action verbs are recognized to be among the primary components of children's vocabulary, and of the semantic competence[6] of native speakers of a language. They are indeed thought to carry the basic information necessary to make sense of any sentence (Moneglia 2014). This also explains why learning action verbs is not an easy operation, and why it instead requires the acquisition of a series of linguistic skills and competences during the process of language development. The second reason is quantitative. A compelling number of corpus-based works (Cresti & Moneglia 2005; Moneglia & Panunzi 2007, 2010; Gagliardi 2014; Moneglia 2014) have shown that action verbs are among the most common tools in oral communication, having an even more significant weight than nouns in spoken language use. This frequency has been interpreted as an additional and direct proof of their pragmatic centrality in human communication.

[5] This observation specifically refers to Italian, as the use of Italian action verbs is the central focus of the study.

[6] Semantic competence is considered here as the ability according to which each native speaker of a language knows the meaning of a word and the entities (i.e., in the case of action verbs, the events) that word may refer to.

In Sub-section (1.2.1.), I will present some of the main problems that happen to be connected to the early acquisition phases of language and, in particular, of the verb lexicon. In Sub-section (1.2.2.), I will present some of the most relevant studies testifying to the quantitative pervasiveness that these action verbs exhibited in everyday spoken language.

### 1.2.1. Learning action verbs: how we build our semantic competence

Speaking from a purely semantic perspective, a large array of studies show that action verbs represent the foundation of native speaker semantic competence (Tomasello 2003), being learned from the early phases of language acquisition[7] (Nelson 1973), and being thus overrepresented in children's earliest vocabulary (Choi & Bowerman 1991; Choi & Gopnik, 1995; Pulverman et al. 2006). Mandler (2006) reports that rapid verb learning in early acquisition phases could partially depend on the speaker's specific linguistic system. For example, such rapid verb learning early in development is the case in languages such as Mandarin (Tardif 1996; Tardif et al.1999) and Korean (Gopnik & Choi 1995; Choi 1997), but not in others, such as English, Italian and Spanish (Gentner 1982; Au, Dapretto, & Song 1994), where an early noun bias has instead been registered. Some scholars (Gentner 1982; Gentner & Boroditsky 2001) point out that verb learning creates more problems than noun learning does[8], as the former involves more complex operations (e.g., action-event conceptualization and the linguistic packaging of events). This view has been supported by a consistent number of experimental works, amongst which is that of Childers and Tomasello (2006: 332), where it is suggested that "noun learning is more robust and less vulnerable to variations in presentations than is verb learning, perhaps because objects are conceptually easier to package".

Although action verbs (and verbs in general) are among the most common and early words to appear in children's vocabulary, the verb-action relationship is harder to learn than the noun-object one. The predicate-action mapping is not a trivial operation[9] and is responsible for difficulties in the pragmatic and linguistic application of verbs. I already stressed that

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[7] Tomasello (2003) points out that action words (e.g. *throw*) are among the early words in children's vocabulary, following general nominals (e.g., *apple*) and specific nominals (e.g., *Jane*).

[8] Although the majority of studies conducted in the field stress that verbs are harder to acquire than nouns (Bornstein et al. 2004), Maguire and colleagues suggest that discrepancies in the literature on verb/noun learning may effectively depend on the fact that the ease in learning some words is not dependent on their form class (Maguire, Hirsh-Pasek & Michnick Golinkoff 2006).

[9] Consistencies in word action mappings are not registered until 5 years of age (Childers & Tomasello 2006).

additional learning problems arise when children attempt to extend the use of a verb to new contexts. During childhood, young speakers not only start learning verbs but also acquiring the ability to coherently extend verbs meaning to different actions (Choi & Bowerman 1991; Bowerman 2005). Yet, as extensively demonstrated in the literature, verbs create quite a few problems when they are used to cover, for example, events involving already known actions, but different participants. This difficulty may spring from the fact that, unlike nouns, verbs are mostly used to label relational concepts (Childers & Tomasello 2006). Nevertheless, the very ability to extend the use of a verb to a set of different action events and to diverse linguistic contexts is considered one of the main functions of the semantic competence of a language (Moneglia 2014).

Another troublesome issue is the fact that verbs are the first step towards grammar acquisition. An essential part of the grammar of every human language indeed consists in the encoding of events and their participants (Croft 2012). In general, learning a verb implies that the speaker is aware of syntactic and semantic restrictions (Levin & Rappaport 1986; Levin 1993). With respect to verbs denoting actions, the speakers should be able to identify the constraints on the number, type, and position of the arguments for the correct representation of the action event (Dowty 1991). The speakers should also be aware, in some way, of the fact that similar action verbs share the same semantic properties and have the same syntactic distribution (e.g., *breaking verbs*: Levin 1993). Learning action verbs thus involves the ability to detect the right contexts of application of the predicate, and the ability to separate its different levels of variation. As stressed in the opening of the chapter, action verbs are not only used to linguistically segment "action space" but also to express highly abstract concepts. It is this ability to determine whether the same action verb is used to refer to concrete vs. abstract concepts that allows us to say that semantic competence has been stabilized over time (Moneglia 1997, 1998).

### 1.2.2. Quantitative pervasiveness of action verbs: data from spoken corpora

The idea that verbs represent the most predominant linguistic category (Halliday 1989) is consistent with a large array of corpus-based experimental findings (Cresti & Moneglia 2005; Moneglia & Panunzi 2007, 2010). As action-oriented verbs seem to proliferate in oral communication, it is worth giving special attention to data extracted from spoken resources.

Corpus-based studies conducted on the Italian lexicon (and compared with data from English, French, Portuguese, and Spanish) showed that, at least in spoken corpora[10], the verb/noun ratio is in favor of verbs (e.g., C-ORAL-ROM[11], BNC: Moneglia 2014):

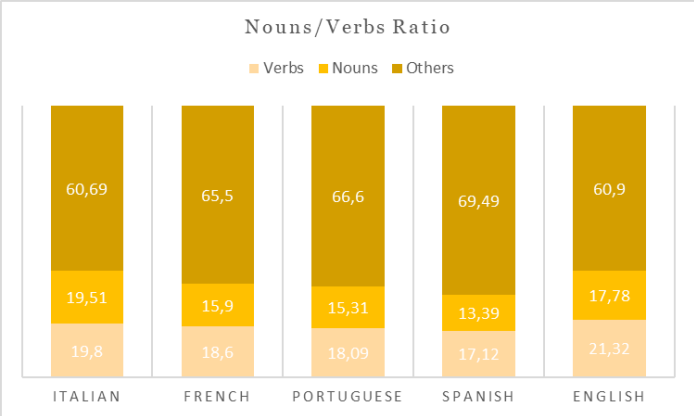



**Figure 1.** Verb/noun ratio in 5 languages (Moneglia 2014)

Although the verbs-noun gap is not very large, the data collected from the C-ORAL-ROM and the BNC corpus still remain quite remarkable. Additional corpus-based studies (Moneglia & Panunzi 2007) carried out on Italian, Spanish, and English data are consistent with the previous findings and indeed confirm that action-oriented verbs have a quantitatively significant impact on the linguistic system, both in terms of lemmas and of single tokens:

| Language | Corpus | Tokens | Lemmas | Lexical entries | Verbs |
|---|---|---|---|---|---|
| **Italian** | C-ORAL-ROM Italian, LABLITA, LIP | 1284978 | 17646 | 1590 | 299 |
| **Spanish** | C-ORAL-ROM Spanish CORLEC | 1104627 | 11759 | 1303 | 314 |
| **English** | BNC spoken | 10378225 | 40583 | 1588 | 287 |

**Table 1.** Impact of action-oriented verbs in Italian, Spanish, and English

[10] Interestingly, the ratio appears to have inverse values when written corpora are analyzed (Moneglia 2014).

[11] The launch of the C-ORAL-ROM project traces back to 1999 and had as its main aim to provide comparable resources of spontaneous spoken language for French, Italian, Portuguese, and Spanish.

Moneglia and Panunzi' s (2007) experimental work also demonstrates that action-oriented verbs occur even more frequently than other verb classes do, such as that of *subordinate verbs* (e.g., *dicendi*, *sentiendi*, or *putandi* verbs: Gagliardi 2014; Moneglia 2014):

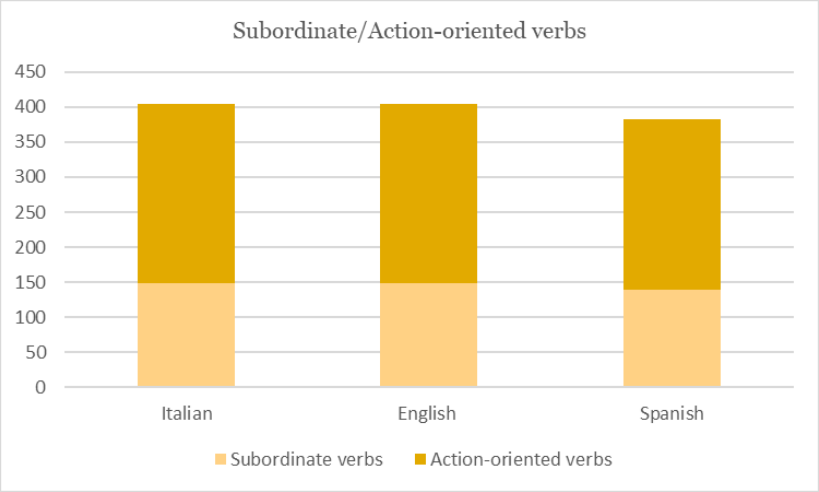



**Figure 2.** Occurrence of action-oriented verbs and subordinate verbs in 3 languages (Moneglia 2014)

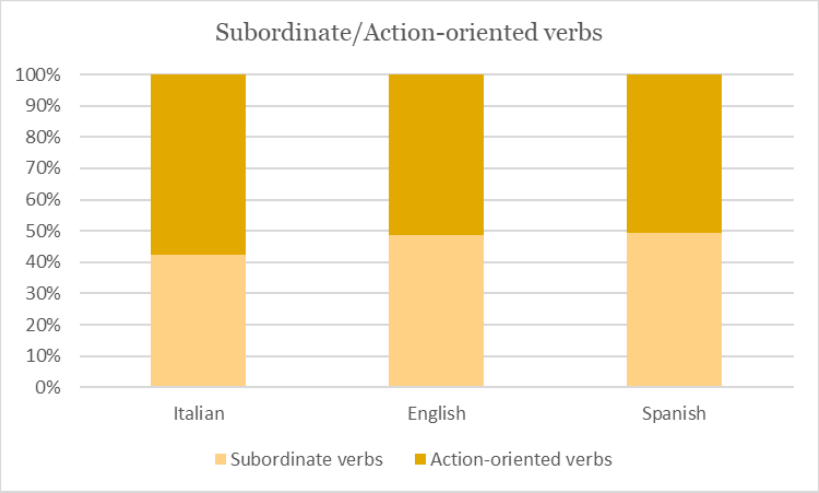



**Figure 3.** Percentage of occurrence of action-oriented verbs and subordinate verbs in 3 languages (Moneglia 2014)

As the Figures show, the speech performance measured through the cross-linguistic comparison of the Italian, English, and Spanish data have fairly similar values. They all converge in showing that the number of lemmas and of tokens is higher with respect to the class of action-oriented verbs.

The quantitative impact of each sub-class (e.g., general action verbs, activity verbs, motion verbs, other non-subordinate verbs[12]) is presented below (Moneglia & Panunzi 2007):

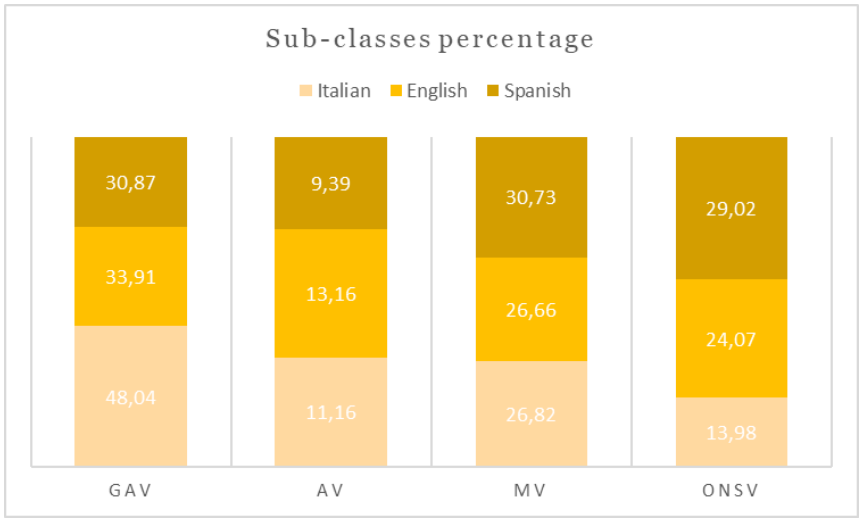



**Figure 4.** Sub-classes percentage in Italian, English, and Spanish

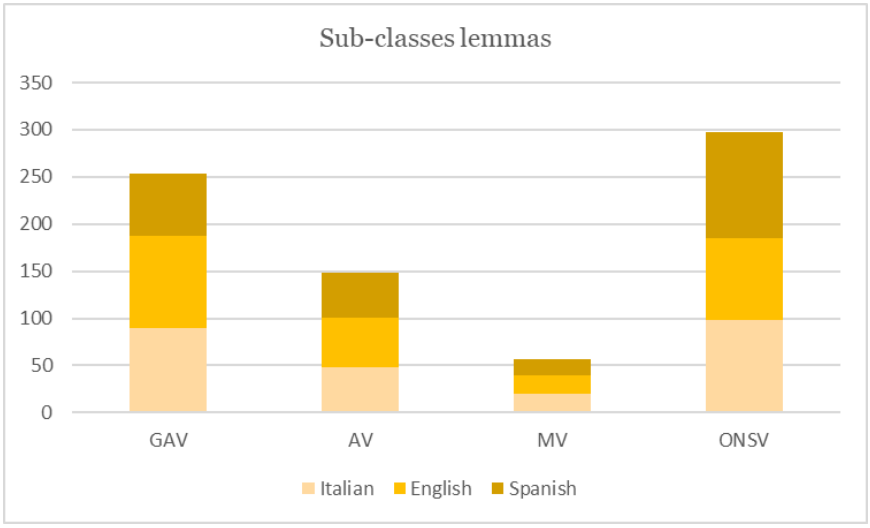



**Figure 5.** Sub-classes lemmas in Italian, English, and Spanish

The histograms also suggest that, quantitatively speaking, the two main classes into which action-oriented lexicon can be partitioned (e.g., general action verbs and activity verbs) do

[12] The label "non-subordinate verbs" contains four different types of predicates: social activities (e.g., *to buy*), activities referring to dialogical exchange (e.g., *to discuss*), abstract actions (e.g., *to modify*), and states (e.g., *to cope*). For an in-depth analysis, see Moneglia (2014).

not have the same pragmatic load. Results are indeed congruent in showing that general action verbs have double the amount of lexical entries and of tokens of activity verbs in all three languages considered (Moneglia 2014).

## 1.3. The class of action verbs

Action verbs represent an important information source about the peculiar ability that humans have to conceptualize and linguistically represent actions. Their relevance within the verb lexicon mainly stems from their tight connection to sensory motor inputs, and to their extreme semantic plasticity, by virtue of which the action scene can be set in a multitude of different ways. Action and language are tied together by a troublesome relationship, where it only seldom happens that events and verbs are engaged in a one-to-one correspondence.

Action verbs can be, in fact, applied to express different types of verb-event associations. On the one hand, the same action event can be predicated by different action verbs (e.g., *Alzare/sollevare il vaso*; Eng., 'To raise/to lift the vase'); on the other hand, different action events can be denoted by the same action verb (e.g., *Alzare il vaso/Alzarsi dalla sedia*; Eng., 'To raise the vase/To stand up from the seat'). Action verbs are also commonly used to refer to different kinds of verb-object interactions. The same action verb can co-occur in combination with different objects (e.g., *Alzare il vaso/il coperchio*; Eng., 'To raise the vase/the lid'), and the same object can be the target of events predicated by different types of action verbs (e.g., *Alzare/rompere il vaso*; Eng., 'to raise/to break the vase').

However, action verbs are not all of the same kind. Some of them are more problematic (e.g., general action verbs), in the sense that they can be productively extended to cover a large set of different action events, body/motor schemas, and relations; others have a narrower extension (e.g., activity verbs), being used to predicate slight variations among events and activities that are conceived as cognitively similar, that is, belonging to the same action type.

### 1.3.1. The sub-class of general action verbs[13]

The majority of action verbs is constituted by very general predicates (Sec. 1.2.2.), that is, by predicates that do not establish a linear relationship between concepts and words (Moneglia & Panunzi 2010: 28)[14]:

> The relationship between action, intended as an ontological entity, and verb, intended as a linguistic entity, is not a one-to-one relationship.

General action verbs do not explicitly specify the entity that they refer to, but instead denote a complex set of actions pertaining to different ontological types (Moneglia 2014). This means that the action events predicated by the same general action verb are cognitively conceived as belonging to diverse action types, each one of them characterized by different semantic properties. To take a case in point, I present three prototypical uses of the Italian general action verb *alzare* (Eng., 'to raise'/'to lift'):

*(1) Maria alza la scatola*
'Mary is lifting the box'
*(2) Maria alza il microfono*
'Mary is raising the microphone'
*(3) Maria alza il cofano della macchina*
'Mary is lifting the hood of the car'

In all the examples presented above (1-3), the agent moves the object upwards, after having exerted a physical force with a different intensity degree on it. The main differences in the action performance strongly depend on the possible affordances (e.g., on the properties of the object that has to be moved and act upon), on the kind of kinesthetic movement, and on the agent's goal. Very roughly, while case (1) describes an event in which an object is lifted and removed from its initial spatial location, case (2) refers to the concrete extension of the size of the object along the vertical axis, and, finally, case (3) points to a situation in which raising causes a change in the resultative state (from closed to opened) of the object itself. By simply observing the sentences in (1-3), it is clear how the verb *alzare* (Eng., 'to raise'/'to lift') can be used to depict qualitatively different sets of actions, each involving specific

[13] The tag *general action verbs* and *action verbs* are mutually interchangeable.

[14] This is my English translation from the Italian original version (Moneglia & Panunzi 2010: 28): "La relazione tra azione, in quanto entità ontologica, e verbo, in quanto entità linguistica, non è una relazione uno a uno".

objects, affordances, results, bodily kinesis and schemas. The predicate permits access to a consistent number of different and independent activities, also proving itself to be semantically flexible, that is, to be applicable in different types of linguistic and pragmatic contexts.

The nature of the links connecting the set of activities encompassed within the extension of a given general action verb can be better understood by referring to a canonical section of Wittgenstein's *Philosophical Investigations* (1953). According to Wittgenstein, the relations between the entities denoted by the same term are not always so clearly defined. For instance, he claims that, although the activities denoted by the term *games*[15] (e.g., card games, board games, etc.) are connected by a tangled network of overlapping similarities, they cannot all be subsumed under the same label by virtue of a sharply identifiable and shared feature. To overcome this apparent incongruency, Wittgenstein introduces the notion of family resemblance. He does suggest that different game activities, just like the members of a family, resemble each other through a variety of features that are possessed by some, but not all, of the family components (Wittgenstein 1953: 67):

> I can think of no better expression to characterize these similarities than "family resemblances"; for the various resemblances between members of a family: build, features, colour of eyes, gait, temperament, etc. etc. overlap and criss-cross in the same way. – And I shall say: "games" form a family.

Similar resemblances can be also appreciated among the action activities predicated by a given general action verb. Just as the term *game* can encompass a whole of different activities where linear similarities exist, a single general action verb (e.g., *alzare*; Eng., *to raise/to lift*) can refer to sets of different action events that, although being structured by a cluster of various semantic components, can be subsumed under the same linguistic label (e.g., *Alzare la scatola/l'asta del microfono*; Eng., 'To lift the box/ the microphone stand'). Unlike Wittgenstein's nihilistic approach to word meaning[16], though, the current discussion on action verbs does not start from the assumption that predicate semantics is an unbounded region having no defined boundaries. It instead rests on the idea that the complex of events encoded by a single predicate is tied together by virtue of some shared

[15] For an in-depth discussion, see Griffin (1972).

16 For instance, the impossibility in finding a property which can work as a common denominator among the different activities encompassed by the term *game* is consistent with the idea that there are no necessary and sufficient conditions for the application of a word, and hence that word meanings depend on the word's contextual use: "The meaning of a word is its use in the language" (Wittgenstein 1953: 43).

properties that do represent, in some way, the sematic core of the predicate[17] (Moneglia & Panunzi 2004; Moneglia 2010; Gagliardi 2014). It is because of this semantic core that an action verb like *alzare* (Eng., 'to raise'/'to lift') can be properly used to cover, for instance, all the three cases presented above (1-3).

The wide referential capacity possessed by general action verbs may generate a strong indeterminacy in action reference (Gagliardi 2014). This should not be looked at as a flawless fact, but it is something that results in significant difficulties especially in early phases of language acquisition (Childers & Tomasello 2006). The indeterminacy in action reference becomes even more problematic when predicates are looked at from a multilingual perspective, as each language segments the action space in its own way (Choi & Bowerman 1991; Bowerman 1996, 2005; Majid & Bowerman 2007; Majid et al. 2008; Kopecka & Narasimhan 2012). From this it follows that languages like Italian and English may adopt different (and semantically distant) verbs to refer to the same activities. I will deal with this issue later, in Sub-section (1.4.1)[18].

### 1.3.2. The sub-class of activity verbs

General action verbs (e.g., *alzare*; Eng., *to raise/to lift*) differ from those predicates that only refer to single and specific action events, i.e., *activity* verbs (Vendler 1967; Dowty 1979; Moneglia 1997, 1998, 2010). A very standard example of an activity verb is represented by the Italian verb *mangiare* (Eng., 'to eat'), whose narrow semantic extension is punctuated by uses that appear to be perceived as similar:

(4) *Maria mangia le verdure*
'Mary is eating the vegetables'
(5) *Maria mangia la zuppa al pomodoro*
'Mary is eating the tomato soup'

In examples (4-5), the verb *mangiare* (Eng., 'to eat') substantially refers to a single action type, in which an actor is involved in a process where solid or semi-solid food is put in the mouth, chewed and swallowed. The intrinsic characteristics of the food, as well as the

[17] In Chapters (5) and (6), they are represented in terms of image-schematic structures constraining the application contexts of the verb, either on a primary or on a marked level of variation.

[18] In this section, for instance, I will show that the Italian verb *alzare* and the English verb *to raise* or *to lift* are not completely equivalent but do diverge in some points.

peculiar way the actor engages in the process of chewing and swallowing, do not impact on the kind of action event which is taking place. Even though slight differences in the realization of the action event can be possible, the activity verb *mangiare* always encodes the same kind of action type. The main reason behind this fact is that, within the class of activity verbs, a complete correspondence is observable between the levels of the linguistic and conceptual categorization, that is, the single verb and the action type stand in a 1:1 relationship (Moneglia 2014: 6). Therefore, it has been pointed out that the semantics of any activity verb is so specific that it seems plausible to say that the predicate meaning (Moneglia 1998):

a) always evokes a clear mental image (we easily represent the meaning of a sentence as *Maria mangia*, 'Mary is eating');
b) remains clear even when the verb is used in isolation, that is, when it does not co-occur with a particular theme (e.g., *Maria mangia* vs. *Maria mangia il pane*; 'Mary is eating' vs. 'Mary is eating the bread');
c) is perceived as strange or vague when the predicate is not prototypically used (e.g., *L'oca mangia*[19] *il cibo*; 'The duck is eating the food').

## 1.4. The semantic variation of action verbs

The pragmatic variation of action verbs is wide, as it extends not only to contexts where the predicate refers to concrete actions, but also to those where the predicate expresses figurative meanings. The differences between these two main axes of variation will be spelled out in the following two Sub-sections[20]. In (1.4.1.), I will make explicit how we use action verbs to encode the everyday activities we are engaged in (e.g., primary variation), and I will also highlight the relations recurring between action verbs which share the same reference

[19] While the use of the verb *to eat* is completely acceptable in English here, in Italian it would be preferable to use the verb *inghiottire* (Eng., 'to swallow') instead of the verb *mangiare* (Eng., 'to eat').

[20] In contrast with Construction Grammar approaches to the analysis of language, this thesis does not specifically focus on the types of possible associations existing between verbs and, say, argument-structure constructions (Gries, Hampe & Schonefeld 2005; Sullivan 2007; 2013). In the present work, action verb behavior will be explored from a combined perspective (cognitive and semantic), that is, on the basis of the specific motor and focal properties of the action that happens to be significantly involved in the linguistic encoding of the events referred to by action verbs.

ability (e.g., local equivalent verbs). Sub-section (1.4.2.), will be devoted to the core of this work, namely to the introduction of the notion of marked variation.

### 1.4.1. What is the primary variation of an action verb?

With the expression *primary variation*, I explicitly point to the set of different action types to which a verb can refer in its proper sense, that is, when it is used to encode physical actions and concrete meanings (Panunzi & Moneglia 2004; Moneglia & Panunzi 2007, 2010). The primary variation encompasses the complex of action classes that, despite being typologically different (e.g., they are characterized by differences in motor schemas, perceptual and focal properties of the action, spatial relationships), are part of the semantic extension of a same general action verb (Panunzi & Moneglia 2004)[21]. To illustrate this point, I will list some of the possible physical uses of the general Italian action verb *alzare* (Eng., 'to lift'/'to raise'/'to rise'):

1) *Maria alza la scatola*
   'Mary is lifting the box'
2) *Maria alza il microfono*
   'Mary is raising the microphone'
3) *Maria alza il cofano della macchina*
   'Mary is lifting the hood of the car'
4) *Maria alza la mano*
   'Mary is raising her hand'
5) *Maria alza la gamba dei pantaloni*
   'Mary is raising the leg of her trousers'
6) *Maria si alza dalla sedia*
   'Mary is rising from her seat'
7) *Il palloncino si alza in cielo*
   'The balloon is rising'

[21] Differently from, say, constructionist approaches to the study of language (Goldberg 1995), the IMAGACT framework posits that a given verb (e.g. *alzare; to raise*) does have one general meaning, that acts as glue for different action types (an approach à la Wittgenstein). It also posits that these single action types are not identified by means of emerging argument structure constructions but, rather, by virtue of cognitive similarities among different instances. Within the IMAGACT framework, motor schemas and focal properties of the action are considered discriminating factors in the description of the semantic variation of a given action verb.

As the examples show, the verb *alzare* encodes a large array of actions, in an equally large variety of linguistic and pragmatic contexts. In each case (1-7), the predicate can be substituted by recourse to a *synset* (Fellbaum 1998) of local equivalent verbs. Local equivalent verbs should not be looked at as synonyms, *strictu sensu*, but rather as predicates that – while having their own meaning, peculiar features and semantic properties – can be properly applied, in the same linguistic and pragmatic contexts, to refer to the same event or class of events (Moneglia 1997, 1998, 1999). With respect to the sentences above, we may say, for instance, that: a) *prendere, sollevare*, and *tirare su* (Eng., 'to take', 'to lift', and 'to pull up') are local equivalent verbs of *alzare* in event (1); b) *allungare* and *tirare su* (Eng., 'to extend', and 'to pull up') in event (2); finally c), *aprire* and *tirare su* (Eng., 'to open', and 'to pull up') in event (3).

Interestingly, the primary variation of the Italian action verb *alzare* does not totally match with that of its main English translator *to raise*. On the same token, the set of local equivalence relationships exploited in Italian does not correspond to those used in English. While in the former case, one verb (e.g., *alzare*) can refer to all the action types listed in (1-7), in the latter case at least two main predicates, i.e., *to raise* and *to rise*, are needed to cover the whole set of action classes (1-7). To take a case in point, cases (6-7) cannot be encoded by the English verbs *to lift* and *to raise* but they require a different predicate, *to rise*. From this it also follows that the Italian verb *alzare* and the English verb *to lift* do not activate the same local equivalence network, but they in fact establish different types of relationships with the other verb members of their lexicon. This is not surprising but does strongly depend on the fact that languages refer to actions in an extremely entangled way, cutting and tailoring events on the basis of different categorization processes (Bowerman 2005; Majid & Bowerman 2007; Kopecka & Narasimhan 2012; Moneglia 2014).

### 1.4.2. What is the marked variation of an action verb?

With the expression *marked variation,* I point to the set of uses in which an action verb does not refer to physical action events but does encode figurative and phraseological meanings (Panunzi & Moneglia 2004; Moneglia et al. 2012; Brown 2014). To better clarify this point, I will consider three uses taken from by the marked variation of the Italian action verb *alzare* (Eng., 'to raise'/'to lift'):

8) *Maria alza il volume dello stereo*
   'Mary is turning up the volume of the stereo'

*9) Maria non alza mai il telefono*
'Mary never picks up the phone'
*10) L'assistente ha alzato il gomito stasera*
'The assistant drank too much tonight'

Examples (8-10) are linguistic representations of 3 different categories of variation: metaphors, metonymies, and idioms. Beyond the peculiarities of the underlying processes involved in each category, what is important to stress is that, in the pragmatic contexts listed above, the verb *alzare* (e.g., *to raise/to lift*) is not used in its proper basic sense, but it does encompass meaning extensions of a different sort. While in example (8) the predicate is used to express the increase of a value (e.g., the conceptual metaphor GREATER INTENSITY IS UP); in example (9), the predicate encodes one single sub-event (e.g., to pick up the phone) which metonymically stands for a more general macro-event (e.g., to make a call: a PART-WHOLE metonymy); finally, example (10) represents an Italian idiom, which is commonly used to describe the behavior of someone who engages in excessive alcohol consumption.

Not surprisingly, in the examples (8-10) it is not possible to apply the English verbs *to raise* or *to rise*. This lack of extendibility is in sharp contrast with what I presented in the previous Sub-section (1.4.1.), where the two verbs were recognized as necessary to cover the action types taken from the primary variation of the Italian action verb *alzare*. This fact should not be taken as random information, as it helps to clearly show that the primary and marked variations of a single action verb do not involve two symmetrical dimensions of meaning but rather two distinct ones, where the possible marked uses are not easily predictable. This phenomenon appears to be relevant especially in a multilingual perspective, where it has been demonstrated that relations that hold in the primary variation of the verb (e.g., *alzare*;*to raise/to lift*) do not necessarily extend to the marked variation of the same verb.

## 1.5. IMAGACT[22] ontology: a way to represent actions

Action-oriented verbs form a huge lexical class in which predicates of a different sort converge. Some verbs specifically denote single action concepts (e.g., activity verbs: *mangiare*, 'to eat'), some others refer to actions belonging to different ontological types (e.g.,

[22] To visit the website, go to: www.imagact.it

general action verbs: *alzare*, *to raise/to lift*). The main problems arise when the latter are considered. As I pointed out in Sub-section (1.3.1.), general action verbs do not establish a one-to-one relationship between the lexical entry (e.g., *alzare*, *to raise/to lift*) and the action concepts they encode (e.g., change of object location; action referring to the body), so creating a sort of indeterminacy in action reference. Additional problems spring from the fact that the segmentation of the action space (i.e., the whole set of actions of the world, here conceived as ontological objects) is not a standard process which recurs in the same way across different languages, but happens to strongly depend on linguistic and cultural specificities (Majid et al. 2008; Moneglia & Panunzi 2010; Moneglia 2012, 2014; Gagliardi 2014). This, for instance, may result in word semantic disambiguation problems in natural language processing (Bar-Hillel 1960), and thus create incongruencies, both on a linguistic and cross-linguistic level.

In the next Sub-section (1.5.1.), I will illustrate the ontology IMAGACT[23], an online interlinguistic repository of action verbs that, starting from a corpus- and competence-based approach to the study of the lexicon, makes explicit the semantic variation of action predicates, including distinguishing between their extensions in concrete and in figurative contexts of application. As a corollary, in Sub-section (1.5.2.), I will try to spell-out some of the reasons why the resource can be considered a good ally when the analysis of marked variation of action verbs is taken into account.

### 1.5.1. The IMAGACT ontology of actions

IMAGACT is a multimodal and multilingual ontology that outlines actions via a visual representation system. The decision to represent action concepts by using prototypical 3D animations or brief videos (Moneglia 2014; Panunzi et al. 2014) stemmed from the need to avoid the under-determinacy of semantic definitions and to have a resource that could disentangle action categorization from representation in a specific language (Brown 2014).

With respect to the amount of data contained in the ontology, IMAGACT includes 1010 distinct action scenes, which have been primarily derived from the annotation of spoken

[23] The creation of the IMAGACT Ontology is part of the more general IMAGACT project, which was funded by the PAR/FAS program of the Tuscan Region and undertaken by the University of Florence, ILC-CNR, Pisa, and the University of Siena.

language corpora in English and Italian[24] (e.g., about 500 verbs for each language: Moneglia 2012). In a preliminary phase of the project, Chinese and Spanish data were also processed. Extensions to Arabic (Syrian), Danish, German, Hindi, Japanese, Polish, Portuguese, and Serbian have been made available on the online interface only recently.

With regard to the visual representation of the action concepts, each prototypical scene is linked to a single action concept (or action type)[25], each action verb is connected to more than one prototypical (Rosch 1975) scene, and each prototypical scene is associated to more than one action verb. Finally, when two or more action verbs share a common referent (or subset of action scenes), they are considered local equivalent verbs. For example, according to the IMAGACT Ontology, the Italian general action verb *alzare* ranges over 8 main action types; each one of them is organized in one or more sub-types and equipped with a specific synset of local equivalent verbs. Below, I present a small excerpt from the visual representation of the Italian general action verb *alzare*:

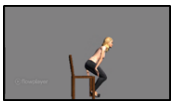
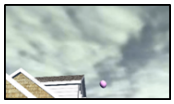
| Action Type | Standardization | LEV IT | LEV ENG | Prototypical scene |
|---|---|---|---|---|
| **Type 1** | Marta si **alza** dalla sedia | Mettere, Tirare su | **Rise**, Stand, Stand up |  |
| **Type 2** | Marta **alza** la scatola | Sollevare, Tirare su | Lift, Pick up, **Raise** |  |
| **Type 3** | Fabio **alza** il cofano della macchina | Aprire, Tirare su | Lift, Move, Put, **Raise**, Reposition |  |
| **Type 4** | Marta **alza** l'asta del microfono | Allungare, Tirare su | Extend, **Raise**, Reposition |  |
| **Type 5** | Il palloncino si **alza** in cielo | Salire | **Rise** |  |

**Table 2.** Partial representation of the primary variation of the action verb *alzare*

[24] With respect to Italian, the reference corpus contains a large array of oral texts and about 1,600,000 tokens. The three main sources used were: the LABLITA corpus of spontaneous spoken Italian, the LIP corpus, and the CLIPS Corpus.

[25] Each action type is constituted by those annotated uses of the action verb which share motor schema, spatial relations, focal properties of the action, and a synset (Fellbaum 1998) of local equivalent verbs.

On the same token, according to the IMAGACT action organization, the English translator *to raise* ranges over 6 main action types and is only partially consistent[26] with the semantic variation of *alzare*. For instance, the action verb *to raise* is applicable only in cases (2,3[27], 4); but it does not encode cases (1) and (5), for which English instead recurs to the verb *to rise*.

Interestingly, IMAGACT only contains physical actions described by action verbs, ignoring any non-literal interpretations. This means that only the primary variation of the verb has been effectively made explicit via the visual representation system. This choice is not connected in any way to the semantic load of marked uses within the infrastructure, as they represent half of the IMAGACT database occurrences. The lack of a clear depiction of marked uses can be rather explained by reference to the visual format of the ontology, which makes the representation of abstract concepts quite difficult (Brown 2014).

Earlier in the chapter, I pointed out that, differently from other resources (e.g., Wordnet: Fellbaum 1998), IMAGACT is based on the preliminary distinction between concrete vs. figurative uses of action verbs. The first step in the corpus annotation process was indeed that of identifying those occurrences in which verbs refer to physical actions, and to consequently separate them from those in which the verbs do encode more abstract concepts. The extraction process via which metaphorical and phraseological usages were separated from those strictly referring to physical actions was made possible through the adoption of an operational "test à la Wittgenstein" (Gagliardi 2014). According to this test, a mother tongue annotator[28] judges whether it is possible to point to a certain (perceptible) event and says to someone who does not know the meaning of a given verb that "this action and similar events are what we refer to with this verb". In the event that this is possible, the

[26] Divergences in action event categorization influences the divergences existing in the linguistic representation of action across languages. This fact becomes a significant problem when it comes to automatic translation: "natural language predications are a challenge for machine translation, since the ontological entities referred to by action verbs in simple sentences are not identified and there is no guarantee that two predicates in a bilingual dictionary pick up the same entity" (Moneglia 2012: 1).

[27] It is also interesting to notice that, although Type 3 is encoded by the Italian local equivalent verb *aprire* (Eng., 'to open'), the use of this resultative verb does not extend to the English action categorization. The English verb *to open*, in fact, does not seem to be normally applied to describe the action event in Type 3.

[28] The basic assumption is that, on the basis of his/her semantic competence, each mother tongue annotator should be able to judge not only which actions a verb use can be extended to, but also whether an occurrence is primary or not. Nevertheless, borderline cases may always arise. According to the annotation procedure adopted in IMAGACT, in case of doubt, different annotators worked together to reach agreement on the specific annotation task.

occurrence is classified as primary; otherwise, it is classified as marked. To make a case in point, if we go back to the events described in (1–7), we could say that this is what *alzare* means. In contrast, it is not possible to elicit the same judgement for the sentences in (8-10), as they do not instantiate the basic meaning of the verb *alzare*. Within the IMAGACT Ontology they are not considered as part of the primary variation of the verb *alzare* (Eng., 'to lift'/'to raise') but as representative of its marked extension (Brown 2014).

### 1.5.2. IMAGACT architecture as a resource to analyze metaphorical uses of action verbs

The IMAGACT Ontology has proven itself to be a good ally in the analysis of both the primary and the metaphorical uses of action lexicon. The advantages of using not only its architecture but also its semantic contents have certainly been numerous. First, the Ontology contains a consistent amount of data that have been massively taken from multiple spoken resources (e.g., IMAGACT and BNC corpora), where it has been demonstrated that the ratio of action words is significantly high. Second, as I already had occasion to emphasize, the resource has been conceived as based on the preliminary identification of the type of use that action verbs bear: the separation into two main semantic sets (e.g., primary and marked variation) indeed depended on whether predicates encoded physical or figurative meanings. This step was of crucial importance in the operation of annotating metaphorical expressions, as it provided us with a definite and clear reference model in the early phases of the present analysis. Third, IMAGACT contains both pivotal cognitive and semantic information[29] for each action verb included in the database. This was an extremely important prerequisite for the clear understanding and representation of the links that, either on a linguistic and cognitive level, appear to tie together the two levels of the variation of the predicates. To be more precise, the information included in the database (e.g., primitive semantic components of the predicate core, definition of the action types, synset of local equivalent verbs, etc.) helped to better structure the process of annotation of the metaphorical uses of the action predicates, and to expand the quantity of details that have been used to show that either metaphorical and physical uses of action verbs are not randomly produced, but that they

[29] Unfortunately, in the IMAGACT database the whole set of metaphorical occurrences are all presented in the form of standardizations, that is, in one single tense form (simple present, singular third person). From this it follows that, as things currently stand, the database does not allow the candidate to access aspectual information or characteristics of a given action verb when it is used in non-literal contexts.

both refer to crucial motor and perceptual inputs coming from our cognitive and actual representation of actions (Part 2 of this thesis).

## 1.6. Conclusions

As the immediate aim of this study is the investigation of the metaphorical variation of a selected set of Italian action verbs, as well as the nature of the bond that this establishes with the primary basic meanings of these verbs, it was extremely important to clarify some of the preliminary issues we will deal with. The chapter started with a focus on those that are recognized to be the main reasons behind the pervasiveness of the action lexicon, both on a semantic and quantitative level of analysis, within our linguistic system. Action verbs are among the earliest words in children's vocabulary and they bear the basic informative load to make sense of any sentence. This fact also is reflected in the high rate of occurrence that action verbs have in oral communication.

This chapter has also been used to shed light on the relational ability that the action lexicon has within language. Action verbs have been distinguished according to two main classes, i.e., general action verbs and activity verbs, between which the former seems to be the most interesting one for my research purposes. This is because general action verbs are able to refer to a large set of activities and to co-occur in combination with many different objects. They are used both to name action events (e.g., primary variation) and to give a linguistic form to highly abstract concepts (e.g., marked variation), springing from various cognitive processes. Finally, the sections above were used to present the specific framework within which the current analysis took place, that is, the IMAGACT Ontology. With respect to this resource, the aims, intents, internal organization, and underlying systems of visual and semantic representation were spelled out.

# Chapter two:
# Embodied theories of mind

## 2.1. Introduction

Starting from the 1980s a growing commitment to a different understanding of cognition can be noted in the literature, namely: the idea that cognition must be investigated by reference to the interaction of the physical body with its external world. This idea has been subsumed under the term Embodied Cognition (hereafter, EC). The stance of EC rests on the assumption that conceptual knowledge is grounded in perceptual and motor systems (Glenberg 1997; Martin & Chao 2001;Gallese & Lakoff 2005; Pulvermuller 2005; Kiefer et al 2008), and that the body's physical properties and its inherent motor processes (e.g., *epistemic vs. ontological version of embodied cognition*: Zipoli Caiani 2016) directly condition cognitive structures. As not only the brain but also features of an agent's body are considered to play a significant role in cognitive processes, embodied models propose a conception of the mind opposite of previously accepted models represented in what many refer to with the simple term Cognitivism, where cognitive abilities are thought to involve processes of computation purely based on symbolic representations (Gardner 1985; Thagard 2005).

EC occupies a prominent position in cognitive science and, over the years, has had a strong impact on a number of disciplines, such as philosophy, linguistics, psychology, neuroscience, and artificial intelligence. However, although it is supported by a substantial number of significant studies and promising findings, a unified theory is still missing. Such a unified theory could potentially bind together the multiple perspectives encompassed therein (Shapiro 2007, 2011, 2012, 2014). Multiple approaches, such as situated, embodied, embedded and enacted cognition, have been proposed. Each one of them differs in their emphasis given to the specific theoretical aspects, claims, and research methods. Yet, all of them share the common assumption about cognition being an embodied phenomenon.

In Section (2.2.), I will briefly illustrate the main theoretical assumptions standard Cognitivism relies upon, mostly focusing on the so-called Cartesian dualism and the computational representational paradigm of human cognition. In Section (2.3.), I will provide the reader with a panoramic view on EC program, trying to disentangle the main

theoretical concerns (2.3.1., 2.3.2.) and approaches to the study of cognitive processes (2.3.3.). Section (2.4.) will be devoted to the investigation of the involvement of sensory-motor information in the shaping of abstract concepts and linguistic representation of meaning. As additional support to this investigation, findings from empirical studies will be discussed.

## 2.2. Early cognitive science: the cognitivist hypothesis

The standard account of Cartesian dualism[30] (Wilson 1978; Clarke 2003)[31] has represented the most influential theory of mind in early cognitive science. In short, it rests on the idea that mind and body are two distinct entities (or substances), and that mental events can only be explained by reference to the human mind. The dualistic model has been taken up by Cognitivism (first-generation cognitive science: see Lakoff & Johnson 1999), an interdisciplinary approach to the study of human cognition that, over the years, has been adopted in various fields of research[32], such as cybernetics (Weiner), computer science (Turing, Minsky), philosophy (Fodor), linguistics (Chomsky) and psychology (Pylyshyn).

Cognitivism assumes that the mind must be conceived as an abstract entity, completely separate from human bodily structure, in which reasoning and its products (e.g., concepts) are not limited by physical or bodily realities (Nunez et al. 1999: 47-48). According to the cognitive hypothesis, human cognitive activity must be described on the level of mental representations (Gardner 1985: 38):

> When working at this level, a scientist traffics in such representational entities as symbols, rules, images—the stuff of representation which is found between input and output—and in addition, explores the ways in which these representational entities are joined, transformed, or contrasted with one another. This level is necessary in order to explain the variety of human behavior, action, and thought.

In this theoretical context, the mind is reduced to a processor of abstract information, where its relationships with the external world are not considered necessary to the comprehension of general cognitive processes (Shapiro 2012: 119):

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[30] See Renè Descartes, *Meditations* (1641).

[31] Although the mind-body dualism is constantly stated as an important legacy of Cartesian philosophy (Núñez, Edwards & Matos, 1999), some scholars discuss the misreading of Descartes' ideas (Clarke 2003).

[32] For an in-depth analysis, see the cognitive hexagon (SOAP 1978).

> In this view, mental processes (e.g., problem solving, remembering, perceiving, comprehending, producing language and so on) are computational processes" and mental objects (beliefs, memories, perceptions, etc.) are symbolic structures with representational content (Shapiro 2012: 119)[33].

A second pivotal assumption within the cognitivist approach in the study of cognition is that computation is based on representations. Cognitivism rests indeed on the idea that not only intelligence and computation share essential characteristics, but that cognition must in fact be understood as computations of symbolic representations (with physical and semantic values) in accordance to explicit combinatorial rules (Varela et al. 2017: 41):

> [...] the only way we can account for intelligence and intentionality is to hypothesize that cognition consists of acting on the basis of representations that are physically realized in the form of a symbolic code in the brain or a machine.

Cognitivist scientists look at the computational representational paradigm (e.g., MIND AS COMPUTER metaphor) as the most theoretically and experimentally successful approach to mind ever developed[34] (Thagard 2005). According to Pylyshyn (1989), the analogy between mind and computer is motivated by the fact that the latter is the only mechanism to manifest the same plasticity and knowledge-dependent behavior that human cognition has been shown to have. Analogous to the computer, the mind can be easily interpreted as an input-output device, where information is automatically and sequentially processed (Gardner 1985: 40):

> The computer serves, in the first place, as an "existence-proof": if a man-made machine can be said to reason, have goals, revise its behavior, transform information, and the like, human beings certainly deserve to be characterized in the same way.

However, the main problem stemming from the mind-computer metaphor is the fact that, unlike the human mind, the computer operates only on the physical form of the symbols that it computes, but it cannot access their semantic value[35] (Varela et al. 2017: 41). Hence, this problem has led many scholars to ask how cognition works on a deeper level and,

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[33] For an in-depth analysis of the computer metaphor (Von Eckardt 1995).

[34] The speculation that between cognition and computation there should be a sort of analogical relation can be traced back to Newell and Simon's (1961) work. Although their GPS (General Problem Solver) computer program was first conceived to replicate human problems solving abilities, it soon converted into a proper theory of human thinking.

[35] The cognitivist hypothesis rests on the strong assumption that in the mind, as well as in a computer, the syntax of the symbolic representations mirrors their semantics (Gardner 1985; Thagard 2005).

specifically, how abstract symbols may acquire their meaning (e.g., the *symbol grounding problem*: Harnad 1990). The difficulty demonstrated by cognitivist approaches in addressing these and similar semantic problems (e.g., the *Chinese room*[36]: Searle 1980) paved the way for new approaches to the study of human cognition (and language) and, amongst others, it opened the way to the heterogeneous group of theoretical models that go under the name of embodied cognition.

## 2.3. What embodied cognition is

In the previous section, I gave a brief report of the more significant theoretical developments in early cognitive science, focusing attention on the main tenets and criticism showed by standard cognitivist models of cognition and meaning representation. I continue to move the discussion ahead and present the framework that the present research has been developed in. Thus the next sections will be devoted to the detailed study of the scene for the embodied mind, from the initial adoption of the new integrated model of cognition (e.g., mind-body-world relationship: Sub-sections (2.3.1., 2.3.2.) to the matrix of the different embodied approaches to the investigation of cognitive processes (e.g., 4E formula: Sub-section 2.3.3.).

### 2.3.1. Setting the scene: to put mind and body together again

EC does not represent a unified theoretical system, but it rather encompasses a matrix of heterogeneous approaches to the study of human cognition. The main hypothesis is that the development of cognitive processes strongly depends on bodily factors (e.g., sensory-motor abilities and body physical structure); and that these very bodily factors influence the way organisms interact with the surrounding environment (Zipoli Caiani 2016). From this it follows that, differently from what cognitivist scientists suggest, cognition cannot be

[36] In the Chinese Room thought experiment, John Searle (1980) imagines himself locked in a room following a computer program provided with a batch of Chinese writing, a batch of Chinese script, and a set of rules and instructions to connect the batches. By following the program, Searle, who is a monolingual English speaker, starts producing a perfect and intelligent conversation in Chinese, without really understanding the meaning of what he is saying. The Chinese room argument is taken to show that computers use syntactic rules only to compute and manipulate symbols. Nevertheless, they have no understanding of semantics. The argument is used, though, to demonstrate that computational processes are not sufficient to ground meaning. From this it follows that the mind as computer metaphor has to be refused.

explained on a mere representational level, but has to be thought of by reference to the synergetic interconnection between mind, body and external reality.

If cognitivism gives a nod to the philosophical front represented by Cartesian dualism, EC takes root in the philosophical tradition of phenomenology, started by Husserl and brought forward by Heidegger and Merleau-Ponty (Varela et al. 2017). In particular, Merleau-Ponty's (1962) phenomenological view exerted a quite relevant influence in the way embodied theories looked at the notion of body, intended both as experiential structure and as locus of cognitive processes. According to the phenomenological approach, perception and representation occur in a specific bodily context and are structured by the continuous interaction that an embodied agent has with the outside world (Merleau-Ponty 1962: 13):

> When my hand follows each effort of a struggling animal while holding an instrument for capturing it, it is clear that each of my movements responds to an external stimulation; but it is also clear that these stimulations could not be received without the movements by which I expose my receptors to their influence. [...] The properties of the object and the intentions of the subject are not only intermingled; they also constitute a new whole.

In his view, representations are conceived of as sublimations of bodily experience, which happen to be controlled by the acting body itself (Hilditch 1995: 108-109). The fact that our cognitive processes and structures are, first of all, determined by practical bodily factors does not entail, though, an interpretation of the organism as a passive agent who is under the total influence of the environment. From the phenomenological perspective, the organism's bodily structure is inextricably interwoven with the environment in which the organism moves, acts and lives (Clark 1998: 171).

> In particular, Merleau-Ponty stressed the importance of what I have called "continuous reciprocal causation"—viz., the idea that we must go beyond the passive image of the organism perceiving the world and recognize the way our actions may be continuously responsive to worldly events which are at the same time being continuously responsive to our actions.

The importance of this last clarification becomes apparent in the light of the central hypothesis of embodied theories. As previously noted, this central hypothesis shared by the sea of different embodied approaches to the study of cognition is the conviction that mental states and cognitive processes depend on the specific features of the agent's physical body. This hypothesis is explainable through an epistemic and an ontological perspective (Zipoli Caiani 2016). According to the epistemic interpretation, the body constrains both the cognitive processes and their informational content (e.g., *The brain in a vat argument*:

Putnam 1981). The ontological interpretation, instead, does not only accept the assumption that the body can exerts some sort of constraint on cognitive systems, but that it also has a constitutive role within cognitive processes[37].

Within the panorama of cognitive sciences, recognition must be given to the role that embodied theories (as a whole) take in the shift away from the computational representational paradigm proposed by Cognitivism. The most relevant fact is that bodily experience ceases to be a marginal piece of the puzzle and starts being considered as a crucial element in the understanding of cognitive mechanisms. EC models propose to look at cognition not as a localized phenomenon in the brain, but as being influenced by the body (and its real-time activities) and the sensory data deriving from the surrounding environment (Anderson 2003).

### 2.3.2. Problematic issues to deal with: human cognition, physical body, and external environment

As I pointed out above, EC should not be looked at as a unified theory, originating from a single idea, but more as spectrum of ideas that form a theoretical framework with different aims, commitments and methodologies (Shapiro 2011, 2014). Although the literature presents EC as an interweaving of different topics and ideas, it is possible to isolate some of the main problematic issues around which the entire discussion on the physical grounding project has been developed over the years. The first issue relates to the underspecified notion of cognition which has been viewed and described differently in the literature. In an attempt to disentangle the various claims, Wilson (2002) identifies six different views of embodied cognition and compresses them into six short and prominent claims:

1) *cognition is situated*: cognitive activity is context-bounded, as it takes place in a specific environment, and involves specific perceptual and motor processes (Steels & Brooks 1995; Clark 1997; Pfeifer & Scheier 1999);

[37] Zipoli Caiani (2016) suggests that an easy way to better understand the ontological interpretation is to think about the act of counting with the fingers. In this case, in fact, not only the nervous system but also features of the agent's body (e.g., fingers) happen to have a functional role in the act of counting. For an in-depth analysis, see the book *Corporeità e cognizione* by Zipoli Caiani (2016).

2) *cognition is time pressured*: cognitive activity is constrained by the pressure of the real-time interplay with the environment (Pfeifer & Scheier 1999);

3) *we off-load cognitive work onto the environment*: the way we model the world is consistent with our information-processing abilities (Brooks 1991; Kirsh & Maglio 1994);

4) *the environment is part of the cognitive system*: the mind is not separated from the outside world and the stream of information between them is continuous (Greeno & Moore 1993; Thelen & Smith 1994; Beer 1995; Hutchins 1995);

5) *cognition is for action*: the mind controls actions, hence cognitive mechanisms are oriented toward achieving situation-appropriate behavior (Franklin 1997);

6) *offline cognition is body based*: cognitive activity is grounded in sensory processing motor control mechanisms (Lakoff & Johnson 1980, 1999).

Wilson (2002) does not treat EC as a single viewpoint but prefers to define those six claims separately, in consideration of the different research perspectives that they may refer to. This way, she describes EC by mainly focusing on the investigation of the concept of cognition and, more in particular, on the distinction between its on-line and off-line aspects. With respect to the latter aspect, it is worth stressing that Wilson's account of off-line cognition is body-based, that is, it explicitly assigns a significant role in human cognitive processes to the body (Wilson 2002: 635):

> In these cases, rather than the mind operating to serve the body, we find the body (or its control systems) serving the mind. This takeover by the mind, and the concomitant ability to mentally represent what is distant in time or space, may have been one of the driving forces behind the runaway train of human intelligence that separated us from other hominids.

Even though Wilson's (2002) shifts the focus to the centrality of body within human cognition, she does not draw enough attention to the kind of body that should be taken into consideration within the embodied framework. This omission is directly linked to the second problematic issue scholars have been confronted with over the years, that is, the issue of which specific kind of physical bodily structure is needed for cognitive activity. Ziemke's (2001, 2015) work can be viewed as an attempt to disentangle the different types of bodies

that have been discussed in EC. In his analysis, he distinguishes and presents four main types[38] of embodiment, here listed in an increasingly more restrictive order:

1) *structural coupling between agent and environment*: this very general definition does not distinguish between cognitive and non-cognitive systems and assumes that systems are embodied if they are 'structurally coupled' to their environment (Maturana & Varela 1980, 1987);

2) *physical embodiment*: embodied systems need to have a physical body, that is, they should be connected to their environment through physical forces and sensory motor programs;

3) *organismoid embodiment*: this very restrictive notion of embodiment covers both living organisms and organism-like bodies (e.g., humanoid robots) equipped with sensorimotor capacities as living bodies;

4) *organismic embodiment of autopoietic, living systems*: this is the most restrictive notion of embodiment. It assumes that embodied cognition is limited to autonomous and autopoietic living organisms.

Special attention to the concept of embodiment has been given in Anderson's (2003) research as well. His approach is partially consistent with that presented by Ziemke (2001, 2015), and can be read as an attempt to highlight the most significant aspects of embodiment that "play a role in helping shape, limit and ground advanced cognition" (Anderson 2003: 105):

1) *physiology*: the body directly impinges on our conceptual and rational structure determining the constraints in our ability to represent high levels of abstraction, their informational content and inherent structure (e.g., *center-periphery structure in color concept*: Lakoff & Johnson 1999);

[38] In a more recent paper, Ziemke (2015) disentangles the notions of embodiment in a different way. Besides the type above in the text, he also presents the notion of historical and social embodiment. To be more precise, historical embodiment is conceived of as the result of a history of structural coupling. Social embodiment could be intended as the state of the body which emerges in social interaction and in social information processing.

2) *evolutionary history of the agent*: this dimension is "physiologically stored" (Anderson 2003: 106) and is expressed in three implicit manners: a) sentiment (e.g., rational thought makes use of our inner animal nature) ; b) metaphorical mappings (e.g., connections between separated domains of experience); c) emergence (e.g., behavior also emerges from the specific kind of interaction that we have when we move and act in the surrounding environment);

3) *practical activity*: this aspect refers to the agent's practical activity and its relationship with thinking, problem solving (e.g., cooperation between computation, representation, and interaction with environmental inputs), and symbol grounding (e.g., giving meaning to particular experiences);

4) *socio-cultural situatedness*: this point refers to the fact that the body-environment interactions are situated in a specific social and cultural context. From this it follows that the bodily interplay that an agent has with her surrounding environment can also take place with persisting structures (cultural and social, concrete and abstract), instead of with individual objects; and that actions themselves can have specific meanings in social or cultural situations (Anderson 2003: 109).

The various ways in which human cognition depends upon an agent's physical properties and its interplay with environmental constraints represents another topic which has been extensively discussed within EC. In particular, Shapiro's (2011, 2014) insists that an analysis which aims to deeply explore the notion of embodiment should start from the discussion of the three main general themes that most frequently reoccur within the sea of claims, studies and new proposals in literature, that is, the constitution, replacement, and conceptualization hypotheses:

1) *Conceptualization hypothesis*: it suggests the existence of a tight relationship between the kind of body an organism has and the kinds of concepts an organism can acquire. Concepts and conceptual abilities are limited or constrained by the physical bodily properties. (e.g., *basic concepts and metaphors*: Lakoff & Johnson 1980; *colors*: Varela et al. 2017 [1991]; *canonical and mirror neurons*: Rizzolatti et al. 1998);

2) *Replacement hypothesis*: it claims that both computational and representational processes can be replaced by the body-environment interaction. In this sense, embodiment and situatedness are the key elements in the understanding of human

cognition (e.g., Ecological psychology: Gibson 1979; Dynamical systems: Van Gelder 1995; Radical embodied cognition theory: Chemero 2009);

3) *Constitution hypothesis*: it states that constitutive elements of cognitive processes may extend beyond the brain, to include features of the body or world (e.g., Extended cognition). This entails that both the body and the environment do not have a mere causal influence on human cognition, but that they are rather constitutive elements in cognitive processing (e.g., *causal dependency* vs. *constitution dependency:* Newen, De Bruin & Gallagher 2018*).*

In the light of the problems discussed so far (Which cognition? Which body? Which relations?), it is more appropriate to look at EC more as a collection of multifaceted research perspectives rather than as one internally coherent research model. Despite some core fundamentals that are shared within the various research proposals that have been made in the last 30 years, it does not seem plausible to present them as a unified theory. Therefore, in the next section, I chose to spell out the main embodied approaches to the study of human cognition.

### 2.3.3. How to classify theories of embodied cognition: the 4E formula

It has already been stressed that, although embodied theories collectively share the idea that cognitive processes and mental states strongly depend on the agent's bodily properties, there is no general agreement about what it really means to say that cognition is embodied. In cognitive science, the extensive use of the concept of embodiment resulted in a full-blown proliferation of very different notions (Brooks 1991; Varela et al. 1991; Clark 1997, 1999; Lakoff & Johnson 1999; Nunez et al. 1999; Pfeifer & Scheier, 1999;). As a main consequence, among the scholars there has been (and still is) no uniform consensus either on the notion of embodiment, or on its most relevant aspects for the study of human cognition.

In the "embodied" literature, four types are customarily distinguished as the most relevant (the "4E" formula)[39], namely embodied, embedded, enacted, and extended cognition

[39] However, other kinds of classifications have been proposed. For instance, Zipoli Caiani (2016), prefers to investigate the field starting from the general distinction between representational and non-representational embodied mind theories.

(Rowlands 2010)[40]. Although this label houses a large array of different theoretical perspectives and methodologies, proponents of 4E cognition all maintain that the brain is not the sole locus for cognitive processes and that cognition should be investigated also considering extra-cranial bodily processes (Newen, De Bruin & Gallagher 2018).

In short, the embodied cognition (or embodied mental processes) framework rests on the assumption that mental processes are constituted by a combination of cognitive activities and sensory-motor processes (Damasio 1994; Shapiro 2014). This assumption entails either that wider bodily structures are responsible for the understanding of mental cognitive activities (epistemic interpretation); and that cognitive processes depend on or are constituted by bodily structures (ontic interpretation). From the embodied perspective, therefore, cognition takes place not only in the nervous system but also in the perceptual and motor systems. This fact is not as trivial as it may seem, since it entails that both cognitive processes and mental states are shaped by properties of the human body and by the way real agents perceive perceptual inputs and perform physical actions in the physical world.

The extended mind thesis (henceforth ExtMT) is based on the idea that the way an agent actively interacts with the world and its objects adds more significant data to the accomplishment of cognitive tasks. This entails that cognition extends beyond the boundary of the individual organism (Clark & Chalmers 1998). To say that cognition may extend beyond the agent's organism entails that all the elements (external or internal to the agent) that are involved in the agent-environment interaction also happen to be involved in the extension of the cognitive processes underlying this same interaction (e.g., "*Inga and Otto" experiment*: Clark & Chalmers 1998; Zipoli Caiani 2016); and that some cognitive processes are partly composed of environmental processes (Rowland 2010: 58):

> The general idea is that at least some mental processes — not all, but some — extend into the cognizing organism' s environment in that they are composed, partly (and, on the version I am going to defend, contingently), of actions, broadly construed, performed by that organism on the world around it.

The ExtMT basic assumption thus is that both bodily actions and environmental resources are recognized as constituent parts of cognitive processes (Kiverstein 2018). In accordance

[40] The so-called 4E label was coined by Shaun Gallagher and first used during a conference organized in 2007 at the University of Central Florida (Rowland 2010; Newen, De Bruin & Gallagher 2018).

with the so-called parity principle (Clark & Chalmers 1998; Clark 2008), in fact, cognitive processes cannot be confined to the agent's body but are "extended" on the base of the specific type of interaction existing between the agent and the environment (Clark 1998: 215):

> [...] I am convinced that it is valuable to (at times) treat cognitive processes as extending beyond the narrow confines of skin and skull. And I am led to wonder whether the intuitive notion of mind itself should not be broadened so as to encompass a variety of external props and aids—whether, that is, the system we often refer to as "mind" is in fact much wider than the one we call "brain."

A variety of ExtMT is represented by the so-called radical embodied cognition theory (henceforth RECT), first proposed by Clark (1997, 2001, 2008), has been drawn from American naturalism (Dewey 1958), dynamical systems theory (Van Gelder 1995) and ecological psychology (Gibson 1979). RECT suggests adopting a new and radical approach to the study of mind and cognition, where information processing and representationalism are abandoned in favor of a "purely embodied know-how" (Hutto & Miyn 2018: 105). RECT is indeed built on the argument that cognitive processes are better studied by completely rejecting computational and representational paradigms (Chemero 2009; Hutto & Myin 2013).

The embedded cognition theory (henceforth EmbCT) is arguably less radical than ExtMT, by resting on the idea that cognitive processes only causally depend on environmental resources[41]. This is to say that, although EmbCT strongly emphasizes the role that the environment has in cognitive processes, it does not entail either that these same processes are extended into the environment or that the environment plays a constitutive role in human cognition (Rupert 2004: 5):

> [...] cognitive processes depend very heavily, in hitherto unexpected ways, on organismically external props and devices and on the structure of the external environment in which cognition takes place.

As Rupert's (2004) words suggest, EmbCT simply endorses the idea that, even though cognitive activity happens in the brain, it may be environmentally embedded. Rupert (2004: 396) indeed claims that there exists some sort of epistemological dependency between an agent's cognition and the context in which the same agent interacts, and that we can fully

[41] For an in-depth analysis of the constitution-causal dependency issue, see the EXT-EMT debate in Kiverstein (2018).

understand the former only if we consider it by reference to the latter. In this sense, the efficacy of an agent's cognitive processes may depend not only on sensory mechanisms but also on things outside the brain and the agent's body (Rowland 2010; Dawson 2014), that is: the context in which the agent is embedded.

Finally, the enacted mind thesis (Varela et al. 2017 [1991]; O' Regan & Noë 2001) starts from the assumption that perception is not simply embedded, but that it can actively contribute to the enactment of the surrounding environment. It conceives the body as an adaptively autonomous and sense-making system, and the nervous system as an adaptively autonomous dynamical system. According to the enactive model, cognitive structures and activities arise from and are dependent on recurrent sensory-motor patterns of perception and action. This means that the external realm, represented internally by its brain, is enacted by the bodily structure and its mode of interacting with the external environment (Varela et al. 2017: 173):

> [...] the reference point for understanding perception is no longer a pregiven, perceiver-independent world but rather the sensorimotor structure of the perceiver (the way in which the nervous system links sensory and motor surfaces). This structure—the manner in which the perceiver is embodied—rather than some pregiven world determines how the perceiver can act and be modulated by environmental events. Thus the overall concern of an enactive approach to perception is not to determine how some perceiver-independent world is to be recovered; it is, rather, to determine the common principles or lawful linkages between sensory and motor systems that explain how action can be perceptually guided in a perceiver-dependent world.

Before concluding this brief introduction to the so-called 4E formula, it is worth bearing in mind that the programs presented above represent only a part of the sea of embodied views on cognition. Other models, which have been left out of the discussion, are constituted by the radical non-representational models of cognition, that is, embodied views on cognition that completely deny the possibility of information integrations between cognitive and sensory-motor systems. Despite their undeniable theoretical importance, Ecological psychology (Gibson 1979), Dynamical systems theory (Van Gelder 1995), and the Sensory-motor account of perception (O'Regan & Noë 2001) have been left out of this very general introduction to the main theoretical embodied approaches registered in the literature, as they do not seem to be easily compatible with the framework adopted in the present research.

## 2.4. Embodiment and meaning

It is now time to explain and try to make more explicit what importance embodied experiences have in processes of meaning construction and understanding. As stressed earlier in the chapter, for a long time, linguistic meaning and embodiment have been claimed to be completely unrelated. This assumption has been viewed as the natural consequence of adopting a specific theoretical paradigm, that is, the computational and representational one, according to which human cognition must be only interpreted as a computation over abstract symbolic representations (Chomsky 1957; Katz 1972; Fodor 1975). This chapter also pointed out that the main problem arising from the traditional cognitivist model was its insufficiency for solving the so-called symbol grounding problem (Harnad 1990), and thus for explaining how to ground linguistic meaning in bodily experience (Lakoff & Johnson 1999).

Unlike traditional cognitivism, EC directly looks at the mind-body-environment relationship, and rests on the idea that language should not be considered as a separate dimension, but rather as "grounded in pervasive patterns of embodied experience" (Gibbs 2003: 14). To put it another way, EC assumes that language, sensory-motor processes, and environmental inputs are tied together, and that the comprehension of the former cannot take place without information stemming from the latter (Gibbs & Colston 1995; Gibbs 2005).

The hypothesis that bodily properties actively participate in meaning construction processes is the starting point for any of the embodied models of human cognition presented so far. In the next two sections, I will draw attention to the specific problem of semantic embodiment. I will first show how perceptual and motor information is incorporated in word meanings, with respect to both their concrete and abstract levels of semantic representation. In the following, I report some of the most relevant experimental findings that have been gathered over the years from various disciplines.

### 2.4.1. The embodiment of meaning: how we make sense from metaphorical mappings and image-schematic projections

Experientialism is the label that Lakoff and Johnson (1999) adopted to refer to their theoretical embodied approach in the study of meaning. According to experientialism, conceptual structure is meaningful because it is embodied, that is, it arises from, and is tied

to, our preconceptual bodily experiences. As it has been shown, the structuring of many abstract concepts is made possible via the exploitation of metaphorical processes based on operations of conceptual mapping, where perceptual and motor information is used to understand less concrete knowledge domains (Lakoff 1987: 303):

> Comprehending experience via metaphor is one of the great imaginative triumphs of the human mind. Much of rational thought involves the use of metaphoric models. Any adequate account of rationality must account for the use of imagination and much of imagination consists of metaphorical reasoning. Such an account is outside the realm of objectivist theories.

According to Conceptual Metaphor Theory, the tendency to ground abstract concepts in more concrete knowledge domains stems from the human necessity to represent something which is not well delineated enough to be mentally visualized and comprehended (Lakoff & Johnson 1980: 115):

> Because so many of the concepts that are important to us are either abstract or not clearly delineated in our experience (the emotions, ideas, time, etc.), we need to get a grasp on them by means of other concepts that we understand in clearer terms [...].

As a matter of fact, highly abstract concepts are represented through classes of concepts which happen to be basic (or fundamental), that is, that happen to be directly connected to physical bodily experience and the sensory-motor system (Lakoff & Johnson 1999: 45):

> Metaphor allows conventional mental imagery from sensorimotor domains to be used for domains of subjective experience. For example, we may from an image of something going by us or over our heads (sensorimotor experience) when we fail to understand (subjective experience). A gesture tracing the path of something going past us or over our heads can indicate vividly a failure to understand.

Very concrete and basic concepts, such as color concepts or spatial relation concepts, are accessible through an agent's (an organism's) orientation, movement, and interaction with the surrounding environment. The spatial concept UP, for instance, can be commonly used to express both the movement and the orientation of an agent's body along the vertical axis. The meaning of UP does not emerge through intermediate processes activated via metaphorical transfers between conceptual domains, but it has an experiential source, as it appears to emerge from the interiorization of a specific kind of very basic and spatial experience (Lakoff & Johnson 1980: 476):

> We have bodies and we stand erect. Almost every movement we make involves a motor program that either changes our up-down orientation, maintains it, presupposes it, or takes it into account in some way.

Interestingly, spatial concepts (e.g., UP) are not only used to express literal meanings but are also extensively employed to structure figurative language. There exist, in fact, experientially grounded metaphorical mappings where the spatial concept UP is used to describe other less concrete concepts such as, say, IMPROVING ECONOMIC STATUS. To give an example, the IMPROVING ECONOMIC STATUS IS UPWARD MOTION conceptual metaphor relies upon the association between concepts with different degree of concreteness (or abstractness), according to which the target domain of IMPROVING ECONOMIC STATUS is organized on the basis of the source domain of VERTICALITY (and MOTION). This correspondence, though, is not arbitrary but emerges from experiential domain-to-domain correlations frequently occurring in everyday life (Johnson 2018). The spatial concept UP also appears to be extensively involved in the structuring of many primary metaphors (Chapter 3, Sec.3.1.), that is, metaphors that link together basic concepts directly arising from sensory experience. In primary metaphorical structures as, say, HAPPINESS IS UP[42], two directly perceived and experienced domains are aligned together (e.g., HAPPINESS and VERTICALITY). The main difference between the two domains is that, while the source domain (e.g., VERTICALITY) relates to sensory-perceptual experience, the target domain (e.g., HAPPINESS) relates to subjective responses to sensory-perceptual experience. Primary metaphors, more than other types of conceptual metaphorical structures, have been used as a proof of a direct connection between human cognition and bodily properties. They do demonstrate that the way we develop and familiarize ourselves with basic concepts is strongly dependent on the specific kind of bodies and of sensory-motor programs we have[43]. According to Lakoff and Johnson

[42] It has been argued that this metaphor is based on the correlation between happiness and erect body posture (Grady 1997).

[43] Yet, according to Lakoff and Johnson (1980), physiology is not the only one factor impacting our conceptualization ability. In fact, not only our direct physical experiences, but also the cultural background in which these same experiences take place, can influence the way we structure our conceptual system. In the literature, it has been shown that people with vision or hearing impairment commonly use primary metaphors based on visual or auditory information (Littlemore 2019). This phenomenon may be explained by reference to the fact that sensory metaphors happen to be among the most frequently recurring metaphors used in the dominant culture. However, research has demonstrated that people with different kinds of sensory impairment (e.g., blind or deaf people) are more willing to produce metaphors of a different sort (Taub 2001; Rinaldi et al. 2017). For a complete overview, see Littlemore (2019).

(1980, 1999), indeed, organisms having structurally different bodies would develop distinct types of basic concepts (1980: 476):

> Imagine a spherical being living outside of any gravitational field, with no knowledge or imagination of any other kind of experience. What could UP possibly mean to such a being?

The embodiment of meaning is made also possible via projections of image schemas, that is, via skeletal (in the sense of 'schematic') preconceptual structures (e.g., CONTAINER, PATH, UP-DOWN, FRONT-BACK, etc.) that frequently recur in the way human bodily functioning takes place in the physical spatial frame (Johnson 1987; Lakoff 1987). To provide an example, the understanding of the image-schematic relation UP-DOWN is enabled by the continuous experience of living in a space which happens to be gravitationally constrained. To take a case in point, the lifting of an object requires the removal of the gravitational steady state of the object from the base it is placed on. By the same token, the re-use of the image-schematic relation FRONT-BACK is made possible because of the way we visually perceive body-part relations (Johnson 2018): humans project their front-back sides onto external objects in their surroundings (e.g., the front-back side of a coin). Interestingly, this schematic spatial information is not only used by reference to very concrete spatial concepts (e.g., lifting events; perception of objects), but it is also metaphorically projected to shape more abstract domains of experience. This way, we use schematic spatial relations UP-DOWN to express emotional states (e.g., HAPPINESS IS UP) or time perception (e.g., FUTURE IS IN FRONT OF US)[44]. As these examples show, language is "not divorced from embodiment" (Gibbs 2006) but incorporates sensory information from everyday experience (e.g., image-schematic contents). Meaning is deeply shaped by bodily properties and is indeed enriched with the inputs stemming from the bodily interplay that humans have with things (and other entities) that are existing in their surrounding environment. These same inputs find linguistic representation either through the emergence of preconceptual structures with image-schematic content or through bodily-based metaphorical processes (Lakoff 1987: 278):

> Thus, what has been called abstract reason has a bodily basis in our everyday physical functioning. It is this that allows us to base a theory of meaning and rationality on aspects of bodily functioning.

[44] For a more comprehensive explanation, see Brugman (1983), Ellen Dodge & Lakoff (2005), Johnson (2018).

### 2.4.2. The embodiment of language: experimental evidence

Although traditional cognitivist approaches to semantics deny the existence of a link between semantics and sensory-motor processes (Fodor 1983), the embodied view of meaning has been strongly confirmed by an increasing 'body' of empirical evidence (Barsalou 1999). Embodied approaches to language comprehension, basically, claim that semantic processing, at least partially, takes place in "brain systems involved in direct sensory perception or motor action" (Dreyer & Pulvermüller 2019: 19).

In recent years great attention has been dedicated to the role that motor simulations have in the understanding of language (Gallese & Goldman 1998; Glenberg & Kaschak 2002; Zwaan, 2004; Fischer & Zwaan 2008). For instance, while Stanfield and Zwaan (2001) have succeeded in demonstrating that sentences may facilitate the mental representation of objects' orientations, data have also confirmed that the simulation activated in language processing is sensitive to specific perceptual differences of the objects (e.g., shape: Zwaan, Stanfield, & Yaxley 2002; Borghi & Riggio 2009). Therefore, Kaschak et al. (2005) demonstrated that simulations are indeed sensitive to the motion direction suggested by the sentence.

With respect to the main concern of this thesis, it is worth focusing on those several studies that have specifically investigated the relation between motor representations and the action lexicon. As a matter of fact, many works strongly support the claim that the sensory-motor cortex processes action-related aspects of word meaning (Hauk, Johnsrude, & Pulvermüller 2004; Shtyrov, Hauk, & Pulvermüller 2004; Pulvermüller 2005). A direct connection between sound perception of action words and motor area activation has been identified by Borghi and colleagues (Scorolli & Borghi 2007; Borghi & Riggio 2009; Borghi & Scorolli 2009) and confirmed by brain imaging experiments (Tettamanti et al. 2005). Hauk et al.'s (2004) findings show that the processing of action words, such as *pick, kick*, and *lick*, does elicit motor activity in the hand, foot, and mouth areas of the motor cortex. More interestingly, Pulvermüller and colleagues (2005) found that action words and sensory motor cognition are bidirectionally connected: on one hand, the access of action-related words seems to evoke motor resonance; on the other hand, the access of action words seems to be facilitated by motor resonance. More recently Borghi and Binkofski (2014) showed that words work in the same way that tangible tools work when it comes to the execution of actions. Their results open a door (pun intended) to the idea that semantic and sensory-motor cognition exploit the same sort of resources (Zipoli Caiani 2010, 2016).

Despite the considerable amount of evidence in favor of the embodied approaches to the processing of language (Dreyer & Pulvermüller 2019), there are still conflicting views on embodied representations of abstract words (Dove 2016). Many researchers have focused on semantic processing of abstract words and concepts, succeeding to show how particular kinds of abstraction are grounded in particular domains of concrete experience (Lakoff & Johnson 1980; Barsalou 1999; Gibbs 2006, 2011; Casasanto & Boroditsky 2008). Several studies have compellingly demonstrated that the way we understand linguistic representations of, say, time is grounded in representations of physical spatial concepts (e.g., Santiago et al. 2007; Ulrich et al. 2012). Moreover, abstract words were shown to refer to concrete referents, via metaphorical mappings (Lakoff & Johnson 1999; Casasanto & Boroditsky 2008), and abstract sentences were shown to correlate with activity in the motor system (Glenberg et al. 2008; Glenberg & Gallese 2012). It has also been observed that abstract emotion semantics seems to be grounded in specific motor areas (Moseley et al. 2012; Dreyer et al. 2015). Finally, experimental data support the hypothesis that the processing of abstract mathematical terms does involve the motor system (Tschentscher et al. 2011). However, as I hinted above, criticism still remains. In particular, Aziz-Zadeh et al. (2006) investigated the relation between metaphorical uses of action related words (e.g., *grasp* the meaning) and somatotopic motor areas activation, failing to prove "congruent somatotopic organization of semantic representations for metaphorical sentences in either hemisphere" (Aziz-Zadeh & Damasio 2008: 38). On the same token, more recent findings on action verb processing have been shown to be partially consistent with these results (Tomasino et al. 2014), by confirming that the motor cortex does not seem to be activated upon the processing of abstract uses of action verbs. However, to solve this apparent incongruency, it has been suggested that different kinds of abstract concepts and words may entail different types of processing (e.g., conventional vs. novel metaphors: Mashal et al 2007; Schmidt et al. 2007), and that only novel metaphors would be processed using embodied representations. On the same topic, Dreyer and Pulvermüller (2019) demonstrated that embodied approaches do also account for abstract word meanings, but that the direct involvement of sensory-motor processing depends on the precise semantics of the words.

## 2.5. Conclusions

This chapter introduced the Embodied Cognition framework, a pivotal approach in cognitive science that rests on the idea that human cognition must be investigated by reference to the interaction between the physical body and its external world. Although this framework does not represent a unified theoretical system, the matrix of heterogeneous approaches therein (e.g., embodied, enacted, embedded, extended) collectively share the hypothesis that cognitive processes strongly depend on an agent's bodily properties. Throughout the chapter, it has also been stressed that embodied models represent a sort of counter-reaction to the predominance of Cognitivism, an approach to the study of mind which posits that cognitive abilities involve processes of computation over symbolic representations. Embodied theories indeed try to overcome the incapacity showed by cognitivist approaches in solving the so-called symbol grounding problem, that is, in explaining how abstract symbols acquire their meaning. The operation of meaning construction does represent one of the main concerns of this work. In this doctoral project, the semantics of action verbs has in fact been investigated within the general embodied paradigm, being considered as "grounded in pervasive patterns of embodied experience" (Gibbs 2003: 14). Not only physical, but also figurative, meanings of action verbs have been accounted for by working on the idea that sensory-motor processes can provide us with more data on human understanding and representation of concrete and abstract concepts.

# Chapter three:
# Metaphor between body, mind and language

## 3.1. Introduction

Metaphor has undoubtedly been (and still is) the trope with the most fecund career: from being valued as a tool for making comparisons (Aristotle 2009, 2011), to being considered a grammatical, semantic and conceptual anomaly (Beardsley 1962; Loewenberg 1975; Levin 1977), until being seen as playing a role in the interaction between concepts (Black 1954, 1962, 1979; Ricoeur 2010 [1975]). Nowadays, metaphor is one of the major areas of investigation in Cognitive Semantics, given its capacity to transpose aspects of human cognition, perception and experience into language (and other means of expression). The rise in the interest in metaphor studies in our times can be traced back to the publication of Lakoff and Johnson's (1980) book *Metaphors we live by*, which represents a milestone in the history of semantics and a decisive step toward the proliferation of studies within the field of Cognitive Linguistics. In this theoretical framework, instead of being understood in terms of one-off phenomena or as a merely linguistic embellishment, metaphor is primarily conceived of as a conceptual phenomenon, according to which we conceptualize one mental domain in terms of another (Lakoff & Johnson 1980). As a corollary of that, the ways in which we express metaphors and metaphorical concepts need not be strictly verbal: they can also be expressed by means of gestures (McNeill 1992; Cienki 1998; Cienki & Muller 2008), images (Forceville & Urios-Aparisi 2009) and other communicative or artistic codes.

Because our study is concerned with verbal metaphors and, in particular, metaphors expressed by action verbs, in the present chapter I will focus my attention on a very defined and narrow set of topics. In Section (3.2.), I will present the notion of conceptual metaphor and its structural elements (Lakoff & Johnson 1980). Section (3.3.) will be focused on the concepts of primary and complex metaphor (Grady 1997). In Section (3.4.), I will present a group of multidisciplinary studies that have been used to argue for the so-called psychological reality of conceptual metaphors (Lakoff & Johnson 1999). In Section (3.5.), I will describe the most relevant alternative approaches to the study and comprehension of metaphor (Steen 2007). Finally, Section (3.6.) will be devoted to the brief illustration of the relation that happens to exist between abstract thinking, bodily actions (and functions), and the action lexicon we use to make these relations linguistically explicit.

## 3.2. Conceptual metaphor theory

As noted above, the origin of Conceptual Metaphor Theory (CMT) can be traced back to the foundational book published by Lakoff and Johnson in 1980. This work, which followed the 1979 publication of *Metaphor and thought* (Ortony 1993 [1979]), suggested a new and revolutionary way of looking at metaphor[45] and paved the way for metaphor studies in a myriad of different fields and modalities. One of the most important claims of Conceptual Metaphor Theory is that metaphor is not simply a matter of language but that it rather reflects a deeper cognitive structure and organization of human thought (Lakoff & Johnson 1980: 4):

> The concepts that govern our thought are not just matters of the intellect. They also govern our everyday functioning, down to the most mundane details. Our concepts structure what we perceive, how we get around in the world, and how we relate to other people. Our conceptual system thus plays a central role in defining our everyday realities. If we are right in suggesting that our conceptual system is largely metaphorical, then the way we think, what we experience, and what we do every day is very much a matter of metaphor.

Within this framework, metaphor is not considered as a merely lexical phenomenon and is not reduced, as in what some would consider the canonical view[46] (Searle 1993), to a stylistic embellishment for specific rhetorical purposes (Lakoff & Johnson 1980: 4):

> Metaphor is for most people a device of the poetic imagination and the rhetorical flourish—a matter of extraordinary rather than ordinary language. Moreover, metaphor is typically viewed as characteristic of language alone, a matter of words rather than thought or action. For this reason, most people think they can get along perfectly well without metaphor. We have found, on the contrary, that metaphor is pervasive in everyday life, not just in language but in thought and action. Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature.

CMT relies upon a clear distinction between what we mean by *conceptual metaphor* and what we refer to by the expression *linguistic metaphor*. Linguistic metaphors are linguistic expressions which may represent, at the level of language, deeper cognitive structures. For instance, when we say "I dragged myself into a meaningless existence" or "The dancer pushed herself beyond her limits", we are doing nothing but using single metaphorical expressions to describe situations in which there exists a correlation between acting and

[45] See also Reddy (1979).

[46] For a complete summary, see Johnson (1981).

moving in the space. These examples are ultimately based on our conceptualization of actions in terms of self-propelled motion along a path (Lakoff 1993). If we move from the surface of language to the deeper structure hidden behind it, we see that the metaphorical expressions used above correspond to different ways to express the same (or related) cognitive metaphorical structure(s). The sentences "I dragged myself into a meaningless existence" and "The dancer pushed herself beyond her limits" can be interpreted as the linguistic reflection of the conceptual metaphor SELF-INITIATED ACTIONS ARE SELF-PROPELLED MOTIONS.

### 3.2.1. The conceptual mapping

According to CMT, metaphor is based on a conceptual mapping operation, by means of which one domain is projected onto another domain (Lakoff & Johnson 1980). Conceptual mapping consists in a set of systematic correspondences between the source and the target domain of a metaphorical structure, under which conceptual elements of the source domain correspond to conceptual elements of the target domain. The two domains participating in the operation of conceptual mapping can be conceptualized as particular and coherent organizations of experience, and accordingly, are given two different names (Kövecses 2010: 1) the conceptual domain from which we take knowledge to structure the other conceptual domain is called the *source domain*; 2) the conceptual domain that is structured by means of the experiential knowledge of the source domain is called the *target domain*. This operation is conventionally expressed by the formula A is B, where A stands for the target and B stands for the source domain involved in the mapping. To go back to the example above (e.g., SELF-INITIATED ACTIONS ARE SELF-PROPELLED MOTIONS), through the metaphorical mapping, we build the more abstract domain of action by using pieces of the more concrete domain of motion.

Conceptual mappings are not randomly produced but respect some basic rules. First, it is worth observing that they are not exhaustive and not bidirectional. When we say that mappings are not exhaustive, we mean that not all, but just some, aspects of the source domain are transferred onto the target domain (Evans & Green 2006). This phenomenon, known as "partial metaphorical utilization" (Kövecses 2010), states that in allowing us to focus on one aspect of a concept, a metaphorical concept can keep us from focusing on other aspects of the concept that are inconsistent with that metaphor. When a target domain is organized in terms of a specific source domain, it happens that some aspects of the target

domain are highlighted[47], whereas other aspects are hidden (Evans & Green 2006). For instance, if we consider the metaphor ACTION IS SELF-PROPELLED MOTION, we notice that during the metaphorical mapping we highlight the fact that the actions we perform can have a specific purpose but, at the same time, we hide the fact that our actions could also be caused by an external cause. These example shows that this metaphorical concept provides us with a partial understanding of what actions are and that, in doing this, it hides other aspects of what actions are. Going back to the second problem, we say that the mapping itself is conditioned by an asymmetrical directionality, according to which the transfer of the domain structure may only go from the source to the target domain and not vice-versa[48]. The unidirectionality principle is respected even when two different metaphors share common domains (Lakoff & Turner 1989: PEOPLE ARE MACHINES has very different implications than MACHINES ARE PEOPLE does).

How can one decide whether a domain can function as a target or as a source domain? We commonly use more concrete and physically grounded concepts to represent more abstract and vaguer ones (Lakoff & Johnson 1980). The source domain is commonly recognized as the more concrete and specific one and the target domain is often the more abstract one. While this is not an absolute rule (we can think of physical processes in terms of more abstract models, such as putting together of two pieces of a puzzle as a "marriage"), in the literature (e.g., Kövecses 1986, 2002)[49], it has been shown that the most common source domains in many languages that have been investigated pertain to very basic categories (e.g., human body and sensory motor processes), and that the most common target domains refer to more abstract categories (e.g., emotion, thought, etc.). The directionality of correspondences between more basic and more abstract categories also confirms the experiential nature of metaphor and, in particular, the pivotal role that embodiment plays in the building of our conceptual system. As a matter of fact, many metaphors are the result of experientially motivated mappings, built on knowledge structures directly emerging from our pre-conceptual bodily experience (e.g., image-schematic structures: Johnson 1987;

[47] This phenomenon is called "metaphorical highlighting" and can be better explored in Kövecses (2010).

[48] Just to give an example, Grady (2007) points out that the term *weather* can be metaphorically used to describe a specific economic or political situation. Nevertheless, specific economic or political circumstances, i.e. recession, cannot be used to metaphorically refer to a storm. Directionality is not a simple inherent property of the metaphorical mapping, but it is strong evidence of the fact that metaphor cannot be reduced, as was assumed in some previous theoretical approaches, to a substitution between words that share an alleged, and not otherwise proven, similarity (Evans & Green 2006; Grady 2007).

[49] To have a wider view, also consider Pauwels & Simon-Vandenbergen (1995).

Lakoff 1987). Just to give an example, it very often happens in describing emotional states (e.g., depression) by means of very specific spatial configurations and relations (e.g., IN-OUT): "John fell into a very depressive phase". We very commonly use the CONTAINMENT schema to conceptualize emotional states as containers, restricting the behavior of the person who is experiencing them (Johnson 1987).

### 3.2.2. Logical entailments and inferences

A metaphorical mapping is a partial transfer operation, in which some features of the source domain are projected onto the target domain. According to the theory, during the transfer, conceptual mapping does not only concern objects and properties but also relations. It can therefore happen that conceptual mapping moves rich additional knowledge[50] from the source to the target domain, namely logical entailments and inferences (Evans & Green 2006). One of the basic elements of the conceptual metaphor ACTION IS SELF-PROPELLED MOTION is that the action is performed along a path, which has an end point. When we have a purposeful action to achieve, we may think of the path as corresponding to the progress or development of our actions and may have a specific goal as a final destination. From the everyday knowledge that we possess about actions, we know that we can also encounter some impediments or difficulties that make us stray from the path, and hence walk away from the final destination of the path itself. This additional knowledge is reflected in the metaphorical entailment that dealing with things or events that make it difficult for us to act means dealing with situations that may prevent us from reaching our initial goal. In this case, we say that we made use of additional knowledge about the domain of motion to understand an aspect of the domain of action and its potential developments.

### 3.2.3. The invariance principle and the target domain override principle

One of the main problems arising from the discussion in the previous section has to do with the kind of additional knowledge (i.e., logical entailments) which can or cannot be transferred from the source to the target domain. How can we predict the kind of entailments and inferences that can be mapped from domain to domain? The invariance principle hypothesis states that (Lakoff 1993: 215):

[50] This rich everyday knowledge goes under the name of "folk theory" or "folk understanding" of a domain (Evans & Green 2006; Kövecses 2010).

> Metaphorical mappings preserve the cognitive topology (that is the image schema structure) of the source domain, in a way consistent with the inherent structure of the target domain.

The term "invariance" refers to the fact that the knowledge that is mapped from the source to the target preserves its skeletal structure. In this case, we say that the conceptual material is invariant. Nevertheless, it can happen that the skeletal structure of the source conflicts with that of the target. Thus, we can say that the main function of the invariance principle is that of stopping the knowledge that is not coherent with the schematic structure of the target domain (Turner 1991; Lakoff 1993)[51]. In addition to the Invariance Hypothesis, Lakoff (1993: 216) also introduces the so-called "target domain override" principle, according to which:

> Image schema structure inherent in the target domain cannot be violated, and [...] inherent target domain structure limits the possibilities for mappings automatically.

The "target domain override" principle states that, in the metaphorical mapping, the target domain structure plays an active role, automatically limiting the elements that can or cannot be mapped. To better understand these two points, let us consider two linguistic instances of the conceptual metaphor CAUSATION IS OBJECT TRANSFER (a-b) and let us compare them with one nonmetaphorical sentence (c) to which they seem to be related to (Kövecses 2010):

a) He gave her headache
b) She gave him a hug
c) She gave him a gift

There exists a systematic correspondence between the conceptual elements of the domains involved in the mapping (e.g., the source domain of TRANSFER, and the target domain of CAUSATION) the agent corresponds to the transferor, the affected entity corresponds to the recipient, and the effect of the action corresponds to the transferred object. By virtue of this correspondence (and of its logic entailments), we would expect that, as well as in case (c), in (a-b) both the recipients are in possession of the metaphorical object that has been giving to them (e.g., headache, hug):

d) He gave her headache, and he still has it

[51] It has been suggested that the Invariance principle does not offer a concrete solution for many metaphorical cases. For instance, with respect to the conceptual metaphor THEORIES ARE BUILDINGS, the invariance principle does not explain why theories can have foundations but not windows. For an in-depth discussion, see Grady et al. (1996).

e) *She gave him a hug, and he still has it

Nevertheless, as examples (d-e) show, only the metaphorical sentence in (d) remains acceptable. This is possible because, while the source domain in both (d-e) is TRANSFER, the example in (d) refers to a STATE (e.g., headache) and that in (e) refers to an EVENT (e.g., hugging). What is important to point out here is that, unlike STATES, EVENTS are temporally bounded and cannot last in time (Evans & Green 2006), hence they cannot support the gaining possession entailment. This very short example helped us to show that EVENTS' schematic structure fails to map those metaphorical entailments (from the source domain) that could result in a violation of the target structure. As it has already been discussed above, metaphorization processes take place in accordance with a series of principles and rules, among which the invariance principle and the target domain override principle. Both the principles act as tools that prevent conflict between the source and the target domain to happen.

## 3.3. Primary metaphor theory

As we anticipated in the previous section, CMT holds that the cognitive association we make via the use of metaphor is based on our human experience of the world and of the environment we are surrounded by. It also posits that many of the metaphorical expressions we use daily are built on the tight bond existing between our sensory-motor experiences (and processes) and our subjective (or mental) responses to those experiences and processes (Grady 1997). The "Primary Metaphor Theory" developed by Grady (1997) has had a strong impact on the way scholars from different research fields have analyzed conceptual metaphors. It went a step further with regard to the way of looking at metaphors and at the nature of conceptual associations that metaphors establish. PMT, in fact, relies upon the idea that metaphors are connected to experiences, via a series of stages (e.g., co-occurrence of basic events and cognitive tendencies/abilities, experience of primary scenes, conceptual binding, deconflation, creation of primary metaphors), and that metaphors can be distinguished on the basis of their basic or complex nature.

### 3.3.1. From basic events to primary scenes

Basic events are those salient real-time experiences which relate in particular ways to our goal-oriented interactions with the world (Grady 1997: 21). The frequency of occurrence of basic events mirrors their very saliency: basic events are, in fact, more meaningful than

others since they are directly connected to our goals and purposes. Let us consider, for instance, the common experience of interacting with the objects around us: it often happens that we manipulate objects, we set relations between objects, or move objects from one place to another. As humans, we have the innate (biological) tendency to subjectively respond to perceptual inputs and experiences. For instance, we can perceive the size and the weight of an object, we can distinguish one object from another, and we can make judgments about the intensity of the force needed to move one object from one place to another. We also have very innate ways of responding to these perceptual inputs that we receive from our experience: we can have difficulty in raising a heavy object, we can prefer lighter to heavier objects, and we can feel satisfied when we are forceful enough to move a heavy object from one place to another. Such examples illustrate that there exists a correlation between basic events and the subjective responses that we give to those basic events and perceptual inputs. Primary scenes can be conceived of as the result of this recurrent correlation between distinct dimensions of our experience (Grady 1997: 23):

> This subjective (phenomenological) experience of a basic event— including both the perceptual aspect and our response to it—is what I will refer to as a primary scene.

When we lift an object (basic event), for example, we experience the fact that to remove the object from its stationary gravitational state we have to use a certain amount of force (cognitive abilities and responses). It is the very co-occurrence of height and weight that makes these two dimensions of experience start to be closely associated in our mind (primary scenes). As result, in our cognitive representations of the world, we start binding the basic concepts emerging from these two dimensions, that is, the upward motion along the vertical axis and the force (Grady 1997). The relevant fact is that we tend not to simply associate (or bind) basic distinct concepts, but also to create wider correspondences between them. It is by virtue of the phenomenon of binding that we can metaphorically align two different basic concepts coming from two different basic scenes.

### 3.3.2. Primary metaphors

When we talk about metaphors, a main distinction can be made between primary and complex metaphors (Grady 1997). Primary metaphors are basic in the sense that they link together concepts that arise directly from our sensory experience. In addition, they are basic in the sense that they cannot be further decomposed into more basic metaphors and into

more basic mappings (e.g., ATTRACTION IS PHYSICAL FORCE)[52]. Primary metaphors are foundational cognitive structures in which two primary domains are aligned together (e.g., ATTRACTION and PHYSICAL FORCE). Both the conceptual domains are directly perceived and experienced. The main difference between the two conceptual domains is that, while the source domain (e.g., PHYSICAL FORCE) relates to sensory-perceptual experience, the target domain (e.g., ATTRACTION) relates to subjective responses to sensory-perceptual experience[53]. This means that the distinction existing between the two domains has nothing to do with their degree of abstractness but, rather, with their degree of subjectivity (Grady 1997). The basicness of both the source and the target concepts involved in the primary metaphors could make us erroneously think that in the operation of conceptual mapping there is no directionality, and that both directions could be available. But, as in all the other metaphorical mappings, primary metaphor mappings are constrained by the principle of unidirectionality: from the source to the target domain. Primary source concepts derive from external sensory experience and are said to have what is called image content, a type of content which is directly tied to physical perception or sensation (Grady 1997: 26):

> The feeling of an itch; the perception of shape, weight, and distance; the detection of movement—all of these experiences involve the (apparently) direct perception of features of our bodies or our environments. In keeping with Damasio (1994) and others, I will use the term image to refer to mental representations of such experiences, which include content from any sense modality or bodily sensation. When we perceive brightness, heaviness, sweetness, nearness, and so forth, or experience hunger or pain, the cognitive representations of these experiences have what I will refer to as image content. Primary source concepts, then, are characterized by image content.

Primary target concepts derive from real experience but are not directly perceptual, hence they lack image content. These concepts refer to subjective responses deriving from background operations to which we have low conscious access (Evans & Green 2006). They are said to have a different kind of content, that is, response content (Grady 1997: 26):

[52] Unlike primary metaphors, complex metaphors are understood as compounds of more basic metaphorical structures. For instance, the complex metaphor THEORIES ARE BUILDING is the result of the combination of the more general metaphors ORGANIZATION IS PHYSICAL STRUCTURE and VIABILITY IS ERECTNESS (Grady 1997).

[53] Grady (1997) claims that the experiential motivation for the primary metaphor ATTRACTION IS PHYSICAL FORCE lies in the correlation between the desire for an object and the physical motion towards it.

> Primary target concepts such as Similarity, Happiness, and Achieving Purposes, on the other hand, lack image content. They are not direct perceptions of the world, but responses to—or, to use mathematical terminology, operations or functions over—our perceptions of the world.

Finally, primary metaphors are "widespread across languages that are not related genetically, areally, or culturally" (Grady 2007: 194).[54] A very canonical example, in this sense, is given by the primary metaphors belonging to the general Event Structure metaphor system (Lakoff 1994), under which, say, CHANGES are conceptualized as MOVEMENTS, CAUSES are conceptualized as FORCES, and ACTING is conceptualized as MOVING.

### 3.3.3. Complex metaphors

Complex metaphors can be conceived of as multi-level structures, arising from the stratification of two or more basic metaphors. A canonical example of compound metaphor is represented by the IMPEDIMENTS TO IMPROVING ECONOMIC STATUS IS ANTAGONISTIC FORCE metaphor. This metaphorical structure is built on the primary metaphor IMPEDIMENTS TO ACTION ARE ANTAGONISTIC FORCES. The two conceptual domains involved in the operation of metaphorical mapping, i.e., IMPEDIMENTS TO IMPROVING ECONOMIC STATUS and ANTAGONISTIC FORCE, are so rich, complex and detailed that they can be broken down into more elementary components. For instance, the source domain ANTAGONISTIC FORCE can be further decomposed into smaller and inter-related concepts, such as force-application, manner of application or duration of the application. Nevertheless, it is wrong to assume that the entire additional knowledge is projected from a domain to another. By the expression "poverty of mapping", Grady (1997) refers to the fact that, in compound metaphors, the additional rich knowledge structuring the source domain (e.g., ANTAGONISTIC FORCE) fails to be mapped onto the target domain (e.g., IMPEDIMENTS TO IMPROVING ECONOMIC STATUS). Another specific characteristic possessed by compound metaphors is that these latter lack a clear experiential basis. In the IMPEDIMENTS TO IMPROVING ECONOMIC STATUS IS ANTAGONISTIC FORCE metaphor, it is easy to see how the source and the target concepts are not connected with one another in our daily experience of the world. The very fact that we commonly discuss the difficulties that we may encounter in improving our economic status in terms of forces does not mean

[54] For example, it happens that in different languages, words used to refer to *size* are also used to express *importance*. As Grady shows (1997), in languages such as Russian, Turkish or Hawaiian, a semantic extension from large to important is observable. This fact is not unexpected but is the natural confirmation of the fact that primary metaphors are experientially motivated, being based on the recurrent association of basic concepts (e.g., big and important) in everyday life across different cultures.

that these two conceptual domains are closely related in real life. Their co-occurrence, in fact, is not experientially motivated but is a matter of incidental association made on the base of a metaphorical mapping. Finally, the lack of an experiential basis and the fact of possessing a very detailed knowledge structure explain why, differently from primary metaphors, compound metaphors are not likely to represent cross-linguistic universals. The specificity of their background knowledge makes them phenomena that are culture-dependent.

## 3.4. The psychological reality of metaphorical mappings

Earlier in this chapter, we said that Conceptual Metaphor Theory defines metaphor as a conceptual phenomenon which structures both our way of thinking and speaking. CMT indeed posits the existence of a tight link between our metaphorical way of thinking of experience and the kind of language that we use to refer to that experience. Competent members of any culture have at their disposal an entrenched set of conceptual structures, which appear in language in the form of linguistic metaphorical structures.

In the following sub-section, I will give an overview of the support for CMT's claims by presenting some of the multidisciplinary research which demonstrates the idea that conceptual metaphors do play a role in the organization of the human mind and have psychological reality.

### 3.4.1. A brief overview on the multidisciplinary evidence

The conceptual reality of metaphors (and of metaphorical mappings) has thus been a key research issue. In the last 20 years, a consistent number of multidisciplinary works has lent support to the idea that conceptual metaphors have psychological reality (Lakoff & Johnson 1999; Gibbs 2006; Núñez et al. 2006; Grady 2007). In particular, linguistic studies demonstrated that metaphors do play an essential role in semantic change (Sweetser 1990), by contributing to the historical evolution of words' meanings (e.g., pervasiveness of the conceptual metaphor KNOWING IS SEEING Indo-European languages). Another important source of data has been provided by research in the field of gesture studies, where it has been shown, for example, that many spontaneous gestures accompanying speech can be motivated on the basis of existing conceptual metaphors (McNeill 1992; Cienki & Müller 2008). On the same token, data collected from American Sign Language (ASL) confirmed not only that the sign lexicon does contain many different metaphorical signs but that these

same metaphorical signs mirror cross-cultural conceptual metaphors (Taub 1997; Lakoff & Johnson 1999). Some language acquisition studies (Johnson 1997) have paid attention to the use that children make of the conceptual metaphor KNOWING IS SEEING, and demonstrated that the acquisition of this metaphorical structure goes through a primary phase of deconflation (where the act of seeing is associated to the act of acquiring knowledge) and a subsequent phase of differentiation (where children acquire the ability to separate the literal from the metaphorical meaning). The psychological reality of conceptual metaphors has been also supported by experimental studies conducted in the field of psycholinguistics (Nayak & Gibbs 1990; Gibbs 1994; Boroditsky 2000; Gentner 2001; Grady 2007). In particular, Gibb's (1994) findings are consistent with the hypothesis that conceptual metaphors (e.g., ANGER IS HEATED FLUID IN A CONTAINER) may have an important role in idiom comprehension. Boroditsky's work focused on the conceptualization of time, showing that the human representation of the temporal dimension is based on our concept of space (e.g., TIME IS SPACE), and that this very stable conceptualization is indeed metaphorically motivated.

## 3.5. Alternative approaches to the conceptual metaphor theory

The conception of metaphor that we illustrated so far (e.g., *Conceptual Metaphor Theory*: Lakoff & Johnson 1980) rests on three main tenets. First, CMT holds that metaphors shape both our way of thinking and our way of talking or communicating our ideas. Metaphor thus is understood as a cognitive phenomenon that is reflected in language, where it manifests itself through different types of linguistic expressions (e.g., phrases, lexical items, morphemes). Second, CMT is based on the assumption that metaphor stems from an operation of conceptual mapping, via which information is transferred from a source domain to a target domain (Lakoff & Johnson 1980). Third, cross-domains mappings are not randomly produced but are considered part of our conceptual system. According to Lakoff and Johnson (1980, 1999), this entails that, when we use a metaphor, we automatically access the mappings to arrive at the correct interpretation; and that this ease in the accessibility depends on the fact that some of the interpretation is retrieved from semantic memory.

However, in the last 20 years, CMT has not been the only available theoretical framework in the Cognitive Linguistics panorama, but many other models have been proposed (Steen 2007). Amongst others, we will focus on: a) Blending Theory (Fauconnier & Turner 1994,

1996, 1998, 1999, 2002; Turner & Fauconnier 1995, 2000); Class-inclusion Theory (Glucksberg 1991; Glucksberg, Brown, & Mc-Glone 1993; Glucksberg & Keysar 1990, 1993; Glucksberg & McGlone 1999; Glucksberg, McGlone, & Manfredi 1997); and the Career of Metaphor Theory (Bowdle & Gentner 2005; Gentner & Bowdle 2001; Gentner, Bowdle, et al. 2001; Gentner & Rattermann 1991; Gentner &Wolff 1997; Wolff & Gentner 2000). In the following 4 sub-sections, I will shortly describe each one of these alternative approaches to the study and understanding of metaphor.

### 3.5.1. Blending theory

Blending Theory (or Conceptual Integration Theory) was introduced by Gilles Fauconnier and Mark Turner (Turner & Fauconnier 1995, 2000; Fauconnier & Turner 1996, 1998, 1999, 2002) and immediately hailed as the most important theoretical extension of Conceptual Metaphor Theory (Geeraerts 2010). Basically, the main novelty proposed by BT is the fact that, within its integration model, the two conceptual domains of CMT are substituted with four temporary structures (mental spaces)[55], whose elements are connected by mappings. In the prototypical situation, the content comes from one space (e.g., the Target) and the structure comes from the other (e.g., the Source). The two input spaces interact with each other in the so-called blended space, in which the knowledge deriving from the cross-mapping between the two spaces is merged. Even though its elements are derived from the input spaces, the information structure emerging[56] in the blended space contains information that does not belong to either of the input spaces. This means that, after merging, the blend space contains new meaning that cannot be traced to either of the input spaces, when considered in isolation. A fourth space to be presented is the so-called generic space. The generic space works as a container for the highly schematic material shared by the two input spaces, and it is, in fact, used to regulate the identification of those elements of the two input spaces that will be merged within the blended space. As a matter of fact, the information that is mapped onto the blended space is selective, and only elements that show to be necessary to the metaphor are involved in the operation of merging.

[55] Mental spaces can be defined as "small conceptual packets constructed as we think and talk, for purposes of local understanding and action" (Fauconnier & Turner 1998: 137).

[56] This means that the blended space emerges from the fact that elements and structure of the two input spaces are combined to produce new additional information.

Blending Theory's model of metaphor differs from that of Conceptual Metaphor Theory on many levels (Geeraerts 2010). First, even though it is also based on the idea of cross-domain mappings, conceptual mappings are conceived in BT more as interactions (or conceptual integrations) rather than as cross-domains transfers. Furthermore, the mapping is not necessarily unidirectional: information structure can be projected from the input spaces to the blend space and vice-versa. Second, Blending Theory pays more attention to the dynamic role that blending plays in meaning construction, where Conceptual Metaphor Theory mainly focuses on the importance that the metaphor system has within human cognition.

This last point happens to be extremely relevant within this study, as it helps to explain why, for my specific purposes (the analysis of metaphorical uses of action lexicon), I preferred the approach proposed by Conceptual Metaphor Theory over that one proposed by Blending Theory. Although Blending Theory stands as the most relevant attempt to expand Conceptual Metaphor Theory, and although it provides an excellent model for the understanding of how the human mind integrates information to represent new figurative meanings, it does not pay enough attention to the entrenched conceptual relationships that metaphor establishes between: 1) concepts with different degrees of abstractness; 2) perception, human cognition and language. Blending Theory, in fact, has always been primarily concerned with analyzing novel or very creative metaphorical utterances[57], instead of detecting the metaphorical patterns that emerge in the way we use everyday language and ground it, for example, in our bodily experience. In short, blending theory has always been focused on the particulars of individual examples rather than on the generalizations across a broad range of metaphoric expressions (Grady, Oakley & Coulson 1999).

### 3.5.2. The class-inclusion theory of metaphor

The class-inclusion theory (Glucksberg & Keysar 1990, 1993; Glucksberg 1991; Glucksberg, Brown, & Mc-Glone 1993; Glucksberg, McGlone, & Manfredi 1997; Glucksberg & McGlone 1999) suggests that metaphor understanding is based on a categorization process, according to which metaphorical comparisons stem from the interaction of three conceptual categories (e.g., domains: Lakoff & Johnson 1980; spaces: Fauconnier & Turner 1998). In this model, metaphorical statements (e.g., *My job is a jail*) are interpreted as class-inclusion statements, where the metaphor topic (e.g., job) corresponds to the conceptual target category, the

[57] The Blending Theory approach is not simply limited to the analysis of metaphor, but it also appears to be used in the investigation of many other rhetorical forms (e.g., counterfactuals: Fauconnier & Turner 2002).

vehicle (e.g., jail) corresponds to the conceptual source category[58], and the conceptual superordinate category (e.g., oppressive situations) can be interpreted as the set of things or situations that the metaphor vehicle exemplifies. Class-inclusion Theory rests on the idea that the vehicle has a dual reference (it can have both literal and figurative meanings), and that it provides the topic with the properties to be attributed. It also assumes that the topic provides dimensions for attribution, thereby constraining the set of candidate vehicle properties (Glucksberg & McGlone 1999: 1542-1544):

> In metaphors, the vehicle term thus has two potential referents: the literal referent (e.g., actual jails), and the category of things or situations that the metaphor vehicle exemplifies (e.g., situations that are confining, oppressive, etc.). When such a category is used to characterize a metaphor topic, it functions as an attributive category in that it provides the properties to be attributed to the metaphor topic. The category of 'jail' in its broadest sense is such an attributive category. [...] For any given metaphor topic, certain dimensions of property attribution will be potentially relevant, while others will not.

One of the most relevant consequences is that, according to this model, the metaphor vehicle can have different interpretations and that these same interpretations may vary in accordance with the metaphor topic and the discourse context (Glucksberg & Glone 1999: 1544):

> Understanding a metaphor thus requires two kinds of knowledge. First, one must know enough about the topic to appreciate which kinds of characterizations are interesting and meaningful, and which are not. Second, one must know enough about the metaphor vehicle to know what kinds of things it can epitomize.

This problem is of extreme importance, since it is strictly connected to the idea that "people actively construct interpretations of utterances in discourse" (Glucksberg & McGlone 1999: 1546). The categorization hypothesis, in fact, relies upon the idea that metaphors are not understood via stable and pre-fixed mappings, stored in long-term memory (Lakoff & Johnson 1980, 1999), but that they rather derive from processes of ad-hoc categorization (Barsalou 1983). In this model, cross-domains mappings are not explicitly represented as part of our cognitive system, and metaphors interpretation is recognized as a dynamic process that speakers (or users) of language actively put in place during conversation for communicative aims (Glucksberg & Glone 1999).

[58] The conceptual target category can be viewed as a sort of prototypical (or representative) exemplar of the superordinate category.

As it has been discussed so far, the class-inclusion approach rests on the idea that understanding a metaphorical statement begins with the creation of a class-inclusion relationship, involving both the target and the source category (Gibbs 1992). It also posits that there is no underlying structure of conceptual metaphors in the mind and that metaphors are created on the fly, for specific communicative aims. Yet, this same idea contrasts with the hypothesis that metaphor understanding is enabled by the availability and direct accessibility of conceptual mappings, which happen to systematically structure our cognitive system (Lakoff & Johnson 1999).

Although this study does not directly tackle the question of how metaphor comprehension takes place, it is explicitly based on a conception of metaphor as a conceptual phenomenon that happens to have a primary role in the grounding of abstract concepts and figurative meanings in bodily experience. This thesis rests on the idea that many metaphorical mappings, especially those that are involved in the structuring of primary metaphors, exist as part of our everyday knowledge and stem from our sensory-motor experience. I believe that it would be misleading to think of metaphorical mappings as isolated structures: they should be rather considered as tiles of our conceptual system, by means of which we are not only able to understand single metaphorical expressions but also to see the coherent and general metaphorical structure which is behind them. Therefore, the coherence of the general structure permits us to investigate the systematic relationships between cognition and the real world, the metaphor system and sensory motor processes. When it comes to the study of metaphor, considered as figure of thought and of language, the main problem arising from the adoption of the class-inclusion approach is that this approach only looks to the peculiar features of the single pieces of the puzzle instead of, as in the case of Conceptual Metaphor Theory, to the puzzle itself.

### 3.5.3. The career of metaphor theory

The career of metaphor hypothesis was introduced by Gentner and her colleagues and meant to be a sort of theroretical compromise between the two most important models for the analysis of metaphors (Gentner & Rattermann 1991; Gentner &Wolff 1997; Wolff & Gentner 2000; Gentner & Bowdle 2001; Gentner, Bowdle, et al. 2001; Bowdle & Gentner 2005). It was, indeed, proposed as a hybrid framework for the study of metaphor and thought with the aim of combining in a single formula the standard cross-domains mappings (e.g., in Conceptual Metaphor Theory) and the minimalist class-inclusion approaches (e.g., in Class-inclusion Theory) to metaphor comprehension. The career of metaphor theory (Bowdle &

Gentner 2005, Gentner & Bowdle 2008) posits that the range of conventionality of a metaphor influences the kind of comprehension processes that the metaphor is subjected to: novel metaphors are invariably understood via comparison, conventional metaphors via categorization (Gentner & Wolff 1997; Bowdle & Gentner 1999; Wolff & Gentner 2000; Gentner & Bowdle 2001; Gentner et al. 2001). According to Gentner and colleagues, the choice between the two processes strongly depends on the type of linguistic material that has to be interpreted. Novel metaphorical statements are processed according to the structure-mapping theory (Gentner 1983), which bases on a process of structural alignment (SME; Falkenhainer, Forbus & Gentner 1989)[59], where the structures of both the target and source concepts are compared via similarity and analogy. On the contrary, the claim is that conventional metaphorical statements are processed according to the categorization hypothesis (Glucksberg & Keysar 1990), according to which interpreting a metaphor means creating a superordinate conceptual category that includes both the source and the target conceptual categories, where properties are attributed via a class-inclusion mechanism[60]. As Glucksberg points out, one of the problematic points of the career of metaphor approach is that this model is based on the assumption that metaphors and similes are equivalent tropes and that metaphors and their corresponding similes mean the same thing (Glucksberg 2008: 75):

> Whereas comparison theorists argue that metaphors are understood as implicit similes, categorization theorists argue that the opposite is true: that similes are understood as implicit categorization assertions. Metaphors are not understood by transforming them into similes. Instead, they are intended as class-inclusion statements and are understood as such. When metaphors are expressed as comparisons, then they are interpreted as implicit category statements, rather than the other way around.

On the contrary, Glucksberg insists that not only novel and apt metaphors may be better understood when in the form of metaphor rather than in the form of similes, but that their interpretation may differ from their corresponding similes. In Glucksberg's (2008) account, comparison and categorization should be considered as complementary strategies for metaphor comprehension. In this framework, the appropriateness of the approach depends on the quality and aptness of the metaphor: comparisons could be a useful strategy in case

[59] The structural alignment hypothesis relies upon the idea that lexical concepts are interrelated entities part of wider semantic structures.

[60] For an in-depth analysis, see Steen (2007).

categorization does not make sense; whereas categorizations could be useful when a metaphor (either novel or conventional) proves to be apt to the context in which the metaphor is presented.

An in-depth analysis of the relation between metaphors and similes goes beyond the immediate aim of this work. Thus, for our purposes, it is not essential to discuss whether there could be points of convergence or not in the interpretation of a statement as metaphor or simile (Gentner 1983; Glucksber 2008). What is important to stress, instead, is the fact that, as in the case of the class-inclusion approach, the career of metaphor model does not provide us with tools that could help analyze the nature of relations existing between experience, cognition, and language. This model seems to be better tailored to the analysis of novel or very creative metaphors. However, in our study we mainly collected data that refer to conventional metaphorical uses. In addition, the career of metaphor model proposal of adopting a categorization approach to the analysis of conventional metaphors does not match our needs. As we discussed in the previous Sub-section (3.5.2.), the categorization approach does not make it possible to depict the big picture which is behind the single metaphorical uses of lexical items (e.g., action verbs), hence, it does not make it possible to establish which types of general metaphorical structures tie together the level of meaning (literal and figurative) and the level of concepts (concrete or abstract) which appear to be expressed in the semantics of the action verbs that are subjected to our linguistic investigation.

## 3.6. Metaphors and action verbs

As it has already been stressed during the chapter above, the idea that many highly abstract concepts are embodied, that is, that they are understood via our bodily experience in the world, represents a basic assumption of Conceptual Metaphor Theory (Lakoff & Johnson 1999). CMT holds that a large variety of abstract concepts arise via metaphorical projections from perceptual and motor concepts and that these projections should not be considered as random cognitive operations but as part of a general system of conceptualization which happens to be structured by means of conceptual metaphors. In this theoretical framework, our experience and conceptualization of the world do not represent separated dimensions of meaning. Quite the opposite: they both reflect the human ability for linguistic representation. This is to say that lexicon works as a container where directly and indirectly embodied information merge.

In the following section, I will highlight the function that action verbs have in the linguistic encoding of concepts with a different degree of abstractness. I will show that they are involved in the representation of both action-related and metaphorical (but action-based) concepts. I will describe the ways via which new metaphorical information arises from the action verbs' semantic shift and how this new additional information is tightly linked to the concrete physical meaning contained in the deep semantic core of the verbs.

### 3.6.1. Metaphorical extensions of action verbs

If it is true that much of our thinking is structured by metaphor; it is also true that much of our metaphorical thinking is cognitively grounded in our bodily schemas and sensory-motor processes (Lakoff & Johnson 1999; Gibbs 2006; Barsalou 2008). A great variety of metaphors use our experience of basic-level perceptions and motor activity to structure abstract domains of knowledge and experience (Narayanan 1997). If there is no doubt about the pivotal role that embodiment plays in abstract reasoning (Talmy 1987; Gallese & Lakoff 2005; Pulvermüller 2005; Aziz-Zadeh & Damasio 2008; Desai et al. 2011), there also should not be doubts about the role that the action lexicon plays within the linguistic encoding of figurative and abstract meanings. Action verbs are extensively used to express both action events and action schemas (e.g., physical force events) and metaphorical associations based on our bodily knowledge (causation frames). From this point of view, action verbs can be considered as linguistic anchors, which bond together the flow of information that we get from our perceptual experiences (e.g., the experience of exerting physical force on an object) and the phenomenological responses given to those same perceptual inputs and experiences (the difficulty experienced in the lifting of an heavy object). They linguistically transfer the rich knowledge that we have of action events (e.g., force events) to contexts in which no concrete action is implied, but where highly abstract contexts are profiled (e.g., the difficulty in performing a purposeful action can be conceptualized as a physical burden affecting the motion of the actor/mover). As action verbs primarily describe physical and concrete actions performed with our body or experienced through our bodily interaction with the surrounding space, their primary source domain concerns the body and related sensory-motor processes (Panunzi & Vernillo 2019; Vernillo 2019). As a matter of fact, when they are not used to express concrete or physical meanings, they are pervasively used in the linguistic representation of very basic primary metaphors.

With regard to the set of verbs analyzed in this study, it is clear that each group of verbs (verticality, force) encodes conceptual metaphors related to the semantic features associated

to its own group[61]. With regard to the force-dynamics group, verbs of force are primarily used to encode the physical interaction between a force and a targeted object or entity (with or without the actual motion of the affected party). It is not surprising that these same verbs are also involved in the encoding of such very basic metaphors as CAUSES ARE FORCES, COMPULSION IS A COMPELLING FORCE, CAUSATION IS AGENTIVE CAUSATION, ACTION IS SELF-PROPELLED MOTION, and so on. The verticality group gathers together verbs that are primarily used to encode spatial schematizations, and, in particular, bodily motion or objects shift along the vertical axis. As verbs encoding specific spatial relationships, they are mainly used to profile orientational primary metaphors, as INCREASE IN QUANTITY IS UPWARD MOTION (or DECREASE IN QUANTITY IS DOWNWARD MOTION), PURPOSEFUL ACTION IS GOAL-DIRECTED MOTION, CHANGE IN MOOD IS VERTICAL MOVEMENT, etc. As the examples show, each group of verbs is associated to specific imagery and, hence, encodes a specific type of metaphor system which appears to be coherently structured on the base of this imagery (e.g., object manipulation, motion in the space, etc.). This fact is important since it shows that each group of action verbs effectively exploits the domain knowledge of bodily experience stored within the peculiar semantic core each group is provided with. Nevertheless…As Sullivan (2018: 13) claims that "syntactic regularities in metaphoric language show that there are aspects of grammar that affect metaphoric language regardless of the conceptual metaphor involved". Accordingly, the combination of constructionist and conceptual approaches should be able to explain regularities such as the role of the verb in metaphorical sentences, where one source domain (predicate) is connected to a target domain (noun), as in the sentence *the lawyer built an argument*, where the relation between the verb and the noun is asymmetrical. Not only Construction Grammar but Cognitive Grammar, too, focuses on the role that constructions have in metaphoric language (meaning of grammatical categories and constructions). Either in metaphoric and non-metaphoric language, "words fill roles in grammatical constructions. The words evoke frames, and the constructions evoke these frames, according to pattern of conceptual autonomy and dependence" (Sullivan 2018: 26).

[61] The specific metaphors will be discussed throughout the data analysis chapters (Part 2 of the present study).

## 3.7. Conclusions

This chapter enabled us to introduce some of the main notions and concepts we will deal with in this present work. Undoubtedly, the presentation of the essential basics of Conceptual Metaphor Theory (Lakoff & Johnson 1980, 1999) was the inescapable starting point. From the beginning, it has been stressed as one of the main tenets of CMT that metaphor is a conceptual phenomenon which happens to be pervasive in thought, language and action. In particular, it has been said that conceptual metaphors are based on conceptual mapping operations, via which objects, properties and relations of a more concrete domain (e.g., source domain) are mapped onto the structure of a more abstract domain (e.g., target domain). These mappings do not consist in random cross-domains transfers of information, but they respect some basic rules: they have directionality, they are selective, and they do not violate neither the source nor the target domains structure (e.g., Invariance principle; Target domain override principle). With regard to the type of information that is moved from domain to domain, it has been claimed that most of it stems from directly embodied concepts (e.g., perceptual and motor concepts) and that is indeed grounded in perception and action. Linked to this last point was the introduction of the so-called Primary Metaphor Theory (Grady 1997; 2005), according to which metaphors are supposed to be connected to perceptual-bodily experiences via a series of intermediary stages (e.g., co-occurrence of basic events, primary scenes, etc.), and they are first distinguished in terms of primary (e.g., ATTRACTION IS PHYSICAL FORCE) and complex (e.g., IMPEDIMENTS TO ACTION ARE ANTAGONISTIC FORCES) structures on the basis of their basic or complex nature. The whole theoretical discussion served as a general frame in which to develop our specific approach to the study of metaphors in action contexts. In the final section, in fact, the action lexicon and the linguistic encoding of their metaphorical projections were the main focus. This part, far from being complete, only has the aim of introducing one of the pieces of the complex puzzle represented by action verbs in the anchoring of abstract concepts and sensory-motor processes in language.

# Chapter four:
# What is an image schema?

## 4.1. Introduction

This chapter aims to present the growing amount of research that, in the last 30 years, has been developed around the notion of image schemas. It will outline the scope of the concept starting from our main field of interest, that is, the field of cognitive linguistics, and I will try to widen the area of investigation, also considering contributions from other disciplines. As image schemas are approached here in the light of their role within the analysis of the semantic variation of general action verbs, the chapter will introduce some of the issues that will be dealt with in the development of the thesis. In Sections (4.2. and 4.3.), I will try to define the concept of image schema and I will also describe some of the most salient properties (e.g., gestalt structure) and cognitive operations in which image schemas are involved (e.g., transformations). In Section (4.4.), I will present some of the most relevant taxonomic proposals for the classification of image schemas. In Section (4.5.), I will discuss the role played by image schemas in metaphorical processes of different kinds. Section (4.6.) will be devoted to the illustration of how image schemas have been used in the analysis of language (i.e., VERTICAL ORIENTATION schema; STRAIGHT schema). Section (4.7.) will focus on the consistent amount of evidence that researchers from various disciplines (i.e., psycholinguistic and developmental studies) collected to demonstrate the purported psychological reality of image schemas. Finally, in Section (4.8.), I will introduce an alternative theoretical concept that complements that of image schemas, namely the notion of mimetic schemas.

### 4.1.1. To set the scene

In the field of Cognitive Linguistics, image schemas[62] represent an essential tool aimed to show the tight connection between embodied experience, thought and language. The early notion of the concept dates to the empirical works on spatial relation terms by Talmy (1972, 1975, 1978, 1983) and Langacker (1976, 1987), although it received a more comprehensive treatment only ten years later in Johnson (1987) and Lakoff (1987). Image schemas have

[62] In the literature, there is a frequent oscillation between two different plural forms: schemas and schemata.

proved to play a key role in many research fields, among which are psycholinguistics (Gibbs, 1994; Gibbs & Colston, 1995), first language acquisition studies (Mandler 1992; Mandler & Canovas, 2014), poetics (Lakoff and Turner, 1989), literary criticism (Turner, 1987, 1991), linguistic theories of grammar (Talmy 1983; Langacker 1987), cognitive anthropology (e.g., Quinn 1991; Kimmel, 2005), gesture studies (Cienki 2005), mathematics (Lakoff & Núñez, 2000), computational modeling (Feldman & Narayanan 2004) and neurosciences (e.g., Deane 1991, 1995; Dodge & Lakoff 2005; Gallese & Lakoff 2005; Rohrer 2005).

## 4.2. Preliminary distinctions: images and schemas

Immanuel Kant's first elaboration of the notion of *schema* inspired Johnson's (1987) use of the term. As Kant puts it, the term *schema* denotes a structure of imagination that cannot be reduced to propositional content, as it is based on perceptual experiences. In this theoretical context, schemas are described as non-propositional procedures of image construction that link percepts to concepts. The embodied nature of the concept is emphasized in Johnson's (1987: 19) elaboration, according to which schemas shall be recognized as "patterns of meaningfully organized experience"[63]. As the expressions explicitly suggest, these embodied structures' inner function is that of operating in our perceptive modality, bodily motion through space, and physical manipulation of objects. From this point of view, schemas could also be connected to Neisser's (1976) definition, according to which schemas are nothing but flexible structures of perception and motor programs that play a pivotal role in the way we interact with the world and organize our experience. Yet, it is important to stress that these ways of viewing the concept of schema do not coincide with the popular version of the concept, according to which a schema is represented as a "unified, recurring organization of conceptual and propositional knowledge and values that we share about typical situations and events" (Johnson 1987: 20). In this sense, schemas are supposed to represent "generalized knowledge about a sequence of

[63] Beside the term schema, in fact, Johnson (1987) also adopts the expressions *embodied schema* and *image schema*.

events" and to be assimilated to the notion of scripts[64] (Rumelhart 1977), with whom they share the nature of being fixed templates used to create meaningful representations.

With respect to the word *image*, it is important to bearing in mind that, even though schemas are thought of as structures of imagination, they do not correspond to rich, concrete images (Johnson 1987). Image schemas arise at a level of abstractness higher than that at which rich images or mental pictures do. Unlike image schemas, images are more detailed and concrete: they contain specific features of a specific object, event, or activity (Johnson 1987). Moreover, image schemas entail a cognitive processing different from the one which appears to be involved in mental pictures or rich images: a) they are not limited to the visual modality but also have a kinesthetic character; b) they can be used to perform cognitive operations comparable to physical operations performed in physical space (e.g., two or three-dimensional rotations); c) they can undergo natural transformations (Lakoff 1987), which can be used to shape abstract structures in mental space. Finally, image schemas are less concrete than images or mental pictures, as they are not influenced by general knowledge in the same way that the latter are.

To sum up, the idea of schema proposed by Johnson (1987) strongly diverges from the traditional definition of the term, according to which schemas should be the same as scripts (Rumelhart 1977); and it also differs from the notion of rich images or mental pictures. Johnson's idea of image schemas is that of malleable components with topological characteristics, "insofar as they constitute 'spaces' sectioned into areas without specifying actual magnitude, shape, or material" (Oakley 2007: 217). It is by virtue of this lack of internal specificity that image schemas may arise at a high level of abstraction and may be repeatedly used to order and reason about our bodily experience.

## 4.3. The original definition of the concept

Johnson (*The body in the mind*, 1987) and Lakoff (*Women, fire and dangerous things*, 1987) introduce the term *image schema* in two separated but synchronous works, in an attempt to reconnect meaning and thought to their embodied origins. The central idea is that our ability

[64] In Schank and Abelson's (1977) account, a script is a predetermined and stereotyped structure used to describe sequences of actions in very specific context, which cannot be used to provide information for novel or not well-known situations.

to conceptualize, reason and infer about the experience depends on our bodily nature. In this framework, image schemas are deemed to be imaginative structures of understanding, by means of which we make sense of our everyday sensory-motor experience. According to Johnson (1987: xiv):

> An image schema is a recurring, dynamic pattern of our perceptual interactions and motor programs that gives coherence and structure to our experience.

In an analogous way, Lakoff (1987: 267-268) defines image schemas as directly meaningful structures constantly recurring in our preconceptual experiences. These two views combine in Hampe's (2005) conception, according to which image schemas are conceived as non-propositional, preconceptual, dynamic and gestalt structures. Image schemas are *non-propositional* in the sense[65] that, unlike propositions, they do not state truth or other conditions of satisfaction. Image schemas are preconceptual[66] in the sense that they are grounded in our sensory-motor processes, perceptual interactions and manipulation of the objects therein. Lakoff (1987: 372) himself writes that "they pre-conceptually structure our experience of functioning in space, as human beings". They are not mere "receptacles into which experience is poured" (Johnson 1987: 29) but dynamic patterns that exist "in a continuous, analog fashion in our understanding" (Johnson 1987: 23), and whose flexibility emerges in the way they enter transformations and other types of cognitive operations. Finally, image schemas are characterized by having an internal gestalt-configuration (Hampe 2005), which means that: a) they are made up of few unified parts (participants, props, events, states, sources, goals) and relations (causal relations, temporal sequences, part-whole patterns, relative locations, agent-patient structures, or instrumental relations); b) they cannot be reduced to a collection of parts; c) they should be seen as coherent and meaningful wholes. As has been discussed in the literature, image schemas seem to be characterized by a set of stable properties wider than the ones presented above. First, image schemas do not recur in an isolated fashion but are co-experienced together (as clusters: Cienki 1997) in differing ways. Second, they show orientations towards positive or negative default evaluations when they are used in metaphorical mappings (the *plus-minus* or *axiological parameter*: Krzeszowski 1993). Third, they have both a static and dynamic

[65] The use of the term derives from its original elaboration by Immanuel Kant. He conceived schemas as non-propositional structures of imagination, which link concepts with perceptual patterns in our bodily experience (Johnson 1987).

[66] This is also to say that image schemas operate beneath the level of our conscious awareness.

nature, which means that they can represent either a state of being or a process (Cienki 1997).

### 4.3.1. SOURCE-PATH-GOAL: an example of image schema

As image schemas are first conceived as spatial concepts (Talmy 1972, 1975, 1978, 1983; Langacker 1976, 1987), it should not be surprising that the SOURCE-PATH-GOAL schema is one of the most common and basic structures operating in our everyday experience of functioning and interacting in the mundane world. The SOURCE-PATH-GOAL schema results from our recurrent experience of motion and relocation in the physical space (Johnson 1987; Lakoff 1987). The basic logic of this schema is that if we move from a source (SOURCE POINT FOCUS schema) to a destination along a path (END POINT FOCUS schema), we necessarily pass through the whole sequence of points on the same path. From this it can be inferred that the further along the path we are, the more time has passed since we started; and that if we are at the goal location, then we have already been at the source and path locations. With respect to the schema's internal structure, The SOURCE-PATH-GOAL consists of five basic units (Lakoff 1987): a) The mover (or trajector) is the entity moving along the path; b) the SOURCE location (or the *starting point focus*) is instantiated by the initial location; c) the PATH is represented by the distance (sequence of contiguous points) traversed by the mover over time; d) the GOAL location consists in the destination (or *end point focus*) of the motion; e) the DIRECTION is the way to the destination. The SOURCE-PATH-GOAL schema is often draw upon in the use of linguistic spatial expressions, such as "to", "through" and "from", with or without a motion verb:

(1) She came back from University
(2) She went to the grocery store
(3) She flew from Naples to Amsterdam
(4) She walked through the kitchen

The SOURCE-PATH-GOAL schema does not only play a role in literal sentences as the ones presented above (1-4), but it is also frequently engaged in the encoding of figurative meanings. Let us consider the following examples:

(5) It took them two years to reach a sort of stability in their relationship
(6) After working on the thesis for months, Constanza finally reached the end of the tunnel

Though sentences in (5-6) do not describe a concrete movement of a human trajector in the physical space, they are both built upon the metaphor PURPOSEFUL ACTIONS ARE DIRECTED MOTION TO A DESTINATION, in which purposes are mapped as destinations along an imagery path containing the same kind of structural elements as those discussed above. Without going too far in the interpretation of the last examples (5-6), the examples are supposed to simply to show how the SOURCE-PATH-GOAL schema is essential in the representations of many pervasive concepts, from the more concrete to the less concrete ones[67].

Traditional examples of image schemas that have been discussed in the literature in some detail are COMPULSION (Johnson 1987), SELF and CAUSED MOTION (Mandler 1992), RESISTANCE (Gibbs 1994), VERTICALITY (Ekberg 1995), STRAIGHT (Cienki 1998), LEFT-RIGHT (Clausner and Croft 1999), CONTAINMENT (Dewell 2005; Bennet and Cialone 2014), and PATH (Hedblom et al. 2015), amongst others.

Within their core semantics, general action verbs encode most of the image schemas cited so far (and even more). The action imagery associated with action verbs, in fact, is wide and highly flexible, enabling the application of these predicates in a large array of linguistic and pragmatic contexts. For instance, the Italian verb *tirare* (Eng., 'to pull'), which happens to be one of the action verbs included in our dataset, is involved in the encoding of many different action concepts and events. It is used to express different types of FORCE schemas, e.g., COMPULSION FORCE (e.g., *Tira la corda*, 'pull the rope'), restraint removal (e.g., *Tira il pesante sacco lungo il corridoio*, 'She pulls her coat after her along the floor'), the OBJECT MODIFICATION schema (e.g., *Tira l'elastico per i lembi*, 'She pulls the elastic band'), caused motion schema (e.g., *Tirare il cavallo*, 'She pulls the horse down the path'), or the VERTICAL ORIENTATION schema (e.g., *Tira il secchio verso di sé*, 'She pulls the bucket up'). These and similar examples confirm the relevance that image-schematic structures operating within the semantics of the verbs have within our project of annotating general action verbs.

### 4.3.2. Image schemas transformations

Most common events and actions involve our ability to manipulate abstract structures – that is, to transform image schemas. Image schema transformations are very natural[68]

[67] For an in-depth analysis of the role of image schemas in metaphorical domains, see Section (6.1).

[68] Lakoff (1987: 443) defines image schemas transformations in terms of natural relationships, as he observes that these are nothing but "direct reflections of our experiences, which may be visual, or kinesthetic".

operations among image schematic structures, in which one image schema is mapped into another. Transformations are essential cognitive processes, which contribute to extend categories (Johnson 1987; Lakoff 1987; Gibbs & Colston 1995), and hence to create new distinct senses of a word (i.e., the examples of Japanese *hon* and English *over*: Lakoff 1987). Lakoff (1987) identifies and describes in detail four main image schemas transformations[69]:

a) PATH-END POINT FOCUS: the common experience of following the physical path traced by a moving object and to focus on the final point where it comes to rest:

(1) John walked over the mountain (PATH)
(2) John lives over the mountain (END OF PATH)

b) MULTIPLEX-MASS: as one moves further away from a cluster of objects, it happens that the single objects begin to appear in the form of a mass:

(3) John bough a lot of boxes of milk (MULTIPLEX)
(4) John bought a lot of milk (MASS)

c) 0DTR-1DTR: the common ability to mentally trace the path of a continuously moving object. It enables the transformation linking zero-dimensional moving trajector and a one-dimensional trajector:

(5) John ran through the hills (0DTR)
(6) There is a road through the hills (1DTR)

d) NRT-RT: given a relationship between a trajector and a landmark, which are conceived of as two distinct entities, the same relationship can be perceived between 1) different parts of the same entity 2) different locations of the same entity:

[69] Another kind of transformation mentioned in Lakoff (1987) is image transformations (Kosslyn 1980, 1983; Shepard and Cooper 1982), such as rotation. Lakoff (1987) underlines that, differently from the listed image-schematic operations, these transformations are structure-preserving. Johnson (1987) refers to this kind of transformation using the term superimposition (Johnson 1987: 217): "Imagine a large sphere and a small cube. Increase the size of the cube until the sphere can fit inside it. Now reduce the size of the cube and put it within the sphere".

(7) She poured the wine out of the bottle
(8) The wine spread out over the table

Lakoff (1987) insists that, even though the name of image-schematic transformations (e.g., NRT-RT) is based on a set of arbitrary symbols[70], their existence is not the result of an equally arbitrary operation (Lakoff 1987: 444):

> The names that we have given to image schemas, and to image-schema transformations, are very much in keeping with the kind of symbolization that might be used in studies of computer vision. But the names are not the things named. This is shown by the naturalness of image-schema transformations relative to visual experience, as opposed to the arbitrariness of the names for those transformations. It seems to me that image schema transformations are cognitively real; the pervasiveness of the kinds of relationships between senses of lexical items that those transformations characterize is a strong indicator of their cognitive reality.

With respect to my approach, to understand how image schema transformations operate within action verb semantics is an extremely important step of my analysis. For instance, Italian verbs such as *salire* (Eng., 'to rise') or *scendere* (Eng.,' to descend'), in specific contexts and under specific conditions, can activate so-called fictive motion (Talmy 1983, 1996; Matlock 2004). Fictive motion is a linguistically pervasive phenomenon, in which the motion of an object through space is entirely simulated:

a) *La scala sale al piano di sopra*;
   'The ladder goes up'
b) *La cucitura scende lungo i pantaloni*;
   'The stitching moves down along the pants'

The examples in (a-b) are instances of fictive uses of the action verbs. They can be explained resorting to one of the image schemas transformations discussed above, that is the ODTR-1DTR transformation. Via the ODTR-1DTR schema, we can motivate why the semantics of the verb elicits the simulation of mental movement along an imaginary trajectory, even though the verb depicts a static scene. The reason why we are able to extend the semantics of the verb in this way is that, as humans, we are able to mentally trace the path of a continuously

[70] For an in-depth discussion, see Pylyshyn (1981), the "propositional theory".

moving object, by linking a zero-dimensional moving trajector and a one-dimensional trajector (Lakoff 1987).

### 4.3.3. Clusters of image schemas

Image schemas do not only occur in an isolated fashion, but also as a set of related schemas. Some image schemas show the tendency to group together or, better, to be co-experienced as gestalt groupings, and to function as clusters (Cienki 1997). It has been shown that spatial image schemas such as OBJECT or SURFACE can be frequently co-experienced with force-dynamic schemas, such as BLOCKAGE or RESTRAINT REMOVAL (Cienki 1997). These patterns can occur either in literal uses (i.e., "to push the window" versus "to have the window opened") and in metaphorical ones (i.e., "that procedure is a stumbling block"). Other examples discussed in Cienki (1997: 8-9) are:

a) CYCLE, PATH, PROCESS, ITERATION, FORCE: a cycle can be conceptualized as a path in which the end point is its point of origin. It represents a process that can be repeated by means of a force (i.e., time);
b) BALANCE, CONTACT, SURFACE, COUNTERFORCE: the metaphorical extension of the BALANCE structure in argumentation bases on the assumption that there is a contact with a surface and un underlying operating force (i.e., "to tip the scale in favor of an argument");
c) CONTAINER, FULL-EMPTY, CENTER-PERIPHERY: consider the role of the CONTAINER in holding its contents (FULL-EMPTY) and in protecting the contents from external forces (CENTER-PERIPHERY).

A more interesting case of groupings of image schemas is given by those categories which appear to share significant common properties, as, say, the category of FORCE. Johnson (1987) identifies 7 different types of force, including COMPULSION, BLOCKAGE, COUNTERFORCE, RESTRAINT REMOVAL, ENABLEMENT, and ATTRACTION. In this description, force consists of a series of connected schemas, which share a consistent number of properties Johnson (1987): a) force schemas are always experienced through interaction; b) force schemas involve a force vector (i.e., a directionality); c) force schemas typically involve a single path of motion; d) force schemas have sources for the force and targets that are acted upon; e) forces involve degrees of intensity; f) forces involve a chain of causality, a consequence of having a source, target, force vector and path of motion. Quinn's (1991) work moves in the same direction. In a study on metaphorical extensions used to represent the American cultural model of

marriage, she observes that the whole set of metaphors investigated bases on the combination of four abstract schemas, namely the ENTITY, TRAJECTORY, RELATION, and CONTAINER schema. More in particular, Quinn (1991) argues that the RELATION schema, which includes the image schemas LINK, CONTACT, MERGING, SPLITTING and NEAR-FAR, gives the structure to metaphors representing marriage as two inseparable objects (i.e., *We knew we were going to stay together*) or like an unbreakable bond (i.e., *That just kind of cements the bond*). The ENTITY schema, which encompasses the PART-WHOLE and CENTER-PERIPHERY image schemas, appears to be the basis for those metaphors which conceive the marriage as an indestructible natural object (i.e., *The everlasting Gibraltar nature of the thing*) or as a secure possession (i.e., *We got it*). The TRAJECTORY schema involves the image schemas CYCLE, ITERATION, SCALE and PATH, and, among the others, structures metaphors of ongoing journey (e.g., *That's going to keep us going*). Finally, Quinn (1991) provides the description of the image schema CONTAINER, WHICH relies on the FULL-EMPTY pattern, and seems to operate in metaphors such as "There's more that goes on in a marriage". Quinn's (1991) findings represent a sort of starting point for Cienki's abstract groupings of image schemas. Below, his personal classification (1997: 12):

| more general | more specific |
|---|---|
| PROCESS | MATCHING, MERGING, CONTACT, LINK, SPLITTING |
| PATH | STRAIGHT, SCALE, ITERATION, CYCLE |
| OBJECT | PART-WHOLE, CENTER-PERIPHERY, SURFACE, MASS-COUNT, COLLECTION |
| CONTAINER | FULL-EMPTY, SURFACE, CENTER-PERIPHERY |
| [force] | ATTRACTION, ENABLEMENT, COMPULSION, COUNTERFORCE, BLOCKAGE, RESTRAINT REMOVAL |

**Table 3.** Cienki's proposal on groupings of image schemas

As the table shows, Cienki's classification (1997) lists 4 different types of groupings, distinguishing them between those image-schematic structure which appear to be more general (e.g., PROCESS, PATH, OBJECT, CONTAINER, and FORCE) and those ones which appear to be more specific (e.g., MATCHING, MERGING, CONTACT, LINK, etc.).

The cluster of image schemas also represents a relevant phenomenon when it comes to investigating the action-semantic imagery associated with general action verbs. As we

already indicated, action verbs are general in the sense that they can be used to encode different kinds of action concepts and events. In particular, within our study, we saw that each action concept is connected to a specific type of action schema; and each action schema is connected to a specific cluster of image-schematic structures. So, for example, the action verb *spingere* (Eng., 'to push') can be used to profile both events of object manipulation (e.g., *Spingere il pulsante*, 'To push the button') and events of actual motion in the physical space (*Il nuotatore si spinge con le gambe*, 'The swimmer pushes herself off of the wall with her legs). While in the former case, the action scene (and schema) is based on a cluster in which COMPULSION FORCE, CONTACT and OBJECT schemas seem to be the most salient semantic features, in the latter COMPULSION FORCE, PATH and SELF-PROPELLED MOTION schemas are co-experienced together to profile the specific action concept they refer to (i.e., self-motion). This demonstrates that to define a particular concept or schema (and hence differentiate the different meanings of a same lexical item) we need to consider the image schemas as chained rather than isolated components.

## 4.4. Taxonomy

It is Johnson (1987) that provides the first attempts to give a partial list of the most important image schemas, arising from our sensory motor processes. His taxonomic proposal (p. 126) is made of 27 components:

| | | |
|---|---|---|
| CONTAINER | BALANCE | COMPULSION |
| BLOCKAGE | COUNTERFORCE | RESTRAINT REMOVAL |
| ENABLEMENT | ATTRACTION | MASS-COUNT |
| PATH | LINK | CENTER-PERIPHERY |
| CYCLE | NEAR-FAR | SCALE |
| PART-WHOLE | MERGING | SPLITTING |
| FULL-EMPTY | MATCHING | SUPERIMPOSITION |
| ITERATION | CONTACT | PROCESS |
| SURFACE | OBJECT | COLLECTION |

**Table 4.** Johnson's taxonomy

Johnson's (1987) highly selective survey is based on an informal analysis of the most basic phenomenological features of every-day experience (Johnson 2005) for whose

identification, he suggests resorting to a sort of reflective interrogation (Johnson 2005: 20), describing it as follows:

> Ask yourself what the most fundamental structures of your perception, object manipulation, and bodily movement are, given that human bodies share several quite specific sensory-motor capacities keyed to the size and constitution of our bodies and to the common characteristics of the different environments we inhabit. Certain obvious patterns immediately jump out at you.

It is worth noticing that the list set out by Johnson (1987) is not intended to be a closed and defined inventory but, rather, a condensed selection of the most basic image-schematic structures recurrently used to shape our embodied experience and capacity of reasoning.

Differently from Johnson, Talmy (2000 2005) limits his set of primitive image schemas[71] only to motion and spatial structures and gathers them in 4 main categories:

a) Categories pertaining to scene segmentation (e.g., focal distinctions within a scene, figure (focal object) and ground (secondary focus, serves as reference object to locate figure);

b) Categories pertaining to an individual scene component (figure and ground geometries, relative orientation);

c) Categories pertaining to one scene-component's relation to another (presence or absence of contact of the figure with the ground);

d) Non-geometric categories, that is non-geometric elements commonly associated with spatial schemas (e.g., force-dynamics).

Talmy (2005) builds his set on the basis of an extensive cross-linguistic analysis of the most basic spatial-relations terms used in different languages. His findings show that, even though world languages can strongly diverge in the way they make spatial distinctions, they are characterized by a small inventory of distinctions, and that the cross-linguistic variation of their relations does not appear to be excessively wide.

[71] Talmy (1983, 2000, 2005) never uses the term "image schema". Nevertheless, he seems to understand spatial schemas, represented by closed-class forms, in terms of schematic structures arising from sensory motor experience.

On the same token, Mandler (1992, 2005, 2008, 2014) claims that spatial information, especially that regarding movements in space, is the first to be attended to and conceptualized by infants. Spatial inputs are recoded in the form of image schemas during processes of perceptual meaning analysis (Mandler 1992) and used as primitive conceptual components in the development of human thought. At this juncture, one might wonder how many primitives we would need to build up our conceptual system. Mandler (2008: 221) points out that, despite the existence of a large cross-linguistic variation in the use of terminology for spatial distinctions, primitives do not constitute a large set:

> Of course, other languages package spatial relations in different ways, sometimes using verbs instead of prepositions and/or requiring different information to be expressed in individual words, but it seems that a small set of basic notions is used in all languages and each has a limited vocabulary of spatial terms.

Even though it could be surprising, the limited number of primitives is reasonably explainable, as it is in direct connection with the way we root our bodily experience in physical space (Mandler 2008: 221):

> Such a limitation may be due to the mechanism of Perceptual Meaning Analysis, which is itself limited in the kinds of redescriptions it produces.

The primacy given to space and spatial structures constitutes one of the reasons why Mandler and Canovas (2014) refuse to adopt the general term of "image schema" in their research. In contrast to Johnson (1987) and Lakoff's (1987) approach, they feel the need to make a distinction between the various cognitive structures responsible of our conceptual knowledge development. Their distinction is articulated in three levels: a) SPATIAL PRIMITIVES; b) IMAGE SCHEMAS[72]; c) SCHEMATIC INTEGRATIONS. SPATIAL PRIMITIVES are understood as early conceptual building blocks formed in infancy, necessary to the comprehension of what we perceptually experience. For a complete list, consider the table below (Mandler & Canovas 2014: 9):

[72] Mandler and Canovas (2014) refuse to adopt the term *image schema* to refer to the whole set of cognitive structures involved in the development of human conceptual knowledge. It is worth to bearing in mind that, in their work, the term *image schema* is not meant to work as a general label. On the contrary, it does refer to one single type of the cognitive structures listed in their research.

| | |
|---|---|
| PATH | ±MOVE |
| START PATH | ANIMATE MOVE |
| END PATH | BLOCKED MOVE |
| PATH TO | INTO |
| LINK | OUT OF |
| THING | BEHIND |
| ±CONTACT | APPEAR |
| CONTAINER | DISAPPEAR |
| OPEN | EYES |
| LOCATION | |

**Table 5.** Mandler and Canovas's taxonomy

Common examples of what they call image schemas are PATH TO THING, THING INTO CONTAINER. Finally, SCHEMATIC INTEGRATIONS are conceived of as non-spatial concepts built from previous cognitive structures, that is, spatial primitives and image schemas. To give an example, infants start developing the concept of FORCE only after the first six months of life, with crawling and interaction with heavy objects (Mandler & Canovas 2014). It happens that the feeling of FORCE (e.g., BLOCKED MOVE), which is repeatedly experienced by the infant, becomes progressively spatialized and integrated with an image schematic structure[73].

Besides Mandler (2005, 2008) and Mandler and Canovas (2014), Grady (2005) also criticizes the lack of specific parameters to distinguish one scholar's definition of image schemas from another, and the consequent vagueness of the term. Grady's (2005) attempt to achieve a clearer understanding of the concept of image schema is structured around the essential role assigned to perceptual information. He firstly makes a distinction between perceptual prototype and non-perceptual prototype. Perceptual prototypes of image schemas could be represented by structures such as CONTAINER, SUPPORT or BALANCE. Prototypicality emerges from the fact that all these image-schematic structures refer to aspects of physical, perceptual experience. In contrast, non-perceptual image schemas are conceived of as structures that do not refer to any specific aspect of sensory motor experience. Examples of this kind are represented by image schemas as CYCLE, PROCESS, SCALE[74], or CEASING TO EXIST[75], which should be intended more in terms of "basic (non-

[73] The same happens with time and its relations, which are both spatially conceptualized.

[74] For an in-depth discussion on the SCALE schema, see Clausner and Croft (1999).

[75] Turner's (1991) notion of image schema is much more inclusive than the traditional one (Johnson 1987; Lakoff 1987), and it is more indefinite than the ones discussed so far (Grady 2005; Mandler & Canovas 2014).

sensory) dimensions of phenomenological experience, independent of the sensory associations" (Grady 2005: 41). On the base of the preliminary distinction between perceptual and non-perceptual prototypes, Grady proposes to use the term image schemas only for the former, that is, for recurring patterns of particular bodily experience (2005: 44):

> the most useful way of understanding image schemas is to see them as mental representations of fundamental units of sensory experience.

Schemas that do not fall under this definition, as not directly connected to sensory experience, are considered part of a separate category and take the name of *response schemas*. For instance, response content (opposed to image content, see Grady 1997) structures non-perceptual target domains of primary metaphors (Grady 1997), such as DIFFICULTY, SIMILARITY, CAUSATION or QUANTITY. Grady's (2005) taxonomic proposal does not stop there, and it indeed presupposes an additional level of schematization. This further level goes beyond the distinction discussed above (e.g., sensory and not sensory content) and is conceptualized as the highly abstract dimension in which the source and target domain of a primary metaphor share their structure (Grady 2005: 50):

> In sum, superschematic features of a scene have some of the properties that have been ascribed to image schemas but allow us to draw a distinction between the level of sensory representation, with all its special status in cognition, and a more general level that truly crosscuts the broadest range of conceptual domains.

Among the other type of super-schemas, Grady refers to information such as SCALARITY and DIMENSIONALITY, ASPECT, BOUNDEDNESS, and CAUSAL STRUCTURE. For a complete overview on the three types of schematic structures identified in Grady (2005: 48), consider the table below:

Just to give some examples, he understands as image schematic structures that do not have perceptual nature, such as CEASING TO EXIST, COMPLEXIFICATION, GEOMETRICAL CONFIGURATIONS or PERMANENCE.

| Image Schema | Response Schema | Superschema |
|---|---|---|
| Heaviness | Difficulty | Scalar property |
| Up | More | Scalar property |
| Proximity | Similarity | Scalar binary relation |
| Arriving at a Destination/Goal | Achieving success | Bounded (punctual) event involving an actor (TR) and a LM |
| (Emerging from) Source | (Resulting from) Cause | Binary temporal relation involving TR and LM |
| Heat | Anger | Unbounded entity (or scalar property) |

**Table 6.** Grady's taxonomy

Grady's (2005) distinction between sensory (image) and non-sensory (response) domains appears to be essential in Clausner and Croft's (1999) approach to the classification of image schemas. Clausner and Croft's (1999) attempt to identify image schemas is influenced by a different interpretation of the notion, according to which image schemas should be better intended as a subtype of domains, namely as image-schematic domains. The two scholars distinguish between *abstract, not imagistic domains*, and *grounded* (or *embodied*) *domains*. Image-schematic domains are of the latter type, since they represent specific, embodied experiences and our perceptual interaction with the physical space and the objects therein. It is also clarified that the association of basic domains with image schemas relies on a double level of motivations. Clausner and Croft (1999) claim: a) many of the properties that characterize image schemas are also true for domains (e.g., they are schematic and pervasive); b) many properties of domains are true for image schemas (e.g., they support different types of concept profiles). In the light of this preliminary distinction, a new version of the notion of schematicity is proposed by Clausner and Croft (1999: 22):

> These facts suggest a natural definition of image schematicity: domains which are image schematic are those found in the largest number of domain matrices (for the concepts used in human experience).

As image-schematic domains are similar to concrete domains, any attempt to define the concept via a set of necessary and sufficient criteria appears to be useless. On the contrary, Clausner and Croft (1999) rather propose to redefine image schemas on the basis of a distributional criterion, that is: by the enumeration of image schematic structures in domain matrices. A condensed list of image schemas collected from various sources (Johnson 1987; Lakoff & Turner 1989) and integrated with new items is given below (Clausner & Croft 1999: 15):

| | |
|---|---|
| *SPACE* | *UP–DOWN, FRONT–BACK, LEFT–RIGHT, NEAR–FAR, CENTER–PERIPHERY, CONTACT* |
| *SCALE* | *PATH* |
| *CONTAINER* | *CONTAINMENT, IN–OUT, SURFACE, FULL–EMPTY, CONTENT* |
| *FORCE* | *BALANCE, COUNTERFORCE, COMPULSION, RESTRAINT, ENABLEMENT, BLOCKAGE, DIVERSION, ATTRACTION* |
| *UNITY/MULTIPLICITY* | *MERGING, COLLECTION, SPLITTING, ITERATION, PART–WHOLE, MASS–COUNT, LINK* |
| *IDENTITY* | *MATCHING, SUPERIMPOSITION* |
| *EXISTENCE* | *REMOVAL, BOUNDED SPACE, CYCLE, OBJECT, PROCESS* |

**Table 7.** Clausner and Croft's list of image schemas

As I tried to show in this section, there seems to be a lack of clear-cut criteria to distinguish image-schematic representations from other schematic components. As a matter of fact, the absence of a current defined image schema repository had a direct impact on the development of this research. The vagueness of the notion of image schema, whose degree of specificity seems to change from scholar to scholar, and the proliferation of different taxonomic classifications, made the procedure of annotation quite arduous. The main problems stemmed from the fact that, in order to distinguish the different physical meanings and uses of a given action verb, I had to clearly separate the basic semantic components operating within the variation of the verb itself. Therefore, this phase happened to be necessary and preliminary to the evaluation of the connections existing between the physical and figurative meanings of a single action verb, that is between the primary variation of the verbs and its metaphorical extensions. The absence of a clear-cut repository of image-schematic structures, as well as the lack of clear parameters that could help to separate the

borders of a schema from those of another, represented, and still represents, a theoretical gap that has concrete consequences when it comes to applying an image-schematic approach to the analysis of language (in our case to the analysis of the action lexicon).

## 4.5. Image schemas and their metaphorical projections

Metaphorical projections of image schemas (at least in Johnson's sense of the term) enable us to make sense not only of bodily aspects of experience but also of more abstract ones (Johnson 1987; Lakoff 1987; Lakoff & Johnson 1999). Our sensorimotor understanding of experience strongly impinges on our cognitive structure, hence on our capacity to create and model highly abstract concepts. Every time we move from one place to another, we move following a specific direction and necessarily go through a sequence of intermediate and contiguous locations. As we already discussed in Sub-section (4.4.1.), the SOURCE-PATH-GOAL image schema is pervasive in our experience and recurrent in our sensory motor functioning. It draws upon the flow of information that we have about our bodily experience and bodily motion in the physical space and projects it into highly abstract domains. In this context, metaphors are conceived as cognitive operations, in which the source domain maps its structure (or more specifically, its image-schematic structure) onto a target domain (Lakoff & Johnson 1980). For instance, in the PURPOSES ARE PHYSICAL GOALS primary metaphor, we understand PURPOSES in terms of PHYSICAL GOALS, and the achievement of a purpose in terms of movement along a path from a starting point to an end point. The argument is that this is possible because of the strong correlation, in our experience, between the domain of PURPOSES and the domain of PHYSICAL GOALS (Lakoff 1987). The target domain (PURPOSES) presupposes the same structural elements of the source domain (PHYSICAL GOALS): a) an initial state (or starting point), in which the purpose is unfulfilled; b) a sequence of actions (motion along path from the starting to the end point), which is necessary to reach the desired state; c) a final desired state (end point) where the purpose is fulfilled; d) an actor (trajector or mover) who tries to achieve the purpose. Let us consider the following examples:

(9) She finally reached a state of considerable awareness of her skills

(10) He reached all his aims

The SOURCE-PATH-GOAL schema is one of the image-schematic structures most commonly used in the shaping of abstract concepts, but this is not the only image schema with a structural role within the processes of metaphorical projection. Elements and entailments of the CONTAINER schema are essential for the understanding of non- or less-concrete concepts, such as those involving the visual modality (e.g., *The hill is out of my field of vision*) or personal relationships (e.g., *Our marriage was a trap*); the LINK image schema is often used to describe social relationships (e.g., *Social networks help you to make new connections*); the CENTER-PERIPHERY schema stands as a primary structure in the comprehension of political or social domains (e.g., *The election of the new candidate is a central issue for the party*; *He likes to be the center of attention*); the FORCE schema appears to play a pivotal role in the representation of how psychological forces affect human decisions and behaviors (e.g., "She changed jobs since she felt pressed by the surrounding environment").

As discussed so far, image schemas do not only work as containers for compressed spatial information, but also as a basis for the representation of the highly abstract. These conceptual building blocks can be metaphorically projected from a very physical domain to a non-concrete one and be accordingly used to point to events, states, or abstract entities. Abstract domains of knowledge are commonly encoded by very concrete lexical items, as, for example, predicates referring to action events. As this research is concerned with the analysis of the semantic variation of action verbs, either on a concrete or abstract level of representation, I believe that to adopt an approach to the study of language, such as that proposed in theories on image schemas, can help: a) to better disclose the nature of the relationship that ties together the concrete and metaphorical meanings of a given action verb; b) to investigate the specific role that bodily-action information (in the form of basic image-schematic structures) plays within our conceptual system, which appears to be largely shaped by metaphorical processes.

### 4.5.1. How to map image-schematic information from domain to domain: the "invariance" and the "target domain override" principles

Knowledge arising from our sensory motor system could serve as the basis to structure conceptual knowledge and abstract concepts (Johnson 1987; Lakoff 1987, 1990, 1993). Nevertheless, the information transfer must respect some basic rules and is supposed to be constrained by a number of different factors that can enable or stop the metaphorization process (Rudzka-Ostyn 1995). The flow of information that is mapped from one domain to

another is first regulated by the Invariance Principle, according to Lakoff (1993), which states which pieces (or portions) of the image-schematic source domain must be mapped onto the target domain (Lakoff 1993: 215):

> Metaphorical mappings preserve the cognitive topology (that is the image schema structure) of the source domain, in a way consistent with the inherent structure of the target domain.

A re-elaborated version of the principle is given in Turner (1991: 274):

> In metaphoric mapping, for those components of the source and target domains determined to be involved in the mapping, do not violate the image-schematic structure of the target, and import as much generic-level structure from the source as is consistent with that preservation.

Either in Lakoff and in Turner's version, the Invariance Principle stands out as a constraint which controls the flow of information, hence the possible correspondences, that can be transferred during the operations of metaphorical mapping (Chapter 3, Sec. 3.2.1.). Since there cannot exist incongruencies between the structure of the two domains, the Invariance Principle also causes the source domain inferences due to image-schematic structure to be preserved in the target domain. For instance, if we think of categories in terms of containers (CATEGORIES ARE CONTAINERS), we implicitly assume that entities could be either in or out of the category, and that entities could be either inserted or removed from the same category. This has to do with the image-schematic structure of the BOUNDED REGIONS (or CONTAINER) domain: the logical properties of containers correspond to the logical properties of categories.
In addition to the Invariance Hypothesis, Lakoff (1993: 216) postulates the existence of the so-called "target domain override" principle, according to which:

> Image schema structure inherent in the target domain cannot be violated, and [...] inherent target domain structure limits the possibilities for mappings automatically.

To put it another way, in the metaphorical projection, the image-schematic structure of the target domain plays an active role, automatically limiting the elements that can be mapped. To better clarify this point, it could be useful to present a couple of examples. Let us thus consider two sentences of the ACTIONS ARE TRANSFERS metaphor (Kövecses 2000):

(11) John gave David a kick

(12) Mary gave John a kiss

In (11-12) actions are conceived as OBJECTS which can be transferred from a subject to another. Nevertheless, we also know that objects cannot only be transferred but also possessed. Unlike objects, though, actions run out during the action event and cease to exist after they have been accomplished. Since actions cannot be possessed, metaphorical extensions in (13-14) are not possible:

(13) *John gave David a kick and David still has it

(14) * Mary gave John a kiss and he still has it

The examples in (13-14) are not acceptable because they are built on specific entailments of the source domain (object possession) that do violate the inherent structure of the target domain.

As it has already been pointed out at the end of Section (6.5.), the exploration of metaphorical projections of image schemas helped us to understand the behaviors that action verbs have when used to encode abstract concepts and figurative meanings. Metaphorical extensions of action verbs are not randomly produced but are the result of metaphorical processes in which sensory-motor information and specific image-schematic features are "moved" from one domain to another. In this context, the principles discussed so far (e.g., Invariance Principle; Target Domain Override Principle) helped us to motivate the type of constraints that the metaphorical extensions produced by action verbs have to face with. Differential semantic properties (and image-schematic structures) characterizing the semantic core of action verbs strictly impinge on their metaphorical potential, determining, in some way, the type of metaphorical concepts (and meanings) that may or may not be expressed by the verbs.

## 4.6. Image-schematic approach to the analysis of language: examples of cross-linguistic investigations

Polysemy has shown to be one of the most productive areas of application for theories on image schemas (Oakley 2007). In Cognitive Linguistics, several studies have been conducted to investigate the nature of the relation existing between image-schematic structure, word meaning and sense extension. Amongst others, we cite the work on Japanese *hon* (Lakoff

1987), the analysis of *over* (Brugman [1981] 1988), the study on *stand* (Gibbs et al. 1994), and the description of the verbs *to put* (Pauwels 1995) and *to give* in Casad (1998). In the next Sub-sections (4.6.1., 4.6.2.), we will briefly describe two different, but equally crucial, attempts at cross-linguistic analysis made via image-schematic approaches to the study of language: the case of VERTICALITY schema (Ekberg 1995) and the STRAIGHT schema (Cienki 1998). One of the reasons why we chose to deepen the analysis of these two cases is that both represented a sort of guideline for the action verb semantic annotation. They provided us with relevant examples of how to structure the linguistic analysis of different types of predicates, on the base of the rich flow of information which happens to be associated to their image-schematic structure.

### 4.6.1. The role of image schemas in the manipulation of the VERTICAL AXIS

Ekberg (1995) analyzes a set of linguistic transformations of the vertical axis in English and Swedish, succeeding to show how we systematically make use of vertical expressions to refer to non-vertical relations. Ekberg starts the analysis, considering five cognitive processes, where the high flexibility of the VERTICAL ORIENTATION image schema appears to be used in non-prototypical vertical contexts:

a) horizontal transformation (e.g., *He walked up and down the corridor*, Ekberg 1995: 70);

b) fictive motion effect, resulting from the transformation of a of a zero-dimensional entity tracing a path to a one-dimensional extended entity (e.g., *the tree reached up to the roof/the dress reached up to the ankles*, Ekberg 1995: 71);

c) path to end point transformation (e.g., *She lived on the first floor*, Ekberg 1995: 72);

d) deictic orientation according to the ME-FIRST principle (e.g., *He sat at the head of the table*, Ekberg 1995: 73);

e) mapping from the physical to the temporal space (e.g., *Down to the present day*, Ekberg 1995: 79).

Ekberg's (1995) study also provides with data that show the meanings overlapping between the VERTICAL ORIENTATION and the IN-OUT schemas. In particular, she observes that there exists a systematic correspondence between the type of information encoded by the spatial relations "up" and "out" (away from the reference point), on one hand; and by the spatial relations "down" and "in" (close to the reference point), on the other hand. Ekberg's (1995)

data suggest that vertical expressions are often used to denote movement location in physical space (e.g., Swedish *Ett par kilometer upp på vägen låg en gommai ruin*; Eng., 'A couple of kilometers away lay an old ruin'), direction/position in abstract domains (e.g., *Huset brann upp*; Eng., 'The house was destroyed by fire'), or temporal relations (e.g., *Stiga up till urgamla tider*; Eng., 'To go back to ancient times'). Ekberg (1995) reports that, in cases of deictically marked uses, the correspondence results in the horizontal transformation of the VERTICAL AXIS (or VERTICALITY) image schema (Ekberg 1995: 84):

> The correspondence between "up" and "out" is given by a cognitive operation of tipping the vertical axis while preserving the unmarked reference point at the foot of the axis. The correspondence between "up" and "in" - on the other hand - is the result of both tipping the vertical axis and deictically orienting it so that the reference point is close to the upper pole.

The spatial elements "up" and "down" can also be used in contexts where the upper and the lower poles of the axis are deictically oriented, relatively to a conceptual reference point. In these cases, it happens that the ME-FIRST principle is applied on the basic VERTICAL ORIENTATION (or VERTICALITY) schema (Ekberg 1995: 80):

> According to the ME-FIRST principle, "up" is closest to the conceptual reference point, and thus the upper pole of a transformed vertical axis will be oriented toward the reference point.

In particular, the Swedish "*upp*" denotes the motion of the trajector toward the landmark (e.g., *Hanförsökte skynda sig, men hon gick upp bredvid honom*; Eng., 'He tried to hurry, but she walked up beside him'), the entering of a physical or abstract object into the visual field (e.g., *Hunden jagade upp kaninen*; Eng., 'The dog hunted up the rabbit'), or an earlier point in time (e.g., *Upp frá pvi*; Eng., 'Since then'). What is important for us to note is that Ekberg's (1995) cross-linguistic analysis not only shows that vertical expressions are systematically used to refer to spatial, abstract and temporal non-vertical relations but, on a more general level, that lexical polysemy may be derived by the application of cognitive transformation onto image-schematic structures.

### 4.6.2. The role of image schemas in the lexical extension of words: the case of the STRAIGHT schema

Cienki (1998) proposes STRAIGHT as an important image-schematic structure in our perceptual experience, daily interaction with the world, and social interplay with others. He notices that the STRAIGHT schema also recurrently occurs in our non-bodily experience, that is, in the way we extend our everyday world knowledge to abstract domains. On the base of

a data sample taken from American English and Russian, Cienki (1998) shows how physical concrete meanings of "straight" are metaphorically projected onto a large variety of abstract domains. Many metaphorical expressions in English make use of the STRAIGHT schema in connection with the TRUTH domain (TO SPEAK IN A MAXIMALLY INFORMATIVE WAY IS TO TRANSFER WORDS ALONG A STRAIGHT PATH, *Tell it to me straight*) or INFORMATIVE SPEECH domain (TO BE MAXIMALLY INFORMATIVE IS TO BE (ORIENTED) STRAIGHT, *To be straight as an arrow*)[76]. The STRAIGHT schema is also often used in connection with such domains as EVENT (IMMEDIATE ACTION IS MOTION ALONG A STRAIGHT PATH, *To discover something straight off*), CONTROL (CONTROL IS STRAIGHT AND UP, *Stand up right! or stand up straight*), and MORALITY (MORAL BEHAVIOR IS MOTION ALONG A STRAIGHT PATH, *To follow the straight and narrow path*).

With respect to Russian (Cienki 1998), various examples of metaphorical expressions for TRUTHFUL SPEECH have been identified, both in the location (motion) version of metaphors (MAXIMALLY INFORMATIVE (HONEST) SPEECH IS STRAIGHT, *Prostite za prjamoe slovo*; Eng., 'Excuse me for my directness'), and in the object one (A PERSON WHO SPEAKS IN A MAXIMALLY INFORMATIVE WAY IS STRAIGHT, *prjamolinejnyj čelovek*; Eng., 'a direct, straightforward person'). The data analysis confirms that, in Russian as well as in English, the STRAIGHT schema plays an essential role in metaphors for events (e.g., IMMINENTLY REALIZABLE IS STRAIGHT, *prjamaja opasnost'*; Eng., literally 'straight danger' – 'real/immediate danger'), control (e.g., CONTROL IS STRAIGHT, *upravljat'*; Eng., 'to control, to govern') or morality (e.g., MORAL IS STRAIGHT, *porjadočnyj čelovek*; Eng., 'honest, decent person').

Interestingly, metaphors built upon the STRAIGHT image schema have been proven to occur in many other languages. As Cienki (1998) points out, they are also quite common in non-Indo-European languages, such as Japanese or Hungarian. For instance, expressions like *massugu(ni) mono-o iu* (Eng., 'to express in an outspoken way what is thought or felt') or *massugu hakujyousuru* (Eng., 'to confess everything, to come clean') recur quite often in Japanese. The same is true for Hungarian, where we find metaphors like *egyenes beszed* (Eng., 'straight talk') or *egyenes valasz* (Eng., 'straight answer'). This cross-linguistic and cross-domain pervasiveness cannot be dismissed as a meaningless factor. What Cienki's

[76] Moreover, Cienki (1998: 118) notes that speech metaphors can be expressed in two different ways: 1) as a motion event (as in the cases discussed above); and 2) as an object (maximally informative speech is a straight object, e.g., "straight talk").

findings seem to demonstrate is that the presence of the STRAIGHT image schema in so many and various abstract domains of application, as well in as in so many different languages, is a clear indication of the pervasiveness of the schema in our conceptual knowledge. The STRAIGHT schema is relevant in processes of word meaning extension, giving rise to new senses and explaining how one simple word (e.g., straight) can become so highly polysemous and adaptable to so many different contexts.

## 4.7. On the psychological reality of image schemas

A growing body of experimental studies supports evidence that image schemas are not mere components of linguistic theory but that they do have psychological reality. In the last 30 years, support for psychological reality of image schemas has come from various works (Klatzky et al. 1989; Gibbs 1992, 2005; Mandler 1992, 1998; Gibbs et al. 1994; Gibbs & Colston 1995; Stanfield and Zwaan 2001; Zwaan et al. 2002; Richardson et al. 2003; Mandler & Canovas 2014;). In this section, I will introduce the issue of whether image schemas do or do not have psychological reality; and whether they play a role in real time thought and linguistic processes. This is especially important when it comes to evaluating the intuitions that people may have about the types of image-schematic information underlying action verbs, either in concrete or abstract uses. In the following two Sub-sections (4.7.1., 4.7.2.), I will present an overview of the main studies conducted in the field of psycholinguistics and developmental studies.

### 4.7.1. Are image schemas real? Evidence from psycholinguistic studies

There is a considerable amount of empirical research which gives evidence of the psychological reality of image schemas. Many experimental studies from cognitive psychology show how image schemas can be used to make predictions about people's capacity to comprehend language. In their various works, Gibbs and his collaborators (Gibbs 1992, 2005; Gibbs et al. 1994; Gibbs and Colston 1995) constitute an essential reference point for psycholinguistic research on image schemas.

By way of a set of 4 interlinked experiments, Gibbs et. al. (1994) attempted to examine the related meanings of the word *stand*, succeeding in demonstrating that people make sense of its different uses because of the image schemas emerging from the recurring bodily experience of *standing*. In the first test, participants were guided through a session of bodily exercises and were later asked to read descriptions of 12 different image schemas related to

acts of standing (e.g., VERTICALITY, BALANCE, RESISTANCE, ENABLEMENT, CENTER PERIPHERY, LINKAGE). Finally, they were asked to rate the relevance of each image schema to their bodily experience. The upshot of the first experiment was that participants associated 5 main image schemas to *standing,* namely BALANCE, VERTICALITY, CENTER PERIPHERY, RESISTANCE, and LINKAGE. In the second test, participants were asked to judge the similarity between the different senses of *stand*. The experimental findings showed that subjects classified 35 senses of *stand* into 5 main groups, with no distinction between physical and figurative senses. In the third experiment, subjects were asked to take part in a short bodily session, to focus on their own experience of *standing*. In the next phase, they were asked to read the verbal descriptions of the 5 image schemas found in the first experiment (e.g., BALANCE, VERTICALITY, CENTER PERIPHERY, RESISTANCE, and LINKAGE). Finally, participants were provided with a list of 32 senses of *stand* and asked to rate the relation between each sense and each image schema. After the data were gathered from the third test, the experimenters built an "image-schematic profile" for each of the 32 uses of *stand*. As Gibbs et al. (1994) observe, the image schema profile let many interesting similarities emerge within the semantic network of the word *stand*. For instance, linguistic expressions such as "It stands to reason" and "the matter now stands" share the same image-schematic pattern (e.g., LINKAGE, BALANCE, CENTER PERIPHERY, RESISTANCE, and VERTICALITY). On the same token, the expressions "Don't stand for such treatment" and "To stand against great odds" appear to have the same image-schematic profile: RESISTANCE, CENTER PERIPHERY, LINKAGE, BALANCE, and VERTICALITY. It is noteworthy that, in both the profiles, the VERTICALITY does not have a prominent position in the schema order. It in fact correlates with expressions that are not normally associated with this schema, such as "The barometer stands at 30 centimeters" or "Got stood up for a date". Furthermore, data show that there is a strong correlation between the VERTICALITY and the BALANCE schemas, on one hand, and the VERTICALITY and the LINKAGE schemas, on the other hand. The last experiment suggests that the classification of the 32 senses of "stand" in different groups does not simply depend on subjects' understanding of the contexts in which the word appeared, but also from the understanding of how different image-schematic profiles are used to make sense of different uses of the word (e.g., *stand*). On the basis of the collected data, Gibbs et al. (1994) demonstrated that people's perception of the similarity between different senses (concrete and abstract) of the same polysemous word is partly based on the image schema profile at the root of each contextual use of the word.

In a previous work, Gibbs (1992) explored the role that image schemas play within the process of metaphor understanding. The study was carried out to empirically show that idioms are not only the linguistic outcomes of metaphorical processes but also that their underlying mappings preserve the cognitive topology, and hence the image-schematic structure, of the source domains (the invariance principle, Lakoff 1990). The image schemas profiles constrain the metaphorical projections in a way that it is easy to make predictions about the source-to-target correspondence, which is at the base of many abstract concepts. For instance, Gibbs (1992) observes that people's understanding of the concept of "anger" is partly organized on the concept of a hot fluid in a bodily container. This is evidenced by idiomatic expressions, such as "blow your stack", "flip your lid", or "hit the ceiling". In the processing of idiomatic expressions people have regular intuitions, and easily draw inferences about the causation, intentionality, and manner of various events (Gibbs 1992). As the results demonstrate, in people's comprehension, anger is caused by internal pressure, is not intentional, and the counter-reaction is expressed in a violent way. Nevertheless, these same properties do not seem to be true for literal paraphrases of these idioms, such as "To get very angry". The study also shows that there is a strict connection between people's processing of anger idioms and the linguistic contexts within which these expressions are presented. The research findings demonstrate that the reading happened to be easier in those cases where the source domain entailments (e.g., causation, intentionality, and manner) were explicitly described, rather than in those contexts where they were not. These findings are of primary importance within the psycholinguistic research on image schemas, since they support the view that image-schematic profiles have a critical role in people's processing, and that they could be used to make predictions on conventional metaphoric language comprehension.

### 4.7.2. Are image schemas real? Developmental studies on image schemas

A considerable number of developmental studies support the idea that image schemas have a crucial role in reasoning and language development. In a work that has become a canonical reference point on the subject, Mandler (1992) argues that infants firstly form concepts through the perceptual analysis mechanism (Mandler 1988; see also, redescription of procedural information in Karmiloff Smith 1986, 1991), in which perceptual information is first analyzed and then recoded into non-perceptual, topological, and simplified forms of representations. In her view, image-schematic structures stand as the condensed redescription of perceptual and motor processes, by means of which spatial structure is

abstracted and results in conceptual one[77]. The central idea is that, starting from spatial structure extracted from everyday experience, infants create meanings and compose them into concepts that make conscious thought possible (Mandler 1992: 589):

> Most of the perceptual information normally encoded is neither consciously noticed nor accessible at a later time for purposes of thought. Perceptual analysis, on the other hand, involves the active receding of a subset of incoming perceptual information into meanings that form the basis of accessible concepts.

Mandler's studies (1992, 2008, 2014) suggest that motion along paths and locations in space are what children typically attend to and remember. Since the earliest ages of life, infants appear to be quite responsive to different forms of motion and to objects' movement. One of the first concepts to be developed is the concept of ANIMACY (Leslie 1988), by means of which, for instance, children are able to distinguish between ANIMATE and INANIMATE MOTION. Animate entities start paths on their own, and their motion has rhythmic but not predictable in all its facets. In contrast, inanimate entities only start paths when contacted by another object and have a mechanical and tendentially undeviating motion. Another essential characteristic which permits us to draw a sharp distinction between animate and inanimate entities has to do with the contingency of motion (Mandler 1992, 2014). Animate entities can interact from a distance, whereas inanimate objects require contact with each other for interactive events to occur. Mandler (1992) points out that, from the age of three months, infants are also sensitive to the distinction between SELF (something moves on its own) and CAUSED MOTION (something is pushed or made to move). The former type of motion entails an independent trajectory, and no other object or object trajectory involvement; in contrast, the latter presupposes that the beginning of the path involves a new trajector and, consequently, another trajectory. With respect to this specific point, Leslie (1984) holds that the development of CAUSALITY is directly connected to the formation of the concept of AGENCY. Animate things do not only move on their own, but also make other things move. The same fact that animate things can impinge on other objects' motion means that they can also fulfill the role of agents. In a previous study, Leslie (1982) observes that infants as young as 4 months differentiate between the causal motion involved in one ball launching another and very similar events in which there is a very short spatial or temporal gap between the end of the first movement and the beginning of the second one. Gibbs and Colston (1995)

[77] Piaget (1952) conceived of infancy as a purely sensory motor period, during which infants do not seem to have any conceptual representations about objects or events.

explain this phenomenon, arguing that in this case children might use a TRAJECTOR-PATH image schema within a TRAJECTORY schema transformation, where the end point of the first TRAJECTOR becomes the starting point of the second TRAJECTOR. They also claim that when the pattern does not appear, the ensuing motion of the second TRAJECTOR is conceived of as self-motion rather than caused motion. On the same token, Cohen and Oakes (1993) argue that 10-month-old infants can make a distinction between causal and non-causal events; Kotovesky and Baillargeon's (1994) data show that 10- to 12-month-olds can elaborate judgments about collision events. Following on from Leslie (1982, 1984), Gibbs and Colston (1995) conclude that the significant amount of research on young children's development confirms the existence of a strong bond between the physical causality and the psychological causality. Findings seem to suggest that physical causality might be represented before psychological causality. This point is of crucial importance because it represents a significant break with Piaget's traditional assumptions that causality order was the other way around, with the psychological reality representing the necessary starting point for the physical one.

Another relevant set of studies for the image schema theory investigates the concepts of CONTAINMENT and SUPPORT. Mandler (1992) claims that containment is a particularly important notion since it is an early conceptual development, that is: it is central in preverbal thinking. Several findings (Freeman, Lloyd, & Sinha, 1980; Lloyd, Sinha, & Freeman, 1981) suggest that 9 months old infants already conceptualize containers as places where things disappear and reappear. In this respect, it may also be that, more than the containers themselves, the acts of going in and out of containers[78] are what really matter to infants (Mandler 2014: 6):

> Presumably infants are attracted to containment and occlusion events because the objects they are watching disappear from sight; people go out of the room, objects go into pans and cupboards. It may be these acts of disappearing that make containers the first objects we are sure that infants conceptualize (other than people and their eyes).

Moreover, Needham and Baillargeon's (1991) results report that 3 months old infants are sensitive to violations of the SUPPORT relations between objects. Kolstad (1991) provided evidence showing that infants as young as 5.5 months are surprised when containers without

[78] Dewell (2005) underlines that the image schemas formed by infants are not static: young children do not conceive of containers as bounded regions in the space (Lakoff 1987), but they rather pay attention to motion into and out of containers themselves.

bottoms appear to hold things. These outcomes demonstrate that the existing bond between the notions of CONTAINMENT and SUPPORT is close from a very early age (Gibbs & Colston 1995). Mandler (1992) argues that the primitive representation of the SUPPORT image schema may be based only on the contact between two objects in the vertical axis, and that other potential changes in its representation take place within months[79]. Early comprehension of the CONTAINMENT schema seems to be connected to acts of closing and opening. In this regard, Piaget (1954) reported the actions accomplished by his 9- to 12-month-old infants while they were attempting to imitate acts that they could not see themselves accomplish (i.e., blinking), noticing that, before they correctly performed the action, they happened to open and close their mouths, their hands, or covered and uncovered their eyes. Mandler (1992) explains that, to understand this specific action, young children may activate an image-schematic structure of spatial movement on the container boundary (IN or OUT of the CONTAINER).

To conclude this brief overview on the developmental literature, it is worth focusing the attention on the studies carried out on so-called object permanence, that is, how beliefs about physical objects' existence is independent of the sensory modalities with which we perceive them. Some studies (Baillargeon 1987) prove that 3.5 to 5.5-month old infants are able to represent the existence of up to three hidden objects. Another set of experiments demonstrates that infants know that visible as well as hidden objects cannot move through space occupied by other objects, and that objects can occupy two places in space only if they are moved from one point to the other (Baillargeon 1993). Gibbs and Colston (1995) argue that the formation of the concept of OBJECT PERMANENCE may be conceived of as the development of different image schemas, and their transformations (Gibbs and Colston 1995: 257-258):

> We propose, following Mandler (1992), that the transformations LANDMARK, to BLOCKAGE, to REMOVAL OF BLOCKAGE, and finally back to LANDMARK underlie the demonstration of object permanence in the 4.5-month old.

[79] In particular (Baillargeon, Needham, & DeVos 1991) note: 1) 3 month-old infants expect objects to be supported only if there is full contact with the surface; 2) 5 month-old infants expect an object to be supported only if each of the parts of the object lies on the surface; and 3) 6 month-old infants distinguish between partial but inadequate support and adequate support.

## 4.8. Beyond the concept of image schema: image schemas versus mimetic schemas

Zlatev (2005, 2007a, 2007b, 2014) introduces the concept of mimetic schema to react to the highly polysemous (and ambiguous) definition of image schemas, thereby providing an alternative account for the bodily basis of linguistic meaning. His proposal is based on the concept of bodily mimesis (Donald 1991, 2001), which refers to "conscious, self-initiated, representational acts that are intentional but not linguistic" (Donald 1991: 168). Following on from that, Zlatev (2005) claims that a specific bodily act of cognition or communication is an act of bodily mimesis if and only if: a) it is cross-modal (it involves an exteroception-propioception mapping, hence both kinesthetic and visual experience); b) it consists of a volitional bodily motion; c) it represents some action, object or event for the subject (the addressee should recognize either the representation and the communicative intention behind it); and d) it stands for some action, object or event for the addressee.

This introductory characterization[80] is not an end in itself but it has a fundamental role for the understanding of the notion of *mimetic schema*. Mimetic schemas, in fact, are described as "categories of acts of overt or covert bodily mimesis" (Zlatev 2005: 317), regarding recurrent daily actions or events. They are conceived as non-linguistic representational structures, operating as intermediary tools between sensorimotor cognition and language (Zlatev 2005: 318):

> 'Running' the schema (either in reality or in imagination) is differentiated from the object, action or event to which is corresponds, 'from the standpoint of the subject'.

Mimetic schemas can either be represented by structures with more or less universal status, in turn subdivided in "unbounded" activities (e.g., CRYING, RUNNING) and "bounded" actions (e.g., GRASP-X, PUSH-X)[81]; and by structures more or less culturally specific schemas (i.e., ICE-SKATING). Moreover, they are conceived as pre-linguistic cognitive structures, whose characterization lies on a specific set of necessary elements: a) they are representational; b)

[80] A second essential theoretical reference for the characterization of the concept of mimetic schemas comes from developmental psychology. According to Piaget's (1962) theory, first cognitive representations in children emerge through acts of sensory-motor imitation, that could eventually be subject to an internalization process.

[81] According to Cienki (2013: 424), while these action structures can be viewed as essential characteristics of mimetic schemas, they have to be considered as properties that can work as possible descriptors of image schemas.

they are accessible to consciousness; c) they are intermediately abstract; d) they are proprioceptively based; e) they are pre-reflectively shared in a community.

With respect to the relation between the concepts of mimetic schema and that of image schema, Zlatev (2005) insists that a similarity may be find only if we conceive of image schemas as representational structures (Mandler 2004; Grady, 2005), and not as mere structures of sensory-motor experience (Lakoff & Johnson 1999; Johnson 2005). Mimetic-schematic structures are representational in the sense that, even if they do not correspond to what they stand for, they can be enacted overtly (as pantomime and gesture) or covertly (as mental images). Therefore, mimetic schemas are accessible to consciousness in two main ways 1) their nature is experiential, that is, their existence is on the level of very specific bodily actions; 2) they could be used in imagination and, in this case, become basic forms of reflective consciousness. In this sense, mimetic schemas appear to consistently differ from image schemas, as these latter do not operate at the level of conscious awareness (Johnson 1987). Another way in which image and mimetic schematic structures diverge is about their inherent degree of abstractness. Unlike image schemas, mimetic schemas are relatively concrete. Even though they should not be intended as specific episodes or actions schemas, they are more similar to concrete actions and events, and thus are quite close to bodily experience (Zlatev 2005: 326):

> In sum, mimetic schemas are relatively concrete, "analogue" and "holistic" representations. As such, they qualify for the adjective "pre-verbal", and are therefore a possible ground for language. The kind of structures that cognitive linguists have termed "image schemas" come in different levels of specificity, but to the extent that they constitute semantic primitives such as CONTAINMENT, PATH and MANNER, they are not a ground, but rather a product of language in probably both phylogenetic and ontogenetic terms.

Image schemas shall not be regarded as amodal structures but, despite this, it is still not clear which specific kind of modalities they involve in their formation. On the contrary, mimetic schemas are proprioceptively based (or proto-conventional), that is, they originate from the cross-modal mapping between exteroception, which is dominated by vision, and proprioception, which is instead controlled by kinesthetic sense (Zlatev 2005, 2007). Nevertheless, mimetic schemas are not exhausted by proprioception, since they derive from a process of mental simulation rather than of actual re-enactment. Intersubjectivity is the last characteristic that needs to be discussed in this brief overview on mimetic-schematic structures. Image schemas are conceived of more as individual phenomena. Their "private"

nature seems to be in stark contrast with the nature of linguistic meaning, which, by definition, should be "public", shared and conventional. Zlatev (2005: 332) argues that, in the case of mimetic schemas, this problem does not arise, since they "are shared among the members of a community who engage in close face-to-face, or rather body-to-body interaction". They can be defined as pre-reflectively shared components, originating from the overt or covert imitation of culturally salient activities and actions (Zlatev 2007). This means that their content can be "shared" by the members of the community, and thus constitute collective representations (Zlatev 2007: 19):

> This yields what Arbib (2003, 2005) calls representational parity and the content of a mimetic schema, e.g., JUMPING, will be similar for the one who performs the act and for the one who observes it, imitates it, and internalizes it.

Even though the notion of mimetic schema was not used to structure the analysis of the semantics of action verbs, I believe that the introduction of this concept may represent a useful way to illustrate some of the flaws that seem to affect image schemas. In this sense, mimetic schemas could be used as complementary tools (in association with image schemas) in the analysis of action lexicon. As I already stressed in the lines above, in fact, the concept of mimetic schema has been conceived as an alternative to the sometimes too vague, general and blurry, notion of image schema. What basically distinguishes the two diverse types of schemas is that mimetic schemas relate more to concrete actions and events and are closer to specific sensory-motor experiences[82] (Zlatev 2007), than image schemas are. Moreover, as mimetic schemas are more closely tied to actions than image schemas are, they have been argued to be more dynamic structures, whose experiential specificity is "more information-rich" (Cienki 2013: 424) than that provided by more general image-schematic structures. Nevertheless, the actual application of mimetic schemas to the analysis of action lexicon does not seem to be an obstacle-free route. The main and more immediate concern originates from the lack of studies (with the exception of gesture analyses: Cienki 2014; Zlatev 2014) where this concept is concretely used to systematically investigate linguistic phenomena of a different kind.

[82] A strong similarity can also be observed between these mimetic structures and the first action verbs learned by English children in the early phases of language acquisition (Tomasello 1992).

## 4.9. Conclusions

This chapter, far from being exhaustive, aimed to give a general introduction to image schema theories (Lakoff 1987; Johnson 1987; Lakoff & Johnson 1999). The concept of image schema originally stems from the field of cognitive linguistics, where it has been conceived as a means to explain the embodied origin of cognition and language. Image schemas are deemed to be imaginative structures of understanding, directly emerging from our bodily experience and representing a sort of link between sensory-motor information and higher cognitive functions. These conceptual building blocks (Mandler 1992; Mandler & Canovas 2014) not only encode spatial and bodily related information but also play an essential role in the modelling of highly abstract concepts. We use basic skeletal information, in the form of image-schematic structures, to metaphorically represent one domain in terms of another. During the operation of metaphorical mapping, image schemas are claimed to play an active role, by constraining the information transfer in a way to prevent that the source domain topology is incoherent with the target domain internal structure (the Invariance principle; Lakoff 1990, 1993; Turner 1991). The notion of image schemas has shown to be extremely relevant and extensively applied in a large amount of linguistic investigations (e.g., Ekberg 1995; Cienki 1998). The concept, though, is not free from critique. The difficulty in defining it and has led to very different interpretations. Moreover, the absence of a set of clear-cut parameters to its identification (and clear definition) led, on one hand, to the proliferation of various attempts at taxonomies, and on the other hand, to the emergence of new alternative concepts (e.g., mimetic schemas).

# Part II. Experimental research

# Chapter five:
# Metaphors in action: vertically oriented verbs[83]

## 5.1. Introduction

When we lift a heavy object from the floor, we experience the fact that to move that object we need to use a certain amount of force to change the object's position from a lower to a higher point in the space. On the same token, when we rise from our seat, we experience the fact that to move our body we have to use our knees and legs to stand up, and also that we have to change our bodily schema to change our initial position and find a new physical balance. Moreover, when we ascend along a path, we know that to reach our final destination we have to move from one point to another, and that this motion is temporally scanned. These and similar experiences contain a complex of raw data, perceptual inputs, sensory correspondences, and pragmatic inferences that, as it will be shown within this chapter, are commonly used to enrich and shape the meaning and the semantic structure of many abstract concepts.

As action verbs are responsible for the representation of many highly abstract concepts, their semantics will be the focus of the present linguistic investigation. In chapter (1), it has been shown that they are not simply used to refer to action events but also massively involved in mechanisms through which we linguistically express figurative meanings, mostly exploiting the high-level conceptualization provided by a cognitive metaphor. This chapter is a sort of tribute to the fundamental role that action verbs play in the production of metaphorical extensions. It also aims to investigate the nature of the relation existing between the two dimensions of the semantic variation of action verbs, i.e., the primary and the marked ones. The main questions that will guide the present analysis will be: a) How is the metaphorical meaning linked to the physical representation of the events? And, more specifically, how do the action verbs' concrete senses enable and influence the emergence of new abstract meanings? The central hypothesis is that the metaphorical production of action verbs is not a random phenomenon, but has a coherent and internal logic, which is also strongly

[83] This chapter quotes verbatim (in parts or in full) observations, hypotheses, research and results from the published papers (Panunzi & Vernillo 2019) and (Vernillo 2019).

dependent on the kind of image schemas that happen to have saliency, i.e., semantic relevance, either in the primary and marked variation of the predicates. The ideas, thus, is that image schemas can be used to detect the contexts in which the metaphorical extensions of action verbs are plausible or not.

In Section (5.2.), the collected data and the methods by which the analysis has been carried out will be briefly introduced and discussed. Section (5.3.) proposes a very general overview of the set of primary uses that the 5 vertically oriented action verbs analyzed refer to. The core of the analysis will be presented in Section (5.4.), where the different metaphorical types produced by the predicates in analysis will be listed, described and commented upon. Section (5.5) will show the results of the task to assess the agreement between different annotators: the goal is that to measure the closeness of judgment between the author and other coders in the evaluation of the role that image-schemas have in the structuring of metaphorical meanings of action verbs. Finally, in Section (5.6.), I will try to draw some general conclusions on the basis of the material analyzed in this case study.

## 5.2. The annotation procedure

This study has been built on the basis of the analysis of Italian spoken corpora. The data extracted[84] refer to the metaphorical variation (e.g., marked variation) of a cohesive group of five action verbs that, in their basic meaning, codify a movement along the vertical axis: *alzare* (Eng., 'to raise'), *abbassare* (Eng., 'to lower'), *salire* (Eng., 'to rise'), *scendere* (Eng., 'to descend'), *sollevare* (Eng., 'to lift'). The immediate aim of the chapter is that of empirically investigating their metaphorical production through: a) the comparison between their primary and marked[85] variation (Chapter 1); b) the isolation of the metaphorical conceptual structures (Chapter 3) found within their marked variation; c) the detection of the image schemas (Chapter 4) behind the application rules they are subject to, either when they encode physical and figurative meanings.

[84] The whole dataset of data is available online via the link: http://lablita.it/app/users/~vernillo/phd/

[85] The analysis will exclusively focus on the metaphorical production of the 5 action verbs. Other types of marked uses (e.g., metonymies, idioms, and merely phraseological uses) will not be investigated. Hereafter, the expressions "marked variation" and "metaphorical variation" will be considered as mutually interchangeable.

### 5.2.1. Data and methods

The corpus-based annotation focused on the Italian general action verbs *alzare* (Eng., 'to raise'), *abbassare* (Eng., 'to lower'), *salire* (Eng., 'to rise'), *scendere* (Eng., 'to descend'), and *sollevare* (Eng., 'to lift'). The data were primarily taken from the corpus IMAGACT[86] and, in a second phase, they were enriched and integrated with the materials extracted from the Opus2 corpus (Italian subtitles)[87]. Table (8) reports the number of tokens and verbs in IMAGACT:

| IMAGACT | |
|---|---|
| Tokens | 1600000 |
| Verbs | 3500 |

**Table 8.** Tokens and verbs in IMAGACT

The quantitative relevance that the 5 action verbs subject to analysis have within the IMAGACT corpus is illustrated in Table (9), where rank and frequency are clearly spelled out:

| Verb | Rank | Freq |
|---|---|---|
| *Alzare* | 85 | 349 |
| *Scendere* | 94 | 315 |
| *Salire* | 128 | 213 |
| *Abbassare* | 379 | 52 |
| *Sollevare* | 449 | 43 |

**Table 9.** IMAGACT dataset

The quantitative information relative to the Opus2 corpus is schematized in Table (10):

| Opus2 | |
|---|---|
| Tokens | 231,143,960 |
| Words | 180,532,849 |
| Total verbs frequency | 33,672,707 |

**Table 10.** Tokens, words, and frequency in Opus2

[86] In its Italian version, the corpus IMAGACT (Moneglia 2012a, 2012b, 2014) contains linguistic materials taken from a wide and variegated complex of oral texts, for a total of 1,600,000 tokens. The three main sources it is based on are: LABLITA Corpus of Spontaneous Spoken Italian, Corpus LIP (De Mauro et al. 1993), and Corpus CLIPS (Leoni 2007).

[87] The Open source parallel corpus (Tiedermann & Nygaard 2004) is a collection of translated documents taken from internet. It counts about 30,000,000 words in 60 languages. The Opus version used for the current study is the Italian one.

Table (11) represents the impact that each of the 5 action verbs analyzed have within the Opus2 corpus:

| Verb | Rank | Freq |
|---|---|---|
| *Alzare* | 85 | 349 |
| *Scendere* | 94 | 315 |
| *Salire* | 128 | 213 |
| *Abbassare* | 379 | 52 |
| *Sollevare* | 449 | 43 |

**Table 11.** Opus2 dataset

The annotation process started with the scrutiny of almost 6000 occurrences, of which just a small part became the classification core (e.g., 381 metaphors). With respect to the IMAGACT repository, the following table contains the number of occurrences for each verb, distinguished on the base of the type of semantic variation considered:

| Corpus | IMAGACT | |
|---|---|---|
| Variation | Primary | Marked |
| *Alzare* | 261 | 88 |
| *Abbassare* | 30 | 21 |
| *Salire* | 175 | 39 |
| *Scendere* | 229 | 87 |
| *Sollevare* | 27 | 16 |
| Total/V | 722 | 251 |
| Total/P-M | 973 | |

**Table 12.** Data extracted from IMAGACT

With respect to the metaphors extracted from the IMAGACT database, the Table (13) gathers the precise number of occurrences that have been classified and annotated in detail[88]:

| IMAGACT - Metaphors | |
|---|---|
| *Alzare* | 20 |
| *Abbassare* | 15 |
| *Salire* | 24 |
| *Scendere* | 59 |
| *Sollevare* | 13 |
| Total | 131 |

**Table 13.** Metaphors annotated in IMAGACT

As it has already clarified above, this collection of data was later enriched with that taken from the Opus2 corpus (Italian subtitles). For each verb, 1000 occurrences were selected and scrutinized (e.g., 5000 occurrences in total). This means that the verb uses were initially distinct as primary and marked, and that the latter were cleaned by removing those occurrences that were not of prior interest to the analysis (e.g., phrasal uses, idiomatic expressions, phraseologies, metonymies, grammatically improper uses). The annotation procedure was conducted on a selection of 250 metaphorical uses (e.g., 50 for each action verb).

Once that the collection of data taken from the corpora IMAGACT and Opus has been put together, the real annotation procedure has been started. The annotation was articulated in a number of distinct but equally crucial steps:

[88] As already anticipated in Chapter 1, aspectual characteristics of action verbs were not really taken into account, that is, different tenses of a given verb were put on a par. More than a methodological choice, this was a corpus structure limitation, as it strictly depended on the way the metaphorical data were stored in the IMAGACT database and consequently accessed by the researcher. Due to its very interactive nature, the corpus IMAGACT contains a considerable amount of raw data, whose interpretation is strongly conditioned by the spoken pragmatic contexts in which the verb occurs. For this reason, the whole set of metaphorical occurrences, which are the core of the present description, were collected in the form of prepackaged linguistic standardizations (present simple, singular third person: *Maria alza il volume*; 'Mary turns up the volume'), that were eventually analyzed without taking into account potential aspectual variations. It is also necessary to clarify that, differently from IMAGACT corpus, the data collected from Opus were not gathered in the form of standardizations (this explains why, in some of the listed examples, the verbs have different tenses).

1) Overall evaluation of the primary variation of each action verb with extraction of the significant semantic properties with a strong distinctive value (e.g., differences in motor schemas, spatial relations, type of object involved, action participants)[89];
2) Examination of the marked variation of each action verb and gathering of similar metaphorical uses (e.g., similar meaning, same concept) in distinct classes or metaphorical types[90];
3) Selection of one or more significant conceptual metaphor (Lakoff et al. 1991; MetaNet[91]: Dodge et al. 2013) for each metaphorical class;
4) Identification of the most salient (i.e., most relevant) image-schematic components (Johnson 1987; Lakoff 1987; Mandler & Canovas 2014) for each verb and each metaphorical class verb. In Table (14), there is a list of the most common image schemas it will be dealt with in the course of the discussion on the metaphorical production of the selected action verbs:

| Spatial/Motion Group | Force Group | Other |
|---|---|---|
| VERTICAL ORIENTATION | RESTRAINT REMOVAL | SCALE |
| PATH | | SURFACE |
| END-POINT FOCUS | | OBJECT |
| STARTING POINT FOCUS | | |
| SELF MOTION | | |
| CAUSED MOTION | | |

**Table 14.** Most common image schemas found in the marked variation

[89] In this preliminary phase of the annotation procedure, different types of instruments for automatic retrieval were consulted for finding comparisons and, also, to sort personal semantic intuitions into well-structured semantic analyses. More in particular, VerbNet (Palmer, Bonial & Hwang 2017), WordNet (Fellbaum 1998), and FrameNet (Baker, Fillmore, et al. 1998) proved to be extremely useful repositories of information. VerbNet was mainly used to integrate data about the verbs event-structure; WordNet synset was an important tool for the description of synonymy relationships among action verbs (especially from a cross-linguistic point of view); finally, FrameNet was used for the event schematic representation and to extract information about the elements involved therein.

[90] The metaphorical groupings are accessible via the link: http://lablita.it/app/users/~vernillo/phd/

[91] MetaNet is a large repository of conceptual metaphors that adopts a "frame-based approach to the representation of meaning" (Petruck 2018: 4). One of the biggest benefits of MetaNet is represented by its well-defined hierarchical structure (e.g. metaphor cascades: David, Lakoff & Stickles 2018), in which a conceptual combination of frames, metaphorical entailments and image schemas is made explicit, and ready to be used. For the enrichment of the present analysis, MetaNet was mainly used to integrate data about the conceptual metaphors encoded by the verb in its marked variation, and to clearly spell out which kinds of other semantic components were involved in the process of semantic extension.

## 5.3. How we primarily use our group of five general action verbs

The group of action verbs constituted by *alzare* (Eng., 'to raise'), *abbassare* (Eng., 'to lower'), *salire* (Eng., 'to rise'), *scendere* (Eng., 'to descend'), and *sollevare* (Eng., 'to lift') represents an internally cohesive semantic node, in which spatial movements, bodily schemas, and agent-object oriented actions share one single characteristic, that is, the fact of being profiled along the vertical axis (UP-DOWN). Although these verbs happen to frequently recur in similar linguistic and pragmatic contexts, they are characterized by having their own semantic properties and, also, their own specific applications. To better clarify this point, it is worth briefly introducing the kind of action events they refer to, as well as the kind of uses it is possible to encounter along their primary variation. The action types[92] and uses will be spelled out on the basis of the representation proposed within the IMAGACT Ontology (Chapter 1, Sec. 1.5.).

### 5.3.1. A short overview on the primary variation of alzare and abbassare

The verbs *alzare* (Eng., 'to raise') and *abbassare* (Eng., 'to lower') name both agent-object oriented actions and events referring to bodily movements. Within the IMAGACT Ontology,

[92] It is worth bearing in mind that the action types were defined on the basis of purely cognitive and semantic characteristics (e.g., motor schema, spatial relations, focal properties of the action, synset of local equivalent verbs); and that more specifically syntactic properties (or constructions) were not considered as crucial in the delimitation of the action types gathered within the verb meaning representation. To make this point clear, let us consider a small subpart of the primary variation of the action verb *alzare*. As we made explicit in Chapter 1, the verb *alzare* has 7 different action types whose distinctions do not correspond to differences in terms of argument structure constructions. Primary uses as "*Alzare la scatola*" and "*Alzare il microfono*", for instance, are characterized by the same type of structure (subject, transitive verb, object) and do involve the same types of thematic roles (agent, theme). Nevertheless, within the IMAGACT framework they do not refer to the same kind of physical action. In fact, they linguistically convey different kinds of action concepts, each one of which has different scope, employs a different amount of force, and posits different types of agent-object relations. In "*Alzare la scatola*", the agent removes the object from its stationary steady state and exerts a force so as to direct the object upwards; on the contrary, in "*Alzare il microfono*", the object does not change location (although technically the movement does change what space it occupies) but the performed action does result in an extension of the object length along the vertical axis. Accordingly, the two action types, although still subsumed under the same verb label, show to have a different synset (e.g., *sollevare* for the former; *allungare* for the latter).

the primary variation of *alzare* is segmented in 8 different action types (here represented by prototypical scenes), each one of which is characterized by encoding an upward direction:

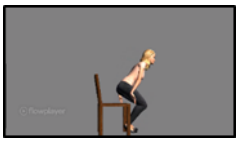
| Primary variation of alzare | |
|---|---|
|  |  |
| *(1) Marta si alza dalla sedia*<br>'Mary rises from her seat' | *(2) Marta alza la mano*<br>'Marta raises her hand' |
|  |  |
| *(3) Marta alza la scatola*<br>'Marta raises the box' | *(4) Fabio alza la gamba del pantalone*<br>'John raises the trouser leg' |
|  |  |
| *(5) Fabio alza il cofano dell'auto*<br>'Fabio raised the hood of the car' | *(6) Marta alza l'asta del microfono*<br>'Marta raises the microphone' |
|  |  |
| *(7) Marta alza la paletta*<br>'Marta raises the sign' | *(8) Il palloncino si alza in cielo*<br>'The baloon rises' |

**Table 15.** Primary variation of *alzare*

As the action scenes presented above show, the verb *alzare*[93] can refer to a wide array of different action types that are not conceived as cognitively similar. Relevant linguistic and

[93] From a cross-linguistic perspective, what is interesting to notice is that, for instance, the Italian and English categorizations of the events in Table (15) do not perfectly match: in English, in fact, we need at least two predicates, i.e. to raise and to rise, to name the activities listed via the scenes in (1-8).

cognitive features indeed change from type to type and from scene to scene, in examples (1-8). For instance, the action type represented by the scene (1) refers to a telic event, in which an agent changes her starting position, with an upward bodily motion; in (3), the intervention of a human agent causes an object to change its initial location along the vertical axis; and, in (5), an agent changes the resultative states of an object from closed to opened, by orienting part of it upwards.

The primary variation of the verb *abbassare* (Eng., 'to lower') partially mirrors that of *alzare,* although it encodes the opposite directionality. To put it in other words, *abbassare* can indeed be applied to express the same action events depicted above (e.g., bodily downwards motion, change of location of an object along the vertical axis, change of the resultative state of an object, from opened to closed), with the exception of the events in (3) and (8), but entails that the motion is directed downwards.

### 5.3.2. A short overview on the primary variation of salire and scendere

The Italian verbs *salire* (Eng., 'to rise') and *scendere* (Eng., 'to descend') name events in which an entity moves along the vertical axis: the movement is thought to have an upward direction in the former case, and downward in the latter. More specifically, within the IMAGACT Ontology, the primary variation of the action verb *salire* appears to be articulated according to four main action types (here visually represented by prototypical scenes):

| Primary variation of salire | |
|---|---|
|  |  |
| *(9) Fabio sale le scale*<br>'Fabio climbs the stairs' | *(10) Fabio sale sulla sedia*<br>'Fabio climbs on the chair' |
|  |  |
| *(11) Marta sale sull'albero*<br>'Marta cimbs the tree' | *(12) Le bolle salgono in superficie*<br>'Bubbles rise in the water' |

**Table 16.** Primary variation of *salire*

As the scenes show, the general action verb *salire*[94], in its basic meaning, can be connected to four main dynamic events, characterized by having different cognitive and linguistic traits: type (9) refers to gradual and continuous upward movements; type (10) describes a discrete upward movement performed by raising the foot and setting it down to move up onto something; type (11) generally refers to upward climbing motions; finally, type (12) generally encodes the upward motion of objects or substances[95].

The primary variation of the verb *scendere* perfectly mirrors that of the verb *salire*. They share exactly the same sub-set of action types, but are opposite in directionality (e.g., continuous downward motion along a path, discrete downward motion along a path, climbing downwards, downward motion of an object or substance).

### 5.3.3. A short overview on the primary variation of *sollevare*

The primary variation of the Italian action verb *sollevare* (Eng., 'to lift') appears to be punctuated by a very narrow set of action events. What is important to notice, though, is the fact that all of them are constrained by the presence of three necessary semantic components, that is: a) the exertion of force and the consequent removal of a physical restraint; b) the separation of the theme (part of body or object) from the surface it relies upon; c) the change of the initial location of the theme along the vertical axis. Within the IMAGACT Ontology, the primary variation of *sollevare* is prototypically represented as follows:

[94] With respect to the operation of cross-linguistic action categorization, the table shows that the categorization labeled by the Italian action verb *salire* slightly varies from that proposed by the English language: while the Italian verb *salire* can be used to cover all the four action types above. English needs to use at least two different predicates: *to climb* in (9-11) and *to rise* in (12). This categorization may also depend on the fact that English prefers to make linguistically explicit the separation between the upward motion made by a sequence of discrete steps (e.g., *to climb*) and the ascending motion along a vertical path (e.g., *to rise*).

[95] The autonomous event profiled in *scene* (12) is very similar, in terms of motion components, to the action type encoded by *alzare* in scene (8). Nevertheless, while *salire* and *alzare* are not local equivalent verbs in the former scene (12), they appear to be mutually interchangeable in the latter (8). This means that to encode this type of upward movement we can apply both the predicates.

| The primary variation of sollevare | |
|---|---|
|  |  |
| *(13) Marta solleva la scatola*<br>'Marta lifts the box' | *(14) Marta solleva la mano*<br>'Marta lifts her hand up' |
|  | |
| *(15) Marta solleva la schiena dal pavimento*<br>'Marta lifts her upper body from the floor' | |

**Table 17.** Primary variation of *sollevare*

As the scenes in Table (17) show, the semantics of *sollevare*[96] is quite strict. The theme supported by the verb *sollevare* (e.g., the box, the hand, the upper-body) must have a [weight], which is actually a gravitational restraint; its upwards motion must result in a sort of separation from the [surface] it lies on (e.g., floor or leg). Finally, the separation takes place because of the intervention of a volitional agent and must be viewed as a consequence of some kind of restraint removal to which the theme is subject to (e.g., in general the gravitational steady state of the theme).

With respect to its relationships with the other verbs of the group (e.g., *alzare, abbassare, salire,* and *scendere*), the scenes clearly show that the primary variation of the predicates *sollevare* and *alzare* converge in some points: *alzare* types (2) and (3), *sollevare* types (13) and (14). This local equivalence springs from the fact that the three semantic constraints cited above appear to be salient traits of the events (2, 3, 13, 14). Nevertheless, these same predicates are not equally interchangeable in other action types: the verb *sollevare* is not applicable to the encoding of, say, the action type (6) of *alzare* (e.g., *Marta alza l'asta del*

[96] From a cross-linguistic perspective, the primary variation of the Italian action verb *sollevar*e and of the English translation *to lift* almost overlap. The main difference between the two predicates is that the verb *to lift* has a variation which seems to be wider than that of *sollevare*: it can also be applied to the relocation of an object from a lower to a higher surface (e.g., *Mary lifts the box onto the table*, 'Marta colloca la scatola sul tavolo') and to events implying the resultative state of an object (e.g. *John lifts the hood of the car*, 'John alza il cofano della macchina').

*microfono*, 'Marta raises the microphone'). This is not surprising but can easily be explained by reference to the fact that, while a sort of gravitational restraint is evident in cases (2, 3), there is no [weight][97] that restricts upwards movement and no surface the object has to be separated from, in case (6).

On the basis of the descriptions made so far, I propose to distinguish the semantic variation of the 5 general action verbs *alzare, abbassare, salire, scendere,* and *sollevare* on the basis of their differential traits and to represent them in the form of image-schematic components[98]:

| | Differential traits | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *IMAGE SCHEMAS* / *Verbs* | VERTICAL ORIENTATION (UP) | VERTICAL ORIENTATION (DOWN) | SELF MOTION | CAUSED MOTION | PATH | OBJECT | RESTRAINT REMOVAL | SURFACE |
| *Alzare* | S | A | O | O | O | O | O | O |
| *Abbassare* | A | S | O | O | O | O | O | O |
| *Salire* | S | A | S | A | S | A | A | A |
| *Scendere* | A | S | S | A | S | A | A | A |
| *Sollevare* | S | A | O | O | O | A | S | S |
| Salient (S); Optional (O); Absent (A) | | | | | | | | |

**Table 18.** Differential traits: primary variation

## 5.4. How we metaphorically use our group of general action verbs

So far it has been stressed that the semantics of general action verbs as, say, *sollevare* (Eng., 'to lift') is strictly connected to perceptual inputs, spatial bodily information, and bodily motor schemas. It has been shown that action verbs are flexible linguistic tools, being able

[97] In a study on the applicability of *alzare* and *sollevare* to different action types, Moneglia (1998) noted that the latter can never be used to refer to events in which there is zero gravity. According to Moneglia, the reason for this can be traced back to the meaning of *sollevare,* which contains the necessary component [removal of the gravitational steady state of the object]. From this it follows that we cannot use the verb *sollevare* to refer to an event in which someone raises to a higher position an object that: 1) has no weight; and 2) does not lie upon a horizontal surface.

[98] The word "salient" refers to the fact that some schemas are more important and essential within the semantics of a verb than others. It should be clear that, by adopting this term, I do not mean to involve in the discussion concepts of mental accessibility or cognitive processing (Giora 2003). The word is used here as a synonym of "important, relevant, necessary".

to be applied in various pragmatic contexts to express different action events (e.g., primary variation). Their pervasiveness, though, is not only manifested on the level of the reference to concrete actions, but also on a more abstract one, where their semantic core is exploited to encode figurative meanings (e.g., marked variation), arising from largely metaphorical processes.

The following sub-sections concern the annotation procedure that was conducted on a selected collection of data (e.g., IMAGACT and Opus2 corpus) that relate to the metaphorical variation of the Italian action verbs *alzare* (Eng., 'to raise'), *abbassare* (Eng., 'to lower'), *salire* (Eng., 'to rise'), *scendere* (Eng., 'to descend'), and *sollevare* (Eng., 'to lift'). It will be shown how, under varying semantic properties, a diverse type of metaphors and metaphorical meanings can be registered. This is to say that, despite sharing the same spatial orientation (e.g., downwards or upwards), the annotated verbs do not always converge on the kind of metaphors encoded and represented.

In Sub-section (5.4.1.) in particular, a short introduction of the vertical orientation (and axis) concept will be provided; the discussion of the common orientational metaphors found within the marked variation of *abbassare, alzare, salire*, and *scendere* (but not of *sollevare*) will be the main focus of Sub-section (5.4.2.); in Sub-section (5.4.3.), a description of the metaphorical network of the verb *sollevare*; will be presented. Finally, in Sub-section (5.4.4.), I will spell out some fictive instances of motion within the marked variation of *salire* and *scendere*.

### 5.4.1. The centrality of the vertical axis

There are many things in the world that we would not be able to speak of without resorting to metaphorical models. But where do these conceptual structures come from? And what are the external factors influencing the way we build them? As it has extensively been shown in the literature (Lakoff & Johnson 1980, 1999; Johnson 1987; Lakoff 1987; Grady 1997), many metaphorical concepts are not completely abstract, but are grounded in the kind of physical and bodily interaction that we have every day with the surrounding environment.

Because of its centrality in our physical experience (Langacker 1987), verticality is one of the most frequently recurring source domains in the operations of metaphorical mapping (Lakoff & Johnson 1980; Johnson 1987), being used to refer to a large array of abstract concepts indeed, such as Events, States, Changes or Purposes. To provide an example, the

mapping between verticality and the domain of quantity in the conceptual metaphorical structures MORE IS UP[99] and LESS IS DOWN (Lakoff & Johnson 1980) finds a concrete justification in our everyday experience, where the concrete correlation between the amount and the level of a solid substance can be observed. In a metaphorical scenario, this relation usually identifies the measurable increase or decrease of a value, force, or intensity (temperature, prices, volume, etc.). Likewise, the conceptual metaphors HAPPY IS UP and SAD IS DOWN, which seem to be very common models in several languages (e.g., English, Mandarin Chinese, and Hungarian, among others), emerge from another bodily experience, that is the universal configuration of human bodies within space (Lakoff and Johnson 1980; Kövecses 2000, 2015). As a matter of fact, we have the cognitive model that people who are happy typically stand up straighter and taller, with an erect posture. In contrast, sadness and similar emotional states lead to an opposite change in our posture: it drops, and the body and its parts go down as if they are being crushed by the force of gravity.

More generally, the vertical axis is often found in association with the quality target domain (e.g., GOOD IS UP, BAD IS DOWN) and it is commonly used to convey a positive or negative evaluation. This last correspondence is very pervasive in our conceptual system, as this may be extended to several contexts: we can raise the level of our performance or lower our ranking position, we can buy a high-definition display or produce low-quality academic work. These examples show how the [up/ down] orientation vectors have undergone an intense process of symbolization, after which the far ends of the vertical axis have acquired diametrically opposed meanings, interpretations and values. The same process of symbolization happens to be active in metaphorical structures such as HARMING IS LOWERING, HIGH STATUS IS UP, CAREER PROGRESS IS VERTICAL MOVEMENT, RATIONAL IS UP, MORAL IS UP, etc. (Lakoff et al. 1991). In the field of Cognitive Linguistics, this evaluative factor, which seems to be generally preserved in metaphorical (especially orientational) extensions, is known as the plus–minus/axiological parameter and is conceived of as an essential component of most image schemas (Krzeszowski 1993, 1997; Cienki 1997; Hampe 2005). According to Krzeszowski (1993), for instance, the vertical axis denotes a sort of default evaluation

[99] This metaphor has to be considered as an entailment of the primary metaphor QUANTITY IS VERTICALITY, which is based on the idea that greater quantities correspond to higher point along a vertical scale (Grady 1997).

scheme, where the positive and negative polarity are fixed (and absolute) values dependent on our bodily experience.

The idea that the vertical axis represents a highly flexible domain has been also supported by Ekberg's (1995) work. She clearly shows that the plasticity of the vertical axis enables us to manipulate the schema and to continuously produce a broad range of new conceptualizations. The study points out that, in our daily experience, we frequently use linguistic expressions that refer to transformations of the vertical axis:

(16) *He walked up and down the corridor* (Ekberg 1995: 70)

(17) *The tree reached up to the roof/the dress reached up to the ankles* (Ekberg 1995: 71)

(18) *Down to the present day* (Ekberg 1995: 79)

Ekberg (1995) explains that each one of these linguistic expressions can be connected to a different cognitive process: a) an horizontal transformation in (15); b) the fictive effect resulting from the transformation of a real entity tracing a path into a static extended entity simulating the path itself, as in (17); c) the mapping from the physical to the temporal space, formalized in the time is space metaphor, as in (18).

### 5.4.2. How action verbs represent common orientational metaphors

It is usual to define the orientational metaphors as those conceptual structures that represent a concept (or an entire system of concepts) by means of spatial vectors or image-schematic components such as IN/OUT, FRONT/BACK, UP/ DOWN. One of the most common type of orientational metaphors stems from the association between the domains of verticality and quantity. Conceptual orientational metaphors like MORE IS UP[100] or LESS IS DOWN[101] are not simple abstract structures, but models of reference for a considerable number of everyday metaphorical expressions that relate to the increase or decrease of a quantitatively measurable value. Among the various options provided by our language, action verbs proved to be some of the most productive tools at our disposal for the linguistic encoding of orientational metaphors. A short list of standardized sentences extracted from

[100] Alternative tags used in this thesis are: INCREASE IN QUANTITY IS UPWARD MOTION and CAUSED INCREASE IN QUANTITY IS CAUSED UPWARD MOTION.

[101] Alternative tags used in this thesis are: DECREASE IN QUANTITY IS DOWNWARD MOTION and CAUSED DECREASE IN QUANTITY IS CAUSED DOWNWARD MOTION.

the metaphorical variation of *alzare, abbassare, salire*, and *scendere* (IMAGACT database) is reported below:

(19) *Marco alza il volume del televisore*

'Marco turns up the volume of the television'

(20) *L'insegnante alza il voto allo studente*

'The teacher raises the student's grade'

(21) *La temperatura si alza*

'The temperature rises'

(22) *Le punture abbassano la pressione a Fabio*

'The injections lower the pressure'

(23) *Il prezzo si abbassa*

'The price drops'

(24) *La febbre sale*

'The fever rises'

(25) *Il numero di malattie sale*

'The number of diseases rises'

(26) *L'affitto sale*

'The rent rises'

(27) *Il valore della moneta scende*

'The value of the currency goes down'

(28) *La frequenza delle piogge scende*

'The rain frequency is decreasing'

(29) *L'inflazione scende*

'Inflation drops'

As the examples show, speakers frequently resort to action verbs to express the association between the verticality domain and the quantity domain in a wide range of different contexts. The operation of metaphorical transfer is possible since each of the predicates used in the expressions listed has: a) the VERTICAL ORIENTATION schema as the focal and salient domain of its primary and physical meaning; b) the SCALE image schema as the semantic core in its secondary and abstract sense. From this it follows that the four Italian action verbs used in the previous examples (19-29) share a common metaphorical type (MORE IS UP or LESS IS DOWN), which is characterized by having the same underlying conceptual mapping (VERTICALITY and QUANTITY), the same local equivalent verbs (e.g., *aumentare*, 'to increase'; or its opposite *diminuire*, 'to decrease'), and the same image schemas (e.g., VERTICAL ORIENTATION (UP/DOWN), PATH, CAUSED or SELF MOTION, SCALE.

The metaphorical process underlying the examples in (19-29) can be explained in detail on the basis of the following steps:

a) the verb always modifies a value, which is conceptualized as a [concrete entity];
b) the scale within which the value increases or decreases is projected onto the vertical orientation schema;
c) the result of the action consists of a metaphorical dislocation or self motion of the value along the metaphorical vertical axis.

As the immediate aim of this thesis is that of exploring the tightness of the link between the two dimensions of variation of action verbs (e.g., primary and marked variation), it is worth pointing out that isomorphism exists between the structure of the abstract events named in (19–29) and the structure of the concrete events demonstrated by the same verbs when they are used in their physical sense. In the examples shown in (19-23), it is plausible to say that the event structure focuses on the endpoint component of the Motion schema: the salient feature is that the trajector assumes a different (higher/lower) location after the event is accomplished. In the instances in (24-29), the event structure is not focused on the event result, but, rather on the process itself, namely the oriented movement of the trajector along an imaginary path/scale.

The identification of the salient image-schematic components enables us not only to motivate the reasons why a predicate can be applied to encode a specific type of metaphorical concept, but also to better understand the restrictions on its application. That is, image schemas permit one to highlight the metaphorical potential of action verbs. As a matter of fact, our model can account for the reason why (although it is largely equivalent to *alzare* [Eng., 'to raise'] as for its primary variation) the use of the verb *sollevare* (Eng., 'to lift') is not allowed within the orientational metaphors MORE IS UP and LESS IS DOWN. What keeps *sollevare* from linguistically codifying these metaphors is that its semantic core is not simply defined by spatial information, but also by force dynamic information. This phenomenon will be examined in further detail in the next section.

### 5.4.3. Semantic constraints within the metaphorical variation of the verb *sollevare*

The reason why the verb *sollevare* cannot encode expressions that evoke a common orientational metaphor like MORE IS UP (or LESS IS DOWN) has to be sought in the core semantics of this verb, which places strong constraints on its applicability. The possible actions described by the primary variation of *sollevare* (Table 17) only refer to events that contain the association between the image schemas VERTICAL ORIENTATION, SURFACE, and RESTRAINT REMOVAL (Table 18). In particular, the salience of the schema RESTRAINT REMOVAL may be explained by the fact that the theme of *sollevare* must have [weight], which is actually a gravitational restraint. To make a case in point, Table (15) and Table (17) show that the verbs *alzare* and *sollevare* are equivalent in type 1 and type 13 (e.g., *Marta alza/solleva una scatola*; 'Mary raises/lifts the box'), but not in type 2 (e.g., *Marta alza/* solleva l'asta del microfono*; Mary raises/*lifts the microphone): while the gravitational restraint is evident in the former cases, there is no weight that restricts upwards motion in the latter.

In a study on the applicability of these two verbs to different action types, Moneglia (1998) suggested that, unlike the verb *alzare*, the local equivalent verb *sollevare* can never be used to refer to events in which there is zero gravity (e.g., #[102] *L'astronauta solleva una scatola nella stazione spaziale*; 'The astronaut lifts a box in the space station'). According to Moneglia (1998), the inapplicability depends on the fact that the meaning of *sollevare*

[102] By using the symbol #, I make explicit the fact that, although this sentence is grammatical, it is nonsensical.

contains the necessary component "removal of the gravitational steady state of the object". Therefore, it should not be possible to use this predicate to refer to an event in which someone raises an object that has no weight to a higher position.

If it is true that the semantic properties of an action verb may influence its metaphorical potential, what are the direct consequences for the verb *sollevare*? The marked variation of this predicate, as has been suggested on the basis of the IMAGACT database (and confirmed by the comparison with the Opus2 corpus), shows two main metaphorical types, each represented by a best example, i.e., an example chosen from among others in order to represent the whole metaphorical type:

(30) *Il cinema solleva dai problemi*

'Cinema is a source of relief'

(31) *Marco era molto sollevato*

'Marco was very relieved'

Example (30) points to a situation in which something or someone makes someone else feel less sad or burdened. Here, the cinema affects a generic (implicit) patient, relieving him from his initial state. This scene could be conceived of as a situation in which something (such as a heavy object) affects another participant in the event (i.e., the patient), constraining his/her physical and (on a more abstract level) emotional state. This metaphorical mapping specifically allows the activation of the restraint removal image schema, and, consequently, proves the applicability of the verb *sollevare*. Example (31) is quite similar to the previous one (someone starts to feel better): in both cases, relieving problems or worries is equated to the removal of a condition that anchors the subject to something heavy. The main difference is that the latter example does not express the entity that causes the change of state. In a CMT scenario, one could analyze these expressions by referring to the specific conceptual metaphors PROBLEMS/WORRIES ARE HEAVY OBJECTS[103], tied up with the most general ones HAPPY IS UP/SAD IS DOWN and HELPING IS RAISING/HARMING IS LOWERING.

[103] This metaphor is strongly connected to the general primary metaphor DIFFICULTY IS HEAVINESS, according to which difficulties in action are understood in terms of weight (Grady 1997).

To confirm the fact that the verb *sollevare* is involved in the linguistic evoking of conceptual metaphors entailing the removal of some kind of burden, it is useful to list two more expressions related to another very productive metaphorical type which has been taken from the marked variation of the verb (Opus2):

(33) *Questo non ci solleva dal compito di studiare risposte adeguate alla situazione*

'This does not relieve us from the task of studying responses tailored to the situation'

(34) *Io propongo che Tony sia sollevato dai suoi doveri*

'I propose Tony be relieved from his duties'

Both the examples in (33) and (34) profile the conceptual metaphor OBLIGATIONS ARE BURDENS (or to its variant RESPONSIBILITIES ARE BURDENS). In both the examples, as well as those discussed above (30-31), relieving tasks or duties is understood as the removal of a condition that anchors the subject to something heavy. Although the set of cases presented in this section are not all of the same metaphorical type (they refer to different conceptual structures) they all seem to be constrained by the recurring of a certain kind of semantic components (e.g., image schemas) and properties (e.g., force on an object). That is, they all seem to depend on the activation of some salient traits that directly stem from the core semantic of the verb.

### 5.4.4. Factive vs. fictive motion within the metaphorical production of *salire* and *scendere*

Earlier in the chapter, it was shown that the action verb *salire* (Eng., 'to rise') may profile four main dynamic events: a) a gradual and continuous upwards motion as in (9); b) a discrete upwards motion performed by raising the foot and setting it down to move up something as in (10); c) an upwards climbing movement as in (11); d) an upwards movement of inanimate objects or substances as in (12). It has also been noticed that, with respect to *salire*, the primary variation of the verb *scendere* (Eng., 'to descend') is punctuated by similar action types that encode direction, though now opposite in nature (e.g., downwards motion along the vertical axis).

When the action verbs *salire* and *scendere* are not applied in their literal and concrete sense, they are extensively used to produce a broad range of spatially based abstract concepts as, say, comparisons (e.g., MORE IS UP/LESS IS DOWN, BETTER RANK IS HIGHER ON THE LIST).

Nevertheless, what seems to be even more productive within their marked variation is an extension of a different sort, that is, fictive motion (Talmy 1983, 1996; Matlock 2004). Fictive motion is a linguistically pervasive phenomenon, in which the motion of an object through space is entirely simulated. As a result, the semantics of the verb elicits the simulation of mental motion along an imaginary trajectory, even though the verb depicts a static scene. In this respect, within the IMAGACT corpus, a wide variety of representative sentences has been identified. Below, I present a brief list, extracted for uses of the verbs *salire* and *scendere*:

(35) *La strada sale*

'The road goes up'

(36) *La linea sale*

'The line goes up'

(37) *La scala sale al piano di sopra*

'The ladder goes up'

(38) *La linea scende sul foglio*

'The line descends along the paper'

(39) *La linea del collo scende*

'The neck line goes down'

(40) *La cucitura scende lungo i pantaloni*

'The stitching moves down along the pants'

(41) *Il guinzaglio scende lungo i pantaloni*

'The leash hangs down beside the pants'

(42) *La stoffa scende dalla manica*

'The cloth comes down from the sleeve'

Sentences (35-42) reflect the more common action schema referred to by *salire* and *scendere* in their primary variation, namely a continuous movement in physical space. The potential for motion (which is an intrinsic component of the semantics of *salire* and *scendere*) is the exact reason why it is possible to trace the path of a continuously moving object and allow the transformation from an actual motion schema (e.g., *Fabio sale le scale,* 'Fabio rises up the stairs') into a fictive one (e.g., *La scala sale al piano di sopra*, 'The ladder goes up'). This means that the potential for motion, shared by these two verbs, enables the conceptualization of the scene, involving a sort of implicit type of motion. In fact, to be correctly represented, the scene requires the conceptualizer to mentally simulate a movement along a path, from its starting point to its endpoint.

Within this frame, image schemas identification is crucial as it enables us to display how the schema is projected from the primary to the marked variation of a verb. In examples (35-42), the prominent spatial component is length, causing the object to be perceived as an extended object (e.g., la *strada, la linea, la cucitura, il guinzaglio*). In the metaphorical interpretation, this extended object acts like a sort of trajector moving along a PATH (strictly corresponding to its actual length; e.g., *sul foglio, lungo i pantaloni*), in a certain direction, with VERTICAL ORIENTATION (UP or DOWN). Within this general picture, the presence of the schema END-POINT FOCUS (e.g., *al piano di sopra*) or STARTING POINT FOCUS (e.g., *dalla manica*) is optional.

Interestingly, by observing the data extracted from IMAGACT and Opus2, it seems that the phenomenon of fictive motion concerns only the marked variation of *salire* and *scendere*, but not the semantic extension of the other vertically oriented verbs that have been investigated (e.g., *abbassare, alzare* and *sollevare*). It is plausible to admit that the main reason lies in the activation of an inherent and salient property of *salire* and *scendere* (which are pure motion verbs), namely the PATH image schema. This same property happens to impinge on the event structure as well. The action motion verbs *salire* and *scendere* focus on a different point in time in the even than the other action verbs do: they do not encode the resulting state of the object, as in *abbassare, alzare*, nor the initial state of the event, as in *sollevare*. Rather, they apply to the process of motion itself. By contrast, the PATH schema is not a focal nor salient property of the semantic core of *abbassare, alzare* and *sollevare*. This is shown by the non-applicability of a linguistically explicit path 'marker' in the coreferential types among *alzare* and *salire*, i.e., in the action event represented by the scenes (8, 12). As a matter of fact, expressing the PATH schema by means of an explicit

constituent generates the non-acceptability of *alzare* in (43) and (44), while the use of the action verb *salire* is appropriate in both examples:

(43) *La bandiera sale/#si alza lungo l'asta*

'The banner rises along the pole'

(44) *Il palloncino sale/#si alza lungo il grattacielo*

'The balloon rises along the skyscraper'

As in the cases analyzed above, fictive motion requires that specific semantic properties of the verb be expressed. The emergence of these focal and salient semantic components (e.g., PATH schema) explains why only two verbs of our set (e.g., *salire* and *scendere*) could be used to encode fictive motion, while the other ones (e.g., *alzare, abbassare*, and *sollevare*) do not possess this metaphorical repertoire.

## 5.5. Experiment on the agreement between annotators

The experiment was conducted to assess the percentage of agreement on the annotation of metaphorical uses of action verbs (extracted from IMAGACT and Opus2), in terms of an image-schematic approach to the analysis of language. The annotators were asked to assign 2 or 3 image schemas to a set of 50 sentences in which the verbs *alzare, abbassare, salire, scendere,* and *sollevare* were not used in their basic sense but to express metaphorical meanings. The data sample can be organized in 5 main metaphorical classes (e.g., MORE IS UP, LESS IS DOWN, FICTIVE MOTION, PROBLEMS ARE HEAVY OBJECTS, OBLIGATIONS ARE BURDENS). The test was built to evaluate whether image-schematic components could be reliably used to represent the internal structure of metaphorical concepts emerging from the semantic variation of action verbs.

Before the start of the task, the coders were provided with oral and written instructions on the procedure. Moreover, a short oral introduction on image schemas was given by the main reference annotator. The task required that each one of the 4 annotators read the sentences

(in context)[104] and assign them 2 or 3 image schemas[105], taken from a list of 6 components that were previously sorted from a larger repository (Johnson 1987; Mandler & Canovas 2014). The list of image schemas that was given to the annotators contained the name of the selected image schemas and a simple explanation for each one of the descriptors used:

| List of Image schemas | Definitions |
|---|---|
| VERTICAL ORIENTATION | [Verticalità]: Indica direzione, verso l'alto (su) o verso il basso (giù). |
| PATH | [Percorso]: Un percorso lungo cui ci si muove o si sposta un oggetto. Di solito, è caratterizzato dall'avere un punto di partenza, un punto di arrivo e dal seguire una traiettoria. |
| OBJECT | [Oggetto]: Indica la presenza di un'entità tangibile |
| SCALE | [Scala]: Versione modificata del path, avente gradienti numerici. Permette, ad esempio, di avere misure di valutazione quantificabili (intensità o quantità). |
| MOTION | [Movimento auto-indotto]: Movimento di un corpo lungo un percorso (path) che nasce spontaneamente, senza l'intervento di stimoli esterni. |
| | [Movimento causato]: Movimento di un corpo lungo un percorso, il quale appare causato dall'intervento di una forza esterna. Può succedere che un corpo o un agente mettano in moto un altro oggetto. |
| FORCE | [Forza]: Implica l'applicazione di una forza in una o più direzioni (verso l'esterno, verso l'interno, su, giù). La forza può presentarsi sotto forma di blocco/resistenza, rimozione di una barriera, attrazione, pressione, compulsione. |

**Table 19.** List of image schemas and their definitions

The coders were asked to read the sentences and mainly focus on the semantic information brought in the metaphorical contexts by the action verbs. The annotators were asked the following questions: "What kind of information can you extract from the use of the verbs in this specific context? And how would you describe it in terms of image schemas?".

[104] The verbs were presented within their real application context. Nevertheless, in those case where it was not possible to provide the annotators with a context, the sentences were presented in the form of standardized sentences (verb presented in third person singular, in the form of present simple, only with the strictly necessary number of arguments needed for the correct interpretation of the sentence).

[105] I decided to sort a feasible number of image schemas, among those which seem to be more commonly discussed in the literature.

As annotators, 4 Italian native speakers were selected. The coders were divided in two groups: 1) a group of expert annotators (1 male and 1 female annotator); 2) a group of non-expert annotators (1 male and 1 female annotator):

| Group | Annotator | Gender | Age | Education level | Profession |
|---|---|---|---|---|---|
| 1 | 1 | M | 34 | Ph.D. in Computer Engineering | Computer scientist |
| | 2 | F | 31 | Ph.D. in Cognitive Science | Post-doc researcher |
| 2 | 3 | M | 29 | MA. in Economics | Office employee |
| | 4 | F | 33 | MA. In Psychology | Psychotherapist |

**Table 20.** Annotators description

The annotators conducted the whole procedure using an Excel file:

| Corpus | SX | Verb | DX | IS |
|---|---|---|---|---|
| OpenSubtitles2011 | giornalismo investigativo. </s><s> Un burbero ma benevolo direttore ... </s><s> La sai una cosa, Barbara? </s><s> Gli arabi hanno deciso di | **alzare** | il prezzo del petrolio di un altro 20 %. </s><s> Hanno beccato la CIA a curiosare fra la posta di un senatore. </s><s> C' è una guerra civile | |
| OpenSubtitles2011 | per bruciare meglio e più a lungo. </s><s> Li uso per la mia forgia. </s><s> Questi tre bruceranno uno dopo l' altro, il calore farà | **alzare** | la pressione ... ed il treno accelererà. </s><s> Pronti a partire! </s><s> Emmett! </s><s> Accesi i circuiti temporali? </s><s> Sì! </s><s> Immetti la | |
| Tatoeba | la voglia di andarsene da questo paese! </s><s> Fatevi valere. </s><s> Grazie a tutti quelli che si sono prodigati per la sorpresa. </s><s> Si | **alza** | l' età pensionabile. </s><s> È di cattivo umore. </s><s> Lei è di cattivo umore. </s><s> È di pessimo umore. </s><s> Lei è di pessimo umore. | |
| OpenSubtitles2011 | la nazione! </s><s> E ' stata scoperta 13 anni fa! </s><s> Tenetevi forte perché è ritornata! </s><s> Come presentatrice! </s><s> Godetevela, | **alzare** | il volume adesso. </s><s> Sì? </s><s> Possono riconoscere solo la mia voce normale. </s><s> Cos' è? </s><s> La ragazza della giungla che è | |
| EMEA | normale risposta del glucagone all'ipoglicemia. </s><s> Per entrambi GLP-1 e GIP la stimolazione del rilascio di insulina si | **alza** | quando il glucosio sale sopra le normali concentrazioni. </s><s> Inoltre, l'attività del GLP-1 e del GIP è limitata dall' | |
| ECB | inflazionistiche sottostanti. </s><s> Fra febbraio e dicembre 1994 il tasso sui Federal Funds (fondi federali) è stato | **alzato** | sei volte; </s><s> inizialmente, la Federal Reserve ha optato per aumenti relativamente lievi dei tassi ufficiali (di 25 | |
| OpenSubtitles2011 | . </s><s> Ne sono felice. </s><s> Siamo andati al college insieme. </s><s> Ha cervello ed è sincero. </s><s> Va bene, Jennie, è tutto. </s><s> Vai pure. | **alzare** | l' aria condizionata. </s><s> Sembra di essere all' inferno. </s><s> Siamo molto in profondità. </s><s> Forse è l' inferno. </s><s> - Sa cos' è successo | |
| OpenSubtitles2011 | tu il comando i metodi usati per il contrattacco ai giapponesi sono diventati piu ' drastici. </s><s> E ' stato quello a farvi | **alzare** | gli ascolti? </s><s> - Non me ne frega niente dello show. </s><s> - Siamo pirati! </s><s> Voglio solo far sapere alle persone che si possono | |
| OpenSubtitles2011 | <s> Con ghiaccio, per favore. </s><s> Conway. </s><s> Scusate, devo asentarmi un attimo. </s><s> Ci penso io. </s><s> Non vuoi parlare, | **alziamo** | un po ' la temperatura. </s><s> Eccoci. </s><s> Perfetto. </s><s> Allora, tutto e ' cominciato con il prossimo Call of Duty. </s><s> Non lo considero | |
| OpenSubtitles2011 | che l' inizio, facendo i conti con la matematica. </s><s> È stato stimato che solo negli USA </s><s> la tassa sul reddito dovrebbe essere | **alzata** | al 65 % a persona, solo per pagare gli interessi nel prossimo futuro. </s><s> Gli economisti prevedono che tra alcune decadi il | |
| Europarl3 | diritti esclusivi per medicinali comuni correntemente usati nel trattamento di disturbi rari, facendo così | **salire** | il costo di tali farmaci. </s><s> Intende la Commissione indagare in merito al livello di tali abusi? </s><s> Quali misure intende | |
| Europarl3 | , si possono analizzare tutti i processi sinora istituiti, ma l' unico sistema che si sia rivelato efficace nel far | **salire** | l' occupazione consiste nella riduzione del costo del lavoro. </s><s> La mia ultima osservazione riguarda il mio emendamento | |
| ECB | inflazione registrato lo scorso anno è imputabile principalmente a fattori esterni. </s><s> Le quotazioni petrolifere sono | **salite** | rapidamente, mentre l' euro si è deprezzato rispetto alle principali valute. </s><s> Poiché tale evoluzione è avvenuta in un | |
| ECB | ALIMENTARI NELL' AREA DELL' EURO Nella seconda metà del 2007 l' inflazione degli alimentari nell' area dell' euro è | **salita** | bruscamente, sia alla produzione sia al consumo. </s><s> I prezzi alla produzione degli alimentari e delle bevande hanno | |
| Europarl3 | di prodotti agricoli. </s><s> L' attuale politica agricola comune non è solo costosa per l ' Unione, ma contribuisce anche a far | **salire** | i prezzi al consumo. </s><s> Il settore agricolo, inoltre, è ampiamente tutelato dalla concorrenza delle importazioni | |
| ECB | detentrici di tali titoli, le quali possono decidere di aumentare la propria spesa per consumi facendone così | **salire** | la domanda. </s><s> Questa situazione potrebbe alimentare pressioni inflazionistiche interne. </s><s> Per converso, un calo delle | |

**Table 21.** Excel file used in the annotation procedure

The annotation results for each one of the 4 annotators were compared with the annotation conducted by the reference annotator (the author). The score of pairwise percentages agreement is reported in the following table:

| **TASK 1** | | Group 1 | | Group 2 | |
|---|---|---|---|---|---|
| | **Average pairwise percent agr,** | Pairwise pct, agr, cols Ref & 1 | Pairwise pct, agr, cols Ref & 2 | Pairwise pct, agr, cols Ref & 3 | Pairwise pct, agr, cols Ref & 4 |
| FORCE | **84.00%** | 100.00% | 80.00% | 68.00% | 88.00% |
| MOTION | **42.00%** | 24.00% | 52.00% | 40.00% | 52.00% |
| OBJECT | **59.50%** | 60.00% | 52.00% | 52.00% | 74.00% |
| PATH | **80.00%** | 80.00% | 92.00% | 80.00% | 68.00% |
| SCALE | **90.50%** | 100.00% | 98.00% | 94.00% | 70.00% |
| VERTICAL ORIENTATION | **94.50%** | 100.00% | 100.00% | 96.00% | 82.00% |
| TOTAL | **75.08%** | 77.33% | 79.00% | 71.67% | 72.33% |

**Table 22.** Pairwise percentage of agreement between annotators

As Table (22) shows, the overall percentage of agreement is high. The scores generally indicate good agreement upon the definition and interpretation of each of the listed image schemas. The only exception involves the MOTION schema. In this specific case, it could be argued that this schema has been overextended to also describe those contexts in which no motion is implied but only a mere change of location or orientation. Nevertheless, the data confirm that intuitions on the role of image-schematic components within the metaphorical variation of action verbs are close to those of the reference annotator. In percentage terms, the highest scores were obtained by the first group (expert annotators). The agreement between the main annotator and annotator 1 is 77.33%; the agreement between the main annotator and annotator 2 is 79.00%. Slightly different results were obtained with the second group: the agreement between the main annotator and annotator 3 is 71.67%; the agreement between the main annotator and annotator 4 is 72.33%. Finally, by comparing the total results obtained by the first group (expert annotators) and those of the main annotator, the percentage agreement is 78.17%; on the other side, by comparing the results obtained by the second group (non-expert annotators) with those of the main annotator, the percentage score is slightly lower, corresponding to the 72.00%. In general, it is plausible to say that there exists a higher similarity of judgement between the group of expert annotators and the reference coder.

In addition to the pairwise percentages agreement, Cohen's kappa coefficient was used to take into account chance agreement:

| TASK 1 | | Group 1 | | Group 2 | |
|---|---|---|---|---|---|
| | **Fleiss Kappa** | Cohen Kappa, agr, cols Ref & 1 | Cohen Kappa, agr, cols Ref & 2 | Cohen Kappa, agr, cols Ref & 3 | Cohen Kappa, agr, cols Ref & 4 |
| FORCE | 0.217 | 1 | 0.151 | -0.018 | 0.595 |
| MOTION | -0.114 | -0.338 | -0.017 | 0.027 | 0.091 |
| OBJECT | -0.043 | -0.154 | 0.504 | 0 | 0.077 |
| PATH | 0.714 | 0.506 | 0.818 | 0.506 | 0.231 |
| SCALE | 0.573 | 1 | 0.957 | 0.874 | 0.438 |
| VERTICAL ORIENTATION | 0.291 | 1 | 1 | 0.658 | 0.151 |
| TOTAL IS | 0.486 | 0.52 | 0.653 | 0.46 | 0.373 |

**Table 23.** Fleiss and Cohen's Kappa scores in Task 1

The data were analyzed in two ways: a) Fleiss' kappa coefficient was used to assess the general strength of each image schema used; b) Cohen's kappa coefficient was calculated to evaluate the consistency in the agreement across the 4 annotators. With regard to the different types of image-schematic categories proposed and evaluated by chance, the best results were obtained by the PATH (k = 0.714) and the SCALE (k = 0.573) schemas, which confirms the scores reported in the previous table (Table 22). Consistently with the previous percentages, the MOTION and the OBJECT schemas registered the lowest (negative) results. These numbers need two explanations: from one side, the MOTION schema may be overlapped with the PATH schema (especially within the variation of *salire* and *scendere*); from the other side, the OBJECT category was probably penalized by the fact of being a too general and, consequently, an underspecified tag. It is also very likely that this schema may be perceived to be of accessory importance, in comparison to others proposed in the experiment. Finally, as expected, the best agreement was registered between referee and expert annotators: the difference is not particularly significant, being 0.653 for the second coder and 0.52 for the first. The results obtained by the non-expert annotators were consistent with those calculated by using the pairwise percentage value (Table 22) and, even in this case, they did not strongly differ: 0.46 for the third coder and 0.373 for the fourth.

## 5.6. Discussion of the results

This study focused on the analysis of 5 vertically oriented action verbs, i.e., *abbassare, alzare, salire, scendere,* and *sollevare*, and showed that, in some cases, the primary variation of these predicates tend to converge, that is the predicates may be applied in the

same pragmatic contexts as local equivalent verbs (e.g., *Alzare/sollevare una scatola,* 'To raise/to lift a box'). Nevertheless, it has also been pointed out that these verbs do not share the same inner semantic structure. Verb meaning houses semantic features which constrain and, consequently, determine the type of event that the verb itself can refer to. For instance, the action verb *sollevare* only applies to contexts in which the theme has [weight]. While all the other verbs only require the presence of the VERTICALITY ORIENTATION schema as necessary component for their application, the verb *sollevare* needs that the RESTRAINT REMOVAL schema is activated. As it follows, *sollevare* cannot be applied to events in which gravity does not constitute a focal and salient semantic property. It could be argued that, in the case of *sollevare*, the vertical orientation is just a contextual property, since upwards motion is always required to overcome gravity and to remove the stationary configuration of an object. Yet, upwards motion is not a sufficient condition for the use of *sollevare*.

Moreover, the present analysis suggests that the five action verbs tend to focus on different time points of the event in question. *Alzare* and *abbassare* focus on the resulting state of the object, i.e., on the end-point component of the PATH schema, since the salient feature is that the [trajector] assumes a different (higher/lower) location after the event is completed. *Salire* and *scendere*, on the other hand, focus on the motion process itself, that is on the path followed by the trajector during the event. Finally, *sollevare* does not focus on motion at all, but rather on a necessary property of its object in the initial state of the event: it has a weight, which currently forms a restraint that is going to be removed to separate the object from the surface it lies upon.

This work not only aims to show that the bond between our conceptual and perceptual systems is real, but above all: how our semantic competence, especially that relating to the use of action verbs, mirrors the way in which we build and shape metaphorical concepts. As a matter of fact, the differential semantic properties that characterize the five predicates in the analysis strictly reflect their metaphorical potential. Although these local equivalent verbs partially share their metaphorical extensions, they do not encode exactly the same kind of metaphorical concepts. When there is a divergence in their semantic network, two questions automatically arise. First, how is it possible that some metaphorical concepts can be accessed by some verbs and not by others? Second, is it possible to determine the key operational factors in the metaphorical shift of the verb? This study showed that for a metaphor to be expressed in a specific context, the predicate must belong to specific schemas

pertaining to that context. More specifically, given the basic meaning of a verb, it is plausible to hypothesize that:

a) orientational metaphors are enabled by the presence of the VERTICAL ORIENTATION image schema;
b) fictive motion metaphors are enabled by the presence of the PATH image schema;
c) the PROBLEMS/RESPONSIBILITIES ARE HEAVY OBJECTS/BURDENS metaphor is enabled by the RESTRAINT REMOVAL image schema.

The relationship between the semantic verb classes and their metaphorical potential is represented within the following application matrix:

| Metaphor type | Necessary image schemas | Alzare and abbassare | Salire and scendere | Sollevare |
|---|---|---|---|---|
| Orientational metaphors | VERTICAL ORIENTATION | P | P | A |
| Fictive motion | PATH | A | P | A |
| Removal of a weight | RESTRAINT REMOVAL | A | A | P |

P= Present; A=Absent

**Table 24**. Application matrix for the group of action verbs annotated

The intersection of the semantic traits of the verbs and the schemas required to apply a metaphor enable the construction of a model that is able to explain why, for instance, *salire/scendere* is the only pair that can generate fictive motion metaphors, whereas change of location verbs such as *alzare/abbassare* cannot generate such metaphors. It also clarifies why *sollevare* does not extend to the common orientational metaphor mapping: its application requires the presence of the restraint removal schema.

## 5.7. Conclusions

The results of this study support the claim that a large number of abstract concepts are grounded in our physical and spatial experience of the world. Our interaction with the space that surrounds us is related to shared sensory motor processes, which screen external inputs and provide us with information about our body and other physical entities. Action verbs encode this information and label the types of movements that we perform with our body

and the types of actions that we engage in with the objects around us. Moreover, action verbs do not only encode concrete meanings, but also develop abstract ones. They constitute linguistic anchors which make clear how the realm of sensory-motor experience is mapped to the conceptual realm and how this gives structure to the representation of highly abstract concepts. Hence, the analysis of the metaphorical variation of action verbs contributes to an enhanced understanding of the way in which we transfer information obtained by means of our bodily interactions to our language. More to the point, the analysis of the image-schematic structure of the semantics of these predicates provides us with precise details on the processing of abstract concepts in natural language. It makes it possible to substantiate the usability of a verb within a certain metaphorical framework, and also to draw the limits and highlight the differences between (partially) equivalent words in terms of their actual applicability. Finally, the analysis of the results is consistent with the Invariance Principle hypothesis, according to which (Lakoff 1993: 215):

> [...] metaphorical mappings preserve the cognitive topology (that is, the image- schema structure) of the source domain, in a way consistent with the inherent structure of the target domain.

# Chapter six:
# Metaphors in action: the case[106] of verbs of force

## 6.1. Introduction

This second case study investigates the semantic variation of a small group of Italian action verbs (*premere, spingere, tirare* and *trascinare*) involved in the encoding of force-dynamic categories (Langacker 1987; Talmy 1988; Croft 2012; Gärdenfors 2014). Although the four verbs in this analysis belong to the same semantic class (force), they profile different types of action concepts and events. It seems reasonable to believe that the specific image-schematic features associated with their action imagery influence the differences in their semantic extension and linguistic use. However, along the semantic axis, there also exist specific points where the use of these verbs tends to converge. For instance, in some specific pragmatic contexts, the different use cases of *premere* converge with those of *spingere* (e.g., setting relationships between objects), and the uses of *trascinare* converge with those of *tirare* (e.g., frictional motion of an object along a surface). These verbs show a partial convergence (or divergence) not only with respect to their primary variation (Chapter 1), that is, when they encode physical concrete meanings, but also with respect to their marked variation (Chapter 1), that is, when they encode figurative meanings.

This study rests on the main hypothesis that there exists some sort of merging between the type of action and abstract concepts which can be expressed by means of the same action verb. What is the nature of the hidden relation that exists between the two semantic dimensions of an action verb? How do we use the rich information about motion experiences, bodily schemas, and relations between physical objects, to shape the internal structure and logic of the abstract concepts that these verbs refer to?

With respect to the structure of the case study, in Section (6.2.), I will show how the data collection took place and I will illustrate the research methods used during the annotation process. In Section (6.3.), I will describe the semantic variation of each of the four verbs, mainly focusing on the salient image-schematic structure and the specific action schemas

[106] This case study quotes verbatim (in full or in part) already published (Vernillo 2019) or submitted papers (Vernillo, submitted for revision).

that characterize the primary core of the verbs. In Section (6.4.), I will try to explain how these same structures and schemas permit the bonding of the marked (or largely metaphorical) and the primary variation of the verbs (see the Invariance principle: Lakoff 1990, 1993; Turner 1991). Section (6.5.) contains an experiment testing agreement between annotators. Finally, in Section (6.6.), I will show that the results of the study are consistent with the idea that metaphorical extensions of action verbs are constrained by the image-schematic structures involved in the core meaning of the verbs, and that these same structures are also responsible for the asymmetries found within the metaphorical variation of action verbs pertaining to the same semantic class (i.e., force).

## 6.2. The annotation procedure

As in the previous case study (Chapter 5), this work has been built on the analysis of Italian spoken corpora. The data refer to the metaphorical variation (e.g., marked variation) of a cohesive group of four action verbs that, in their basic meaning, codify the exertion of physical force. The empirical investigation of their metaphorical production will take place through three main phases: a) the comparison between their primary and marked[107] variation (Chapter 1); b) the isolation of the metaphorical conceptual structures (Chapter 3) found within their marked variation; c) the detection of the image schemas (Chapter 4) behind the application rules they are subject to, either when they encode physical and figurative meanings.

### 6.2.1. Data and methods

The annotation process[108] has been focused on a set of four Italian action verbs encoding a concept of force: *premere* (Eng., 'to press'), *spingere* (Eng., 'to push'), *tirare* (Eng., 'to pull'), and *trascinare* (Eng., 'to drag'). The data have been primarily extracted from the corpus IMAGACT (Moneglia 2014) and later integrated with those of the Opus2 corpus (Italian subtitles). Overall, the 4 action verbs subject to the analysis have high quantitative relevance

[107] The analysis will exclusively focus on the metaphorical production of the four action verbs. Other types of marked uses (e.g., metonymies, idioms, and merely phraseological uses) will not be investigated. Hereafter, the expressions "marked variation" and "metaphorical variation" will be considered as mutually interchangeable.

[108] The whole dataset is accessible by following the link: http://lablita.it/app/users/~vernillo/phd/

within the speech corpora they were derived from, as they register significant values in terms of rank and frequency. The quantitative impact of these action verbs within the IMAGACT Ontology (number of tokens and verbs are reported in Table 8) is illustrated in Table (25):

| Verb | Rank | Freq |
|---|---|---|
| *Tirare* | 62 | 546 |
| *Spingere* | 155 | 166 |
| *Premere* | 478 | 39 |
| *Trascinare* | 790 | 18 |

**Table 25. Force Dataset (Imagact)**

With regard to the Opus2 corpus (data available in table 10, Chapter 5), let us consider the following, Table (26):

| Verb | Rank | Freq |
|---|---|---|
| *Tirare* | 217 | 21265 |
| *Spingere* | 345 | 12111 |
| *Premere* | 538 | 6657 |
| *Trascinare* | 692 | 4497 |

**Table 26. Force Dataset (Opus2)**

The annotation process started with the scrutiny of more than 5000 occurrences, of which just a small part became the classification core (e.g., 310 metaphors). Table (27) reports the exact amount of data extracted from the IMAGACT corpus and used in the analysis. The number of occurrences for each of the 4 action verbs has been distinguished based on the type of semantic variation considered (e.g., primary or marked):

| Corpus | Imagact | |
|---|---|---|
| Variation | Primary | Marked |
| *Premere* | 39 | 5 |
| *Spingere* | 166 | 33 |
| *Tirare* | 546 | 106 |
| *Trascinare* | 18 | 14 |
| Total/V | 769 | 158 |
| Total/P-M | 927 | |

**Table 27.** Data extracted from IMAGACT

With respect to the metaphors contained in the IMAGACT database, Table (28) presents the precise number of occurrences[109] that have been classified and annotated in detail during the analysis:

| IMAGACT - Metaphors | |
|---|---|
| *Premere* | 5 |
| *Spingere* | 32 |
| *Tirare* | 62 |
| *Trascinare* | 11 |
| Total | 110 |

**Table 28.** Metaphors extracted from IMAGACT

The collection of data extracted from the IMAGACT repository was later enriched with the occurrences taken from the Opus2 corpus (Italian subtitles). For each verb, 1000 occurrences have been sorted and scrutinized (e.g., 4000 occurrences in total), and later divided into two categories, according to the type of use (primary or marked). This preparatory step served to cleanse the data, thereby excluding those occurrences that were not subject to the analysis (e.g., phrasal uses, idioms, stabilized phraseological uses, metonymies, grammatically improper uses). The annotation procedure was conducted on a selection of 200 metaphorical uses (e.g., 50 for each action verb).

Once the data were collected and organized, the deep annotation process was begun. As in the previous case study (Chapter 5), the crucial steps were[110]:

1) Overall evaluation of the primary variation of each action verb with extraction of the significant semantic properties[111] with a strong distinctive value (e.g., differences in motor schemas, spatial relations, type of object involved, action participants);

[109] For a brief discussion about the lack of description of the aspectual character of action verbs, consider footnote number 88, Chapter 5.

[110] I quote verbatim (in part or in full) from Chapter (5), Sub-section (5.2.1).

[111] As already clarified in Chapter (5), VerbNet, WordNet, and FrameNet databases were used in this preliminary phase of the analysis as retrieval sources of semantic information on action verbs. In particular, VerbNet showed to be an excellent repository of descriptions of the kind of force-dynamic features involved in the action-force events discussed in the present analysis.

2) Examination of the metaphorical variation of each action verb and gathering of similar metaphorical uses (e.g., similar meaning, same concept) in distinct classes of metaphorical types[112];
3) Selection of one or more significant conceptual metaphors (Lakoff et al. 1991; MetaNet: Dodge et al. 2013) for each metaphorical class;
4) Identification of the most salient image-schematic components (Johnson 1987; Lakoff 1987; Mandler & Canovas 2014) for each verb and each metaphorical class verb. In Table (29), there is a list of the image schemas[113] that will be used in the discussion on the semantic variation of the selected action verbs:

| MotionGroup | ForceGroup | Others |
|---|---|---|
| SELF MOTION | COMPULSION FORCE | OBJECT |
| CAUSED MOTION | BLOCKAGE | LINK |
| CAUSED JOINT MOTION | RESTRAINT REMOVAL | SURFACE |
| STARTING POINT FOCUS | ATTRACTION FORCE | CONTAINER |
| END-POINT FOCUS | | BALANCE |
| ANIMATE ENTITY | | CONTACT |
| SCALE | | |
| PATH | | |
| VERTICAL ORIENTATION | | |
| AWAY FROM | | |
| TOWARDS TO | | |

**Table 29.** Image schemas used in the analysis

## 6.3. How we primarily use our group of four general action verbs

The four general action verbs *premere* (Eng., 'to press'), *spingere* (Eng., 'to push'), *tirare* (Eng., 'to pull'), and *trascinare* (Eng., 'to drag') can be looked at as a cohesive semantic

[112] Groupings are stored in the appendix available via the link: http://lablita.it/app/users/~vernillo/phd/

[113] Except for the CAUSED JOINT MOTION schema, all the schemas listed in the table have all been collected from the list of image schemas discussed in the literature. The CAUSED JOINT MOTION category has been inserted as it allows us to distinguish different types of caused motion. By the expression simple caused motion, I mean to refer a discrete motion which stems from an impulse (e.g., *Marta pushes/shoves the box*). By the term joint motion, I mean to refer to a processual motion which stems from the continuous application of force on the object (e.g., *Marta pushes/carries the cart*).

network, in which the category of force-dynamics represent the main actor. They are, in fact, all used to express the exertion of some kind of physical force on the agent's body, animate theme or tangible object. To simplify the representation of their semantic variations and the isolation of the common and differential traits, the presentation has been organized by coupling these verbs in 2 sub-groups: 1) the group represented by *premere* and *spingere*; 2) the group represented by *tirare* and *trascinare*. As it will be shown in the following pages, although these verbs happen to frequently recur in similar linguistic and pragmatic contexts, they are characterized by having their own semantic properties and, also, their own specific applications.

In Sub-section (6.3.1.), I will briefly introduce the kind of action events the verbs *premere* and *spingere* refer to when used in their basic meaning. In Sub-section (6.3.2.), I will illustrate the kind of uses which are possible to encounter along the primary variation of *tirare* and *trascinare*. As in Chapter (5), the action types[114] connected to these predicates will be spelled out on the basis of the semantic representation proposed within the IMAGACT Ontology (Chapter 1, Sec. 1.5.).

### 6.3.1. A short overview on the primary variation of *premere* and *spingere*

As local equivalent verbs, *premere* (Eng., 'to press') and *spingere* (Eng., 'to push') share a common sub-set of action concepts. They can both be applied in a small range of linguistic contexts to the encoding of action events, in which an agent interacts with an entity (or theme) exerting force on it. Interestingly, the entity is not permanently physically affected by the application of force and is not overall moved from one place to another. According to the IMAGACT Ontology, the local equivalence between the predicates *premere* and *spingere* can be visually represented as follows:

[114] As already clarified in Chapter (5), the potential interference between syntactic and semantic factors was not considered as a crucial parameter in the definition of the single action types connected to a given action verb. As a matter of fact, the variation of a given action verb was action-based rather than being syntax-based. The array of possible syntactic structures, as well as the set of argument structure constructions, in which the predicate could be used was not considered a discriminating factor in the definition of the families of action types identified in the same verb extension.

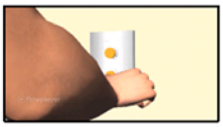
| Local equivalence in premere and spingere | |
|---|---|
|  |  |
| *(1) Marta preme/spinge il pulsante* | *(2) Marta preme/spinge il coperchio sulla scatola* |
| 'Mary presses/pushes the button' | 'Mary presses/pushes the lid onto the box' |

**Table 30.** Local equivalence in *premere* and *spingere*

The force can result in: 1) an activation of the device connected to the affected entity; 2) the setting of new relations between two or more entities. The semantic equivalence of *premere* (Eng., 'to press') and *spingere* (Eng., 'to push') is not absolute; in fact, variations of these two action verbs do not tend to converge systematically.

Besides the uses presented above, the verb *premere* appears also to be used to codify action concepts in which the application of force on a specific entity (manifested in the form of physical pressure) results in a mere physical manipulation[115]:

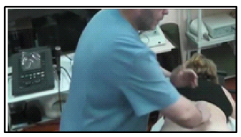
| Premere |
|---|
|  |
| *(3) Il fisioterapista preme sulle vertebre di Maria* |
| 'The physical therapist presses on Mary's back' |

**Table 31**. Action scene 3 in *premere*

With respect to its inherent image-schematic structure, the verb *premere* is based on the FORCE schema and, unlike *spingere*, never entails the MOTION schema. The verb *premere* is mainly used to profile static scenarios, that is, to highlight the mere interaction between a force and the entity affected by the exertion of the force. Given the prototypical action imagery associated with *premere*, the image-schematic components which appear to play a

[115] The Italian verb *spingere* (Eng., 'to push') cannot be applied in these pragmatic contexts. It is interesting to notice that, in this specific case, Italian differs from a language like English, where this and similar action concepts can be encoded by both the verbs *to press* (Ita., 'premere') and *to push* (Ita., 'spingere').

relevant role in its primary variation are: COMPULSION FORCE, CONTACT, OBJECT, SURFACE and BLOCKAGE.

The verb *spingere* (Eng., 'to push') commonly expresses action events in which the exertion of force on a concrete entity involves motion as a direct entailment. The motion can be instantiated by an external force (e.g., CAUSED MOTION schema) and be discrete and controlled by the agent only in the initial phase of the event (a), or continuous and controlled by the agent along the overall path (6). The motion can also be spontaneous and not brought about by another force (e.g., SELF MOTION schema):

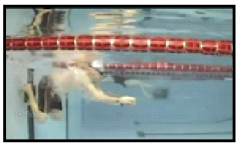
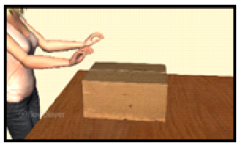
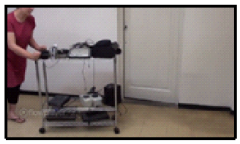
| Spingere | | |
|---|---|---|
| Self Motion | Caused Motion | |
|  |  |  |
| *(4) Il nuotatore si spinge con le gambe* | *(5) Marta spinge la scatola* | *(6) Marta spinge il carrello* |
| 'The swimmer pushes himself with the legs' | 'Mary pushes the box' | 'Mary pushes the cart down the hall' |

**Table 32.** Partial representation of the primary variation of *spingere*

It is important to stress that the MOTION schema in (6) plays a central role in the construal of those action events in which the agent has control of the theme throughout the motion, whereas the schema in (4) is determinant in those action events in which the agent does not experience the overall motion of the theme, and in which the motion results in a different spatial agent-theme configuration, namely in an increase of the physical distance between the agent and the entity affected by the force (AWAY FROM schema). As the analysis of the verb structure suggests, the tight association between the schemas of FORCE and MOTION is a distinctive feature of the semantic core of *spingere*. Rather than being used to encode events of mere force exertion (1-3), the verb *spingere* is mainly used in the encoding of kinetic events, that is, in events involving the shift of the location of the affected entity (animate or inanimate). As the prototypical action imagery associated with the predicate suggests, the

image-schematic components which do play a relevant role in the verb primary variation are: CONTACT, OBJECT, COMPULSION FORCE, MOTION, and PATH[116].

This results in a matrix of differential traits that enable the distinction between the primary semantic variations of *premere* and *spingere*. The table contains traits with different values: salient[117] (necessary components of the meaning of the verb), optional (they can either be present or not), absent (they do not characterize the core of the verb):

| | Differential traits | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *IMAGE SCHEMAS* / *Verbs* | CONTACT | COMPULSION FORCE | RESTRAINT REMOVAL | BLOCKAGE | SELF MOTION | CAUSED MOTION | CAUSED JOINT MOTION | PATH | OBJECT | SURFACE |
| *Premere* | S | S | A | S | A | A | A | A | S | S |
| *Spingere* | S | S | O | O | S | S | S | S | O | O |

Salient (S); Optional (O); Absent (A)

**Table 33**. Table with differential traits

### 6.3.2. A short overview on the primary variation of *tirare* and *trascinare*

When we use *tirare* (Eng., 'to pull') and *trascinare* (Eng., 'to drag') as local equivalent verbs, we normally want to refer to action events in which an agent exerts physical force

[116] It could either entail the separation of the theme from the agent (AWAY FROM schema) or the of a stable distance as in the case of the CAUSED JOINT MOTION schema.

[117] Use of the term "saliency" is not meant imply that more salient components are more perceptually prominent, more easily accessed or fast processed from a cognitive point of view (Giora 2003). When I use the term saliency, I simply refer to the fact that a salient component is an element that has clear semantic importance, centrality, relevance or priority in the application of a verb.

(COMPULSION FORCE schema) on an object, so as to forcefully and roughly move it along a surface (CAUSED JOINT MOTION)[118]:

| Local equivalence in tirare and trascinare | |
|---|---|
|  |  |
| *(7) Fabio tira/trascina la scatola* | *(8) Fabio tira/trascina il sacco dell'immondizia* |
| 'John pulls/drags the box' | 'John pulls/drags the garbage' |

**Table 34.** Local equivalence in *tirare* and *trascinare*

The transfer of the object on the terrain does not happen smoothly, but it encounters some difficulties which slow down the motion of both the entities involved (e.g., the agent and the object). The slowing down may be caused either by the fact that the object has a weight that impedes its motion, or by the object's reluctance to move along the path (BLOCKAGE schema). Either way, in action scenes (7, 8), the verbs *tirare* and *trascinare* profile an action scene in which, at each step of the motion, the agent tries to forcefully overcome the resistance[119] produced by the friction between the object and the path along which the theme moves (RESTRAINT REMOVAL schema).

The verbs *tirare* (Eng., 'to pull') and *trascinare* (Eng., 'to drag') are tied together by a relationship of strictly partial synonymy, that is, they are not always applicable in the same linguistic contexts. Yet, the semantics of the verb *tirare* is based on a larger array of action events and schemas. In general, the predicate describes action scenes in which the force applied may or may not result in events of proper motion. In cases where it does, the predicate describes events in which an agent causes an object to move along a path (e.g.,

[118] The main inference (an important fact to bearing in mind) is that the agent has control of the theme throughout the motion and not only in the beginning phase of the force-action event.

[119] More particularly, it could be argued that gravitation and friction act as opposing forces in scenes (7, 8). They represent the restraints that have to be removed at each point of the path along which the agent moves.

CAUSED MOTION[120]). The motion can be performed either along the vertical or horizontal axis, and is normally directed towards the agent or the effector[121] with whom the force is applied:

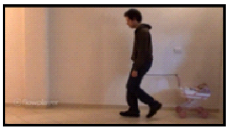
| Types of action-motion schemas | |
|---|---|
| Horizontal axis | Vetical axis |
|  |  |
| *(9) Fabio tira la carrozzina* | *(10) Marta tira su il secchio* |
| 'John pulls the cart behind him' | 'Mary pulls the bucket up' |

**Table 35.** Motion along the vertical and the horizontal axis

In cases in which the exertion of force does not result in a schema of motion, the predicate is used to profile action events involving the mere manipulation or modification of the shape of an object:

| Object manipulation in tirare | |
|---|---|
| With modification | Without modifiation |
|  |  |
| *(11) Marta tira l'elastico per i lembi* | *(12) Fabio tira la corda* |
| 'Mary pulls the elastic band out' | 'John tightens the rope' |

**Table 36.** Object manipulation in *tirare*

Given the prototypical action imagery associated with the verb *tirare*, the following image-schematic components were isolated: COMPULSION FORCE, OBJECT, CONTACT, PATH, CAUSED MOTION, CAUSED JOINT MOTION.

[120] The verb *tirare* only encodes the image schema CAUSED MOTION. Unlike *trascinare*, it does not encode the image schema SELF MOTION.

[121] Note that, in case of caused motion (9, 10), the verb *tirare* frequently entails that the agent moves the theme by means of a sort of link (LINK schema).

The verb *trascinare* (Eng., 'to drag') has a narrower primary variation, being mainly used to encode action events in which the motion is performed in the same agent's or effector's direction (CAUSED JOINT MOTION schema) as in cases (7, 8). This predicate can also be used to name physical events of SELF MOTION, that is, events in which an animate entity moves along a path spontaneously, without the intervention of an external force:

| Self motion in trascinare | |
|---|---|
| Body part | Whole body |
|  |  |
| *(13) Fabio trascina un piede* | *(14) Marta si trascina sul pavimento* |
| 'Fabio drags his foot along the ground' | 'Marta drags herself along the ground' |

**Table 37.** Self motion in *trascinare*

In both the cases (CAUSED and SELF MOTION schemas), the predicate encodes action events in which the existence of a frictional force influences the specific manner of motion along the path (the motion is performed forcefully and roughly). As the analysis of the action imagery associated with the verb *trascinare* suggests, the following image schemas are relevant within its semantic core: COMPULSION FORCE, OBJECT, CONTACT, PATH, CAUSED/SELF MOTION, SURFACE, BLOCKAGE, RESTRAINT REMOVAL[122].

The following table proposes a matrix of differential traits (in terms of image-schematic components) that allow us to better understand the application conditions of *tirare* and *trascinare:*

[122] As the image-schematic profile shows, the application of the verb *trascinar*e is constrained by a higher number of restraints.

| Differential traits | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *IMAGE SCHEMAS* / *Verbs* | CONTACT | COMPULSION FORCE | RESTRAINT REMOVAL | BLOCKAGE | SELF MOTION | CAUSED MOTION | CAUSED JOINT MOTION | PATH | OBJECT | SURFACE | NEAR FAR |
| *Tirare* | S | S | O | O | A | O | O | O | S | O | O |
| *Trascinare* | S | S | S | S | S | A | S | S | O | S | A |
| Salient (S); Optional (O); Absent (A) | | | | | | | | | | | |

**Table 38.** Differential traits

## 6.4. How we metaphorically use our group of four general action verbs

In the previous sections it has been claimed that the semantics of general action verbs is strongly tied to specific perceptual, spatial, and motor schemas. It has been shown that the semantic variation of two similar action verbs (e.g., *premere* and s*pingere; tirare* and *trascinare*) can partially converge and be responsible for their mutual use in the operation of action reference and labelling. However, it has also been pointed out that these same verbs can also be applied in diverse pragmatic contexts to express diverse types of action events. The question I want to investigate is whether these couplings extend the same kind of interwoven semantic relations to their marked variations. Their pervasiveness, though, not manifests itself only on the level of the reference to concrete actions, but also on a more abstract one, where the semantic core is exploited to encode figurative meanings (e.g., marked variation), springing from largely metaphorical processes.

The following sub-sections present the annotation procedure conducted on a selected collection of data (e.g., IMAGACT and Opus2 corpus) that relate to the metaphorical variation of the Italian action verbs *premere, spingere, tirare* and *trascinare*. It will be shown how, under varying semantic properties, a diverse type of metaphors and metaphorical meanings can be registered. This is to say that, despite sharing similar force dynamics, the annotated verbs do not always converge towards the kind of metaphors encoded and represented.

In Sub-section (6.4.1.) a short presentation of the FORCE schema will be provided. The most significant types of metaphors localized within the marked variation of *premere, spingere, tirare* and *trascinare* will be spelled out in Sub-sections (6.4.2., 6.4.3.). The analysis will not only consider the conceptual metaphorical structures needed to explain the large array of abstract uses identified in the verb's semantic network, but it will also isolate the image-schematic components that happen to be salient in the operation of metaphorical meaning construction.

### 6.4.1. The centrality of the FORCE schema

Force plays a pervasive role not only in the myriad of activities that we perform everyday with our body, but also in the way we construct highly abstract concepts and develop equally abstract meanings (Johnson 1987; Sweetser 1990; Albertazzi 2000; Kövecses 2000, 2003; Gärdenfors 2014). Schemas such as COMPULSION FORCE, BLOCKAGE, COUNTERFORCE, DIVERSION, REMOVAL OF RESTRAINT, ENABLEMENT, and ATTRACTION can be conceived as a cluster of gestalt structures that share a common set of characteristics, according to which (Johnson 1987): a) forces are always experienced through interaction[123] (e.g., with objects in the surrounding space); b) forces usually involve the movement of some object through space, and in some direction (force has a vector quality, a directionality); c) forces typically have a single path of motion; and d) forces have degrees of power or intensity.

Given its centrality within our bodily experience, force happens to be one of the richest sources of information that is commonly exploited in the structuring of our conceptual system, and in particular, in the shaping of metaphorical scenarios (e.g., EMOTIONS ARE FORCES, CAUSES ARE FORCES). As it will be shown in the following sub-sections, the schema of FORCE forms the ground of many of the abstract concepts and figurative meanings that characterize the metaphorical variation of action verbs. It does not only occur in isolation, but also with a set of related schemas, some of which have proven to be more frequent than others. As a matter of fact, force can be normally co-experienced with image-schematic structures such as MOTION. It will be shown, for instance, that the almost systematic combination of the force and motion schemas is a salient characteristics of the verb *spingere,* tirare *and* trascinare but not of the verb *premere.*

[123] It is important to stress the fact that, as we experience force via interaction, a structure or sequence of causality is always implied.

### 6.4.2. Symmetries and asymmetries in the metaphorical variation of *premere* and *spingere*

By observing the data, it seems that *premere* (Eng., 'to press') and *spingere* (Eng., 'to push'), may be co-extensively used to linguistically express the similar kinds of metaphorical concept. Both the verbs are involved in the encoding of the general conceptual metaphor PSYCHOLOGICAL FORCES ARE PHYSICAL FORCES[124], via which psychological manipulation (impact or influence) is understood in terms of physical contact or pressure:

(15) *L'oratore preme sui temi sociali*

'The speaker is pushing a social agenda'

(16) *Occorre premere sulle due parti perché il negoziato sia vero*

'We need to put pressure on the parties to make the agreement'

(17) *Bisogna spingere sui processi di liberalizzazione*

'We need to put pressure on the deregulation processes'

(18) *Abbiamo spinto affinché tale diritto sia reso più accessibile*

'We pushed to make this right more accessible'

The verbal items in (15-18) exploit our knowledge of the force dynamic category in the representation of the psychological interaction between two different entities: the source of the force (ANIMATE ENTITY schema) and the party affected by the force (OBJECT schema). The sentences (15-18) basically convert into words the operation through which the abstract domain of psychological forces (e.g., influence) is projected into the concrete domain of physical forces (e.g., pressure).

Unlike the action verb *spingere*, the verb *premere* (Eng., 'to press') is often used to describe a static situation in which the entity exerting the force is perceived as a burdensome object (OBJECT schema), which weighs on another entity or theme (OBJECT schema), through a sort of imagery contact:

[124] This conceptual metaphor is part of the large Mental Events Structure model (Lakoff et al. 1991).

(19) *La disoccupazione preme sulla spesa sociale*

'Unemployment weighs on public expenditure'

Example (19) is a linguistic variation of the metaphor IMPEDIMENTS TO IMPROVING ECONOMIC STATUS IS PHYSICAL BURDEN, which represents a complex case of the primary metaphorical structure DIFFICULTIES[125] ARE IMPEDIMENTS TO MOVEMENT. The sentence frames a very specific scene in which unemployment (OBJECT schema) is conceived as a social burden or as an obstacle (BLOCKAGE schema) that weighs on (COMPULSION FORCE schema) public spending. In more general terms, the action verb *premere* appears to be pervasively used in the picturing of metaphors that make use of our experience of (and motor response to) physical burdens to structure more highly abstract domains. On the same token, when we use the Italian metaphorical expression as *Il tempo preme* ('Time is pressuring us'), we do not refer to the fact that we may eventually change the situation in which we are because of the time pressure; but we rather focus on the fact that another entity (e.g., time) is exerting a psychological force (conceived in terms of pressure), that that same entity is affecting our state of mind, and that we may be weighed down by the force itself. In similar cases, the interaction between the source and the target entity results in a sort of burdensome stasis or mere physical pressure, without implying a change of state or of action of the target entity. This mainly depends on the fact that, as it has been illustrated in Sub-section (6.3.1.), the action imagery associated with the verb *premere* does not entail motion, hence the verb is mainly used to represent static scenarios, that is, to express the mere interaction between a force and the entity affected by the force.

The verb *spingere* (Eng., 'to push'), on the other hand, is used in the encoding of more dynamic metaphorical concepts based on the source domain of MOTION:

(20) *Le circostanze spingono Fabio ad agire*

'Circumstances are pushing Fabio to act'

(21) *La situazione si spinge verso l'anno successivo*

[125] Within Lakoff's (Lakoff et al. 1991) framework, difficulties are viewed as constraints that prevent both actions and motions.

'The situation will press on into the next year'

(22) *L'amministratore spinge avanti l'azienda*

'The manager pushes the company forward'

The metaphorical extensions presented above (20-22) conceptualize causation in terms of motion (either caused or self-initiated). In example (20), external forces (e.g., circumstances) are intended in terms of animacy (ANIMATE ENTITY schema) that cause (COMPULSION FORCE schema) a target entity (e.g., Fabio: ANIMATE ENTITY schema) to perform an action or adopt a set of new actions (and behaviors) (e.g., CAUSED MOTION schema). The important fact is that this example is based on the generalization that a caused change of action is conceived as forced motion relative to a location. The expression in (20) can be seen as the linguistic reflection of the complex conceptual metaphor CAUSED CHANGE OF ACTION IS CONTROL OVER AN ENTITY RELATIVE TO A LOCATION[126], which is an entailment of the metaphor CHANGE OF ACTION IS CHANGE OF MOTION, and which also makes use of the metaphors CAUSES ARE FORCES and CAUSATION IS OBJECT TRANSFER. In example (21), an event is seen as a moving entity (ANIMATE ENTITY schema) directed from one location in space (STARTING POINT FOCUS schema) to another (END POINT FOCUS schema). The change that the event undergoes is understood as self-initiated motion (SELF MOTION schema). Example (21) is a linguistic variant of the metaphor THE PROGRESS OF EXTERNAL EVENT IS FORWARD MOTION[127], but may also be understood in a more general metaphorical scenario in which time is conceptualized as a landscape and action is conceived as self-inducted motion[128]. Finally, example (22) can be connected to the conceptual metaphor CONTROL OVER ACTION IS CONTROL OVER MOTION, which is a special subcase of the conceptual metaphor PURPOSEFUL ACTION IS DIRECTED MOTION TO A DESTINATION[129]. In this example, as well as in (20), causation is intended in terms of forced motion relative to a region/path. With respect to the first example listed

[126] This is part of the Event structure model: Causation (Lakoff et al 1991).

[127] This metaphor is an entailment of PROGRESS IS FORWARD MOTION ALONG THE PATH.

[128] It is a subcase of the metaphor ACTION IS MOTION ALONG THE PATH.

[129] Interestingly, example (22) has a multiple metaphorical potential: it does profile the canonical metaphor TIME IS SPACE, according to which the domain of TIME is conceptualized via the domain of SPACE. More specifically, the action of leading the company (e.g., to push the company forward) unfolds in a linguistically underspecified time span, which is conceived as the landscape through which the agent (e.g., the manager) moves. The TIME IS SPACE metaphor has as main linguistic activator the adverb *avanti* (Eng., 'forward'), by means of which it we entail that the time progression of the action is understood in terms of directed motion (special case: PROGRESS IS FORWARD MOTION ALONG A PATH).

above, the main difference springs from the fact that the metaphorical extension in (22) is based on an action imagery slightly different from the one found in (20). In this last example, the verb *spingere* does not only encode forced motion (CAUSED MOTION schema) but also the idea that forced motion is controlled along the overall path (CAUSED JOINT MOTION schema). This observation may be explained by reference to the fact that an animate and forceful entity (e.g., the manager) may have a specific purpose (e.g., the development of the company) and may want to guide the target entity (OBJECT schema) she has control over (e.g., company) towards the final goal of the long-term purposeful action she is bringing about (END POINT FOCUS schema).

The combination of the FORCE and MOTION schema is also salient in the encoding of the orientation metaphorical extensions of the verb *spingere*, that is: in those uses in which the predicate expresses the change of a value along a measurable scale:

(23) *Tali fattori hanno spinto verso l'alto i prezzi*

'These factors pushed up the prices'

(24) *I rincari hanno spinto l'inflazione verso valori superiori al 2%*

'Price increases pushed the inflation up over 2%'

Cases (23-24) can be both linked to the metaphor CAUSED INCREASE IN QUANTITY IS CAUSED UPWARD MOTION, which is an entailment stemming from the combination of the more general primary metaphor MORE IS UP[130] and of the metaphor CAUSED CHANGE OF STATE IS CAUSED CHANGE OF LOCATION. The metaphorical mapping is built upon image-schematic knowledge: while the target domain (e.g., QUANTITY) makes use of the SCALE schema, the source domain (e.g., CAUSED UPWARD MOTION) makes use of the combination of the image schemas COMPULSION FORCE, CAUSED MOTION and VERTICAL ORIENTATION. What is interesting is that, in these cases (23-24), as well as in the examples discussed above (20-22), the category of force systematically intersects with that of motion. This phenomenon is even more significant if we consider that, unlike *premere*, the verb *spingere* encodes this constant semantic

[130] This metaphorical structure proves to be very pervasive in the marked variation of the verbs encoding the vertical orientation image schema (e.g., *abbassare, alzare, salire, scendere*; Eng., 'to lower', 'to raise', 'to rise', and 'to descend').

combination in the unravelment of both its primary and metaphorical variation (see Table 26).

### 6.4.3. Symmetries and asymmetries in the metaphorical variation of *tirare* and *trascinare*

The metaphorical variation of the verbs *tirare* (Eng., 'to pull') and *trascinare* (Eng., 'to drag') usually converge on the encoding of those conceptual metaphors that construe the domain of CAUSATION on the basis of the intersection of the domains of FORCE and MOTION. The two predicates are indeed involved in the linguistic representations of a large system of metaphors in which causation is connected to animacy (e.g., CAUSATION IS AGENTIVE CAUSATION), causes are intended in terms of force (e.g., CAUSES ARE FORCES), changes of state (or of action) are conceptualized as changes of motion (e.g., CAUSATION IS CONTROL OVER AN ENTITY RELATIVE TO A LOCATION):

(25) *Marco tira Luca nella conversazione*

'Marco involves Luca in the conversation'

(26) *Il governo non tirerà l'Algeria fuori dal solco in cui si trova*

'The government will not get Algeria out of its current situation'

(27) *Ci hai trascinato in mezzo ai guai*

'You dragged us into a lot of problems'

(28) *Il presidente ha trascinato il paese sul fondo*

'The president dragged the country down'

In examples (25-28), the verbs *tirare* and *trascinare* are used to depict metaphorical scenes in which the change of state of the affected entity is caused by an external entity (ANIMATE ENTITY schema), which has control over the whole process of transition from one state to another (PATH schema), and which causes (COMPULSION FORCE schema) that the final state[131]

[131] It is important to say that *trascinare* (Eng., 'to drag') often entails that the change of state or situation is the consequence of a negative process (see the plus-minus parameter in Krzeszowski 1993). This might relate to the fact that the verb *trascinare* always entails a specific effort (the target entity can be heavy or reluctant to move) and thus an important disequilibrium between the entities involved in the event (BALANCE schema).

or goal achieved by the affected entity is intended in terms of motion from one location to another (CAUSED JOINT MOTION schema)[132]. As the examples show, there is an evident correspondence between the metaphorical extensions of the verbs *tirare* and *trascinare* and the specific sensory-motor imagery associated to these same predicates. All the metaphorical items discussed above (25-28) are built upon an operation of conceptual mapping in which: a) the agent corresponds to the agent that leads the motion; b) the party affected by the new situation or process corresponds to the entity (animate or inanimate) moved by the agent along the path; c) the caused change of state or situation corresponds to the motion caused by the agent; d) the achievement of the final goal corresponds to the reach of the final location along the path.

The metaphorical variation of the verb *trascinare* (Eng., 'to drag') diverges from that of *tirare* (Eng., 'to pull') in many points. The systematic combination of image-schematic components from the FORCE and MOTION domains stands as the thread that deeply connects the sets of different metaphorical uses produced by the verb. What is important to notice is that the schemas (and imageries) associated to the predicate are richer and more complex than those involved in the variation of *tirare,* as they seem to be more semantically constrained. The verb *trascinare* does not simply encode the schema of CAUSED MOTION but also that of SELF MOTION. The verb also requires a specific manner of motion (frictional[133], forceful and difficult[134]). With respect to the internal structure of the FORCE domain, the verb *trascinare* requires that the target entity is reluctant or not easy to move (BLOCKAGE schema) and that the force moving the target entity (COMPULSION FORCE schema) tries to continuously overcome that physical restraint (RESTRAINT REMOVAL schema). The metaphorical items identified within the variation of *trascinare* confirm the saliency of all the semantic aspects discussed above (see also Sub-section 6.3.2.). To provide some examples, the CAUSED JOINT MOTION image schema seems to play a structural role within the modeling of many metaphorical uses:

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[132] It is interesting to notice that the change of state can be enriched with additional space information and represented as a motion performed along a bounded path (CONTAINER schema) or along the vertical axis (VERTICAL ORIENTATION schema).

[133] The verb *trascinare* (Eng., 'to drag') always implies a sort of friction (CONTACT schema) between the moving entity and the ground (SURFACE schema) along which the entity moves.

[134] It seems reasonable to posit that this difficulty may be the direct source of most of the metaphorical uses of *trascinare*, in which a sort of evaluative scalarity (from a positive or neutral state towards a negative state; and viceversa) is frequently observable. See, for instance, examples (27-28).

(29) *Gli eventi trascinano la massa*

'The events are dragging people [along]'

(30) *L'odio ti trascina*

'Hatred tugs on you'

(31) *L'attore trascina il pubblico*[135]

'The actor drags the audience along'

(32) *Il tifo non trascina nessuno*

'The cheer does not grab [lit.: does not drag] anyone'

Sentences (29-32) profile an extremely unbalanced system of forces, in which one entity (an agent, external event, process or emotion) is conceptualized in terms of volition and animacy, and impinges on a second entity's behavior, state or action. The general conceptual metaphors that we can relate these examples to are the same cited in the previous section (e.g., CAUSATION IS AGENTIVE CAUSATION, CAUSES ARE FORCES, CAUSATION IS CONTROL OVER AN ENTITY RELATIVE TO A LOCATION). What is interesting about these uses (29-32) is that the verb *tirare* cannot be applied in these same metaphorical contexts to express the same kind of metaphorical meaning. The kind of force encoded by *tirare* does not happen to directly profile the same state of imbalance (or an unbalanced ratio between the entities and the forces involved) that seems to be a salient feature at the base of all the metaphorical extensions expressed by *trascinare*. Unlike *tirare*, the verb *trascinare* always entails the existence of a sort of impediment to motion and, hence, the presence of a specific bodily response to that same impediment: it entails that the motion (and the action) is performed with difficulty and that that difficulty increases the effort needed to accomplish an objective or to reach a goal (e.g., conceptual metaphor DIFFICULTIES ARE IMPEDIMENTS TO MOVEMENT)[136]. The same characteristics discussed so far seem to be relevant to those

[135] Interestingly, the agent (e.g., the actor) is not the direct source of the force. He/She may metonymically stand for something else, that is, for his/her words or his/her performance. The metonymical relationship through which we interpret the sentence is AGENT FOR INSTRUMENT.

[136] For the same reason, the verb *trascinare* (Eng., 'to drag') is mainly used to encode metaphors that imply a slightly negative meaning.

metaphorical extensions of the verb *trascinare* that rely upon the SELF MOTION schema, according to which, instead of being affected by an external force, one entity moves spontaneously, under its own direction:

(33) *Il conflitto si trascina da anni*

'The war drags on for years'

(34) *Gianni si trascina in un'esistenza spaventosa*

'Gianni is dragging himself into an awful existence'

Examples in (33, 34) have different meanings and refer to different abstract concepts but can be both linked to the primary conceptual metaphor SELF-PROPELLED ACTION IS SELF-PROPELLED MOTION (or ACTION IS MOTION ALONG A PATH). While in the first sentence (33) the moving entity is represented by an event whose duration develops during a long period of time (e.g., TIME IS A LANDSCAPE EVENTS MOVE THROUGH)[137] in the second example (34), the moving entity is represented by a person, a volitional and animate entity, who laboriously drags herself in a painful and difficult situation. Interestingly, in (33-34), the verb *tirare* cannot be applied, since it does not happen to encode, within its semantic core, the SELF MOTION schema. On the contrary, the action verb *trascinare* is perfectly usable as it codifies this specific type of motion schema also within its primary variation (see Table 31).

The action verb *tirare* (Eng., 'to pull') is mostly used to encode causation events, that is, to profile metaphorical scenarios in which one entity causes another entity to be affected by the occurrence of a new event or state (e.g., CONTROL OVER ACTION IS CONTROL OVER MOTION, CAUSED CHANGE OF STATE (or ACTION) IS CAUSED CHANGE OF MOTION, etc.). Interestingly, this predicate often encodes causation events which entails a specific spatial relationship between the agentive force and the entity affected by the force:

(35) *Non hai speranze di tirarmi dalla tua parte*

'You cannot get me on your side'

[137] It is interesting to notice that, when the moving entity is represented by an inanimate entity, the verb *trascinare* always encodes figurative meanings in which the duration of a process (event or situation) is measured in terms of motion along a path.

(36) *Sandra tira sempre*

'Sandra is attractive'

Metaphors in (35-36) show that the path schema involved in the semantic core of *tirare* entails that the shift from point A (start point focus schema) to point B (end point focus schema) performed by the entity that has been affected by the force corresponds to the spatial location of the source of the force. The verb implies that the motion is directed towards the actor (TOWARDS TO schema; NEAR FAR schema). In particular, example (35) is a subcase of the metaphorical structure AGREEMENT IS BEING ON THE SAME SIDE (OR AGREEMENT IS PROXIMITY), in which physical closeness is the source domain for metaphors of similarity, solidarity, and support. Example (36) may be conceived as a linguistic extension of the conceptual metaphors DESIRES THAT CONTROL ACTION ARE EXTERNAL FORCES THAT CONTROL MOTION[138] and DESIRES ARE FORCES BETWEEN THE DESIRED AND THE DESIRER, where sexual attraction is interpreted as a force towards physical proximity or closeness (e.g., ATTRACTION FORCE schema) and the desired object is interpreted as a desired state or location.

Interestingly, the verb *trascinare* cannot be applied in similar metaphorical contexts, since its own action-motion schema presupposes that both the agent and the affected entity are in motion (CAUSED JOINT MOTION schema) and that, even though they move in the same direction, i.e., the agent's direction, the final point reached by the affected entity does not correspond to the agent's location and does not result in a sort of shortening of the distances between the entities (NEAR FAR schema). The verb *tirare* also seems to be pervasively used in the encoding of orientational metaphors, that is, metaphors whose mapping organizes target concepts by means of spatial vectors (e.g., up-down, near, far, in-out, center-periphery, and so on):

(37) *L'insegnante tira su il voto di Luca*

[138] This metaphor could be also associated to example (31), in which the verb *trascinare* (Eng., 'to drag') is used to depict a situation of compelling and irresistible involvement exerted by the main actor (or agent) of the event. Nevertheless, the verb *trascinare* does not bring along the same kind of inferential structure of *tirare* (Eng., 'to pull') and does not entail that the attraction force between the agent and the target entity results in a different spatial configuration between the two. In example (31), in fact, the effect reached by the agent of the force simply entails the passage from a state to another (from initial neutral state to positive state of involvement); but it does not entail the approach between the agent and the affected entity as in (36).

'The teacher raises Luca's grade'[139]

(38) *Ho provato a tirarlo su*

'I tried to cheer him up'

In the example (37), the PATH schema is conceived as a SCALE, that is, as a vertical path, whose points are not intended as neutral points but as values. It profiles a scenario in which an actor (ANIMATE ENTITY schema) causes an entity (OBJECT schema) to change position on a scale. The change of position from a point (START POINT FOCUS schema) to another (END POINT FOCUS schema) results in a change of state of the object or value. The metaphorical extension in (37) can be interpreted as a lexical representation of the metaphor CAUSED INCREASE IN QUANTITY IS CAUSED UPWARD MOTION, which is a special case of the more general and primary conceptual metaphor MORE IS UP. Finally, example (38) represents a scenario in which the passage from a negative to a positive emotional state is conceptualized in terms of upwards motion, which happens to be caused by an external force or entity. The expression is a case of the conceptual metaphor CAUSED CHANGE IN MOOD IS VERTICAL MOTION, which is a subcase of the primary metaphor HAPPY IS UP (or IMPROVEMENT IN MOOD IS UPWARDS MOTION).

## 6.5. Test of agreement between annotators

The test was carried out to measure the percentage of agreement on the annotation of metaphorical uses of action verbs. The material used for the annotation was taken from the corpora IMAGACT and Opus2. The annotators were requested to assign 2 or 3 image schemas to a set of 32 sentences in which the verbs *premere, spingere, tirare,* and *trascinare* were used to encode metaphorical meanings. The main goal of the test was to evaluate whether image-schematic components could be reliably used to characterize the internal structure of metaphorical concepts produced within the semantic variation of action verbs.

[139] Unlike *tirare* (Eng., 'to pull'), the action verb *trascinare* (Eng., 'to drag') cannot be applied to encode the metaphorical increase (or decrease) of a value along an imaginary vertical axis (SCALE schema). The main reason behind the inapplicability of *trascinare* stems from the fact that the predicate can only be used to encode force-motion events along the horizontal axis. The kind of force encoded by *trascinare* cannot be parallel to the gravity force. In fact, it presupposes that the gravitational steady state of the entities involved in the event does not change. The entities must move along the ground, producing a continuous frictional force.

Just as in the task built for the case study 1 (Chapter 5), the annotators were provided with oral and written instructions about the annotation procedure. The task required that each one of the 4 annotators read the sentences (in context)[140] and assigned them 2 or 3 image schemas[141], taken from a list of 7 descriptors that were previously selected from a richer repository (Johnson 1987; Mandler & Canovas 2014). The list of image schemas that was given to the annotators is reported below:

| List of Image schemas | Definitions |
|---|---|
| VERTICAL ORIENTATION | [Verticalità]: Indica direzione, verso l'alto (su) o verso il basso (giù) |
| PATH | [Percorso]: Un percorso lungo cui ci si muove o si sposta un oggetto. Di solito, è caratterizzato dall'avere un punto di partenza, un punto di arrivo e dal seguire una traiettoria. |
| OBJECT | [Oggetto]: Indica la presenza di un'entità tangibile, percettibile, delimitata spazialmente. |
| MOTION | [Movimento]: Il movimento di un corpo lungo un percorso (path) può nascere spontaneamente, senza l'intervento di stimoli esterni, causato dall'intervento di una forza esterna. Può succedere che un corpo o un agente mettano in moto un altro oggetto. |
| FORCE | [Force]: Implica l'applicazione di una forza in una o più direzioni (verso l'esterno, verso l'interno, su, giù). La forza può presentarsi sotto forma di blocco/resistenza, rimozione di una barriera, attrazione, pressione, compulsione. |
| CONTAINER | [Contenitore]: Un contenitore è una regione spazialmente delimitata, avente un interno e un esterno |
| CONTACT | [Contatto]: Accostamento (vicinanza fisica) di due corpi relativamente a tutta o parte della loro superficie |

**Table 39.** List of image schemas used in the annotation

The coders were asked to read the sentences and pay particular attention to the semantic information brought in the metaphorical contexts by the action verbs. As in the previous experimental task used (case study 1), the annotators were asked the following questions: "What kind of information can you extract from the use of the verbs in this specific context?

[140] The verbs were presented within their real application context. Nevertheless, in those case where it was not possible to provide the annotators with a context, the sentences were presented in the form of standardized sentences (verb presented in third person singular, in the form of present simple, only with the strictly necessary number of arguments needed for the correct interpretation of the sentence).

[141] I decided to sort a feasible number of image schemas, among those which seem to be more commonly discussed in the literature, and more salient in the present analysis.

And how would you describe it in terms of image schemas?". In this task, the selected annotators[142] corresponded to the same used in the task built for the evaluation of the first case study. Likewise, they were divided in two groups: 1) a group of expert annotators; 2) a group of non-expert annotators. The annotation procedure was conducted autonomously and independently using an Excel file:

| ID | SX | Keyword | DX | IS |
|---|---|---|---|---|
| #102258813 | e minori limitazioni al lavoro notturno delle donne. </s><s> Indubbiamente questo problema si può risolvere in parte | **premendo** | sulla Cina per indurla a rispettare gli sociali ed ambientali, affinché il suo vantaggio competitivo non si fondi su | |
| #97026944 | per il mercato interno, che è competente per tale testo, sconsiglio vivamente il rinvio della votazione a giovedì. </s><s> – Mi | **preme** | chiarire la questione. </s><s> L' onorevole Papayannakis desidera che la votazione si svolga mercoledì invece che martedì, | |
| #118192907 | concesso ai produttori di armi. </s><s> Al contrario, l' Unione europea ha continuato, di concerto con gli Stati Uniti, a | **premere** | per l' ampliamento della NATO e a cercare nuove giustificazioni a supporto della produzione e dell' esportazione di | |
| #11889207 6 | concetto di responsabilità collettiva e sul carattere solidale del sistema sociale. </s><s> La disoccupazione costa cara e | **preme** | sulla spesa sociale. </s><s> Una politica di creazione di posti di lavoro è quindi parte integrante del sistema di protezione | |
| #10980085 1 | , azionisti, management, lavoratori, comitati aziendali e sindacati. </s><s> Naturalmente, proprio perché il tempo non | **premeva** | , si sarebbe potuto mostrare anche più coraggio azzardando una maggior codecisione e non una compartecipazione | |
| #10691854 4 | e con l' Iraq, anziché riconoscere semplicemente che entrambi i bottoni, quello a Teheran e quello a Pyongyang, sono | **premuti** | dallo stesso personaggio. </s><s> Dovremmo almeno sforzarci di capire che Anna Politkovskaja, l' ultima giornalista | |
| #10068025 5 | , ieri il Parlamento ha discusso della patente di guida europea, e credo che una parte della politica attuale miri a | **premere** | l' acceleratore del veicolo sul quale stiamo viaggiando. </s><s> Di ciò mi congratulo con il Commissario Potočnik, il quale si | |
| Imagact | L'associazione **preme** presso le amministrazioni pubbliche | | | |
| #216648494 | . </s><s> Hey. </s><s> Se Madiba lo può fare, noi lo possiamo fare. </s><s> In uno sforzo comune che ha portato avanti la nostra emancipazione e | **spinto** | indietro le frontiere del razzismo. </s><s> Milllioni di nostri connazionali vi ringraziano, e vi ringraziano ancora. </s><s> Sono | |
| #1911827 | e del tasso di cambio dell' euro. </s><s> Malgrado vi siano alcune indicazioni che gli effetti indiretti di tali fattori hanno | **spinto** | verso l' alto i prezzi interni nel corso del 2000, durante l' anno i costi interni, come il costo del lavoro per unità di | |
| #170340805 | buono, atmosfera famigliare ... </s><s> Nodini all' aglio. </s><s> Il menu e ' sul loro sito web. </s><s> Bobby ha ragione. </s><s> Questa tradizione si | **spinge** | indietro nel tempo. </s><s> Puro Hoodoo. </s><s> Non puoi semplicemente togliere di mezzo un coniglio qualsiasi. </s><s> Deve essere in un | |
| #84305405 | congiunto. </s><s> Però è davvero inquietante constatare ciò che potremmo definire una sorta di ricatto contro chi non vuole | **spingere** | sulle riforme oltre al mandato ricevuto dai rispettivi Stati membri. </s><s> Questi vengono spesso accusati dalla stampa di | |
| #86878384 | . </s><s> Nessuno può seriamente ignorare il desiderio di pace della parte israeliana. </s><s> L' ultimo Primo ministro Barak si è | **spinto** | avanti nelle proposte come nessun altro politico israeliano. </s><s> Il risultato è l ' attuale situazione catastrofica. </s> | |

**Table 40**. Data sample used in the annotation

The results have been compared with the annotation conducted by the reference annotator (the author). The score of pairwise percentages agreement is reported in the table below:

| **TASK 2** | | Group 1 | | Group 2 | |
|---|---|---|---|---|---|
| | **Average pairwise percent agr,** | Pairwise pct, agr, cols Ref & 1 | Pairwise pct, agr, cols Ref & 2 | Pairwise pct, agr, cols Ref & 3 | Pairwise pct, agr, cols Ref & 4 |
| CONTACT | **85.16%** | 93.75% | 87.5% | 96.87% | 62.5% |
| CONTAINER | **96.87%** | 100.00% | 100.00% | 96.87% | 90.62% |
| FORCE | **76.56%** | 78.12% | 93.75% | 87.5% | 46.87% |
| OBJECT | **64.06%** | 75.00% | 62.5% | 46.87% | 71.87% |
| MOTION | **75.78%** | 87.5% | 84.37% | 84.37% | 46.87% |
| PATH | **67.97%** | 71.87% | 71.87% | 65.62% | 62.5% |
| VERTICAL ORIENTATION | **88.28%** | 100.00% | 93.75% | 100.00% | 59.37% |
| TOTAL IS | **79.24%** | 86.61% | 84.82% | 82.59% | 62.94% |

**Table 41.** Pairwise percentage of agreement between annotators

Table (41) shows the percentage of agreement between the reference annotator and the two groups of coders. In this case the highest percentage scores were reached with the expert group (85,71%), in which the two annotators registered, respectively, 86,61% and 84,82% in

[142] For a more detailed description, see Chapter 5, Section (5.5.).

terms of pairwise percentage agreement with the reference annotator. With respect to the second group, the scores are lower (72,76%) and diverge from an annotator to the other. By observing the results of the annotation conducted by annotator 4, the pairwise percentage of agreement is slightly over 60%. However, this result is not particularly surprising, as the responses given by annotator 4, in general, were not aligned with those given by the rest of the annotators. Beside the problems stemming from the evaluation of the singular performance of a specific annotator, the data show that there is a good level of agreement upon the identification of each of the 7 image schemas[143] proposed for the annotation. The findings suggest that action verbs, even when used to encode abstract concepts, provide easy access to very skeletal meaning components, that is, to the detection of image schemas.

In addition to the pairwise percentages agreement, Fleiss and Cohen's kappa coefficients were used to measure the possibility of agreement occurring by chance. In particular: a) I calculated the consistency with which the 7 image schemas proposed in the task were used among the annotators; and b) I measured the amount of agreement for each image schema and for the totality of schemas involved in the experiment:

| **TASK 2** | | Group 1 | | Group 2 | |
|---|---|---|---|---|---|
| | **Fleiss Kappa** | Cohen Kappa, agr, cols Ref & 1 | Cohen Kappa, agr, cols Ref & 2 | Cohen Kappa, agr, cols Ref & 3 | Cohen Kappa, agr, cols Ref & 4 |
| CONTACT | 0.413 | 0.855 | 0.668 | 0.92 | -0.164 |
| CONTAINER | 0.77 | 1 | 1 | 0.84 | 0.52 |
| FORCE | 0.141 | 0.176 | 0.475 | 0.297 | 0.049 |
| MOTION | 0.449 | 0.728 | 0.664 | 0.655 | -0.172 |
| OBJECT | 0.173 | 0.5 | 0.25 | -0.006 | 0.438 |
| PATH | 0.222 | 0.363 | 0.363 | 0.102 | 0.169 |
| VERTICAL ORIENTATION | 0.262 | 1 | 0.652 | 1 | 0.14 |
| TOTAL IS | 0.494 | 0.721 | 0.685 | 0.64 | 0.231 |

**Table 42.** Fleiss and Cohen's Kappa scores in Task 2

With regard to the consistency of schemas across groups, the K coefficient reveals that the difference between the scores obtained by the expert annotators (k = 0.721 and k = 0.685) and by one of the non-expert annotators (k = 0.64) was not particularly large. With respect

[143] Table 41 shows that the percentages connected to the recognition of the PATH schema are lower than those connected to the identification of the other image schemas used in the experiment. This fact might be explained by considering the hypothesis of an overlapping between the PATH schema, on one side, and the MOTION schema (which always takes place along a path) and VERTICAL ORIENTATION schema (which could be conceived, in some cases, as a sort of vertical/scalar path), on the other side.

to coder 4, as already illustrated in the previous Table (42), the scores were generally low (in two cases, they are even negative). Coder 4 reported low results not only in comparison with those of the referee annotator but also in comparison with those of the 3 other annotators. With respect to the single categories of schemas, the best results were obtained, in decreasing order, by the CONTAINER (k = 0.77), the MOTION (k = 0.449), and the CONTACT (k = 0.413) schemas. These scores are only partially consistent with those computed by using the percentage agreement test (Table 41), where the scores are generally higher for all the categories of schemas considered. What especially differs in this latter test is that, besides the categories mentioned above, the rest of the categories register very low numbers. However, I believe that future research could improve on the experiment by including distractors, a larger set of image schemas, and a larger number of participants.

## 6.6. Discussion of the results

This work focused on the analysis of 4 action verbs encoding force, i.e., *premere, spingere, tirare,* and *trascinare*. The analysis has been organized in a way to simultaneously compare two sub-classes of verbs: on the one hand, semantic similarities and differences between the verbs *premere* and *spingere* have been presented and discussed; on the other hand, convergences and divergences in the semantic variation of the predicates *tirare* and *trascinare* have been emphasized and explained. One of the central ideas developed in the study is that the exploration of the deep semantic and image-schematic core of these verbs would facilitate the comprehension of how these verbs are used in primary and metaphorical contexts. The idea stemmed from the repeated observation of the linguistic behavior of these verbs. Their specific meanings, in fact, foster semantic features which constrain and, consequently, determine the type of event that the verbs can refer to, as well as the type of application that the verbs can have. To point out one case, it has been noticed that the action verb *premere* only applies to contexts in which the state of the theme affected by the force does not result in any form of motion (BLOCKAGE schema). Unlike *premere*, all the other verbs discussed so far encode the MOTION schema within their inner semantic skeleton, thus being used to profile more kinetic action scenes. Moreover, it has been demonstrated that while verbs such as *tirare* and *spingere* may encode both events of pure force and events where force is combined with motion, the verb *trascinare* requires a greater number of necessary components for its application, and always needs the CAUSED JOINT MOTION and the RESTRAINT REMOVAL schemas to be activated. It could be argued that, in the case of

*trascinare*, the exertion of force is just a contextual property since force is always required to overcome the physical stasis of an object. Yet, the application of force is not a sufficient condition for the use of *trascinare* but happens to be always associated with the motion schema.

Moreover, the present analysis suggests that the four action verbs tend to label different structural elements of the FORCE schema. *Premere* focuses on the pure exertion of force (in the form of physical pressure), i.e., on the interaction between the entity that applies the force and the object towards which the same force is directed. Although *spingere* and *tirare* have very flexible semantics, being able to encode different types of action events (with or without the association of force and motion), they mainly focus on the result of the forceful interaction between the entities involved in the action, that is – on the directed caused motion to which the object is subject to. In *spingere,* the motion is normally thought to be directed from the point of contact between the effector and the object and away from the agent; in *tirare,* the motion is normally thought to be directed from the point of contact between the effector and object, and towards the agent. Finally, *trascinare* does not simply focus on force, but rather on the fact that the object has a weight and may be reluctant to move. These two facts currently represent a restraint that is going to be constantly removed in order to move the object along the surface it lies upon.

This study not only aims to explore how closely tied our conceptual and perceptual systems are, but also aims to show how the semantics of action words mirrors the way in which we internally structure the logic of metaphorical concepts. As it has been stressed in this chapter, the differential semantic traits that characterize the four predicates (*premere, spingere, tirare*, and *trascinare*) strictly influence their metaphorical potential. When their semantic network converges, it is easier to detect the reasons why these predicates can be equally applied to express the same figurative meanings. On the contrary, when their semantic extensions start to diverge, we may wonder how it is possible that some metaphorical concepts can be accessed by one verb and not by the other. On the basis of the data, it seems plausible to argue that for a metaphor to be expressed in a specific context, the predicate must contain specific schemas pertaining to that context. With respect to the evaluation of these four action verbs semantics, it is thereby hypothesized that:

a) Metaphors involving the target domains of PSYCHOLOGICAL MANIPULATION, INFLUENCE or IMPACT are enabled by the presence of the FORCE image schema and have been encountered in the variation of the predicates *premere* and *spingere*;
b) Metaphors encoding CAUSATION[144] are enabled by the presence of the FORCE and MOTION image schemas, and have been detected only along the semantic variation of *spingere, tirare* and *trascinare*;
c) Metaphors encoding self-propelled changes of state or action are enabled by the presence of the FORCE and SELF MOTION[145] image schemas, and have been found in the metaphorical production of *spingere* and *trascinare*;
d) Orientational metaphors are enabled by the presence of the VERTICAL ORIENTATION image schema and have been identified only with the annotation of *spingere* and *tirare*, which happen to be less spatially constrained than *trascinare*.

The relationship between the semantic verb classes and their metaphorical potential is represented within the following application matrix:

| Metaphor type | Necessary image schemas | Premere | Spingere | Tirare | Trascinare |
|---|---|---|---|---|---|
| Manipulation, Influence, Impact | FORCE | P | P | A | A |
| Causation | FORCE, CAUSED MOTION | A | P | P | P |
| Self-caused change of state or action | FORCE, SELF MOTION | A | P | A | P |
| Spatial orientation | FORCE, MOTION, VERTICAL ORIENTATION | A | P | P | A |

**Table 43.** Matrix describing the metaphorical potential of *premere*, *spingere*, *tirare*, and *trascinare*

[144] It is important to stress that, in the present work, CAUSATION and INFLUENCE are not meant to be interchangeable notions, as they do make reference to two different concepts. By using the term CAUSATION, we refer to a dynamic process, according to which a cause causes that an "event is responsible for the occurrence of another event (or state)" (Causation: FrameNet). In this scenario, "A Cause brings about an Effect that would not have occurred otherwise" (Causation scenario: FrameNet). By using the term INFLUENCE, instead, we refer to an inanimate entity or psychological force that has the capability to affect another entity, but for which there is no guarantee that the effect will occur.

[145] It is worth bearing in mind that, differently from *trascinare*, the action verb *tirare* does not allow the use of constructions that are based on reflexive patterns (**tirarsi*). This grammatical observation seems to be in line with our results, which exclude that the verb core may contain the SELF MOTION image schema. Reflexive patterns are possible only with phrasal verbs containing the predicate *tirare* (e.g., 'tirarsi fuori dal finestrino'; Eng., 'To climb out of the window').

## 6.7. Conclusions

The data extracted from the semantic variation of the verbs *premere* (Eng., 'to press'), *spingere* (Eng., 'to push'), *tirare* (Eng., 'to pull') and *trascinare* (Eng., 'to drag') suggest that the metaphorical extensions of these action verbs are not randomly produced, but are the result of metaphorical processes in which sensory-motor information and specific image-schematic features are transferred from one domain to another, to enable the representation of highly abstract concepts. It seems reasonable to believe that differential semantic properties (and image-schematic structures) characterizing the verbs strictly impinge on their metaphorical potential, determining, in some way, the type of metaphorical items that may or may not be expressed (see the Invariance Principle: in Lakoff 1990, 1993; Turner 1991). The analysis also shows that these same differential semantic properties (and image-schematic structures) are also responsible for the type of partial equivalence that can be established between the action verbs (e.g., *premere* and s*pingere; tirare* and *trascinare*), either when their primary and marked variations are considered. In conclusion, it is important to stress that the investigation of action verb semantics contributes to better understanding of the way we use action information and very basic bodily schemas to shape not only the way we think but also the way we talk. In this sense, action verbs constitute essential linguistic anchors between sensory-motor experience and abstract knowledge.

# Chapter seven:
# Pulling the threads together

## 7.1. Framing the issue

In Italian, the action verb *alzare* (Eng., 'to raise'/'to lift'/'to rise') may refer to a wide range of action concepts and events that differ with respect to the type of motor schemas encoded or spatial relations expressed. Semantically speaking, while some of these action events seem to be more similar to each other (e.g., *alzare la mano*, 'to raise one's hand'; *alzare la scatola*, 'to lift the box'), others are linked by a series of features in which the similarities may be less easy to capture (e.g., *alzare la mano*, 'to raise one's hand' vs. *il palloncino si alza in cielo*; 'the balloon rises in the sky'). Whether native speakers are aware or not of this extraordinary semantic flexibility (and complexity), it is very likely that they are able to extend the use of a given action verb to the description of different events and concepts. In other words, they are capable of identifying the action contexts in which an action verb as, say, *alzare*, can be applied; likewise, they are capable of discarding those in which the use of the same verb does not seem to be possible. In this scenario, the first question that arises is: what are the elements that tie together different uses of a given action verb?

Interestingly, the situation becomes even more tangled when we look at an action verb from a different perspective, that is, when the verb is not used in its basic meaning (e.g., *il palloncino si alza*; 'the balloon rises') but to encode highly abstract concepts (e.g., MORE IS UP) and figurative uses (e.g., *la temperatura si alza*; 'the temperature rises'). By observing the metaphorical extension of *alzare*, one notes that this predicate is involved in the linguistic instantiation of a myriad of metaphors that differ with respect to the type of conceptual domains involved (e.g., VERTICALITY-QUANTITY, VERTICALITY-EMOTIONS, VERTICALITY-SOCIAL STATUS) and to the specific metaphorical concept conveyed (COMPARISON, CHANGE IN MOOD, STATE). In this new scenario, the emerging question is: how do these meaning extensions emerge from the primary and basic meaning of the action verb?

Action verbs are an even more interesting field of investigation when they are not considered in isolation but as involved in larger semantic networks, where similarity relations among predicates are considered. The same portion of action space can be simultaneously covered by various predicates that, for this same reason, are deemed to be local equivalent verbs

(Chapter 1). They can be, in fact, applied in the same linguistic and pragmatic contexts to refer to the same type of action event. This is, for instance, the case of the Italian action verbs *alzare* and *sollevare* (e.g., *alzare/sollevare la paletta*; 'to raise/to lift the sign'). Surprisingly, the metaphorical variation of two local equivalent verbs does not always converge. This means that two similar verbs may be used to convey different types of metaphorical meanings. In this larger frame, the questions that may arise are: why does the semantic variation of two local equivalent verbs converge or diverge? Given the semantic extension of two local equivalent verbs (e.g., *alzare* and *sollevare*; *to raise* and *to lift*), how do we know that one metaphor is possible with one but not with the other predicate? Finally, in this spacious semantic ground, where are the boundaries between these action words?

The series of questions that have been posed so far are nothing but the final attempt to rephrase the research questions from which this thesis started:

1) What is the link between the concrete and the metaphorical uses of a given action verb?
2) Which semantic features of the action verb determine the metaphorical potential of the verb?
3) How can we explain divergent metaphorical potentials of local equivalent action verbs?

The hypothesis that leads the development of the entire thesis is that behind the metaphorization processes operating in the semantics of action verbs, there is a coherent logical structuring, which can be illustrated on the basis of the identification of the image-schematic components pervading the semantic nucleus of the verb. The hypothesis can be spelled out in 2 main points:

1) The metaphorical production of a general action verb is not randomly produced but happens to be closely tied to the primary basic meaning of the verb. Thus, the metaphorical scenarios linguistically represented by the use of a general action verb are construed on the basis of perceptual and motor information grounded in human physical experience and potentially encoded by the predicate;
2) The metaphorical convergences (or symmetries) and divergences (or asymmetries) localized along the semantic extension of similar general action verbs can be motivated on the basis of the activation of salient or peripheral semantic components structuring the core meaning of the local equivalent verbs.

As the immediate aim of this thesis was that to investigate the essential mechanisms by which metaphorical expressions arise from the semantic variation of action verbs, an empirical analysis was carried out. In the empirical chapters (5) and (6), two different cases of semantic analysis were illustrated, one tightly connected to the linguistic encoding of spatial information (vertically oriented action verbs) and one linked to the linguistic representation of force patterns (force-oriented verbs). The first group of verbs (*alzare, abbassare, salire, scendere, sollevare*) formed a cohesive semantic node, in which the set of action events shared the fact that they take place along the vertical axis. On the other side, the action verbs *premere, spingere, tirare, trascinare* were grouped together as they contain, within their semantic core, a reference to the force-dynamics category. In total, 9 different action predicates were the focus of the present analysis. On the basis of the scrutiny of two different spoken resources (IMAGACT, Opus 2), about 11,000 occurrences were evaluated. Yet, only a relatively small part of this material was annotated in detail and consequently became the core of this work (about 600 metaphorical uses).

The outcomes of this large annotation procedure seem to confirm the initial hypothesis and, thus, they can be used to draw some general conclusions on the project, and they can be connected to the theoretical background the entire thesis has been built upon. In the following sections, I explain the results by making reference to the Embodied framework, Conceptual Metaphor Theory, and image schemas studies.

## 7.2. Framing the role of the theoretical background

In the following Sub-sections, I will discuss the findings by making direct reference to the theoretical background presented in the first part of the thesis, in Chapters 2, 3, and 4. More specifically, in Sub-section (7.2.1.), I will explain my data in the light of the embodied framework, according to which meaning construction operations could be better investigated by keeping language and sensory motor information together. In section (7.2.2.), I will show how my data can be organized on the basis of the large metaphorical framework elaborated by Lakoff and Johnson (1980 and elsewhere) and expanded by Grady (1997). Finally, in Sub-section (7.2.3.), I will discuss the central role that image schemas (Lakoff 1987; Johnson 1987; Hampe 2005) had in the process of interpretation and motivation of the semantic variation of action verbs.

### 7.2.1. Framing the role of embodiment in the empirical exploration of action verb semantics

From a purely semantic point of view, it would be misleading to define linguistic meaning as the outcome of an arbitrary relationship between language and world. The idea that the domain of semantics is closely tied to the realm of sensory-motor processes holds together the different parts of this work. The decision to investigate the variation of action verbs, thus, finds argumentative roots in this very fact. That is, action verbs are significantly loaded with perceptual, motor and bodily information, and are primary tools in the linguistic labeling of events involving human-world interactions. This thesis rests on the idea that the action lexicon should not be looked at as an empty container that is filled with semantic components that randomly produce meaning and new extensions of sorts. Action verbs can be better looked at as direct and explicit intermediaries between our knowledge about living in a concrete world, having physical bodies, interacting with tangible objects, and our necessity to use words and language to represent experiences. To put it another way, action verbs would be better understood as anchors between language and external reality. Whether we are concerned with vertically oriented action verbs (Chapter 5) or with action predicates fostering force-dynamic features (Chapter 6), we are faced with words that anchor our conceptual and linguistic representation system to a repository of information which happens to be physical, concrete, incarnate. Whether our concern is the exploration of action verbs' basic or abstract meaning, the semantics of these predicates cannot be addressed without reference to the body we have and the world we live in.

Considering this theoretical frame clarifies the reasoning behind the linguistic investigation that was carried out in the empirical Chapters (5) and (6), where the sentences discussed were explained and interpreted by reference to a variegated set of perceptual and motor information, directly stemming from the semantic core of the action verbs under analysis (*alzare, abbassare, salire, scendere*, and *sollevare*; *premere, spingere, tirare*, and *trascinare*). In the previous chapters, it has been suggested that each one of the action verbs annotated is provided with its own spatial elements, bodily schema, human-object interaction, and focal properties of the action. From a purely semantic perspective, it is the very comparison between the sensory-motor specificities encapsulated in the meaning of these verbs that help us to better explain why these verbs behave in a way or another, when metaphorical contexts are considered. That is to say that the isolation of this type of physical

information helped us set the scene and comprehend which are the representational capacities of action verbs, either in concrete or abstract scenarios.

With respect to the linguistic investigation conducted in Chapter 5, it has been stressed that when the predicates *alzare* (Eng., 'to raise') and *abbassare* (Eng., 'to lower') are used in their basic meaning, they identify a wide array of different physical action concepts. On the basis of the action categorization proposed in the IMAGACT Ontology, *alzare* and *abbassare* are associated to a similar number of action types, where much of the information encoded refers to the change of location of objects along the vertical axis and to bodily movements with downwards or upwards orientation. By bearing this fact in mind, it might be easier to see why, from scrutiny of the conceptual metaphors, traceable in their variation, these verbs mostly tend toward the encoding of orientational metaphors. Roughly speaking, almost 90% of their occurrences can be interpreted on the basis of metaphorical structures that use spatial vectors to express the increase or decrease of quantitative measures (MORE IS UP, LESS IS DOWN), the improving or worsening of states (HAPPY IS UP), and to make comparisons (VALUATIVE COMPARISON OF A AND B IN A STATIC SITUATION IS DETERMINED BY THE VERTICAL DISTANCE BETWEEN A AND B).

For the reasons illustrated above, it should be clear why verbs that do localize motion along the vertical axis (*salire* and *scendere*) may also be mainly exploited to express types of metaphorical models (e.g., fictive motion) that are different from those traced within the variation of verbs like *alzare* and *abbassare,* in which 'dislocations' are allowed but no motion in the space is implied. Therefore, the sensory-motor information associated to the former two verbs also helps us to account for those differences detected in the linguistic encoding of same types of conceptual metaphors (e.g., orientational metaphors). Orientational metaphors cover more than half of the marked variation of *salire* and *scendere*. However, as these verbs are directly connected to experiences of spontaneous or self-inducted motion, they construe the metaphorical scene in a different way from the one proposed by *alzare* and *abbassare*, also providing a different perspective on the overall metaphorical scenario. To make a case in point, they are not used to describe the change of location of a value along an imaginary vertical path; rather, they are used to name the self-inducted motion of a value (e.g., temperature) along an imaginary vertically oriented trajectory.

Finally, with respect to the verb *sollevare* (Eng., 'to lift'), it is plausible to argue that the presence of additional sensory-motor information stemming from concrete bodily experiences influences the setting of the metaphorical scene. *Sollevare* evokes, both in primary and marked (metaphorical) contexts, the direct application of force on an object or makes this verb a hybrid lexical item, whose semantics crosses between the domains of verticality and of force. The partial semantic distance from the rest of the action group (*alzare, abbassare, salire*, and *scendere*), can be hence explained by considering the types of bodily action engagement that *sollevare* requires. As it has been pointed out in Chapter 5 (sub-sec. 4.3), the verb *sollevare* always requires the removal of a sort of gravitational restraint. This factor has an impact on the verb's metaphorical production, enabling the instantiation of metaphors that always imply some kind of combination of force and spatial movement along the vertical axis.

With respect to the linguistic investigation conducted in Chapter 6, a crucial role in the explanation of the symmetries and asymmetries found within the semantic variation of the verbs *premere* and *spingere* can be sought in the type of action performances they may refer to. It has been pointed out that these predicates can be both applied in a small range of linguistic contexts to the encoding of action events, in which an agent interacts with an entity exerting force on it, and without causing the entity to change its initial location. When we use these verbs as local equivalent verbs, in fact, we evoke information about tactile perception or manipulation experiences in which there is no room for schemas of motion but only for features related to forceful interaction between entities. This fact happens to be confirmed not only by the comparison between the metaphors that *premere* and *spingere* share, but also by the overall evaluation of the semantic metaphorical variation of *premere*. Here, in fact, the data show that metaphors using domains directly related to the exertion of force in all its variants (psychological forces are physical forces, impediments to improve economic status are physical burdens) cover the totality of the occurrences annotated in the variation of *premere*. On the contrary, this is not true for *spingere*. Although metaphors of pure force correspond to less than the half of the occurrences, the metaphors codified by *spingere* are all characterized by a sort of dynamicity, by virtue of which the verb provides a different construal of the metaphorical scenarios. As a matter of fact, 2/3 of the metaphorical variation of *spingere* appears to be shaped by our experience of motion. These data are consistent with the representation of the primary variation of *premere* and *spingere* within the IMAGACT Ontology. *Premere* is used to encode action types whose common feature is the exertion of force on another entity (with consequent contact between the entities). On

the contrary, *spingere* has a wider variation counting on 14 different action types where at least half encode some sort of motion.

Finally, with respect to the variation of *tirare* and *trascinare*, the load of the sensory-motor information stored in their nucleus is evident both in primary and marked (largely metaphorical) contexts. By means of the IMAGACT Ontology, it has been shown that, with respect to its primary variation, the verb *tirare* may refer to 9 different action types. They point to events of object manipulation with or without modification, caused motion events impacting animate or inanimate patients, and change of location of objects along the vertical or horizontal axis. The verb *trascinare*, instead, ranges over three main action types, according to which only events of self or caused joint motion are represented. This same information package strongly influences the applicability of the verb in metaphorical scenarios. The verb *trascinare*, in fact, seems to be more semantically constrained and exclusively used in contexts where a sort of physical effort is implied (e.g., DIFFICULTIES IN ACTION ARE DIFFICULTIES IN MOTION).

The results discussed so far were investigated by repeatedly stressing the essential function that embodiment has in processes of meaning construction and language representation. As we saw, the present findings seem to confirm that the specific imagery evoked by verbs encoding performable actions partially drives the potential construal of both the physical and metaphorical events these predicates may linguistically refer to. In particular, these findings seem to suggest that the whole set of inferences and information grounded in bodily experience and motor representations are not lost during the processes of meaning extension (e.g., metaphorical mappings). In fact, they are, in some way, recycled to define, in a rather straightforward way, the type of elements that may constrain the nature of the metaphorical imagery that a given action verb may be associated with. In the light of this, it is also important to note that this thesis did not look at a specific embodied approach; and neither did it try to posit a predominant embodied approach to the study of the action lexicon. The more general (and traditional) embodied approach adopted in this work served to simply tackle the issue this thesis was concerned with, that is, that of clearly revealing the crucial combination of semantic and bodily factors that happen to interact in the operation of meaning construction.

### 7.2.2. Framing the role of CMT in the empirical exploration of action verb semantics

One of the conclusions that can be drawn from the investigation conducted in Chapters (5) and (6) is that action verbs mirror, at the linguistic level, the alignment between metaphorical models and action concepts. By observing the metaphorical contents expressed by action verbs[146], one notes that the basic elements necessary to give structure to abstract domains almost systematically correspond to those same elements involved in the structuring of action events.

As the relation between the different axes of variation of a given action verb (e.g., primary and marked) were discussed in the previous sub-section, I will now focus on the whole set of metaphorical models (or conceptual metaphors) that I have been dealing with during the annotation process. These conceptual metaphors can be all interpreted by making reference to the Event and Mental Event Structure models (Lakoff et al 1991). With respect to the former structure, the most significant mappings are presented below:

a) *Metaphor:* MORE IS UP – LESS IS DOWN[147]
   *Explanation:* Comparisons are measured in terms of vertical distance or motion along the vertical axis
   *Action verbs: alzare, abbassare, salire* and *scendere*
b) *Metaphor:* CAUSED INCREASE IN QUANTITY IS CAUSED UPWARD MOTION – CAUSED DECREASE IN QUANTITY IS CAUSED DOWNWARD MOTION
   *Explanation:* comparisons measured in terms of vertical motion caused by the intervention of an external entity
   *Action verbs: spingere, tirare*
c) *Metaphor*: CAUSATION IS CONTROL OVER AN ENTITY RELATIVE TO A LOCATION
   *Explanation:* causes are conceptualized as forces impacting on motion
   *Action verbs*: *spingere, tirare, trascinare*
d) *Metaphor*: ACTION IS SELF-PROPELLED MOTION ALONG A PATH
   *Explanation:* accomplishment of actions and purposes are conceptualized as self-induced motions along a path

[146] In particular, the whole of marked uses contained within the IMAGACT corpus correspond about to the half of the total uses of action verbs recurring in the resource.

[147] Alternative tags: INCREASE IN QUANTITY IS UPWARD MOTION, DECREASE IN QUANTITY IS DOWNWARD MOTION.

*Action verbs: spingere, trascinare*

*e) Metaphor*: ACTION IS SELF-PROPELLED MOTION ALONG A PATH (UP-DOWN)
*Explanation:* accomplishment of actions and purposes are conceptualized as self-induced motions along a vertical path
*Action verbs: salire, scendere*

f) *Metaphor:* DIFFICULTIES ARE BURDENS – DIFFICULTIES ARE OBSTACLES TO MOTION
*Explanation:* Difficulties are conceptualized as obstacles or burdens
*Action verbs: premere, sollevare*

With respect to the Mental Event Structure the most relevant metaphorical model encountered is presented as follows:

a) *Metaphor:* PSYCHOLOGICAL FORCES ARE PHYSICAL FORCES
*Concepts alignment:* Psychological forces (manipulation, influence, control) are conceived as physical forces impinging on an entity
*Action verbs*: *premere, spingere*

Interestingly, all the metaphorical uses that were annotated refer to skeletal aspects of physical and perceptual experience. As a matter of fact, all the metaphors presented above can be considered examples of primary metaphors (Grady 1997), that is, structures in which the pairings of concepts are all experientially motivated (Lakoff & Johnson 1980). More in particular, it seems plausible to argue that the kind of metaphors encoded by action verbs mostly stem from the alignment between two primary domains, both of which are directly perceived and experienced. While the majority of the source domains identified are enriched with image content (MOTION, SPATIAL RELATIONS), most of the target domains evoked by the use of action verbs are enriched with response content (Grady 2005) and can be interpreted in terms of schemas not directly connected to sensory experience but given as responses to that same experience. This is, for instance, the case of conceptual domains such as DIFFICULTY, CAUSATION or QUANTITY. This seems to be consistent with the initial hypothesis that the metaphorical production of action verbs is strictly connected to grounded information, which stems from embodied realms of knowledge, and is stored in action verbs' primary basic meaning. In general, this fact seems to also be consistent with the idea that these predicates are primary tools in the anchoring, at the language level, of the conceptual system to the perceptual and motor one.

### 7.2.3. Framing the role of image schema theory in the empirical exploration of action verb meanings

As it was pointed out in Chapter (3), in the realm of Cognitive Linguistics, image schemas are recognized as essential tools that connect embodied experience, thought and language (Talmy 1972, 1975, 1978, 1983; Langacker 1976, 1987; Johnson 1987; Lakoff 1987). The central hypothesis is that the ability to reason and infer strongly depends on bodily experience, and that, in this scenario, image-schematic structures can be thought of as compressed re-descriptions of perceptual and motor processes, by virtue of which schematic information is abstracted and results in conceptual content (Mandler 1992).

Although the absence of a clear-cut repository of image-schematic structures represents a serious obstacle when it comes to applying an image-schematic approach to the analysis of language, the interpretation of action verb semantics in terms of certain image-schematic components was a crucial step towards the deeper exploration of action semantics. As it was shown in the two case studies, differential semantic properties (and image-schematic structures) characterizing the semantic core of action verbs strictly impinge on their extension (and metaphorical potential), determining the type of abstract concepts (and figurative meanings) that may or may not be expressed by the predicates.

With respect to the group of vertically oriented verbs (Chapter 5, case study 1), the investigation of the image-schematic structure of these predicates provided us with precise information on the metaphorization processes operating in their variation. It also made it possible to motivate the usability of these 5 verbs within a general metaphorical framework, as well as to draw the boundaries between (partially) equivalent words in terms of their applicability. The centrality of the FORCE schema within the variation of the verb *sollevare* explained, for instance, why this verb has a metaphorical potential different from the one found in verbs that simply encode upwards change of location or motion (VERTICAL ORIENTATION schema) such as *alzare* and *salire*. As it was already stressed in Chapter (5), in *sollevare* the vertical orientation has to be considered as a mere contextual property. On the same token, the identification of a different motion pattern in *abbassare* and *scendere* was used to explain why the path-process conversion (Lakoff 1987) is possible in the variation of the latter but not in the one of the former. To put it another way, the semantics of an action-motion verb such as *scendere* enables the 0DTR-1DTR schematic transformation, which seems to be at the basis of fictive uses.

With respect to the verbs of the force group (Chapter 6, case study 2), it is possible to draw similar conclusions. The analysis of the semantics of these verbs in terms of image-schematic components made it possible to substantiate why, for instance, *premere* and *spingere* share some but not all their metaphorical constructions. Although the two predicates may encode a similar FORCE schema (physical pressure exerted on a tangible surface), the force pattern in *premere* and *spingere* does not produce the same result: only the force vector in *spingere* results in a schema of MOTION (self-inducted or caused). Likewise, although the verbs *tirare* and *trascinare* can be considered as local equivalent verbs, their metaphorical constructions may strongly diverge. In particular, it was shown that *trascinare* imposes more restraints with respect to its applicability, as its semantic nucleus requires a more complex combination of image schemas than the one of *tirare*: RESTRAINT REMOVAL and CAUSED JOINT MOTION. The isolation of single image schemas made it also easier to understand why *spingere* and *trascinare* may encode similar metaphors, according to which, for instance, the ACTION domain may be understood in terms of self-propelled motion along a path (SELF MOTION schema); the isolation of image-schematic structures also eased the identification of the reasons why predicates such as *spingere* and *tirare* can encode orientational metaphors (CAUSED INCREASE IN QUANTITY IS CAUSED UPWARD MOTION). As it was stressed in Chapter (6), this is not possible for *trascinare* because, in its basic meaning, it only expresses events along the horizontal axis. Hence, it never activates the VERTICAL ORIENTATION schema.

As emphasized in Chapters (5) and (6), the results of the two case studies can be interpreted as a confirmation of the Invariance Principle hypothesis, according to which, in metaphorical mapping operations, the image-schematic structure (and inferences) of the source domain should be consistent with the structure (and inferences) of the target domain (Lakoff 1993). To provide an example, the target domain of CAUSATION is strongly connected to the concept of AGENCY (Leslie 1984) and is usually built upon the image-schematic source domain of MOTION. Given that the action imagery associated to the verb *premere* does not entail elements such as PATH or CAUSED MOTION, it cannot be used to encode metaphorical constructions as, say, CAUSATION IS CONTROL OVER AN ENTITY RELATIVE TO A LOCATION. This construction can be instead instantiated by verbs such as *tirare, trascinare* and *spingere*. In this sense, it is plausible to argue that the image-schematic imagery associated to the verb *premere* would not be consistent with the structure of the target domain of CAUSATION.

# Conclusions

This dissertation aimed to investigate the mechanisms through which action verbs represent metaphorical meanings. The main research questions I have been concerned with are: 1) How can the relation between the primary (action uses) and marked variation (e.g., metaphorical uses) of a given action verb be described?; b) Which semantic features of a given action verb have an impact on its metaphorical potential?; c) Given two verbs with partially similar primary variation (e.g., local equivalent verbs), how do we explain potential divergencies springing from their metaphorical production?

In Part I, I presented the rich theoretical background that this project relies upon. In Chapter (1) action verbs were discussed in connection to their role in language development, frequency in oral communication, and involvement in the representation of action events and metaphorical concepts. Chapter 2 introduced the very general paradigm of Embodied Cognition, which helped us to illustrate the nature of the bond existing between body, cognition, and language. Chapter (3) and (4) aimed to provide with a presentation of the main tenets Conceptual Metaphor Theory (Lakoff & Johnson 1980, 1999) and Image Schema Theories (Lakoff 1987; Johnson 1987; Lakoff & Johnson 1999) rest on. These theoretical frameworks were crucial for the structuring of the whole analysis, as they offered a new perspective from which to look at action verbs semantic extension.

In Part II, I presented two new studies that addressed the research questions via the comparison between the primary and marked (or metaphorical) variation of 9 Italian action verbs. The corpus-based analysis was conducted on the basis of a data sample taken from the Italian spoken corpora IMAGACT and Opus2. The initial hypothesis has been that the exploration of the semantic core of action verbs could facilitate the understanding of how these verbs are normally used in primary and metaphorical contexts.

Chapter 5 was focused on the investigation of the metaphorical production of 5 vertically oriented action verbs, i.e., *abbassare, alzare, salire, scendere, and sollevare*. Here, the action verb *sollevare* represented a sort of outsider, being only applied to contexts in which the theme had weight and the RESTRAINT REMOVAL schema is entailed: unlike the other verbs of the group, in the sense extension of *sollevare*, the vertical orientation was shown to be just a contextual property but not a sufficient condition for its use. The analysis also suggested that the five action verbs normally focus on different time points of the event and

that this linguistic phenomenon may have an effect on their metaphorical production: *alzare* and *abbassare* focus on the resulting state of the object; *salire* and *scendere*, focus on the motion process itself, that is on the path followed by the trajector during the event; *sollevare* focus on a necessary property of its object in the initial state of the event. These differences were proven to impact on these verbs potential and to consequently determine the specific metaphorical scenario they may or may not refer to.

In Chapter 6, the second case study focused on the metaphorical variation of four action verbs encoding force, *i.e., premere, spingere, tirare, and trascinare*. By analyzing the data sample, it was noticed that, unlike the rest of the group, the action verb *premere* only applies to contexts in which the state of the theme affected by the force does not result in any form of motion. Therefore, it was shown that while verbs such as *tirare* and *spingere* have a very flexible semantics, being able to extend to a large array of different metaphorical contexts, the verb *trascinare* requires a greater number of necessary components for its application. In *trascinare*, the exertion of force is just a contextual property but not a sufficient condition: the use of *the verb* is always associated with the motion.

Finally, Chapter (7) was used to discuss the results obtained from the two case studies. In general, the observation of action verbs linguistic behavior seems to support the idea that their specific meanings could house semantic features which constrain, in some way, the type of metaphorical events that the verbs can refer to, as well as the type of metaphorical meanings that the verbs can convey. It is plausible to argue that differential semantic properties (and image-schematic structures) characterizing the basic meaning of the verbs (skeletal sensory-motor information) may impinge on their metaphorical potential, determining, in some way, the type of metaphorical meanings that they are able to express (Lakoff 1990, 1993; Turner 1991).

The analysis presented in this thesis could be certainly improved and enlarged, for instance, by extending the sampling to a greater amount of data (e.g., more verbs), or by trying to solve those theoretical gaps that may have had an influence on the application of an image-schematic approach to the analysis of language (e.g., absence of a clear-cut repository of image-schematic structures).

However, the research findings may encourage the exploration of those linguistic patterns that helped facilitate the understanding and representation of action verbs' metaphorical extensions. The deep analysis of the semantic core of the verbs, as well as the identification

of their most salient or, on the contrary, peripheral components, may enrich the complex of knowledge that we have about verb semantics and how that plays out in terms of language use. The results of a similar analysis, in fact, may be used to improve the representation of verb senses in linguistic resources or ontologies. To make a case in point, the IMAGACT Ontology of Actions currently represents the primary variation of action verbs (e.g., prototypical action scenes), but it is not provided with a system for the representation of action verbs sense extension. In any case, the adoption of an image-schematic approach to the analysis of action predicate semantics may facilitate the illustration of the connection between the primary and metaphorical extensions of verbs. It may also offer a way to represent in detail the metaphorical network activated by each action verb contained in the Ontology. Finally, this approach may help to define the linguistic boundaries between sense extensions of similar action verbs (e.g., local equivalent verbs).

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