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**CONVENTIONAL MODELS OF TIME AND THEIR EXTENSIONS IN
SCIENCE FICTION**

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INTRODUCTION

At no time, therefore, hadst Thou not made anything, because Thou hadst made time itself.

St. Augustine *Confessions*, Bk. XI, Ch. xiv, 17

Admittedly, time has puzzled thinkers since the dawn of time as we know it. On the one hand, everybody knows what it is, and most people would agree that they live in time and are always bound and subject to it. On the other hand, few would be able to provide an explanation of what time actually is. This ever-present quality seems to be easily comprehended unconsciously, but somewhat surprisingly difficult to apprehend consciously, as illustrated by the well-known quotation from St. Augustine of Hippo: “What, then, is time? If no one ask of me, I know; if I wish to explain to him who asks, I know not” (St. Augustine 1886 (397)). Time has been the interest of philosophers and physicists; remarkably different conceptions of time have surfaced in various cultures and religions all over the world. Some believed time to be one of the fundamental quantities, a primitive that served as a backdrop and a frame of reference for all events, a view developed by Isaac Newton in his seminal work *Philosophiae Naturalis Principia Mathematica*, which lay the groundwork for classical mechanics. Others, like Leibniz, believed time to be part of a conceptual apparatus describing interrelations between events. Time is viewed as cyclical, like in the dharmic religions, or as a linear progression towards an end; according to the concept of time in Christianity, the creation of the world by God marks the beginning of time, with the end of everything (*eschaton*) as the finish line. Finally, the twentieth century saw the unification of time and space into malleable “spacetime,” a concept constructed by Hermann Minkowski shortly after the development of the theory of special relativity by Albert Einstein.

Time is measured, by means of various artifacts, beginning with ancient calendars, largely based on movements of celestial bodies, through sun-clocks, water-clocks, hourglasses and finally the mechanical clocks developed around 14th century A.D. The technological advancements of the twentieth century brought the acutely precise atom clocks. Time is standardized all over the world, with various amendments like leap-years, leap-seconds and Daylight Saving Time used to aid the synchronization. Time has a deep personal and social significance; there are thousands of self-help books and workshops available for those who feel they need to learn to organize their time better, or get the most of however much time they have left.

As a significant cultural reality, time has also surfaced in myth and literature. Notably, one relatively recent genre that has often concerned itself with the mechanics of time is science fiction. As many critics have admitted, science fiction, as a genre, is readily recognizable, but not easy to define. In the introduction to the *Norton Book of Science Fiction*, the renowned author and essayist Ursula K. Le Guin asserts that “Science fiction (...) uses techniques both from the realistic and the fantastic traditions of narrative to tell a story of which a referent, implicit or explicit, is the mind-set, the content, or the mythos of science or technology” (Le Guin 1993: 23). Recalling the opinion of the literary critic Brian Attebery, she goes on to state that “(...) science fiction uses science as its ‘megatext.’ The nourishing medium, the origin of the imagery, the motive of the narrative, is to be found in the contents, assumptions, and world view of modern science and technology” (ibid.).

The term “science fiction” is a transformation of the term “scientifiction,” coined around the year 1910 by Hugo Gernsback. Gernsback published scientific magazines since the early 1900s. As a means of the promotion of science, the magazines frequently contained stories which were written so as to portray and elucidate the ideas of science in a more appealing way than did the usual popular science texts of the time. The term “scientifiction” preliminarily referred to these stories. However, the first issue of the most seminal magazine in the early history of science fiction, *Amazing Stories* (also edited by Gernsback), contained literary texts which were significantly more similar to what is termed “science fiction” in the present day. The first issue, dated April 1926, was filled with pieces by the forefathers of the genre, namely Jules Verne, Edgar Allan Poe, Edgar Rice Burroughs and H.G. Wells. And it is in the novel *The Chronic Argonauts* by H.G. Wells, published as early as 1888, that we find one of the first noted occurrences of the use of imagined technology which allows time-travel. The novel portrays an inventor who uses a “time machine” to escape an angry mob bent on lynching him for “witchery.” The idea of the contraption that allows its user to travel in time was later developed in the well-known book *The Time Machine* (1895) by the same author. Considered as a classic example of early science-fiction, the novel substantiates the claim that time-travel (and other types of alternation of the usual progress through the time-space continuum) is a theme present in science fiction from the very beginning of the genre.

As the ideas and techniques of science fiction progressed, the extrapolative nature of the literature in question generated numerous original storylines, which twisted the commonly held conceptions of the realities of time, and incorporated the advances in science that the

twentieth century provided on the way, such as quantum mechanics or computer-generated virtual realities. Most of the most respected science-fiction writers have penned some time-travel literature. With gradual suffusion of sci-fi cinema with the theme of time-travel, the concept of traveling through time has entered the general public's collective mind. Most people, especially in the occidental cultures, would be able to tell what it means to go back in time, what happens when time is accelerated, and why it would be advisable to avoid contact with one's direct ancestors while on a trip to the past.

There is an interesting question connected with this general knowledge of the rules of time-travel. Time as such has been tackled by physics and philosophy, but few philosophers or physicists have theorized on the possibility of time-travel as it is depicted in science fiction.¹ All the existing theories of time-travel notwithstanding, one cannot assume that the science-fiction reader, or the cinema audience, have the theoretical knowledge needed to comprehend those abstruse theoretical constructs. Moreover, it is not the case that science fiction literature or film provides scientifically sound models of time-travel. The hallmark feature of science fiction is that the literature will use scientific discourse to make the scientific content of the story or novel plausible, yet the actual science is in most cases sketchy and simply phony.

It is important to point out that physics, the science that time-travel science fiction bases its argument on, originated in philosophy. Philosophical inquiry may be seen as an attempt to provide answers to common questions that would go beyond the commonly available explanations. These questions arose in the human mind's endeavor to comprehend its natural milieu. I will claim, therefore, that the reason why science-fiction discourse is readily apprehended even by the layman is that it taps into the same processes of everyday inner inquiry and comprehension that physics attempts to provide scientific answers to. The significant goal of scientific discourse in science fiction is not to refer the reader to her understanding of physical theory, but rather to use elements of physical theory to temporarily re-structure the reader's comprehension of the world and the rules governing it, so that a novel, extrapolated understanding is produced and employed as the science-fiction element of the story. Though scientific terminology and scientific discourse must be there to make the argument plausible enough and make the reader accept the re-structuring of her rationality (at least while she is reading the story), what is aimed at is twisting the reader's commonplace knowledge of the world. In other words, I claim that successfully written science-fiction will

¹ The theories of time-travel in current physics include theoretical models concerning wormholes and quantum entanglement. For a more comprehensive account of theoretical models of time-travel, see Arntzenius and Maudlin 2005.

trick the reader into temporarily extending the conceptual representation of the things and relations in the world that she has formed in functioning in a cultural reality, so as to include new “rules,” like those that govern time-travel in the science-fiction text.

If this is so, then in investigating a science fiction text one needs to be able to account for both the commonplace representation of the world in the reader’s mind, and for how the writer can “re-structure” that representation for the purpose of involving the reader in the understanding of the science-fiction storyline. In the case of time-travel science fiction, such an account would specifically have to include an analysis of the conceptual representations of time, and all that time concerns, e.g. the temporality of events and causation. Accordingly, in my analysis of time-travel science fiction, I decided to employ the theoretical apparatus provided by cognitive linguistics, as it felicitously serves both the requirements very well.

“Cognitive linguistics” is a term referring to a relatively recent tradition of the study of the mind, in relation to language and human social behavior. It arose in the 1970s (initially in a reaction against certain formal approaches to language), partaking of various cognitive sciences, to eventually become one of the most powerful and sophisticated movements in the study of mind. In an overview of cognitive linguistics, Bergen and colleagues describe the two major commitments that the cognitive linguistics enterprise can be characterized by, which are “The Generalization Commitment” and the “Cognitive Commitment” (Bergen et al. 2006: 3-7). As much as the former can be seen as common to all sciences (consisting in the commitment for the science to arrive at generalizing principles, here concerning language), the latter is pertinent to the matter at hand, namely, to the presentation of the commonplace conceptual structure of the human mind. The Cognitive Commitment “(...) represents the view that principles of linguistic structure should reflect what is known about human cognition from the other cognitive and brain sciences, particularly psychology, artificial intelligence, cognitive neuroscience, and philosophy” (Bergen et al. 2006: 6).

In trying to meet the two commitments, cognitive linguistics has developed two major areas of research, cognitive grammar and cognitive semantics. Cognitive grammar, notably in the works of Ronald Langacker, attempts to study linguistic organization in relation to general principles of cognition, and sees linguistic structure as motivated by the structure of conceptualization, as researched by cognitive semantics. Other related traditions in this field of study form the group of theories collectively referred to as “construction grammars,” in which grammar is seen as an inventory of constructions, described as pairings of form and

conceptual content, which is made up by the conceptual structures described by cognitive semantics.

Although the field of cognitive semantics is vast and includes research in many facets of the conceptual content and processing of the human mind, one can enumerate four guiding principles of cognitive semantics. These are:

- 1) Conceptual structure is embodied
- 2) Semantic structure is conceptual structure
- 3) Meaning representation is encyclopedic
- 4) Meaning construction is conceptualization

(Adapted from Bergen et al. 2006: 9)

The major theories within cognitive semantics include image schema theory (as presented in Johnson 1987), Idealized Cognitive Models (developed in Lakoff 1987), research into category structure, cognitive lexical semantics, conceptual metaphor theory and theories of metonymy, and theories of mental spaces and conceptual blending.

In this thesis, I will provide a description of commonplace knowledge structures concerning time, as researched by cognitive linguistics. Then, I will use those cognitive-linguistic theoretical accounts of time in an analysis of selected examples of time-travel in science fiction, and I will endeavor to provide an account of how the commonplace models are re-structured in the formation of novel, extended models of time. As the tool of analysis I will be using the theories of cognitive linguistics, notably the theory of conceptual blending. In the first chapter, I will start out with an overview of Conceptual Metaphor Theory, as well as provide a description of basic (metaphorical) models of TIME basing my account mainly on Lakoff and Johnson 1999. Chapter 2 presents an overview of mental space theory and conceptual integration theory (also known as “conceptual blending theory”), as well as a conceptual blending account of the structure of the conventional models of time discussed in Chapter 1. In Chapter 3, I will begin by describing the role of episodic memory and the conventional models of LOCATION in the formation of the novel extensions of conventional models of TIME presented in science fiction literature. Then, I will describe several types of extensions of conventional models of TIME that can be found in science fiction, as well as delineate the extensions of conventional models of CAUSATION typical of most time-travel scenarios found in time-travel science fiction.

Importantly, most time-travel science fiction foregrounds the effects that the unconventional scenarios of movement in time that the author concocts have on conventional theories of CAUSATION (see Flynn 2003, Rye 1997, Turtledove 2005). Since Chapter 3 endeavors to address the extensions of the conventional models of TIME, and specifically, to provide an analysis of the extensions of the conventional models of MOVEMENT IN TIME in relation to conventional models of LOCATION and conventional models of SELF, as researched by cognitive semantics, the source texts which provided the examples analyzed in sections 3.3 and 3.3 below have been chosen for their suitability for the purpose of presenting the extensions of the models of TIME in relation to the models of (NATURAL) LOCATION² and SELF. However, since most time-travel science fiction explores the extensions of conventional theories of CAUSATION in great detail, and those extensions are conditioned by and related to the extensions of the conventional models of TIME that the story suggests, I will devote the final section of Chapter 3 to the discussion of selected extensions of conventional theories of CAUSATION in time-travel science fiction.

The models of TIME discussed below are probably present in many cultures of the world (Lakoff and Johnson 1999: 150). However, considering that the cognitive linguistic accounts of conventional models of TIME referred to below cite generalizations concerning the use of language by native speakers of English, I will assume, for the sake of clarity, that the models of TIME presented below are characteristic of English-speaking cultures, and that the authors of the source texts, as well as the potential readers forming the potential conceptualizations activated in the reading of the English-language source texts which provided the examples discussed below, are speakers of English, and are in command of the conventional models of TIME discussed below.³

² See section 3.3.1.4 below for the discussion of the notion of natural locations of the SELF.

³ Obviously, this assumption warrants further discussion, e.g. an account of the criteria which would allow the categorization of an individual as a speaker of English. However, such a discussion would fall out of the scope of this thesis. See Lakoff 1992 for the overview of the sources for the evidence of the existence and structure of a system of conventional conceptual metaphors for the users of the English language.

CHAPTER 1: CONCEPTUAL METAPHOR THEORY AND METAPHORICAL MODELS OF TIME

1.1. Overview and basic terminology

In this chapter, I will present an outline of conceptual metaphor theory, as well as provide an overview of the conventional metaphorical models of TIME.

Research into conceptual metaphor began in the seventies, with the paper by Michael Reddy entitled “The Conduit Metaphor” (1979) often cited as the ground-breaking work. The theory was developed soundly in the 1980 book *Metaphors We Live By* (Lakoff and Johnson 1980), and improved upon over the years, with many publications and a growing number of possible applications, in fields such as literary analysis, politics and social issues, psychology, mathematics, cognitive linguistics and philosophy (see the afterword to the 2003 edition of *Metaphors We Live By* for a more detailed account of the development of Conceptual Metaphor Theory).

Conceptual metaphor, unlike metaphor in the traditional “literary” sense, is seen not merely as a phenomenon of language, but as an overarching phenomenon of understanding. Conceptual metaphor can be defined as “(a conventionalized) mapping between two conceptual domains,” in which the stored conceptual representation of one cognitive model is used to provide a structured understanding of another, instilling the *target* conceptual domain with, among other things, selected elements, relations, patterns of inference, and axiological content of the *source* domain.

A well-researched example of a conceptual metaphor is LIFE IS A JOURNEY⁴. This metaphor consists in a mapping of selected aspects of the stored knowledge of journeys onto the diffuse array of stored experience that, as an effect of the mapping, will be apprehended as “life.” This is not to suggest that “life” has a literal, or objective, conceptually represented structure, to which some parts of the culturally learned knowledge of journeys will be applied. Rather, it

⁴ The convention adapted below represents a conceptual metaphor with a mnemonic of the type “X IS Y,” where X stands for the domain structured in the mapping (the “target” domain), and Y stands for the domain that provides the already available conceptual substrate for the structuring of the target domain. Below, conceptual categories, concepts and conceptual domains will be presented in SMALL CAPS, and descriptions referring to frames and elements of frames, as well as scenarios and elements of scenarios, will be presented in italics.

is in the mapping of the more easily apprehensible array of the remembered experience of physical journeys onto a more diffuse and abstract set of cognitive representations, later referred to as “life,” that the structure of the concept of LIFE is created and apprehended. In other words, the process of conceptual metaphorical mapping creates a gestalt, a knowledge structure intuitively easier for human beings to manipulate and to use in reasoning. As such, conceptual metaphor is an indispensable and ever-present process of thought, underscoring all facets of human cultural behavior, including, but not limited to, the comprehension and production of language structures.

A cross-domain mapping like LIFE IS A JOURNEY sets up ontological correspondences between elements of the conceptual substrate of the cultural model of A JOURNEY and whatever structure there is in the stored cognitive representations of “life.” In Lakoff and Turner 1989 the authors, providing an overview of the particular conceptual metaphor in question, assert that the knowledge structure referred to as “journey” calls up a conceptual representation that has a number of differentiated components, like a traveler on the journey, the destination, possible impediments to progress, etc. That knowledge structure, however, must be skeletal enough for the conceptualizer to be able to apply it in the comprehension of something as a “journey.” In other words, it must be possible to apply it to any number of conceptual structures that it is cognitively useful to conceptualize as “a journey.” Lakoff and Turner term such knowledge representation structured in skeletal form a “schema,” and add the term “slot,” used for the elements of the schema that can be filled in. In their description of the internal structure of conceptual metaphors, they state that each conceptual metaphor consists of: slots, mapped from slots in the source schema onto slots in the target, and the mapping of relations, properties and knowledge of the source domain into the target domain. Such mapping allows us to draw inferences about the target domain, which will be conditioned by the inferences entailed by the source domain schema.

For example, in LIFE IS A JOURNEY, the “traveler” slot will be mapped onto the person leading the life. The relation in the source domain of journeys, wherein a traveler reaches a destination, will be mapped onto the person leading the life reaching a purpose in life. The properties of possible strengths and weaknesses of the traveler in the journey domain will be mapped onto properties of people leading lives (so that a person can be understood as having some strengths for conducting life, or not being strong enough to move on). Finally, the source-domain inference that when the traveler hits a dead end she cannot continue on the same path will be mapped onto the domain of life, yielding the inference that if the person

leading a life has hit a dead end, she must choose a different path, or otherwise she will not be able to “get on” with her life.

The most culturally prominent conceptual metaphors are those that are basic and conventional. Lakoff and Turner define the basicity of a conceptual metaphor as the degree to which it is cognitively indispensable in a culture (1989: 56). For example, the metaphor LIFE IS A JOURNEY is a basic metaphor in the English-speaking culture, as it would require extreme effort, or would perhaps be impossible, for a person brought up in that culture to think of life as something other than a forward progression. However, the conceptual metaphor LIFE IS SLEEP is not as culturally prominent, and as such, perhaps, not as basic as LIFE IS A JOURNEY. Lakoff and Turner define the conventionality of a conceptual metaphor as “(...) the extent [to which a conceptual metaphor] is automatic, effortless, and generally established as a mode of thought among members of a linguistic community” (1989: 55). The conventionality of a metaphor is thus a scalar dimension.

1.1.1. Novel metaphors

Another distinction that Lakoff and Turner posit is the one between a general, conventional metaphor, and a novel metaphorical mapping. Lakoff and Turner state that general conceptual metaphors are not the unique creation of individual conceptualizers, but “are rather part of the way members of a culture have of conceptualizing their experience” (1989: 9). In their discussion of novel poetic metaphors, the authors provide an analysis the creation of unique, non-conventional conceptual metaphors. One process that gives rise to such novel conceptual metaphors is *extension*. In a conventional cross-domain mapping, certain slots in the source schema are mapped onto existing slots in the target schema, and at the same time, certain mappings can create slots in the target that were not there before. For example, in LIFE IS A JOURNEY, the *traveler* slot in the source schema of a journey is mapped onto the already existing slot of a person leading a life in the domain of life. However, the *path* slot in the journey schema is created in the domain of life in the mapping, and in effect, the conceptual structure of the domain of life is organized so as to have a “course of life” slot. Accordingly, new inferences begin to hold for the domain of life, like the fact that in life, one can either move back, stay put, move on, or choose a different path. This, however, is the conventional mapping. An extension, as described in Lakoff and Turner 1989 (67 et passim), creates a new slot in the target, one that the conventional mapping does not presuppose. As an example,

consider the title of the fictional journal of a college student: “Speeding through life on the purple chariot” (Example 1). In a possible interpretation of this title, the additional slots of “manner of movement” and “vehicle used in traveling” are mapped from the domain of journeys into the domain of life. This mapping is novel in itself, but readily understood, as it extends a well-known, conventionalized metaphor with conceptual substrate from its conventionalized source domain schema.

Another process that holds in the creation of novel metaphorical mappings is what Lakoff and Turner term “elaboration.” In this mental operation, an already existing slot in the conventional metaphor is filled in a non-conventional way. For example, in the expression “life in the fast lane,” the already existent “path” slot in the conceptual metaphor LIFE IS A JOURNEY is filled with the conventional image of a highway.⁵ Yet another process that creative conceptualizers have at their disposal is “questioning,” where the boundaries of a conventional metaphor are put into question (for example, in an attempt to show that the metaphor is inadequate). In one of the examples of questioning, Lakoff and Turner quote the following lines by Catullus:

Suns set and return again,
but when our brief light goes out,
there’s one perpetual night to sleep through.

Here, the poet is questioning the metaphor A LIFETIME IS A DAY to point out that unlike with the continual progression of night and day in the source domain schema, in what the target domain is a representation of, no day comes after the night.

Finally, the creation of a novel metaphorical understanding can be effected by the process known as “composition,” where a composite conceptual metaphor is formed by the conjoint use of more than one conventional cross-domain mapping culturally available for the conceptualization of a given target domain. For example, an article in the San Francisco Chronicle uses the metaphors LIFE IS A JOURNEY and LIFE IS BONDAGE in conjunction to drive a point home (Example 2). The article is entitled “The folly of trying to escape life,” which activates the metaphor LIFE IS A JOURNEY. However, the author states that even when we do escape, “[we] also have to run away to something” (ibid.) providing a completion of the

⁵ Interestingly, the cultural model of HIGHWAY conditions an additional implicit metaphorical extension, whereby the slot of “vehicle” is created in the “life” schema, and filled with “a car.”

metaphor LIFE IS BONDAGE with LIFE IS A JOURNEY, so as to give the reader an opportunity to achieve new insight into the conceptual domain of LIFE.

1.1.2. Simultaneous mappings and “duals”

Two more aspects of the structure of conceptual metaphors need to be addressed. The first one is the prevalence of simultaneous mappings (as discussed in Lakoff 1992). In discussing simultaneous mappings, Lakoff provides a quotation from a poem by Dylan Thomas: “Do not go gentle into that good night.” Lakoff reflects that in its comprehension, the sentence activates the conventional metaphors DEATH IS DEPARTURE, LIFE IS A STRUGGLE and A LIFETIME IS A DAY. All these conceptual metaphors are necessary in forming a conceptualization of the meaning of that line. Similarly, a metaphor like LOVE IS A JOURNEY entails the activation of additional metaphorical concepts, like LOVE IS A PURPOSEFUL ACTIVITY.

What is more, one can observe a duality in certain metaphorical mappings, referred to as “duals”. In his discussion of the conceptual metaphor TIME PASSING IS MOTION (Lakoff 1992), Lakoff notes that this metaphor has two special cases, namely TIME PASSING IS MOTION OF AN OBJECT and TIME PASSING IS MOTION OVER A LANDSCAPE. This can be seen as a figure-ground reversal, where in the first special case the TIME PASSING is the figure, and in the second the moving agent implicit in the metaphor TIME PASSING IS MOTION OVER A LANDSCAPE becomes the figure against the ground of the LANDSCAPE OF TIME (see the discussion of these metaphors in section 1.2.2. below). Such a pairing of metaphors based on a figure-ground reversal is referred to as a “dual,” and is by no means an isolated phenomenon in the conceptual system of the human mind (see e.g. the discussion of the duality of the Event Structure Metaphor in Lakoff and Johnson 1999: 194-201 et seq.).

1.1.3 Image schemas and the Invariance Principle

Lakoff and Turner, in describing the power of conceptual metaphor, list “the power of reason” as one of the sources of the great potential of cross-domain mappings (1989: 65). The power of reason is understood as the fact that conceptual metaphors provide patterns of inference to use in reasoning about a target domain. These patterns of inference are conditioned by what structure of the source domain schema is selected for the mapping. What is crucial is that the

structure of the source domain schema and its entailments are also constrained, due to the “invariance principle.”

In his 1992 essay, George Lakoff defines the Invariance Principle in the following way: “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.” Image-schema theory was developed in Johnson 1987. Bergen and colleagues state that image schemas are “rudimentary concepts like CONTACT, CONTAINER and BALANCE, which are meaningful because they derive from and are linked to human *pre-conceptual* experience” (2006: 14). Other such rudimentary concepts include PATH, FORCE, CENTER-PERIPHERY, or CYCLE (see Johnson 1987: 28, 42-48, 124-125, and 119-121, respectively). These concepts emerge in our sensorimotor experience and the embodied interaction with the environment, and lie at the basis of *ontological* metaphors, defined in as “ways of viewing events, activities, emotions (...) as entities or substances” (Lakoff and Johnson 1980: 25). Lakoff and Johnson state that these conceptual metaphors serve a number of functions, e.g. they enable referring and quantifying (1980: 27).

Image schemas (like the VERTICALITY or CONTAINER schema) also allow the formation of *orientational* metaphors, like MORE IS UP or SAD IS DOWN (see Lakoff and Johnson 1980 14-21 et passim). These mappings, indispensable in rational thought, relate whole systems of concepts with each other, and rely on the structure of image schemas (ibid.).

In their account of how the invariance principle retains crucial topology in cross-domain mappings and conditions the entailments of conceptual metaphors, Lakoff and Turner introduce the distinction between generic-level and specific-level metaphors (1989: 80-83 et passim). A specific-level metaphor consists of “a certain lists of slots in the [source] schema that maps in exactly one way onto a corresponding list of slots in the [target] schema” (ibid.: 80). A generic-level cross-domain mapping, on the other hand, consists in “not a list of fixed correspondences but rather in higher-order *constraints* on what is an appropriate mapping and what is not” (ibid.).

An example of a specific-level metaphor is LIFE IS A JOURNEY (see section 1.1 above). This mapping consists of two fixed source and target domains (the domain of journeys and the domain of life, respectively), and a fixed list of mappings, whereby the “traveler” slot in the “journey” schema is mapped onto the “person leading the life” slot in the “life schema,” the

“distance covered” is mapped onto the “forward progress achieved” in the domain of “life,” etc. A basic generic-level metaphor like STATES ARE LOCATIONS, on the other hand, does not include fixed source and target domains, and instead of a list of fixed mappings, it only provides a list of generic-level constraints on what mappings can be activated between two conceptual domains structured by the mapping of the generic-schema of a STATE onto the generic-level schema of LOCATION.

Lakoff and Turner state that “generic-level metaphors relate generic level schemas,” and provide a list of what knowledge structures a generic-level schema contains. These are:

- basic ontological categories (entity, state, event, action, situation, etc)
- aspects of beings (attributes, behavior, etc)
- event shape (instantaneous or extended, single or repeated, completed or open-ended, cyclic or not cyclic, etc)
- causal relations (enabling, resulting in, creating, destroying, etc)
- image-schemas (bounded regions, paths, forces, links, etc)
- modalities (ability, necessity, possibility, obligation, etc) (1989: 81).

They also declare that due to the principle of preserving generic-level structure in the mapping, each specific-level schema will preserve such generic-level structure, as well as exhibit additional, specific-level structure. The principle of preserving generic-level structure is defined as follows:

- 1) Preserve the generic-level of the target except for what the metaphor exists explicitly to change
- 2) Import as much of the generic-level structure of the source as is consistent with the first condition.
(Lakoff and Turner 1989: 82)

This is in keeping with what Lakoff describes as the Invariance Principle (Lakoff 1992). The Invariance Principle “ensures” that in cross-domain mapping the generic-level topology will be preserved, so that, for example, an element that is characterized in its generic-level structure by the CONTAINER schema will map onto a target-domain slot that is also structured by the same image-schema in its generic-level structure. This ensures that a concept’s entailments, conditioned by its generic-level structure, will be preserved in the mapping, under the condition that the only inference patterns which will be inherited in cross-domain mapping will be those constrained by the generic-level structure of the slots selected for the mapping.

For example, one important element of the generic-level structure of the source domain for the metaphor LIFE IS A JOURNEY is the PATH schema. One of the ways we can see conceptual metaphor at work is the way that its patterns of inference constrain certain linguistic expressions, and make certain other expressions ungrammatical or incomprehensible. Although a PATH is not inherently directional, directionality is often imposed onto it, together with a start and an end point, and an agent moving on the path towards the end (see the discussion of the SOURCE-PATH-GOAL schema in Lakoff and Johnson 1999: 32-34 et passim, where the entity moving along the PATH is referred to as *the trajectory*). The agent, in turn, prototypically exhibits a front-back orientation, with the agent's front being directed in the direction of movement, that is, towards the end point of the PATH. Thus, although a sentence like "You have a long way ahead of you" (meaning "there is much work or time to be devoted to the reaching of a certain goal") will be perceived as grammatical, the sentence "You have a long way behind you" will not probably activate a similar conceptualization in the same context, and will most probably be perceived as very odd, if it is intended to be read as "there is much work or time to be devoted to the reaching of a certain goal." This is because the sentence "You have a long way behind you" (with the intended reading specified above) does not meet the inference, conditioned by the PATH schema in the generic-level structure of the domain of journeys, that when a location on a path is situated towards the end of the path, and the agent moving along the path has not yet reached that location, that location is conceptualized as being "in front of" and not "behind" the moving agent.

What can also be observed are the so-called *inheritance hierarchies* of conceptual metaphors. That is, cross-domain mappings sometimes partake of and are conditioned by more generic conceptual metaphors, exhibiting something of a hierarchical organization. For example (as analyzed in Lakoff 1992), the structure of the specific-level metaphor LOVE IS A JOURNEY is in a large degree inherited from the more generic metaphor (A PURPOSEFUL) LIFE IS A JOURNEY, which is in turn conditioned by the inferences in the still more generic metaphor LONG-TERM PURPOSEFUL ACTIVITY IS A JOURNEY, which in turn inherits its generic-level structure from the Event Structure Metaphor (see Lakoff and Johnson 178-206 et passim, and 2.4.2 below).

1.2. Metaphorical models of TIME

1.2.1 The origins of the experience of temporality

In *Philosophy in the Flesh* (Lakoff and Johnson 1999), Lakoff and Johnson introduce the distinction between primary and complex metaphors. The theory of primary metaphors was developed by Joseph Grady in his Ph.D. dissertation (1997). According to Grady, each “complex” metaphor (like LIFE IS A JOURNEY) is made of up primary metaphors (compare the distinction between generic and specific-level mappings, discussed in section 1.1.1 above). A primary metaphor is held to be culturally universal, and its source and target domains are equally basic. These primary cross-domain mappings arise due to recurrent correlations in experience, a process referred to as “conflation” (Lakoff and Johnson 1999: 46 et seq.). In conflation, “subjective (nonsensorimotor) experiences and judgments” and sensorimotor experiences are regularly associated, so that, for example, the experience of affection is often associated with the sensorimotor experience of warmth. In a later period of development of the individual, the child begins to be able to differentiate between those two domains of experience, but the associations developed earlier persist. Due to this process, the various domains of experience can later be co-activated, giving rise to primary metaphorical mappings, like AFFECTION IS WARMTH.

One of the examples of primary metaphors that Lakoff and Johnson provide is TIME IS MOTION (Lakoff and Johnson 1999: 52). In this conceptual metaphor, the sensorimotor domain is motion, and the “subjective judgment” component is the passage of time. Trying to provide an account of the origins of the subjective, phenomenological experience of the flow of time, Evans claims that “(...) what makes time inherently temporal is duration” (2002: 17). Additionally, Evans develops an analysis of how the experience of duration arises from certain features of perceptual processing. Perceptual information from many modalities is integrated by virtue of synchronized oscillations of selected neuronal assemblies. These oscillations last for short periods of time, and each such “period” (termed *perceptual moment*) is bound by a silent interval. Evans suggests that these synchronized firings of neurons enable the formation of coherent percepts (2002: 18 et seq.). Bound by recurring temporal intervals which create perceptual moments, perception seems then to be inherently temporal.

According to Evans, the experience of the succession of events in time can be accounted for by the relation between the currently ongoing perceptual moment, and a rudimentary memory

of the perceptual moment that preceded (Evans 2002: 22). The memory relating the two perceptual moments provides the experience of an interval in between the two, and thus, the conceptualization of two discrete moments. The awareness of either a dissimilarity or lack of dissimilarity between the current perceptual moment (what is being perceived), and the one that came before (what is represented in memory), is the basis of the experience of duration. Evans suggests that “(...) the succession between a perceptual moment held in memory and the current perceptual moment giving rise to the experience of duration constitutes (...) a relation which forms the basic unit of temporal experience” (2002: 22). Additionally, the conceptual integration of the succession of perceptual moments, the continually updated memory of past perceptual moments, and the diffuse array of sensory information received in the perception of the environment, gives rise to the fundamental perception of an “event” (2002: 24 et passim).⁶

In their discussion of conceptual models of time, Lakoff and Johnson (1999: 138-169) assert that time, rather than existing objectively in the world as a thing-in-itself, is defined by metonymy: “(...) successive iterations of a type of events stand for intervals of time” (1999: 138). The conceptualized magnitude of duration of an event, such as the movement of the hands of the clock, the change of day into night, etc., along with its “comparison” against the stored knowledge of the length of duration of other recurring events, is what constitutes the conceptualized magnitude of “time.” For example, the assertion that an event takes “two seconds” is reflective of the conceptualization of the event as compared against the cultural model of some recurring events in the world, such as the movement of the hands of the clock that is taken to be “one second” (see section 2.4.2 below for a conceptual blending account of these conceptualizations) These judgments depend on conceptual models which are culturally entrenched, and are reinforced by material anchors, such as the clocks themselves.

The conceptualization of the magnitude of duration can vary in different circumstances. For instance, Evans, reviewing the findings of the psychologists Robert Ornstein and Michael Flaherty, describes the two widely reported judgments of the “speed” of duration, namely “protracted duration” and “temporal compression” (2003: 3-4). “Protracted duration” refers to experiencing time as passing “more slowly,” and it occurs when “(...) the density of conscious information processing is high” (Flaherty 1999, qtd. in Evans 2003: 4). This happens, for example, in emotionally charged situations, such as incidents of violence, where the experiencer’s attention level is extremely high. “Temporal compression,” on the other

⁶ Conceptual integration will be discussed in more detail in Chapter III below.

hand, is experienced when “the density of conscious information processing is low” (ibid.). This experience occurs, for example, when the conceptualizer is engaged in familiar, routine activities, which require little conscious attention. Citing the two ways of conceptualizing duration as evidence, Evans asserts that “(...) it is how we interact with and attend to a particular event, rather than any ‘objective’ temporal properties associated with an event which gives rise to our experience of duration” (2003: 3).

1.2.2. The basic metaphorical models of TIME

This section will provide an overview of the basic conventional metaphors of TIME, based mainly on the account of conceptual models of TIME provided in Lakoff and Johnson 1999 (137-169).

1.2.2.1. The TIME ORIENTATION metaphor

Analyzing the basic properties of the conceptual models of time in the English-speaking culture, Lakoff and Johnson state that, as the conceptualization of time originates from the conceptualization of regularly recurring events, the basic literal properties of time are the basic literal properties of events (1999: 138). This finding can be accounted for by the Invariance Principle, by which the topology of the source domain (here, EVENTS) is preserved in the mapping, as long as it does not violate the image-schematic structure of the target domain (here, TIME). Lakoff and Johnson (1999: 138) list the basic properties of time and the basic properties of events, which are:

Time is directional and irreversible because events are directional and irreversible; events cannot “unhappen.”

Time is continuous because we experience events as continuous.

Time is segmentable because periodic events have beginnings and ends.

Time is measured because iterations of events can be measured.

Following Lakoff and Johnson, I will begin the discussion of the prevalent basic conceptual metaphors of time in the English-speaking culture with the TIME ORIENTATION metaphor. The TIME ORIENTATION metaphor is reflective of the basic conceptualization of time, present in all cultures of the world (see Radden 2003), namely SPATIAL TIME. Although there are areas in

the human brain that have been found to be responsible for the detection of motion, there are no structures evolved for the perception of “time.” Unlike in physics, for the human mind motion seems to be a more fundamental concept than time. The TIME ORIENTATION metaphor is a basic cross-domain mapping which uses spatial and motional concepts as the source domain in conceptualizing the domain of TIME. In this mapping, there is a spatial configuration with an OBSERVER, localized at the PRESENT. The space in front of the OBSERVER is the FUTURE, and the space behind is the PAST. This can be represented in the following way:

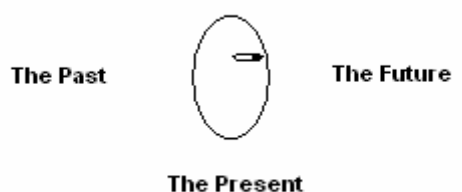


Figure 1

Linguistic expressions underpinned by this conceptual metaphor (quoted in Lakoff and Johnson 1999) include “That is now behind us,” and “He has a great future in front of him” (140). Lakoff and Johnson stress that “time orientation is cognitively separate from other aspects of time” (140). They assert that this metaphorical model does not specify the OBSERVER’s movement in time, but merely states the OBSERVER’s orientation.

1.2.2.2. The MOVING TIME metaphors

There are two other basic conceptual metaphors that specify the OBSERVER’s MOVEMENT IN TIME, namely, the MOVING TIME metaphor and the MOVING OBSERVER. The former is described as follows (Lakoff and Johnson 1999: 141):

There is a lone, stationary observer facing in a fixed direction. There is an indefinitely long sequence of objects moving past the observer from front to back. The moving objects are conceptualized as having fronts in their direction of motion.

Lakoff and Johnson specify the conceptual mappings in the structure of the MOVING TIME metaphor in the following way:

Objects	→	Times
The Motion of Objects past The Observer (1999: 141)	→	The “Passage” of Time

This mapping is activated simultaneously with the TIME ORIENTATION metaphor, yielding the additional specification that the location of the stationary OBSERVER is the PRESENT, the space in front of the OBSERVER is the FUTURE, and the space behind is the PAST. Thus, TIMES move from the FUTURE, through the PRESENT, and into the PAST. The location of the PRESENT TIME is the location of the OBSERVER. Lakoff and Johnson provide a selection of linguistic examples of the MOVING TIME metaphor:

The time will *come* when there are no more typewriters. The time has long since *gone* when you could mail a letter for three cents. The time for action *has arrived*. The deadline is *approaching*. The time to start thinking about irreversible environment decay is *here*. Thanksgiving is *coming up on* us. The summer just *zoomed by*. Time is *flying by*. The time for end-of-summer sales *has passed*. (1999: 143).

The examples quoted above demonstrate how the use of spatial vocabulary is extended to yield temporal uses, as conditioned by the mapping of the structure of the domain of MOVEMENT IN SPACE into the target domain of TIME. Additionally, due to the Invariance Principle, certain crucial inferences entailed by the structure of the schema of MOVEMENT IN SPACE are inherited in the mapping. Lakoff and Johnson (1999: 142) point out that the fact that there is only one OBSERVER in the mapping conditions the inference that there is only one PRESENT TIME (because in the domain of SPACE, a single element can only be located in a single location). Since in the source domain of SPACE, the OBJECTS all move in the same direction, all the TIMES move in the same direction. Finally, as conventionally an OBJECT moving in space will be conceptualized as having a front-back orientation, with the front in its direction of motion (see Lakoff and Johnson 1980: 42), the inference for the domain of TIME in the MOVING TIME metaphor is that all TIMES face in their direction of motion.

Lakoff and Johnson add further inferences that hold by virtue of the fact that in the cross-domain mapping, the domain of TIME is structured by the domain of SPACE (1999: 142). They point out that the OBJECTS in the source domain of SPACE, as the TIMES in the target domain, form a sequence. This conditions such inferences as, for example, if OBJECT 1 is behind OBJECT 2 as related to the OBSERVER, TIME 2 is in the FUTURE relative to TIME 1, and TIME 2 is in the PAST relative to TIME 1.

Additionally, Radden (2003) points out that “(...) another way of viewing sequences of time is having them bounded at one end” (234) There are two viewing arrangements possible here. In one, “(...) the observer [is] positioned outside the sequence of time units.” The other has the observer “(...) included in the sequence of time units” (ibid.: 234). The former variety is activated by the English expressions like *last week*, *last month*, or *last year*. These expressions prompt the conceptualization of a sequence of time units, based on the cultural model of the calendar, in which the last element is positioned behind the OBSERVER. For example, if today is Wednesday, March 10, the expression “last week” will be read as “the week from Monday March 1 to Sunday March 7.” Alternatively, expressions like “the last week” or “the last month” prompt a conceptualization of a sequence of units of time (roughly seven days and roughly thirty days, respectively) which goes back from and includes the present (and hence, the observer). For example, if today is Wednesday, March 10, the expression “the last week” will be read as “roughly, the period of time between the moment of speaking and around seven days back,” i.e. approximately the time between now and March 3.

The MOVING TIME metaphor can be represented in the following way:

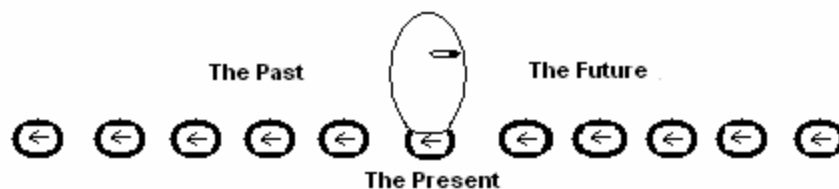


Figure 2

This metaphorical mapping is what provides the conceptual models that are activated in the comprehension of linguistic expressions such as *the summer is coming*, *the exam is getting closer*, *I was just watching the days passing me by*, *that day is long gone*, etc. Of course, this mapping can be observed in extra-linguistic behavior as well. As stressed by Lakoff and Johnson (1999: 144), it is common for speakers to point behind while uttering sentences like “that was in our past,” and to point ahead while uttering sentences like “it will come in our future.” Interestingly, Radden points out that “In English, time may be seen as flowing down from the earlier time into the present” (2003: 228). This conceptualization is evidenced by linguistic examples such as “These stories have been passed *down* from generation to

generation,” or “This tradition has lasted *down* to the present day” (ibid.). Additionally, Radden suggests that for future time, English uses a conceptual model in which the OBSERVER (and hence, the PRESENT, where the OBSERVER is located) is positioned above the PAST and the FUTURE (ibid.: 228). FUTURE TIMES come up, and PAST TIMES go down. The examples Radden provides are “The new year is coming *up*” and “This year went *down* in family history” (228).⁷

As evidence for the cross-domain mapping of the MOVING TIME metaphor, apart from the inference patterns described above, Lakoff and Johnson cite examples of polysemous lexical items and poetic expressions (1999: 144). George Lakoff stresses that “[a conceptual metaphor] sanctions the use of source domain language and inference patterns for target domain concepts” (1992). Accordingly, the use of the domain of MOVEMENT IN SPACE in the structuring of the domain of TIME will sanction the temporal-reference use of certain lexical items, such as “before, after, behind, precede, follow, come, arrive, approach,” etc. The use of these lexemes will be grammatical in both spatial and temporal senses, and the temporal senses will be bound by the inference patterns available in the domain of SPACE. David Lee states that

Sentences will be maximally natural if the meanings they express correspond to natural ways of conceptualizing the relevant situation. Conversely, they will exhibit various degrees of unnaturalness to the extent that this correspondence does not hold. (2001: 77)

Thus, a sentence like “Yesterday will not come before tomorrow” will strike the reader as ungrammatical, or incomprehensible without any additional context. Violating the inference patterns available in the domain of MOVEMENT IN SPACE, the sentence does not provide cues for a conceptualization based on the structure of the “natural,” conventional conceptual model of MOVEMENT IN TIME.

1.2.2.3. The metaphor TIME IS A CHANGER

Very often, if an element is seen as usually occurring together with an event, that element will be conceptualized as a property, or even cause of the event. For example, if I am a singer, and my friend Mary has been in the audience a few times when my microphone went down in the middle of the performance, when that happens again I will get mad at Mary and call her a

⁷ For an alternative account of these conceptualizations, see Lakoff and Johnson 1980: 16.

“jinx.” The lexeme “jinx” is used to refer to a person or thing that “brings bad luck,” or, in other words, is perceived as being the agent that caused an unfavorable (accidental) occurrence. Lakoff and Turner (1989) provide a discussion of this very interesting folk theory of causation (37 et passim). This metaphorical mapping in question is referred to as EVENTS ARE ACTIONS. Lakoff and Turner note that this conceptual metaphor is activated when “(...) we ascribe the occurrence of a particular event to a nonincidental property of something indispensably involved in the event” (ibid.: 37). In other words, this mapping creates an AGENT slot in the structure of the schematic representation of the event in question. Certain events, like aging, have no easily discernible cause. However, all the perceived changes that these events have consisted in occur in time. Thus, TIME is often what fills the AGENT slot in the conceptualization of the cause of an event through the mapping EVENTS ARE ACTIONS. This mapping leads to the creation of linguistic expressions such as “time-defying cream” or “he has aged.” This common conceptual metaphor is referred to as TIME IS A CHANGER (see Lakoff and Turner 1989: 37 et passim).

TIME IS A CHANGER can be seen as a special case of the basic metaphor TIME IS MOVING. In the latter, TIME is conceptualized as an entity having an existence on its own, separate from events (see Lakoff and Johnson 1999: 156-158). This entity, conceptualized as the cause of the perceived change, fills the AGENT slot in the EVENTS ARE ACTIONS metaphor. There are many special cases of the TIME IS A CHANGER metaphor, which specify the kind of agent TIME is conceptualized as. They include:

- TIME IS A DESTROYER (“Time has eradicated his beauty”)
- TIME IS A DEVOURER (“Finance, like time, devours its own children.” – Honore de Balzac)
- TIME IS A HEALER (“Time heals all wounds”)
- TIME IS A PURSUER (“But at my back I always hear / Time’s wingéd chariot hurrying near.” Andrew Marvell, “To His Coy Mistress”)
- TIME IS A THIEF (“Not to understand a treasure's worth / Till time has stol'n away the slighted good (...)” William Cowper)⁸

Our folk theories of the world hold no explanation of the causes of certain (often tragic) events, but these events always occur in time. Therefore, the TIME IS A CHANGER metaphor is commonly used to provide an explanation of a perceived change, with no other explanation readily available. The cultural existence of this conceptual metaphor can be observed not only

⁸ Unless otherwise noted, examples have been found by the author of this thesis. In cases where it was possible to ascertain the source of the linguistic example, the source will be indicated.

in literary texts, but also in conventional expressions, like proverbs. For a discussion of examples of how the conventional conceptual metaphor TIME IS A CHANGER and its special cases provide structure for certain novel and conventional uses of language, see Lakoff and Turner (1989: 40-43 et passim).

1.2.2.4. The TIME IS SUBSTANCE metaphor

In a variation of the MOVING TIME metaphor discussed in section 1.2.2.2 above, in place of the sequence of TIMES, conceptualized as discrete objects, time is conceptualized as a flowing substance (Lakoff and Johnson 1999: 144). This change of construal is reflective of the mental operation referred to as the *multiplicity-to-mass image-schema transformation* (see Lakoff 1987: 428-429 and 440-444). If a multiplex entity is perceived from a distance, it will be conceptualized as a mass. Applied to the conceptualization of time, this organizing principle of perception provides the construal of time as substance that can be measured, so that one can speak of *a lot of time*, *less time*, etc. Lakoff and Johnson (1999: 145) describe how the conventional knowledge of substances, involved in the mapping TIME IS SUBSTANCE by virtue of the Invariance Principle, leads to the formation of certain inferences in the domain of TIME. These are:

- A small amount of substance added to a large amount of substance yields a large amount. → A “small” duration of time added to a “large” duration yields a “large” duration.
- If Amount A of a substance is bigger than Amount B of that substance and Amount B is bigger than Amount C, then Amount A is bigger than Amount C. → If Duration A of time is greater than Duration B of time and Duration B is greater than Duration C, then Duration A is greater than Duration C.

The conceptual metaphor referred to as TIME IS SUBSTANCE has two important special cases, namely, TIME IS A (FLOWING) LIQUID and TIME IS A RESOURCE. The former is an elaboration of the generic mapping TIME IS A SUBSTANCE, wherein the PASSAGE OF TIME is conceptualized as the flow of a liquid. This mapping provides the conceptual substrate activated by expressions such as “time flows fast when you’re having fun,” or by the title of an avant-garde “surf movie,” *Liquid time* (Example 3). The most readily culturally available conventional image⁹ of a linear body of water in constant unidirectional motion is A RIVER. Unsurprisingly, one special case of the conceptual metaphor TIME IS A (FLOWING) LIQUID is the mapping TIME IS A

⁹ See the discussion of conventional mental images and image-mappings in Lakoff and Turner (1989: 90-96 et passim).

RIVER. This mapping can be seen at work in the following quotation from an article in The New York Times: “time ebbs and flows in a sluggish tide (...)” (Example 4). Another interesting example of how this mapping functions in thought is “The Time River Theory” developed by Goro Adachi (Example 5). In the words of its creator, the Time River Theory “[is about a] grand system of literal ‘rivers of time’ flowing on our planet, created by some mysterious, higher intelligence” (Example 5).

The other special case of the TIME IS A SUBSTANCE metaphor is the cross-domain mapping named TIME IS A RESOURCE. In this metaphor, what maps onto the SUBSTANCE slot is the culturally entrenched RESOURCE schema. By virtue of this structure-mapping, the rich structure of elements and relations in the RESOURCE schema is mapped into the structure of TIME, providing the conceptual apparatus that enables the comprehension of such expressions as “I have no time; we’re running out of time; we have all the time in the world; time is precious,” etc. In a special case of the conceptual metaphor TIME IS A RESOURCE, the RESOURCE slot is filled with a salient member of the cultural model of RESOURCE, yielding the metaphor referred to as TIME AS MONEY. This mapping is strongly reinforced in the English-speaking culture (for example, by the practice of remunerating workers on the basis of how much time they have spent performing their duties). For a detailed discussion of the metaphor TIME IS A RESOURCE and the special case TIME AS MONEY, see Lakoff and Johnson 1999: 161-166.

1.2.2.5. The MOVING OBSERVER or TIME’S LANDSCAPE metaphor

In the basic conceptual metaphor referred to as the MOVING OBSERVER or TIME’S LANDSCAPE, the metaphorical OBSERVER is not stationary, but instead moves along a path. The locations on the OBSERVER’s path are TIMES, and the OBSERVER’s location is always the PRESENT (in other words, when a metaphorical location has been traversed, it comes to be conceptualized as PAST, while the OBSERVER’s current location becomes THE PRESENT). This can be represented in the following way:

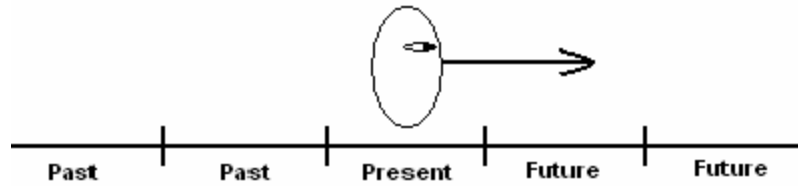


Figure 3

This metaphorical model of TIME, as described in Lakoff and Johnson (1999: 146), combines with the TIME ORIENTATION metaphor, yielding the following cross-domain mappings:

The Location of the Observer	→	The Present
The Space in Front of the Observer	→	The Future
The Space Behind the Observer	→	The Past
Locations on the Observer's Path of Motion	→	Times
The Motion of the Observer	→	The "Passage" Of Time
The Distance Moved by the Observer	→	The Amount Of Time "Passed"

The OBSERVER traverses a metaphorical landscape, hence the alternative mnemonic for this set of conceptual structure-mapping, TIME'S LANDSCAPE. Lakoff and Johnson note that the metaphorical "distance traveled" by the OBSERVER can be measured, which enables the conceptualizations of a "short" or "long" amount of time (1999: 146). Since locations are conceptualized as bounded regions in space, and a bounded region in space is conceptualized via the CONTAINER schema, a location can be conceptualized as exhibiting an in-out orientation, like any element of a conceptual domain conceptualized as a CONTAINER (see Johnson 1987: 34-35). In the TIME'S LANDSCAPE metaphor, by virtue of the Invariance Principle, these features of the structure of the source domain of SPACE allow conceptualizations such as those expressed by the expressions *within two hour's time*, *go through the winter*, etc.¹⁰

Another English preposition used with a temporal meaning is *over* (as in "The lesson is over"). This temporal use of the preposition *over* is reflective of the spatial use exhibited in the sentence "New Jersey is over the bridge," and discussed in Lakoff 1987 under the name

¹⁰ The *multiplicity-to-mass image-schema transformation* (see section 1.2.2.4 above) can also induce the conceptualization of time as substance in the moving observer model, giving rise to conceptualizations such as the one expressed in the sentence *[the] pair covered a lot of time saving features that will make their overall use of the product more efficient* (Example 6), where a sequence of LOCATIONS on TIME'S LANDSCAPE is conceptualized as SUBSTANCE.

“Schema 1.X.C.E” (424). According to Lakoff, this use of the preposition activates a conceptualization with an “end-point focus” on the location on the other side of the bridge, and as such, it is a stative use (1987: 424). Similarly, in sentences like “The lesson is over,” the construal of the temporal configuration focuses on the end-point of the metaphorical “temporal location,” i.e. on the end point of the “length of time” the lesson has taken. The preposition *on* is used when the temporal location is conceptualized as having a metaphorical SURFACE (a conceptualization enabled by the fact that locations are conceptualized as CONTAINERS, which are characterized as having BOUNDARIES, which can be conceptualized as SURFACES). The preposition *at* is used when the location on the TIME’S LANDSCAPE is conceptualized merely as a point in space that the path of the MOVING OBSERVER will converge with (see the discussion of the image schemas activated by *at* in Lee 2001: 23-27). Lakoff and Johnson provide further examples of how the spatial topology of the source domain in the MOVING OBSERVER metaphor enables the use of locational expressions with temporal meanings (1999: 146). These examples include:

Will you be staying a *long* time or a *short* time? What will be the *length* of his visit? His visit to Russia *extended over* many years. The conference *runs from* the first *to* the tenth of the month. She arrived *on* time. We’re *coming up on* Christmas. We’re *getting close to* Christmas. He’ll have his degree *within* two years. I’ll be there *in* a minute. He left *at* 10 o’clock. We *passed* the deadline. We’re *halfway through* September. We’ve *reached* June already.

As with the TIME ORIENTATION metaphor and the MOVING TIME metaphor, Lakoff and Johnson provide a description of selected mappings between spatial concepts and temporal concepts in the MOVING OBSERVER metaphor (1999: 147). These mappings give rise to the structure of the inferences available for the domain of TIME, as well as constrain the grammaticality of the temporal uses of certain lexemes with spatial meanings. The examples of the mappings include:

- The Observer is at Location 1, and Location 2 is ahead of the observer. → Time 2 is in the Future relative to Time 1.
- The Observer is at Location 1, and Location 2 is behind the Observer. → Time 2 is in the Past relative to Time 1.
- A short distance added to a long distance is a long distance. → A short time added to a long time is a long time.
- If Distance A is longer than Distance B and Distance B is longer than Distance C, then Distance A is longer than Distance C. → If Duration A is “longer” than Duration B and Duration B is “longer” than Duration C, then Duration A is “longer” than Duration C.

As an example, Lakoff and Johnson discuss the temporal uses of the adverbial “close to” (147). The inference in the domain of MOVEMENT IN SPACE holds that if we are close to Location A, we only have a short distance to travel to Location A. Accordingly, if we are close to TIME A, we only have a short time to wait to reach TIME A.

Interestingly, the two metaphorical models of time discussed above, namely the MOVING TIME and the MOVING OBSERVER, both activate conceptualizations of the passage of time “(...) in terms of relative motion between the observer and times conceptualized in terms of space” (Lakoff and Johnson 1999: 148) In the former, the salient figure is the MOVING TIME, as related to the stationary OBSERVER, serving as the background. In the latter, the OBSERVER becomes the figure moving against the stationary background of the LANDSCAPE OF TIME. In other words, this pair of metaphors constitutes an object-location dual (as described in section 1.1.2 above).

According to Lakoff and Johnson, the origin of these metaphors is to be found in “our most common everyday experience of functioning in the world” (1999: 151). In everyday “motion-situations,” which consist in our moving towards or away from a destination, movement is automatically correlated with “time-defining events:” bodily rhythms, the movement of the clocks, etc (compare section 1.2.1 above). As discussed in Lakoff and Johnson (1999: 151 et seq.), the structure of the conceptual domain of MOVEMENT IN SPACE, along with the inference patterns constrained thereby, is reflective of the non-metaphorical features of “movement-situations.” For example, in a typical motion-situation, we are moving ahead (not backwards); the objects we have passed by are located behind us, the objects that we are in contact with are right by us, and the objects that we will come in contact with are typically located in front of us. The schematic cognitive representation of these typical motion-situations provides the structure of the domain of MOVEMENT IN SPACE that is used to structure the domain of TIME in the mappings presented above.

As the schematic conceptualization of the situation with the use of the conceptual representation of time-defining events and the domain of movement in space are always correlated in the processing of the common motion-situations, one domain can metonymically stand for the other. Thus, for example, we can encounter sentences like “Chicago is two days from here,” where the temporal “two days” is used metonymically to describe the distance that one needs to cover to reach Chicago. An interesting result of the fact that the structure of

the domain of TIME in the conventional metaphorical models of TIME is constrained by the schematic representation of common literal motion-situations is the inference that, while the OBSERVER is located in the PRESENT, both PAST and FUTURE exist (Lakoff and Johnson 1999: 159). This is a corollary of a literal property of motion-situations: in a typical motion situation, as we move ahead, the space covered and the space to be covered both literally exist.¹¹

The metaphorical models of time delineated above have indubitable cultural benefits. As Lakoff and Johnson point out, the MOVING OBSERVER model, which allows the conceptualization of times as locations in space, is what enables the mathematization of physics (1999: 155). The MOVING OBSERVER model also underpins the cognitive schemas that made possible the invention of some of the time-measuring devices, like sun-dials and clocks. Our daily activities are oriented with respects to such time-measuring devices, as well as cultural models such as the work week and the month. Obviously, all the models of time have powerful psychological repercussions. For example, events conceptualized as being “close” in time bring with them a sense of heightened urgency, so that, for example, a stressful confrontation conceptualized as “coming only in two weeks’ time” will not probably strike one as an equally overwhelming occurrence as a stressful event that is “only a day away” (see Lakoff and Johnson 1999: 156). These feelings are conditioned by conceptualizations based on spatial inferences available for the domain of TIME in the conventional MOVING TIME model.

¹¹ Interestingly, this metaphysical consequence of the fact that the domain of TIME is structured by the conceptual domain of MOTION IN SPACE is by no means universal. Not all cultures have grammaticalized future reference in their languages, for example. For an overview of how the metaphor TIME IS MOVEMENT appears in selected world languages, see Radden 2003.

CHAPTER 2: MENTAL SPACE THEORY AND CONCEPTUAL INTEGRATION NETWORKS

2.1. Introduction

In this chapter, I will overview the theoretical models of meaning construction referred to as “mental space theory” and “conceptual blending theory,” as well as relate these theoretical approaches to the discussion of conceptual metaphor theory in general, and the metaphorical models of TIME, contained in the previous chapters in particular.

2.2. Mental Space Theory

Mental space theory was laid out in Fauconnier 1985. Giles Fauconnier defines mental spaces as “(...) partial structures that proliferate when we think and talk, allowing a fine-grained partitioning of our discourse and knowledge structures” (1997: 11). For example, in saying a sentence like *George thinks Mary is beautiful*, we set up a space with George’s beliefs, in which there is an embedded space with Mary being beautiful.

Fauconnier and Turner state that

[mental spaces] have elements and, often, relations between them. When these elements are organized as a package we already know about, we say that the mental space is *framed* and we call that organization a “frame”. (2003: 102)

For instance, a sentence like *Mary bought milk from Pete* can call up a mental space in which the elements activated by the words *Mary*, *milk* and *Pete* are structured by the entrenched frame of *buying*. Both frames and elements can vary in specificity. For example, the element identified by the word *Mary* in the sentence above is more specific than the element identified by the word *someone* in the sentence *Someone bought something*. Similarly, a frame like *buying* is less specific than a frame like *buying milk from Pete*. The structure of a mental space exhibits a topology that can be characterized in terms of scales, force-dynamic patterns, and image schemas. For example, a mental space structured by the frame *eating ice-cream* will include the scale of how much ice-cream there is to eat, the force-dynamic structure of

the resistance of the ice-cream against the spoon, and the image-schema of CONTAINER underlying the conceptualization of the cup.

Bergen and colleagues note that when mental spaces build up dynamically in working memory as discourse unfolds, the elements introduced into a mental space recruit pre-existing knowledge structures (2006: 30). For example, the entrenched mental space of “funeral” can co-activate frames such as *viewing the body of the deceased in the coffin, funeral procession, burial*, etc, as well as various other content, such as feelings of grief, a rich mental image of a funeral the conceptualizer has witnessed, and many more. What structure the mental space will have depends, of course, on the cognitive model of a funeral that the individual conceptualizer has.

In discourse, the mental-space configuration that develops is constructed by *space builders*, that is, “linguistic units that either prompt for the construction of a new mental space, or shift attention back and forth between previously constructed mental spaces” (Bergen et al 2006: 30). Additionally, meaning construction involves setting up mappings between elements of the structure of mental spaces (*ibid.*), discussed in greater detail below. Linguistic units influence the setting up of mental spaces, structure them internally, activate mappings between the spaces already available, shifting focus within the mental space configuration. Importantly, in mental space theory linguistic units are seen as having the *potential to generate* meaning, rather than a fixed set of possible interpretations (Fauconnier 1997: 38). Bergen and colleagues note that

(...) linguistic expressions represent partial building instructions, according to which mental spaces are constructed. Mental spaces are regions of conceptual space that contain specific kinds of information. They are constructed on the basis of generalized linguistic, pragmatic and cultural strategies for recruiting information. (2006: 29)

It is important to point out that on this view, the structure of a mental space activated in the comprehension of a sentence is constrained by “the mental-space configuration (generated by earlier discourse) to which the sentence actually applies” (Fauconnier 1997: 40). Interestingly, Fauconnier argues that even in the case of the examination of the potential interpretations of a single isolated sentence, “it is necessary to construct implicitly a discourse in which to interpret it” (1997: 55).

Analyzing the development of mental-space configurations in discourse, Fauconnier introduces the terms *viewpoint* and *focus*. *Viewpoint* is defined as “(...) the space from which others are accessed and structured or set up” (Fauconnier 1997: 49). *Focus* is described as “(...) the space currently being structured internally – the space, so to speak, upon which attention is currently focused” (ibid.: 49). For example, consider the following discourse:

Superman thinks he looks good in red. He runs fast.

The first sentence activates a mental space configuration with a mental space containing the element *Superman*, and a mental space containing a representation of *Superman*'s beliefs, with an embedded mental space where *Superman* is dressed in red and looks good. The appearance of the second sentence generates a new mental space, which is now the *Focus*, considered from the *Viewpoint* of the mental space configuration evoked by the first sentence. In a process known as *optimization*, structure from the primary mental space configuration will be transferred to the newly structured space, and mappings will be set up between elements and frames in the primary and the new mental space, “(...) to the extent that it does not contradict explicit structure in the new space” (Fauconnier 1997: 43). Fauconnier states that

A crucial property of language, cognitive constructions, and conceptual links, is the Access Principle (also called Identification principle). This principle states that an expression which names or describes an element in one mental space can be used to access a counterpart of that element in another mental space. (2006)

Accordingly, in the example above, the anaphoric *he* will be construed as a reference to *Superman*, and the property *runs fast* will be incorporated into the structure of the mental space of *Superman* (which will probably also recruit certain additional features of the cultural model of *Superman* by default).

2.3. Conceptual Blending Theory

Conceptual Blending Theory (also known as Conceptual Integration Theory) is a cognitive theory of meaning construction, developed by Giles Fauconnier and Mark Turner in the early 1990s. Conceptual Blending Theory can be seen as a development of mental space theory, due to its “(...) central concern with dynamic aspects of meaning construction, and its

dependence upon mental spaces and mental space construction as part of its architecture” (Bergen et al. 2006: 31). However, Conceptual Blending Theory is a more sophisticated theoretical model of meaning construction, which has been shown to provide a unified account of a vast range of phenomena pertaining to the process of human cognition, and which presents valuable insight into many areas of linguistic and extra-linguistic activity, including “(...) literature, religious thought and practice, and scientific endeavour” (Bergen et al. 2006: 32).

2.3.1. The structure of a Conceptual Integration Network

The central notion in Blending Theory is the *conceptual integration network*. A conceptual integration network is an array of mental spaces, consisting of at least two structured *input* spaces, at least one *generic* space, and at least one *blended* space. The input spaces are structured mental spaces, as described in section 2.2 above. In a conceptual integration network, there are mappings between the input spaces. The *generic* space captures structure that is conceptualized as shared by the input spaces (Fauconnier and Turner 2003: 47). Fauconnier and Turner note that “[a] given element in the generic space maps onto paired counterparts in the two input spaces” (ibid.). In the process of *selective projection*, some of the structure from the input spaces, and the structure of the generic space, map into the *blended* space (or “the blend”). Generally, “[blends] contain generic structure captured in the generic space but also contain more specific structure that is impossible for the inputs (...)” (Fauconnier and Turner 2003: 47).

A striking feature of conceptual integration networks is the creation of new, *emergent* meaning. Emergent meaning in the blend is created in the processes of *composition*, *completion* and *elaboration*. *Composition* frames the elements projected in the blend, providing a relation that does not exist in the separate input spaces (Fauconnier and Turner 2003: 48). Fauconnier and Turner point out that “[counterpart] elements can be composed by being included separately in the blend (...) or by being projected onto the same element in the blend” (2003: 48). This mental operation is referred to as *fusion*. Additionally, mappings between the structure of the input spaces or within one input space (often referred to as “Vital Relations” in the literature on blending) can be *compressed* in the blend, often into other mappings (see section 2.3 below for the discussion of compression). The process of *completion* recruits additional knowledge structures into the blended space. Fauconnier and

Turner note that “[a] minimal composition in the blend is often automatically interpreted as being a richer pattern” (2003: 48), which is projected into the blend from an entrenched structure. Finally, the process referred to as *elaboration* involves “mental or physical simulation of the event in the blend” (Coulson and Oakley 2000: 180). The meaning construction that occurs in blending is dynamic, and “[any] space can be modified at any moment in the construction of the integration network” (Fauconnier and Turner 2003: 49). For example, the blend can project back into the input mental spaces, changing their structure.

As an illustration of the process, consider the conceptual integration network activated by the oft-quoted example, *This surgeon is a butcher*. Conceivably, this sentence can generate two mental spaces. In one, there is a representation of the person the deictic *this* refers to in the context of the utterance, and the role *surgeon*, which recruits the cultural model of *surgeon*, which, in turn, is structured by the *job* frame. The representation of the referent of *this* and the role *surgeon* in the cultural model recruited to this input space are connected by a Role-Value link (see Fauconnier and Turner 2003: 98 et passim). The other mental space is structured by the cultural model of *butcher*. The copula *is* signifies a mapping between the two spaces is to be activated.

As noted above, “(...) a given sentence does not have a fixed set of readings; rather, it has a *generative potential* for producing a set of interpretations with respect to any discourse mental-space configuration” (Fauconnier 1997: 38) Accordingly, one can postulate several possible readings of *This surgeon is a butcher*. The mappings between the inputs can obtain between elements related to the *job* frame, such as *role, agent, means, goal, and work-place*, which can be captured in the generic space in the conceptual integration network. Also, many more specific elements of the entrenched cultural models of *surgeon* and *butcher* can be conceptualized as counterparts. These elements include: *doing physical work, interacting with flesh, using a sharp tool, the object of interaction set on a table*, etc.¹² The reading of the sentence will vary, depending on the structure projected into the blend. The aspects of the structure of the input spaces which are conceptualized as identical will be captured in generic spaces with varying degrees of specificity. Discussing the conceptual integration network behind the sentence *This surgeon is a butcher*, Fauconnier and Turner state that

¹² Interestingly, an informal survey carried out by the author of this thesis revealed that another feature, the gender of the person doing the job, seems to be an element of one or both of the cultural models of *surgeon* and *butcher*. In response to the question “Consider the sentence *This surgeon is a butcher*. What can you tell me about the butcher?,” the seven informants uniformly began their responses with “he.”

One very abstract generic space fitting this blend has only a person who acts. A less abstract one has an actor and something acted upon. A still less abstract space has an actor and the physical object (living or not) acted upon. (2003: 297-298).

Of course, another more specific generic space can capture the more specific elements of the cultural models of *surgeon* and *butcher* mentioned above.

In one possible reading, in the blended space of the conceptual integration network evoked by the sentence *This surgeon is a butcher*, the element *the surgeon's identity* in the *surgeon* input is fused with the Role *butcher* from the *butcher* input. Additionally, the element “lack of concern for flesh interacted with” in the *butcher* input can be projected into the blend instead of the element “surgeon's concern for the patient” from the cultural model of *surgeon* in the *surgeon* input. The element *bodily tissues worked on* in the blend can map onto *meat* in the *butcher* space, instead of the element *the human body* in the surgeon space. Also, the goal of the surgeon's action in the cultural model of *surgeon* in the *surgeon* input, i.e. *healing*, will not be projected into the blended space, and the blend will contain the counterpart from the *butcher* space instead, i.e. *butchering the meat*. The structure in the blended space contains a new, integrated concept, which exhibits some of the elements of the cultural model of *surgeon*, and some of the elements of the cultural model of *butcher*.

In the process of composition, the very abstract generic frame of a person who acts, mentioned above, is recruited into the blend, and the two agents in the cultural models of the professions in the input spaces are fused into one. Since certain crucial elements of the cultural model of surgeon were not projected to the blend (such as *healing the patient*), the structure of the blend can be completed by the entrenched frame of a person who does not fulfill the crucial aspects of the role that their job assigns to them. This frame is linked to the entrenched frame of *incompetence*, which is recruited into the blend. Importantly, the notion of *incompetence* is not part of the structure of either the *surgeon* input space, or the *butcher* input space, but emerges in the blended space through completion. The incompetent agent in the integrated frame in the blend maps into the element in the surgeon input identified by *this*. In effect, the element identified by *this* is now conceptualized as *incompetent*, and his surgery skills as abominable.

What will be imported into the blended space created in the interpretation of the sentence depends on many variables, such as the immediate linguistic and situational context, prosody, gesture language, previous experience and motivations of the conceptualizer, etc.

Additionally, we can assume that a number of possible interpretations are formed in the cognitive unconscious, some of them discarded, and some delivered to consciousness. One of the processes that unfold in forming those possible interpretations is *elaboration*, or “running the blend.” Fauconnier and Turner point out that

We can run the blend as much and as long and in as many alternative directions as we choose. (...) The creative possibilities of blending stem from the open-ended nature of completion and elaboration. (2003: 49)

Running the blend of *This surgeon is a butcher* can introduce additional projections of certain elements of the structure of the input spaces into the blend. For example, the imaginative elaboration of the blend can specify the nature of the incompetence in the surgeon’s performance, recruiting structure such as *carelessness*, *wastefulness* and *lack of finesse and precision* into the blend. These elements can in turn map into the *butcher* input. Importantly, this new structure is not necessarily part of the conceptualizer’s representation of the performance of actual butchers in the world, but forming the conceptual integration network for *This surgeon is a butcher* can prompt the emergence of that novel structure emergence in the *butcher* input, and even permanently enrich the structure of the conceptualizer’s model of BUTCHER.

2.3.2. Human Scale

Fauconnier and Turner stress that “[the] *raison d’être* of mental spaces is to juggle representations that, in the real world, are incompatible with each other” (2003: 29). Very often, the construction of a conceptual integration network allows the conceptual integration of such spaces and the formation of emergent meaning, relevant to a purpose. For example, in the conceptual integration network for *This surgeon is a butcher*, the integration in the blended space allows the conceptualization of an element which exhibits at once some characteristics of a surgeon at work, and some characteristics of a butcher at work. Although in reality this is hardly possible and, admittedly, the surgeon referred to in the sentence probably conducted the operation according to proper medical procedure, the integration of the incompatible structure of the two input spaces enables the satisfaction of the purpose at hand, by providing a powerful critical evaluation of the surgeon’s competence. To refer to the incompatibility between two spaces in an integration network, Fauconnier and Turner use the term “counterfactual” (2003: 230). For example, a space where an element is conceptualized

as a SURGEON can, for some conceptualizers, be counterfactual with respect to another space, where that element is a BUTCHER.¹³ Fauconnier and Turner stress that

When we want to establish, understand, or manipulate actual outer-space connections over various spaces, it is good to compress them into a blend, which often means compressing them into powerful inner-space relations in the blend. The “literal falsity” of those relations is irrelevant to the reasoning process. (...) This way of constructing integration networks is particularly useful for casting light on the input spaces by finding a counterfactual compression that, through proper alignments between the blend and the inputs, preserves the structure we need in the inputs but operates over that structure efficiently and memorably, giving it a global insight at human scale. (2003: 37)

Fauconnier and Turner stress that achieving human scale in the blended space is the main driving principle in the construction of a conceptual integration network (2003: 312). Describing the properties of blended spaces which contain structure at human scale, they point out that

The most obvious human-scale situations have direct perception and action in familiar frames that are easily apprehended by human beings: An object falls, someone lifts an object, two people converse, one person goes somewhere. They typically have very few participants, direct intentionality, and immediate bodily effect and are immediately apprehended as coherent. (2003: 312)

The creation of human-scale blends involves integration of more diffuse input structure into more easily accessible, “compressed” human-scale frames, events and scenarios in the blended space. A process that takes place very often in the creation of such human-scale blended spaces is the compression of Vital Relations that hold between the input spaces in a network, such as the relations of Time, Space, Cause-Effect, Analogy, etc. Compression can involve a single vital relation, or the integration of two or more vital relations into a single

¹³ If such counterfactuality was projected into the blend, a response to *This surgeon is a butcher* could be “How can he be a butcher. He is a surgeon!” In this case, in the blend, instead of a fusion of the two Roles projected from the inputs, the two Roles are included separately in the blend. The element identified by *this* in the *surgeon* input is projected into the blend and mapped onto the surgeon input, probably because of previous discourse and entrenched mental spaces imported into the *surgeon* input (e.g. the conceptualizer has seen the referent of *this* performing a surgery, which for her makes that person a surgeon). This produces an incongruity in the blended space, which is reported. In another possible network, the Role element in the *surgeon* input is mapped onto the Role *butcher* projected from the *butcher* input, which maps back into the *surgeon* input, replacing the *surgeon* model with the *butcher* model (“Oh, I thought he was a surgeon because he said he cut up muscles for a living”). In yet another possible network, both the *surgeon* and the *butcher* Roles are projected into the blended space, and the blend is completed with the entrenched frame “has two jobs.” In that frame, the two Roles are assigned to a single Value (a human Agent). That single Agent in the blend maps onto the element identified by *this* in the *surgeon* input.

relation in the blend. In the case of the compression of a single vital relation, one can observe the processes of *scaling*. Scaling involves the compression of an inner or outer-space relation which “comes with a scale” (Fauconnier and Turner 2003: 312). These vital relations include Time, Space, Cause-Effect, etc. A single vital relation can also be compressed by *syncopation*, which is defined as follows:

Some vital relations bring with them an interval, expanse, or chain that we call a “string.” Those vital relations are Time, Space, Cause-Effect, Change, Part-Whole, and Intentionality. (...) [The] partial activation of points on a string we call “syncopation” (Fauconnier and Turner 2003: 114)

The processes of scaling and syncopation can “work together” (Fauconnier and Turner 2003: 314). Another type of compression described by Fauconnier and Turner is the *highlights compression*. A highlights compression involves “a number of key events and participants connected by strong vital relations extending over mental spaces” (2003: 320) These key, “highlighted” elements are “compressed into simultaneous highlights in the blend” (ibid.). Unlike in the case of syncopation, the “string” in the input spaces is not projected into the blended space. Importantly, Fauconnier and Turner note that a pattern of compression can be *borrowed* from an input space in the integration network (2003: 320-321).

Fauconnier and Turner describe many “canonical” compressions that integrate an outer-space vital relation into another relation within the blend (2003: 92-102, 312-325 et passim). As an example, consider the compressions of the vital relation of Identity. The sentence *You have changed* activates an integration network where one input, containing the representation of the referent of *you* in a time before, is connected with an Identity and Change link to another input space, containing the representation of the referent of *you* as she is now. Interestingly, Fauconnier and Turner note that “It is a general property of mental-space configurations that Identity connections link elements across spaces without implying that they are identical or have the same features or properties” (2003: 70). Although the representations of the element identified by *you* in the two mental spaces could be conceptualized as very different, the Identity connection aligns the spaces so that in the blended space, the two elements linked are conceptualized as identical. The two elements connected with the vital relation of Identity can then undergo compression into Uniqueness, which amounts to saying they are fused in the blend (2003: 92). In the emergent scenario, a Unique element undergoes Change in the course of Time. Many other vital relations can be compressed into Uniqueness. For example, Fauconnier and Turner note how the Role-Value relations between the Role *Pope* and its Value (e.g. *Karol Wojtyla*) can be fused in a blended space into a single element – *Pope John*

Paul II (Fauconnier and Turner 2003: 98). Many such conceptual integration networks (e.g. Pope Paul VI, Pope John Paul, Pope John Paul II, etc) can be compressed in the formation of an integration network, where the blended space has a fused, single element *Pope*, and this can lead to the creation of sentences like *Pope Dies Again!* (ibid.; example taken from Fauconnier and Turner 2003: 98).

2.3.3. Decompression and Optimality Principles

Compressions of vital relations bring the more diffuse structure of the input spaces into more easily accessible, human-scale structure in the blend. However, it needs to be pointed out that a compression of a vital relation into another relation in the blended space does not remove the outer-space relation from the conceptual integration network. Fauconnier and Turner stress that

The connections between the blend and the inputs never disappear. We work not just with the blend but with the entire integration network. (2003: 94)

In other words, a conceptual integration network also contains decompressions of inner-space vital relations in the blend into inner and outer-space relations in the integration network. This way, a blend fulfills the “Web” and “Unpacking” principle. These principles come from a list of principles or constraints posited by Fauconnier and Turner, “under which blends work most effectively” (Coulson and Oakley 2000: 186). The Web Principle states that “representation in the blend should maintain mappings to the input spaces” (ibid.). The Unpacking Principle states that “Other things being equal, the blend all by itself should prompt for the reconstruction of the entire network” (Fauconnier and Turner 2003: 332), and decompressing a vital relation in the blend should help to activate input spaces in the network (see Fauconnier and Turner 2003: 325-334 and Coulson and Oakley 2000: 186 for the discussion of other optimality principles). Very often the satisfaction of one optimality principle will involve going against another (Coulson and Oakley 2000: 186). However, it is important to note that a conceptual integration network generated in the interpretation of a piece of discourse will most likely be the one that satisfies the most of the optimality principles (ibid.). Additionally, Fauconnier and Turner note that the principles of conceptual integration have been found to converge in order to accomplish one overarching goal: achieving Human Scale in the blended space (2003: 322). Generally, the construction of the conceptual integration network will also strive to achieve certain “sub-goals,” which are:

- Compress what is diffuse.
- Obtain global insight.
- Strengthen vital relations.
- Come up with a human-scale story (event, scenario, etc).
- Go from Many (in the inputs) to One (in the blend).

(Adapted from Fauconnier and Turner 2003: 323)

2.4. Conceptual Blending and Conceptual Metaphor Theory

Like Conceptual Blending Theory, Conceptual Metaphor Theory is a theory of conceptual projection (see Chapter 1 above). Coulson and colleagues note that the two approaches have a lot in common:

(...) [Both] treat metaphor as a conceptual rather than a purely linguistic phenomenon; both involve systematic projection of language, imagery and inferential structure between conceptual domains; both propose constraints on this projection; and so forth. (1999)

The following section will briefly overview the differences between the two approaches, as well as present a conceptual blending analysis of the conceptual models of TIME presented in Chapter 1 above.

2.4.1. A comparison of Conceptual Metaphor Theory and Conceptual Blending Theory

While conceptual metaphor theory analyses involve the description of the mapping of conceptual structure between two mental representations, termed the source and target domains, a conceptual blending account of the structure of a conceptual integration network involves the analysis of the participation of at least two, and usually many more, mental representations, informed by the notion of mental space discussed above. As noted in Coulson et al 1999, “[mental] spaces (...) are not equivalent to domains, but, rather, they depend on them: spaces represent particular scenarios which are structured by given domains.” A Conceptual Metaphor Theory analysis of a sentence like *This surgeon is a butcher* could involve listing the entrenched conceptual mappings that the sentence can activate, and perhaps positing the novel conceptual metaphor that the conceptualizer must create in the comprehension of the sentence (e.g. BAD SURGERY IS BUTCHERY). Such an account could also

involve describing how the novel metaphor came to exist in the process of extending certain well-researched, conventional conceptual mappings. However, such an analysis would not account for the emergence of the concept of *incompetence* in the process of conceptual integration. Coulson et al. note that although conceptual metaphor theory does attempt to provide an account of how “simple metaphors interact to yield more accurate conceptualizations,”¹⁴ conceptual blending theory seems to be “particularly well-equipped to capture this complex interaction of concepts and links, since it explicitly allows for multiple spaces and multiple iterations of the integration process” (1999). While conceptual metaphor theory has yielded a great body of work on conventional source-domain mappings and the principles that underlie them, conceptual blending theory proves more useful in providing accurate accounts of the construction of novel, emergent meaning in conceptual integration networks.

Apart from being able to provide a more accurate account of novel mappings, conceptual blending theory can also shed more light on the structure of conventional conceptual metaphors. Fauconnier and Turner describe several types of conceptual integration networks, one of which, the *single-scope* network, “[is] the prototype of highly conventional source-target metaphors” (2003: 127). A single-scope network is a conceptual integration network with “two input spaces with different organizing frames, one of which is projected to organize the blend” (ibid.: 126). Fauconnier and Turner point out that the defining property of a single-scope network is that “the organizing frame of the blend is an extension of the organizing frame of one of the inputs but not the other” (2003: 126). This kind of conceptual projection can be seen as compatible with the model provided by conceptual metaphor theory (see Chapter 1 above), where, in a conceptual blending analysis of a single-scope integration network, the equivalent of the source domain is referred to as the *framing* input, and the equivalent of the target domain is referred to as the *focus* input. Importantly, Fauconnier and Turner suggest that “[a] principal job of such networks is to project diffuse structure from the focus input into the already-compressed inner-space relations that have been projected to the blend from the framing input” (2003: 129). As noted in section 2.3.2 above, the process of compression is crucial in providing accessible human-scale structure in the blended space. In a single-scope network, the already available compressions in the framing input are used to conceptualize the focus input and “bring it down to human scale.” Additionally, the rich structure available in the conceptual integration network “primed” by the compressed blend in

¹⁴ See the discussion of simultaneous metaphorical mappings in section 1.3 above.

the framing input can project into the blend of the single-scope network, and back into the focus input.¹⁵

Conceptual blending theory can account for the conventional source-target mappings, as well as novel extensions of conceptual metaphors (see section 1.1.1. above). In the process of the formation the blend of the single-scope network of a conceptual metaphor, parts of the structure of the framing input which are not conventionally recruited into the blend can be projected into the blend from the network primed by the compressed blended space of the framing input. For example, new slots can be created in the organizing frame of the blend through decompression and projection from the framing input (in the process referred to as extension in conceptual metaphor literature), and existing slots can be filled in by structure projected from the framing input (in the process referred to as elaboration). Alternatively, some of the structure of the focus input can be projected into the blend and clash with the organizing frame projected from the framing input, which can lead to the emergence of the awareness of some counterfactuality within the network, in the process known in conceptual metaphor literature as *questioning*. Finally, the process referred to as *composition* (in the sense discussed in section 1.1.1 above), where more than one culturally available cross-domain mapping is used to structure the conceptualization of a concept is easily captured by the many-space conceptual integration model of conceptual blending.¹⁶

Coulson et al note that in metaphorical blends, “certain very salient aspects of input domain structure are prohibited from entering the blend, and (...) some salient structure in the blended space is prevented from floating back to the inputs”. (1999) For example, the metaphor LIFE IS A JOURNEY activates conceptual integration networks where aspects of the structure of the LIFE input that do not fit the organizing frame of “journey” are prevented from entering the blend (e.g. the culturally available conventional mapping of LIFE AS FLUID), and similarly, certain elements of the conventional structure of the “journey” schema (e.g. *the manner of movement*) are not projected into the blend and into the focus input. However, as noted above, conventional metaphorical mappings can be extended and allow for more projection from either of the inputs into the blend, and the resultant back-projection into the inputs.

¹⁵ Of course, the structure of the integration network that an entrenched conventionalized blend will activate in the conceptualizer will be different for different conceptualizers and constrained by many factors, such as the nature of the mental-space configuration of the immediate discourse. See the discussion of the acquisition of conventionalized blends in children in Fauconnier and Turner 2003: 214 -216.

¹⁶ See Section 1.1.1 above for a discussion of the creation of novel conceptual metaphors. Obviously, the creation of novel metaphorical blends is a complex and varied phenomenon. See, for example, the related discussion of double-scope networks in metaphorical blends below, and the discussion of the metaphor NATION AS SHIP in Coulson 1999.

As noted above, in conceptual metaphor literature, the patterns of projection are seen as directional projections from the source to the target domain, constrained by the topology of the target domain, and preserving the inference patterns available in the source domain, as long as it is allowed by the target domain topology (see the discussion of the Invariance Principle in section 1.1.3 above). However, blending analyses of metaphorical conceptual integration networks demonstrate how certain mappings do not exhibit the source-target directionality postulated in conceptual metaphor theory, and show that metaphorical blends often violate the topologies and inference patterns of the inputs (see e.g. Coulson et al 1999, Fauconnier and Turner 2003: 131-135 et passim, and Fauconnier and Turner 2006: 1-3). For example, in another type of integration networks described by Fauconnier and Turner, referred to as *double-scope* networks, the inputs contain “different (and often clashing) organizing frames as well as an organizing frame for the blend that includes parts of each of those frames and has emergent structure of its own” (2003: 131). While in a single-scope network “the cross-input mapping aligns the topologies of the inputs and that topology appears in the blend” (ibid.), in a double-scope network the topologies of the inputs can clash, and the organizing frame of the blend can be imported from another input, in order to achieve human-scale integration in the blended space. For example, Fauconnier and Turner note that the conceptual integration network evoked by the idiom *digging one’s own grave* imports “causal, intentional, and internal event structure from the ‘unwitting failure’ input,” not from the input spaces of grave-digging, death or burial (Fauconnier and Turner 2003: 131-134). Instead of a one-directional mapping from source to target, the network exhibits conceptual projection between many spaces.

2.4.2. A conceptual blending account of the models of TIME

In a recent article, Fauconnier and Turner (2006) provide a conceptual blending account of the metaphorical models of TIME discussed in Chapter 1 above, demonstrating how the findings of conceptual blending theory can enrich the study of conventional metaphorical models. Fauconnier and Turner contend the assumption that the mapping of the domain of SPACE onto the domain of TIME can be taken as a primitive of the organization of the human conceptual system. Instead, they propose a model which consists of “[an] elaborate integration network that involves a number of input spaces, blended spaces, vital relations, and compressions,”

(2006: 9), as well as the emergent structure of the notion of time and the spatial inferences that hold for the conceptual domain of TIME (see above, Chapter 1).

One of the input spaces in that conceptual integration network is the domain of EVENTS¹⁷. Fauconnier and Turner assert that human beings are able to understand “event shape, including ordering and event type” and categorize the representations of events (2006: 9). Importantly, the input space structured by the domain of EVENTS can also include subjective experience of events (as exciting, burdensome, pleasant, etc). Another input in the conceptual integration network discussed in Fauconnier and Turner 2006 is a sub-section of the domain of events: the conventional representation of motion-situations with its spatial logic, or “the input of experienced motion through physical space,” referred to as X (ibid.). One aspect of the inherent logic of that input space is that “[if] we travel from A to B and then B to C, we know that the event of traveling from A to B is over before the event of traveling from A to C is over” (ibid.). Accordingly, Fauconnier and Turner point out that “relative length corresponds to ordering of events” (2006: 10). Importantly, another correlation embedded in the structure of the conventional representation of motion in space is the notion of relative speed, which correlates with the duration of movement. Fauconnier and Turner note that “in English, we say that going from A to B is ‘faster’ than going from A to C, even if our speed in the technical sense is the same” (ibid.).

E, the domain of events, and X, the domain of motion in space, blend in routine ways to yield emergent structure (Fauconnier and Turner 2006: 10). These conventional blends have been described in conceptual metaphor literature as the Event Structure Metaphor. According to Lakoff and Johnson, the Event Structure Metaphor is a cross-domain mapping which “[allows] us to conceptualize events and all aspects of them – actions, causes, changes, states, purposes, and so forth – in terms of our extensive experience with, and knowledge about, motion in space” (1999: 179). Lakoff and Johnson note that the Event-Structure Metaphor is a dual¹⁸ of the Location Event-Structure Metaphor and the Object Event Structure Metaphor. Those two basic metaphors include a number of well-researched submappings, namely:

¹⁷ Following the convention adopted in Fauconnier and Turner 2006, the domain of EVENTS will be referred to as *E*, the domain of MOTION IN SPACE will be referred to as *X*, and the Timepiece network (see below) will be referred to as *M*.

¹⁸ See section 1.1.2 above.

The Location Event-Structure Metaphor

STATES ARE LOCATIONS (interiors of bounded regions in space)

CHANGES ARE MOVEMENTS (into or out of bounded regions)

CAUSES ARE FORCES

CAUSATION IS FORCED MOVEMENT (from one location to another)

ACTIONS ARE SELF-PROPELLED MOVEMENTS

PURPOSES ARE DESTINATIONS

MEANS ARE PATHS (to destinations)

DIFFICULTIES ARE IMPEDIMENTS TO MOTION

FREEDOM OF ACTION IS THE LACK OF IMPEDIMENTS TO MOTION

EXTERNAL EVENTS ARE LARGE, MOVING OBJECTS (that exert force)

LONG-TERM, PURPOSEFUL ACTIVITIES ARE JOURNEYS

The Object Event-Structure Metaphor

ATTRIBUTES ARE POSSESSIONS

CHANGES ARE MOVEMENTS OF POSSESSIONS (acquisitions or losses)

CAUSATION IS TRANSFER OF POSSESSIONS (giving or taking)

PURPOSES ARE DESIRED OBJECTS

ACHIEVING A PURPOSE IS ACQUIRING A DESIRED OBJECT

(Adapted from Lakoff and Johnson 1999: 179 and 198. See pp. 178-205 for detailed discussion of the sub-mappings).

Fauconnier and Turner note that as a consequence of the conceptual integration of E and X, “any event has length and experienced motion (including speed, in the everyday sense of fast and slow rather than in the technical sense of physics)” (2006: 10). Additionally, in the E / X network, the agent traversing the path in the input X is fused with the experiencer of the event. Also, because in the conceptual integration network behind the input X traversing a path is blended with the path itself, blending the domain of events, E, with the domain of motion in space, X, produces a compression wherein “an event becomes a path, and completing the event is traversing the path” (ibid.). Because the relative speed in the input X is preserved in the mapping, one event can be faster than another, just like one stretch of road can be faster than another (ibid.). Blending E with X yields a human-scale blended space, where the diffuse structure of an event is compressed into the more accessible, human-scale structure of movement in space. Fauconnier and Turner point out that an event can be an origin and a destination (since events are compressed into the bounded lengths of the input X), and the internal logic of the input X allows for two travelers “to begin at the same origin

and arrive at the same destination, [yet] traverse different paths, so the event can be long for one but short for the other, and can be slow for one and fast for the other” (2006: 10).

Another input participating in the conceptual integration network that generates the conventional understanding of time contains the Cyclic Day network and the Timepiece network, referred to as M in Fauconnier and Turner 2006 (see also Fauconnier and Turner 2003: 195-198). The Cyclic Day network represents a compression of the mental representation of many single days into a single cyclic “day.” Fauconnier and Turner note that in this network, “[the] inner-space time relations – the period from dawn to dusk – and outer-space relations – the ‘nighttime’ that bridges day to day – [are] compressed into a single inner-space temporal cycle” (2003: 196). Expressions such as *morning sickness* or *this park closes at dusk* pick out elements of the structure of the Cyclic Day network (ibid.; examples taken from Fauconnier and Turner 2003). The other input to the M network is “a natural or technical dynamic mechanism with structure that gets partially and systematically mapped onto the cyclic day” (Fauconnier and Turner 2006: 12). These mechanisms are the “recurring events” referred to in section 1.2.1 above.

The M network contains many conventional blends of “standard, normed, shared events” (Fauconnier and Turner 2006: 12) with parts of the structure of the Cyclic Day network. For example, in the M network, the motion of the hands of the clock is mapped onto the structure of the Cyclic Day in such a way that a certain position of both of the hands of the clock is fused with the element of the Cyclic Day network picked out by the word *midday*. Fauconnier and Turner point out that the blends available in the M network “yield the emergent structure of *hours, minutes, seconds, years...* which do not exist before the creation of these compressions to ideal events” (2006: 12). They also stress that, importantly, the compressions of the cultural models of recurring events with the structure of the Cyclic Day network depend on “matching onset and termination for the same constructed events,” not the conceptualization of the movement in space between these two points, so that “how [different timepieces] operate between onset and termination is unimportant for the mapping, as is how they mark onset and termination, so long as onset and termination stay invariant across timepieces” (ibid.). As the M network represents a conceptualization of an idealized type of events (blending idealized recurring events with the structure of the Cyclic Day network), it naturally integrates with the E / X blend, defining “universal events in which everything in the universe participates” (Fauconnier and Turner 2006: 13).

As a result, any particular local event is “contained in universal events projected from M,” and one cannot conceptualize going through an event without the simultaneous activation of the conceptualization of going through a universal event of the M network, such as an HOUR or a MINUTE (Fauconnier and Turner 2006: 13). What emerges in the E / X / M integration network is the length of duration of events, resulting from the conceptual integration of the emergent event-path of the E / X blend with the event-path of the universal events of the M network. One corollary of this integration is that in the blend, the subjective experience of an event is fused with “[the] experience of the projected universal event,” and one can speak of a *painful hour* as well as a *painful meeting* (Fauconnier and Turner 2006: 14). Also, as mentioned above, the subjective experience of going through an event can vary, so that the event of the meeting can be conceptualized as a *painful hour* by one conceptualizer, and *the most exciting sixty minutes of my life* by another. Similarly, like in the E / X blend, one event can be traversed at different speeds, relative to the conceptualized length of the event-path, and the E / X / M blend can also generate construals of traversing the universal event at different speeds, depending on the conceptualized length of the event (as blended with the universal events of the M network), like in the sentence *Minutes are quick but hours are slow* (Fauconnier and Turner 2006:14; example taken from Fauconnier and Turner 2006: 5). Sometimes, events are conceptualized as exhibiting uniform duration and occurring on the same path (*Visiting your parents always goes so fast for you and me*), and sometimes, like in the E / X network, two separate experiencers can be on different paths, which is exemplified in the sentence *Remember that visiting your parents goes faster for me than it does for you* (example adapted from Fauconnier and Turner 2006: 16).

Fauconnier and Turner point out that in the E / X / M network, there are two possible mappings, one of which preserves the topology of M, where the length of the universal event does not vary, and another, which preserves the topology of E / X, where the length of the event-path can vary, relative to the conceptualized speed of traversing the path. For example, the sentence *The lecture took ten minutes longer than it should* represents a mapping where the topology of the universal event in M is projected to the blend, but the sentence *The lecture went on for ages* preserves the topology of duration from the E / X network (Fauconnier and Turner 2006: 15). In Fauconnier and Turner 2006, the former mapping is referred to as E / X / M, and the latter mapping is identified as E / X / M. Fauconnier and Turner stress that “we have the ability to manipulate the full network with no contradiction, choosing to operate in [the E / X / M] blend when we need subjective time, and in the [E / X / M blend] when we need objective time” (2006: 16).

The E / X / M network provides a model that explains the emergence of the concept of TIME itself, and of the conventional mapping of TIME AS SPACE. Additionally, Fauconnier and Turner provide an account of the emergence and structure of the MOVING TIME–MOVING OBSERVER duality addressed in section 1.2.2.1 above. The input X in the E / X / M network contains the frame of “relative motion.” Discussing the phenomenon of the alternative construals of “relative motion,” Fauconnier and Turner note that “[for] any scene we inhabit, we can take ourselves as a point of reference, or something else as a point of reference” (2006: 16). For example, while moving down the road, we can look at a tree and, taking ourselves as a point of reference, conceptualize the tree as “moving past us;” alternatively, taking the tree as a point of reference, we can conceptualize ourselves as “passing by the tree.” The construals allowed by the relative motion frame can be projected into the E / X network, allowing for the conceptualizations where “[the] path / events move relative to the experiencer,” like in the sentence *The party went by pleasantly* (Fauconnier and Turner 2006: 17). Fauconnier and Turner refer to such blends as (E / X)’. Similarly, the E / X / M network also has its “relative motion counterpart,” referred to as (E / X / M)’, and exemplified by conceptualizations generated by sentences such as *The first two hours went by effortlessly* (ibid.). Relative speed and the possibility of conceptualizing different event-paths can also be projected to the (E / X / M)’ blend, yielding the conceptual integration network referred to as (E / X / M)’ and seen at work in examples such as *Friday always goes by faster than Monday* or *The three hours went by slowly for me, but the same three hours went by quickly for him* (Fauconnier and Turner 2006: 18). Similarly, a relative-motion counterpart of the E / X / M blend, referred to as (E / X / M)’, is also possible, as exemplified by the sentence *The same hour will go by whether you are suffering or having fun* (ibid.: 19).

In another conventional variant of the E / X / M network, the blend is extended with the notion of agency. Fauconnier and Turner suggest that since in the E / X / M network “all [observers] are constrained to move at the same rate,” agency can be projected onto that causal constraint (2006: 20), which yields, for example, the conventional mappings discussed in section 1.2.2.3 above. Fauconnier and Turner note that this new emergent entity, Time, “derives its motion from the network in which times move, but derives its landmark from the network in which [the Observer] moves” (2006: 20). Additionally, they stress that “this new agent is not a projection from the network of moving shared events” but the movement of Time itself, conceptualized as an agent (ibid.). Interestingly, in the case of a scheduled event (e.g. a tooth extraction), Time can move along the universal event that the specific scheduled

event is blended with at the invariant, universal speed (*The tooth extraction is scheduled between three and four*), but other conceptualizations are also possible: the Observer can move through the actual event faster than at the universal speed of the scheduled event (*It didn't really seem like the tooth extraction took as long as it was supposed to, but it did*), or slower (*The tooth extraction did not take an hour, it felt like I sat there for ages*) (Fauconnier and Turner 2006: 21). Fauconnier and Turner also note that “Time may reach the end of the scheduled event before [the Observer] reaches the end of the actual event,” or it may be “closer to the end of the scheduled event than [the Observer] is to the end of the actual event” (ibid.). As the blended spaces in these conceptualizations have two agents moving along two different paths, the structure of the blends can easily be completed by such entrenched frames as “racing,” as in the sentence *We are racing against time* (Fauconnier and Turner 2006: 21). Fauconnier and Turner also address linguistic expressions such as *Time has frozen*, suggesting that they come up in situations where the experiencer’s expectations or desires as to events to be taking place clash with the construal of the actual situation:

In ($\underline{E} / X / M$)’, times and events are blended and move together. Events not happening is the same as events not moving, and accordingly subjective time is not moving. (...) The delay between expectation and reality can be solved by recruiting from ($\underline{E} / X / M$)’ a variable speed for time of zero. (2006: 24)

As discussed above, the conceptual blending framework can inform and indeed, shed more light on the conceptual mappings analyzed by conceptual metaphor theory. Fauconnier and Turner assert that

The ultimate conceptual correspondence between time (itself emergent) and physical space is real and especially visible, but it is a final product of emergent structure in the elaborate integration network, not something to postulate as a basic primitive of human understanding. (2006: 20)

Arguably, the theoretical model of conceptual integration networks of $E / X / M$ and their extensions provides a more unified account of the conceptual structure of the models of time discussed in Chapter 1 above. In combination with the body of data accumulated by conceptual metaphor theorists and the knowledge of general conceptual techniques and principles of human understanding, as researched by conceptual blending theory, this model can be used to provide an account of conventional cognitive models of TIME, as well as their ingenious novel extensions found in science-fiction literature, which will be discussed in the final chapter of this thesis.

CHAPTER 3: EXTENSIONS OF CONVENTIONAL MODELS OF TIME IN SCIENCE FICTION

The no boundary [proposal] predicts that the universe would start at a single point, like the North Pole of the Earth. But this point wouldn't be a singularity, like the Big Bang. Instead, it would be an ordinary point of space and time, like the North Pole is an ordinary point on the Earth, or so I'm told. I have not been there myself.

Stephen Hawking, "The Beginning of Time"

3.1. Introduction

In the imaginative scenarios of time-travel found in science-fiction, imagined technology allows the change of physical location in the course of idealized movement in TIME. As a result, MOVEMENT IN TIME in time-travel science fiction gains concrete dimensions, becoming MOVEMENT IN SPACE. Below, I begin by discussing the possible origins of these conceptualizations of MOVEMENT IN TIME. In the following section, I analyze several variations of time-travel which can be found in science fiction, address possible clashes between the frames of MOVEMENT IN TIME and MOVEMENT IN SPACE which science fiction presents, and survey several extensions of conventional models of CAUSATION, as related to the novel extensions of conventional models of TIME.

3.2. The origins of the concrete dimensions of MOVEMENT IN TIME

Although, arguably, certain kinds of temporal experiences can be said to be veridically experienced (Evans 2002: 4), conventional cultural models of TIME elaborate MOVEMENT IN TIME as actual, but not concrete. However, interestingly, the locations on TIME'S LANDSCAPE seem to derive their dimension of actual existence from models representing located, direct physical experience. Additionally, the structure of conventional models of TIME provides compressions over representations of physical motion, interaction and movement in actual physical locations. Scenarios involving time-travel enabled by some imagined technology

make these compressions literal, and elaborate MOVEMENT IN SPACE as MOVEMENT IN TIME. The following section will overview the origins of the concrete dimensions of MOVEMENT IN TIME, and the metaphorical model MOVEMENT IN SPACE IS MOVEMENT IN TIME, concentrating on the role of episodic memory and mental time-travel.

3.2.1. Episodic memory and mental time-travel

The study of the nature of memory, especially studies involving cases of amnesia in humans, revealed that “there is at least a dual memory system” (Corballis and Suddendorf 1997). In that system, *declarative* or *explicit* memories, defined as “memories that can be declared, or brought into conscious awareness” (ibid.), are distinguished from *non-declarative* or *implicit* memories, which cannot be brought into consciousness, such as “learned motor and cognitive skills” (ibid.). Declarative memory can in turn be divided into *episodic* and *semantic* memory. While semantic memory is defined as general knowledge about the world, as conditioned by development in a specific culture (Corballis and Suddendorf 1997), episodic memory involves recollection of personal experience.

It has been pointed out that while the sub-systems of memory can be analyzed as distinct, they are not isolated, and accordingly, activation of the contents of episodic memory involves active reconstruction mediated by the other memory systems, and as such can be seen as generative, rather than merely consisting in a capability to passively recall the retained experiences of events (Corballis and Suddendorf 1997). Corballis and Suddendorf note that “although the term ‘memory’ is often associated with a fixed databank (e.g., a library), [this] metaphor seems more appropriate for semantic knowledge than for episodic memory” (ibid.).

Activating episodic memory has been shown to involve matching the pattern of brain activity to restructure the state of brain activity produced during the actual experience (DeNoon 2005). Although formerly this process had been equated with recalling a past event, recent research demonstrated that the mental capability referred to as episodic memory also provides the conceptualization of future events (Murray 2003), and that even “the pastness of an episode may not be inherent in the memory itself and may need to be added” (Corballis and Suddendorf 1997). The process of the conceptualization of oneself as involved in a past or future event, as distinguished from the event experienced as present, is referred to as *mental time-travel*, or *chronesthesia* (Murray 2003). It is reasonable to assume that all research on

memory has taken the conceptual models of TIME delineated in Chapters 1 and 2 of this thesis as obtaining. Accordingly, the term *mental time-travel* can be assumed to refer to conceptualizations of oneself as involved in events construed as past, present or future in relation to conventionalized models of TIME delineated above.

Understood in the current, broad sense, episodic memory recall can be seen as the ability to re-structure the pattern of brain-activity that occurs in conceptualizing an actual situation, and since it was shown to involve conceptualizations of future events, the mental capability referred to as episodic memory can be considered as similar to what Fauconnier and Turner term *imagination*. Imagination, one of the three basic mental operations that Fauconnier and Turner hold to be “at the heart of even the simplest possible meaning,” is defined as the ability of the brain to run imaginative simulations in the absence of external stimulus (2003: 6). It is important to point out that while the scenarios provided by episodic memory can be conceptualized as past, current or future, they may or may not figure a representation of the experiencer as one of the participants, and may be conceptualized as actual (they really happened, they really are happening) or not actual (they never happened, they will never happen) with many degrees of actuality inbetween. Additionally, recalled events are always organized into a story structure, with causal and temporal order established between the individual events. Quoting Freud, Corballis and Suddendorf note that “[Even] memories that reveal themselves as images require a story grammar if they are to be distinguished from random hallucinations” and add that

The storyline (...) is often reconstructed on the basis of general knowledge (semantic memory) rather than on what actually happened (Bartlett, 1932), so that the memory trace itself may play a relatively small part. (1997)

3.2.2. The metaphor MOVEMENT IN SPACE IS MOVEMENT IN TIME

3.2.2.1. Models of LOCATION

Fauconnier and Turner identify compression of the vital relation of Cause and Effect as a central aspect of perception (2003: 78-80). They assert that

The perception of a single entity, such as a cup, is an imaginative feat (...). The perception available to consciousness is the *effect* of complicated interactions between the brain and its environment. But we integrate that effect with its causes to create emergent meaning: the existence

of a *cause* – namely, the cup – that directly presents its *effect* – namely, its unity, color, shape, weight, and so on. As a consequence, the effect is now in the cause: the color, shape and weight are now intrinsically, primitively, and objectively in “the cup” (2002: 78)

The emergence of this compression is fundamental in the formation of a cognitive model in which the perception is conceptualized as distinct from the object perceived, and the formation of the cognitive model where the perception can be attributed to the SELF¹⁹ (as the object perceived and the perception of it become distinguished). Additionally, the emergence of the notion of object permanence, i.e. “the understanding that objects continue to exist, even when they cannot directly be perceived” (Chen and Weng 2005: 35), as well as the development of a theory of mind, understood as “the ability to correctly attribute beliefs, goals, and percepts to other people” (Scassellati 2000), contribute to the formation of models of the world (or environment), as distinct from perception.²⁰ Importantly, under these models, many ENTITIES can be conceptualized as REAL, or ACTUAL, even if direct perception of them by the experiencer is not occurring or has not occurred. These entities can be experienced vicariously by interaction in a culture, and the human faculty of episodic memory enables the experiencer to run imaginative scenarios which approximate the perception of these entities even if it has never occurred.

Another crucial aspect of cultural models of the world is the role of the conceptualization of certain kinds of physical interaction with the world, where interaction with some entities in the world gives rise to the structure of cultural models of motion-situations. In the course of the embodied interaction with the world, constrained by many factors, such as the force of the earth’s gravity, or the structure, development and characteristics of the human body which allow locomotion, the experience of motion-situations comes to be structured in terms of the PATH schema (see Johnson 1987 113-117). Additionally, entities which allow locomotion come to be conceptualized in terms of the CONTAINMENT schema (see Johnson 1987: 21-23 et passim). The conceptual integration of the representation of an object allowing locomotion with counterfactual scenarios of possible movement, can give rise to the concept of ROOM, understood as (*what*) *can be moved on*. A cultural model of the world, with ROOM as a feature

¹⁹ Cognitive models of the self will be discussed in section 3.3.1.1 below.

²⁰ Obviously, the formation of these networks, and the formation of an ego distinct from perception, are very complex processes, which cannot be done justice in such a short account. Importantly, as some studies have demonstrated, such seemingly fundamental concepts as object permanence and ego differentiation are not primitives, and develop pararely in the course of the cognitive development of the individual, with, it seems, recourse to an earlier model of the world always possible (see, for example, Subbotskii 1991). The existence of these models and the availability of contrasting conceptualizations can also be seen in many cultural artifacts such as stories concerning magic, the loss of ego in Christian ecstasy, or the challenge to object and ego permanence and ego differentiation in the Buddhist tradition (see, for example, Ripoche 2000).

of OBJECTS that allow the experiencer to engage in embodied movement, can elaborate the PHYSICAL WORLD as CONTAINER for OBJECTS, with ROOM and OBJECTS as contents of the metaphorical CONTAINER²¹. In other models of the world, the notion of ROOM is extended to yield the concept SPACE; in very simple terms, SPACE can be considered as room elaborated as a CONTAINER SUBSTANCE (see Lakoff and Johnson 1980: 30), which allows for non-physical movement, e.g. the imagined movement “through” an object which allows the conceptualization of the measurement of the diameter of a solid sphere.²²

Importantly, all actual embodied interaction is conceptualized as contained in a model of the world, and additionally, in a part of that model of the world, which is conceptualized as an instance of a particular cultural model of LOCATION²³. In their discussion of conventional metaphorical models of the SELF, Lakoff and Johnson introduce the notion of *normal locations* (1999: 274). One type of normal locations are those that “have to do with surroundings, some contained or bounded space one normally occupies: one’s home, place of business, the earth, and so on” (Lakoff and Johnson 1999: 274). Many models of LOCATION define LOCATION with respect to conceptualizations of objects which restrict physical movement; conceptualizations of these objects will map onto the boundaries in the CONTAINER schema, by virtue of the entailment of the embodied schema of containment, which has been stated by Johnson as

Containment also limits and restricts forces within the container. When I am *in* a room, or *in* a jacket, I am restrained in my forceful movements. (1987: 22)

For example, a part of the environment can be compressed in a process of composition with the container schema and completed with the cultural model of *a room*. The cultural model of a room includes the element WALL, which restricts embodied movement, and so prevents the continuation of motion, or, in other words, defines the extent of possible motion. Other models of location define the extent of possible motion towards what maps onto the BOUNDARY in a model of LOCATION currently activated in terms of various metrics, e.g. *three feet from the wall*. In this case, the location identified as three feet from the wall is also conceptualized as a container, in the sense that it is conceptualized as an area in which an entity’s is halted, or restrained, for a given time. It is important to point out that the structure

²¹ This model can obviously be elaborated in many ways, e.g. as the flat earth model found in many cultures throughout history; see Skopeliti and Vosniadou 2006.

²² See also the discussion of natural locations of the SELF in section 3.3 below.

²³ See the discussion of the notion of *situatedness* in Croft and Cruse 2004: 58-59.

of the integrated events of every episodic memory will probably include the conceptualization of part of that structure underpinned by a model of LOCATION.

3.2.2.2. Models of CHANGE OF LOCATION

The conceptualization of a CHANGE OF LOCATION, made possible by the use of episodic memory (which provides the experiencer with conceptualizations of actual locations other than the one conceptualized as current), can be structured with the scenario of an agent moving between two points on a path, analyzed as the SOURCE-PATH-GOAL schema by Lakoff and Johnson, who note that trajectories of motion are “conceptualized as a line-like trail left by an object as it moves and projected forward in the direction of motion” (Lakoff and Johnson 1999: 33). This means that the SOURCE-PATH-GOAL schema serves as a blending template, providing useful compressions at human scale over the content of episodic memories of physical interaction in the world, which often involves complex motion of the experiencer, and can often be conceptualized as CHANGE OF LOCATION. In scenarios of embodied physical interaction structured by the SOURCE-PATH-GOAL schema, structure from one input space, conceptualized as a LOCATION, maps onto the element SOURCE, and structure from another input space with a LOCATION maps onto the element GOAL. Additionally, structure from an input space containing a representation of the experiencer maps onto the moving TRAJECTOR in the SOURCE-PATH-GOAL scenario.

Importantly, a LOCATION can be conceptualized as having the feature of object-permanence, and so does not disappear when it is not being perceived or interacted with. Since in scenarios of physical, embodied movement, a location is conceptualized as a CONTAINER, and the agent engaged in physical movement is conceptualized as an ENTITY contained in a LOCATION, the agent, moving from location A to location C through location B, cannot be simultaneously contained in both A and C. This conceptualization results from an entailment of the CONTAINER schema, which states that “[given] a container and an entity, the entity is either inside or outside and not both at once” (Lakoff and Johnson 1999: 380).

The SOURCE-PATH-GOAL schema enables a conceptualization of movement between two locations wherein the actual complex motion involved in the CHANGE OF LOCATION is compressed into a “line-like trail” between two LOCATIONS (Lakoff and Johnson 1999: 33). Lakoff and Johnson note that the PATH in the schema can be “expanded, shrunk, deformed

and still remain a path” (1999: 33). In other words, even if the MANNER OF MOVEMENT, a number of the conceptualizations of LOCATIONS traversed, VEHICLE USED FOR TRAVEL, etc, are projected into the blended space in the conceptual integration network representing the integrated scenario of CHANGE OF LOCATION, the blended space will still contain the compressed, human-scale scenario of movement along a line-like path.

3.2.2.3. Compressions over physical CHANGE OF LOCATION

Although all conceptualizations of motion-situations are based on the SOURCE-PATH-GOAL schema, in a given situation there are usually many cultural scripts available to elaborate that idealized scenario of movement, providing the necessary compressions over the available episodic memories of the physical CHANGE OF LOCATION. For example, an inquiry like

1. *Today, you are in London. Yesterday, you were in Paris. How did you get here?*

enables the interviewee to use a multitude of conventional scripts, which can be conceptualized as fitting the scenario of movement in the representation of the actual physical CHANGE OF LOCATION well enough to provide compressions, and can be imported into the blend containing the integrated scenario of CHANGE OF LOCATION through the process of completion, yielding conceptualizations such as those expressed in the sentences *I flew, I drove*, etc.

However, although all CHANGES OF LOCATION require physical motion, sometimes there are no cultural scripts of physical CHANGE OF LOCATION to provide the necessary compression. As an example, let us consider a situation where we confront the inhabitant of a house with the following inquiry:

2. *Two days ago, you were in the kitchen. Now, you are in the living room. How did you get here?*

If the interlocutor is able to activate a cultural model which can provide a compression over a number of representations of integrated events which resulted in the subsequent changes of physical LOCATION, she will be able to respond. For example, the answer *I have the key you locked the door with* can activate a conceptualization in which the content of episodic

memories of localized physical interaction that the speaker has engaged in, with the result of finding herself in the *living room*, is compressed with the scenario containing the element referred to as *the key*, with possible default co-activation of other scenarios, such as *being locked out of the living room* or *searching for the key*. Importantly, the scenario evoked in the interpretation of the sentence *I have the key you locked the door with* provides a compression wherein the representations of actual physical actions performed in the CHANGING OF LOCATION between the kitchen and the living room are compressed into one single element in the blend, evoked by the words *the key*, and can in turn be decompressed by the interlocutor in the process of elaboration into imaginative scenarios of CHANGE OF LOCATION provided by episodic memory.

However, when no such model is available, it seems that the EVENT-PATH of the sequence of EVENTS that episodic memory provides is conceptualized as the LOCATION traversed. As described in section 2.4.2 above, the domain of experienced MOTION IN SPACE, referred to as X in Fauconnier and Turner 2006, blends with the structure of the domain of subjective experience of events, referred to as E, “in routine ways to provide emergent structure” (Fauconnier and Turner 2006: 10). In the E / X blend, any event has length and experienced motion, and “an event becomes a path, and completing the event is traversing the path” (ibid.). Since the compression of the representation of physically located interaction with the EVENT-PATH projected from X is recursive, integrated episodic memories of physical, localized, embodied interaction can be compressed with the SOURCE-PATH-GOAL schema, yielding the conceptualization of a sequence of events of varying length.

Importantly, the events forming the sequence are compressed representations of physical interaction in physical locations. For some conceptualizations of sequences of episodic memories of events, the location of the particular events constituting the sequence will be conceptualized as different, which can induce the conceptualization of a scenario of CHANGE OF LOCATION. Although, as noted above, the conceptualizer is sometimes able to use a compression from a cultural model of physical CHANGE OF LOCATION to elaborate such a sequence of events, at other times such models are not available. However, conventional E / X blend provides useful compressions at human scale, allowing the conceptualizer to abstract from the immense amount of physical movement that occurred in the interaction with the physical environment, in absence of or as an alternative to the human-scale compressions available in the culturally available conventional models of physical movement. The compressed movement along the idealized event-path can be elaborated in terms of scenarios

of physical (or actual) change of location, mapped onto the structure of the M network, as described in detail in Chapters 1 and 2 above.

The model providing compressions of that idealized movement has several interesting features. The representations of integrated events can be accessed via episodic memory, which, as pointed out above, is characterized as the ability of the human brain to restructure the brain-pattern to approximate that of actual experience (see Corballis and Suddendorf 1997). Although perception takes place in a singular, current physical LOCATION, the conceptualizer engaging in mental time-travel has access to integrated episodic memories of perception and interaction in physical LOCATIONS other than the one conceptualized as current, and is able to relate one LOCATION, conceptualized as PRESENT, to other LOCATIONS, conceptualized as CURRENT, PAST or FUTURE, as described above. As pointed out in section 2.4.2 above, in the E / X / M blend, all events, constituting representations of physical interaction with the environment (including sequences of events conceptualized as CHANGE OF LOCATION), become idealized temporal events. In other words, all located physical interaction is, at the same time, abstract movement along an EVENT-PATH, and temporal movement along the path of a UNIVERSAL EVENT of the M network. Therefore, MOVEMENT IN SPACE, compressed into CHANGE OF LOCATION on a line-like PATH IN SPACE, is often conceptualized in terms of MOVEMENT IN TIME (which gives rise to the cultural model of spacetime).²⁴ Although scenarios of movement over the EVENT-PATH elaborated in terms of the structure of the cultural models presented in Chapters 1 and 2 above as models of TIME represent movement on an idealized PATH, they are used to compress episodic memories of actual, physical interaction in and movement between actual, physical LOCATIONS.

As mentioned above, such scenarios can be implemented in cases where other conventional compressions over physical CHANGE OF LOCATION are not available. For example, in example 2 above, the prototypical conceptualization of the CHANGE OF LOCATION between *the kitchen* and *the living room* is characterized by the compression of the actual physical motion between the two LOCATIONS into motion over the idealized EVENT-PATH of the sequence of EVENTS, which maps onto the structure of the models of TIME described above by default.²⁵ In other words, although some cultural models allow the conceptualization of the CHANGE OF LOCATION between *the kitchen* and *the living room* in Example 2 above as PHYSICAL

²⁴ Importantly, sequences of events assessed via episodic memory can be elaborated as movement on the idealized time's landscape even if no conventional model of location would induce the conceptualization of the change of physical location in the sequence of events. See section 3.3 below for examples.

²⁵ For example, *I quickly found myself in the kitchen*, as a response to 2, suggests *It didn't take me much time* by default. See also the discussion of the elaboration of the temporal PATH as SUBSTANCE in section 1.2.2.2 above.

MOVEMENT, the most human-scale conceptualization seems to be the one which compresses the representation of the physical movement between the two locations into the scenario of NON-PHYSICAL TEMPORAL MOVEMENT between the two LOCATIONS. Importantly, although the source of the compression is conventional model of TIME, with the integrated representations of events conceptualized as idealized LOCATIONS on TIME'S LANDSCAPE, the compressed idealized LOCATIONS in the blend decompress to episodic memories of events experienced in actual physical locations.

3.2.3. The personal past

In mental time-travel, the conceptualizer accesses memories of events forming the structure of her *personal past* (Corballis and Suddendorf 1997), as well as conceptualizations of events in a possible personal future. The personal past can be considered as a schematic representation of a sequence of integrated EVENTS, provided by episodic memory. The integrated events constituting this model decompress to episodic memories of localized, direct physical interaction. As the events in the personal past form a sub-section of the domain of subjective experience of events, or E (see section 2.4.2 above), they map onto the structure of the universal TEMPORAL EVENTS of the M network, so that, for example, an imaginative scenario where the currently adult experiencer figures as a child can activate construals of the event such as those expressed in the following sentences: *it was when I was four, it was the year 1984, it was forty years ago, it was ages ago, etc.*²⁶

Since the sequence of events forming the personal past undergoes compression with the EVENT-PATH in the E / X blend, discussed above, it maps naturally onto the structure of the metaphor referred to as THE MOVING OBSERVER or TIME'S LANDSCAPE, described in detail in section 1.2.2.5 above. In the conceptual integration network representing the integration of the representation of the personal past and TIME'S LANDSCAPE, an abstract generic space receives the SOURCE-PATH-GOAL schema, projected from the inputs of the compressed event-sequence

²⁶ See also the discussion of the R / S network in Fauconnier and Turner 2006 (21-23). The R / S (Recall / Space) network is defined as “[an] independent integration network involving memory and physical space,” in which “[events in memory] can be ‘close’ or ‘distant’, ‘far apart’ or ‘hard to access’” (ibid.). The R / S network blends with the structure of the E / X / M network (see section 2.4.2 above), producing sentences like *Where have all those years disappeared* (example taken from Fauconnier and Turner 2006: 6). Importantly, in their discussion of this network, the authors fail to take account of the structure of certain particular conventional models of thinking, such as THINKING IS OBJECT MANIPULATION, THINKING IS PERCEIVING, and THE MIND IS A CONTAINER (see, for example, Lakoff and Johnson 1999: 235-266), subsuming them all under the term Space. Similarly, the many sub-systems of memory as researched by cognitive psychology and neuroscience (for example, see Corballis and Suddendorf 1997) are subsumed under the term Recall. However, it seems that the term Recall implicitly refers to the system of episodic memory (as the authors discuss memories of events).

of the personal past and the metaphorical model of TIME'S LANDSCAPE. Another generic space holds the shared scenario of an AGENT traversing LOCATIONS, shared by both inputs. In the personal past space, the AGENT is engaged in actual movement along and direct physical interaction in physical LOCATIONS, which are conceptualized as existing objectively and as exhibiting the property of object-permanence (see section 3.2.2.1 above). In the MOVING OBSERVER model, the idealized OBSERVER moves along idealized LOCATIONS which constitute TIME'S LANDSCAPE. The compressed representations of events in the personal past map onto the objective, universal LOCATIONS of TIME'S LANDSCAPE (i.e. the TIMES; see section 1.2.2.5 above). These locations are the universal, objective TEMPORAL EVENTS of the M network (see section 2.4.2 above), and they are granted the dimension of objective, veridical existence due to the projection of this dimension from the representation of LOCALIZED EVENTS in the model of personal past. The blended space receives the idealized LOCATIONS from the MOVING OBSERVER model. Additionally, the counterfactual dimension of actual movement and actual, direct interaction are projected into the blended space of the conceptual integration network from the personal past model. As a result, in the blend of the model of personal past and the MOVING OBSERVER model of TIME, the experiencer, activating a section of the personal past in the process of mental time-travel, has direct, actual experience of movement in and interaction with the objective locations of TIME'S LANDSCAPE. In other words, the experiencer has actual, subjective, direct experience of the objective PAST and PRESENT (and sometimes, FUTURE).²⁷

Interestingly, in the blend of the representation of personal past and TIME'S LANDSCAPE, the direction of the movement along the EVENT-PATH of the personal past, mapped onto TIME'S LANDSCAPE and conceptualized as movement along the EVENT-PATH of a shared UNIVERSAL EVENT, is the same for all the experiencers. While, as pointed out in section 2.4.2, some mappings preserve the topology of X, over the topology of the universal events of M, so that different speeds and different paths are possible for different experiencers, in conventional models of TIME the direction of movement always remains the same.

²⁷ One example of this blend at work can be seen in the practice of ascertaining "what really happened" by comparing episodic memories of several witnesses; if the witnesses shared a physical and temporal LOCATION, their experience will be taken as representing "the actual past," i.e. what *really* happened. Also, if two informants are asked to relate what they did on September 2, 1998, their related experiences will probably be conceptualized as experiences of the same, shared "day in the past," since in the blend, the agents have direct physical experience of a shared, objective PAST, not only the experience of two distinct, compressed, physically located events.

3.2.3.1. The personal past vs. the objective PAST

As indicated above, the experiencer, conceptualizing an episodic memory as PAST, construes the past experience as not only subjective experience of localized embodied interaction, but also as direct experience of an objective, shared PAST. At the same time, the personal past is bounded in TIME, in the sense that most folk theories of life prevent the experiencer from conceptualizing a scenario figuring herself which would map into a section of the cultural model of the calendar (or history) prior to the section of it marked as the experiencer's DATE OF BIRTH, as an experience of an episode in the personal past. Since the personal past can be analyzed as a model representing an idealized sequence of events, and as such, is underpinned by the SOURCE-PATH-GOAL schema, it will include an element conceptualized as current location (which will map onto the PRESENT in conventional models of TIME described in Chapter 1 above), and usually, a trajectory "projected forward in the direction of motion" (Lakoff and Johnson 1999: 33). This projected trajectory is the conceptualizer's model of personal future. Finally, the GOAL in the SOURCE-PATH-GOAL schema maps onto the imagined TIME OF DEATH²⁸.

Importantly, although in the blend of the personal past and the conventional metaphorical model referred to as TIME'S LANDSCAPE, the experiencer has actual, direct, subjective experience of the objective PAST, the objective PAST is a "longer" EVENT than the personal past, sometimes elaborated as an unbounded EVENT (see Hawking 2006). Additionally, imaginative scenarios of events which the experiencer has participated in physically are often easier to re-create (in the sense of re-structuring the pattern of brain activity to fit the one experienced in actual physical interaction) than events experienced vicariously, such as EVENTS conceptualized as having appeared in the objective PAST but outside of the section of the objective PAST covered by the EVENT-PATH of the personal past. Moreover, the metaphorical models of mental activity referred to as THINKING IS PERCEIVING and KNOWING IS PERCEIVING can induce the conceptualization of scenarios of EVENTS experienced vicariously as not equally actual as scenarios of events conceptualized as experienced first-hand²⁹. However, importantly, scenarios provided by episodic memory in the blend of the

²⁸ This model is often elaborated in terms of the conceptual metaphor LIFE IS A JOURNEY (see section 1.1 above).

²⁹ Obviously, judgments regarding the actuality of a given scenario are influenced by many more models of actuality. Also, interestingly, scenarios conceptualized as experienced by oneself but not easy to restructure, like "half-forgotten memories" can also be held to be less actual, as evidenced by the following example: *'I think I remember it,' he says. 'But I can never decide if it really happened or if I persuaded myself it did just to keep your mum happy. Memory's funny like that, isn't it?'* (Example 8).

personal past with conventional models of TIME discussed above represent experiences of a selected part of the objective, and very often unbounded, PAST. Arguably, as a result, conceptualizations of culturally experienced events set in the unbounded PAST are in most respects equivalent in nature to conceptualizations of the events in the personal past, with the exception that the experiencer does not figure in them as a participant.

3.2.3.2. Personal past vs. absolute time

Discussing possible interpretations of the lexeme *time*, Evans identifies a conceptual model of what he terms the Matrix Sense of the lexeme (2002: 3 et passim). This model represents “an entity which has an infinite elapse, and thus subsumes all other events” (Evans 2002: 14) and is congruent with what is identified as absolute time in classical physics, i.e. “a manifold which “contains” events, and constitutes a reality independent of other events” (Evans 2002: 16). Evans argues that the formation of this concept can be analyzed as the formation of a double-scope blend, where one input is “the phenomenological experience of temporal processing” (Input Space 1), and the other is “event perception, (...) that is, the conception that events are sequenced in an ongoing and hence continuous fashion” (Input Space 2) (2002: 24). The blend receives the awareness of “experience in continual modification” from Input Space 1, and event-structure from Input Space 2, with the generic space being structured by “the [abstract] notion of continuity of experience” (Evans 2002: 25). In the blended space, there is a single, temporally continuous but unbounded EVENT. In view of the discussion of the blend of personal and objective PAST presented above, it can be assumed that the entity referred to by Evans is conceptualized as an objectively experienced EVENT-PATH subsuming the EVENT-PATHS of the objective PAST, PRESENT, and FUTURE, and, therefore, sharing all the characteristics of the blend of the personal and the objective PAST. Interestingly, although, as noted by Evans, some cultural models hold that entity to be unbounded, there seems to be a long tradition of elaborating these models so that the entity becomes bounded, e.g. by the creation and end of the world in some religious models, or in the many scientific theories of the origin and end of the universe, discussed in Hawking 2006.³⁰

³⁰ Interestingly, the creators of the scientific models of the universe described in Hawking 2006 seem to conceptualize the universe as an EVENT, with a BEGINNING, and END. Interestingly, the concepts of BEGINNING and END seem to rely on the PATH-SOURCE-GOAL schema, and on the embodied experience resulting in the formation of the a “single general structure governing all neural control systems for bodily movements,” researched by Narayanan and discussed in Lakoff and Johnson 1999 (176) (see also section 3.5 below), from which arises “our structuring of all events, concrete and abstract” (ibid.). Arguably, the universe probably does not share the same general structure governing neural control systems for bodily movements, and the ensuing EVENT-STRUCTURE.

It is important to point out that the faculty referred to as mental time-travel, which allows the experiencer to conceptualize representations of events provided by episodic memory as having happened in her personal past or future, is considered to be a uniquely human faculty, and accordingly, a biologically normal and acculturated human being will probably be able to use the faculty. This suggests that most, if not all, science-fiction writers and readers possess the ability to engage in mental time-travel, a representation of their personal past, and conventional models of TIME (without which it is impossible to engage in mental time-travel). Accordingly, it seem reasonable to assume that the reader engaging in the interpretation of a text will be able to activate these models and structure their interpretations using the structure of conventional models of TIME.

3.3. Extensions of conventional models of MOVEMENT IN TIME

Our movement in space is greatly conditioned by how the characteristics of our bodies can interact with our physical surroundings. For example, we know that we can move over long distances on land by walking, but the same will turn out to be impossible if one attempts to travel similarly on water. However, unlike many other animals, human beings are capable of imagining scenarios that run counter to intuition, and imagining ways of making them work in actual physical reality. Conceivably, at some point in history, an irrational scenario which ran counter to some conventional theories of movement was created, and an element of that scenario was constructed as the physical form of a boat. Direct and indirect interaction with this technology expanded the contents of conventional models of MOVEMENT, which grew to include models of TRANSPORT, and thus, imaginative scenarios of traveling over long distances by water came to be conceptualized as rational and essentially unimaginative. The creation of such technology was made possible due to the set of cognitive capabilities characteristic to homo sapiens, such as the ability to produce a multiple-scope blend (see Fauconnier and Turner 2003: 279-298 et passim). In the novel model of MOVEMENT, water is like ground, in that it is conceptualized as having a SURFACE, and interacts with OBJECTS moving on it in a way similar to the way ground interacts with OBJECTS moving on it. At the same time, certain characteristics of this extended cultural model of water are counterfactual with respect to certain characteristics of the cultural model of ground, being projected from the domain of interacting with water experienced as SUBSTANCE, water conceptualized as a CONTAINER, water conceptualized as OPPOSING FORCE, etc. Certain experiences of movement

in physical reality (e.g. the episodic memory of the subjective experience of floating in water on a piece of wood) must have provided the conceptual substrate for the author of that counter-rational scenario to flesh out his invention.

In a similar way, cultural developments expanded conventional models of reality to allow for many new ways of traversing physical paths in SPACE. At some point, such conceptual substrate, experienced as part of the shared cultural reality, fed the imaginations of people who constructed counter-rational scenarios of traversing the actual, but not physical, distances in TIME. While implementation of those scenarios has not proven feasible as of yet, some of the imaginative human beings who conceived of novel ways of imagined travel along a culturally real dimension have been able to find a venue to showcase these scenarios in detail in text, scientific or literary. The first use of the idea of technology allowing time-travel in fiction can be found in the story “The Chronic Argonauts” by H. G. Wells, published in 1888 (Wikipedia 1). As science fiction literature developed, authors came up with numerous novel extensions of the structure of conventional models of time, and have expanded these extensions in novel ways.

Time-travel stories involve the conventional cultural model described above, in which MOVEMENT IN SPACE IS MOVEMENT IN TIME. In science fiction, this model is elaborated to yield the mapping ACTUAL CHANGE OF LOCATION IN TIME IS ACTUAL CHANGE OF LOCATION IN SPACE. In this novel model, scenarios in which imagined technology presented by the science-fiction author allows movement along the path of TIME result in change of the physical LOCATION in SPACE. This novel extension is conditioned by the nature of the compressions of CHANGE OF LOCATION provided by the models of MOVEMENT IN TIME, as well as the integration of the models of personal past and objective TIME, discussed above. Since in the blend of the personal past and objective TIME, the idealized movement along TIME’S LANDSCAPE is conceptualized as actual (in the sense that actual interaction in SPACE always involves actual movement in TIME), and models of movement in TIME compress over change of physical location, technology which allows actual movement in TIME will accordingly allow actual change of location.³¹

³¹ Importantly, these compressions can also be used in cases where the representations of located events provided by episodic memory are conceptualized as STATES, and the conceptualization of the MOVEMENT IN TIME between the locations of those two events is underpinned by conventional metaphor STATES ARE LOCATIONS (see 3.4 below for detailed discussion).

Below, I will refer to mental spaces containing representation of a physically located event or scenario, conceptualized as actual and located physically, and at the same time, as constituting one of the temporal events of the M network (or a LOCATION on TIME'S LANDSCAPE) as *temporal locations*. Additionally, I will use the term *temporal origin* for the starting temporal location in a journey through time, and the term *temporal destination* for the final temporal location reached in the course of a journey through TIME.

3.3.1. Time-travel scenarios

In the following sections, I will provide the overview and analysis of scenarios of unconventional MOVEMENT IN TIME, as presented in science fiction. I will begin by addressing the role of conventional models of the SELF in the conceptualization of time-travel scenarios. In the next section, I discuss unconventional scenarios of location in time in which more than one LOCATION on TIME'S LANDSCAPE is conceptualized as present. As models of change of location in time provide compressions over scenarios of change of physical location, I overview unconventional scenarios of movement in time in relation to particular conventional models of location of the SELF that the time-travel scenario activates. Since most time-travel science-fiction explores the effects of the extensions of conventional models of TIME on conventional models of CAUSATION (see Flynn 2003, Rye 1997, Turtledove 2005 for overview of the most common time-travel themes), I devote the final sections of this chapter to the discussion of selected extensions of conventional models of CAUSATION in time-travel scenarios.

It needs to be pointed out that while the extensions of conventional models of MOVEMENT IN TIME in science-fiction literature serve many functions which merit an extended analysis, I have endeavored to limit my discussion of these extensions to the presentation of their relation to the structure and entailments of conventional models of change of location and causation. A more extensive approach could capture the possible influence of the conceptualization of the novel scenarios of MOVEMENT IN TIME that time-travel science fiction presents on the construal of story structure and character development, for instance, but as such, it would fall out of the scope of this thesis.

3.3.1.1. The role of conventional models of the SELF

Lakoff and Johnson state that “our real experience of time is always relative to our real experience of events” (1999: 139). Admittedly, our real experience of events is derived from the conceptualizations provided by episodic memory.³² Corballis and Suddendorf stress that mental time-travel, the capacity of the human brain and mind generally defined as the ability to run scenarios of events conceptualized as PAST or FUTURE, “is critically dependent on other mental capacities,” including the structure of the representations of the SELF (1997). An interesting cognitive semantic account of certain possible conventional conceptualizations of the SELF is provided in Lakoff and Johnson 1999 (267-289). Lakoff and Johnson describe a conventional metaphorical model of the SELF, which allows the conceptualization of oneself as divided into a metaphorical SUBJECT and a metaphorical SELF (ibid. 269). The subject is defined as “that aspect of a person that is the experiencing consciousness and the locus of reason, will, and judgment” (ibid.). The SELF is defined as “that part of a person that is not picked out by the subject” and can include “the body, social roles, past states and actions in the world” (ibid.). Additionally, Lakoff and Johnson stress that, unlike the SELVES, the SUBJECT exists only in the PRESENT (ibid.). The SUBJECT-SELF model allows the conceptualization of many identical, partly identical, or different SELVES, and specifies possible patterns of interaction between the SUBJECT and the SELVES, and between various SELVES, with several sub-models, where the SELF can be conceptualized as a PHYSICAL OBJECT, LOCATION, or PERSON (see Lakoff and Johnson 1999: 269-289 for detailed discussion). It is important to point out that every conceptualization of oneself as involved in a PAST, FUTURE or PRESENT event, as well as conceptualizations of other individuals involved in such events, will probably make use of a variation of the metaphorical SUBJECT-SELF model.

Another notion related to the conceptualizations of the SELF is the *normal location* of the SELF (Lakoff and Johnson 1999: 274). One of the conventional models of the SELF is identified in Lakoff and Johnson 1999 as the LOCATIONAL SELF (274-277 et seq.). In this model, the experiencer is mapped onto the SUBJECT, and the SELF is mapped onto a “normal location”

³² Although what is conceptualized as a REAL EVENT does not have to be a conceptualization of an event conceptualized as a memory of something the experiencer personally took part in (as many EVENTS conceptualized as REAL are experienced vicariously through interaction in a culture), all imaginative scenarios, including scenarios of EVENTS conceptualized as REAL but not experienced first-hand, can be seen as the work of episodic memory, understood in the broad sense defined in section 3.2 above.

(ibid.: 274; see also section 3.2.2.1 above). For example, a sentence like *I was beside myself* induces a conceptualization where

The Subject's being out of control is conceptualized as being out of the container, namely (...) out of the part of the Self where the Subject is normally understood as residing, namely, the body, the head, the mind, or the skull. (...) the I refers to my Subject – my experiencing consciousness. If the Subject is beside the Self, then it is also outside the Self, that is, outside the body, which is not where it normally resides. (Lakoff and Johnson 1999: 274)

Importantly, conceptualizations of time-travel scenarios will always involve the use of a cultural model of a normal location of the SELF. Below, I will discuss time-travel in science fiction in relation to the model of normal location of the SELF involved in the particular time-travel scenario.

3.3.1.2. Simultaneous presents

In the story “Forever to a Hudson Bay Blanket” by James Tiptree Jr. (Tiptree 1973: 191-213), Dov Rapelle, a teenage boy alone in a mountain cabin, is visited by a teenage girl, Loolie, who professes to be in love with Dov and proceeds to aggressively, and successfully, seduce him. The surprised but yielding Dov realizes, during intercourse, that Loolie's sexual prowess is somewhat uncharacteristic of a teenage virgin: “Virginal fucks did not, in his experience, achieve such loin-bursting poetry (...)” (Tiptree 1973: 197). The indications that Loolie's behavior is not typical of a teenage girl can activate the cultural model of the SUBJECT, where the SUBJECT can be elaborated as a CONTAINER for the person's ESSENCE (see Lakoff and Johnson 1999: 282-284). The Folk Theory of Essences states that

Every entity has an “essence” or “nature,” that is, a collection of properties that makes it the kind of thing it is and is the causal source of its natural behavior. (Lakoff and Johnson 1999: 363)

A sub-model in conventional model of the SELF, referred to as the INTERNAL CAUSATION metaphor (Lakoff and Johnson 1999: 270), figures the SUBJECT conceptualized as a PERSON, and the SELF conceptualized as a PHYSICAL OBJECT (very often elaborated as THE BODY). The physical object is conceptualized as a container for the SUBJECT, and the SUBJECT is seen as exerting physical control over that PHYSICAL OBJECT (which I will term the BODILY SELF). Since Loolie's behavior is conceptualized as unnatural, the sub-models of the SELF and

SUBJECT delineated above can induce the conceptualization where Loolie's BODY, whose PHYSICAL ATTRIBUTES prompt the activation of the cultural model of a TEENAGE GIRL with its natural behavior (under conventional metaphor ATTRIBUTES CAUSE BEHAVIOR; see Lakoff and Turner 1989: 169-170 et passim), contains a SUBJECT which is not congruent with the ESSENCE of a typical SUBJECT of a typical teenage girl. This alien SUBJECT can be conceptualized as the source of the girl's behavior, under the INTERNAL CAUSATION metaphor.

In the models of SELF presented above, the SUBJECT, conceptualized as a PERSON, and as the CONTROLLING FORCE behind physical behavior, is contained in the SELF, conceptualized as a physical object (like the body). Additionally, in certain cultural models of the SELF, a part of the body can provide access and be indicative of the person contained inside the body and controlling it. That part of the body is very often the eyes, under conventional mapping EYES ARE CONTAINERS and the metonymy EYES FOR THE PERSON (or PRESENCE OF PERSON; see Ródenas Tolosa 2004: 448-449 et passim). Before submitting to the girl's urgent pleading to have sex with him, Dov notices something about Loolie's eyes:

Her eyes didn't seem wild or druggy, but they had a funny deep-down spark, like something lived in there. (Tiptree 1973: 196)

This sentence can further reinforce the scenario where the SUBJECT is contained in the BODILY SELF, and at the same time is not the body's typical SUBJECT, as indicated by the word funny, which can be interpreted as "out of the ordinary, strange" (WNWD). After the coupling, there is another instance where the girl's eyes are referred to:

The far beacon in her eyes was coming closer. "Dovy. You didn't ask me my whole name. (...) I'm Loolie Aerovulpa... Rapelle."
He stared. He didn't get it at all.
"I don't—are you some kind of relative?" (Tiptree 1973: 199)

The first sentence in the quotation above reinforces the conceptualization of EYES as CONTAINERS FOR THE PERSON, activating conventional metaphor LIFE IS LIGHT (see Lakoff and Turner 1989: 87-89 et passim), with LIFE elaborated as a beacon. Life is naturally mapped onto the SUBJECT, as the SUBJECT is seen as the locus of the person's experiencing consciousness and essence, i.e. what makes them alive.³³ Additionally, the full name revealed

³³ This may be related to the entailments in the folk theory of the Great Chain of Being, which organizes entities in the world into a hierarchy, with HUMANS enjoying the highest place, followed by ANIMALS, PLANTS, COMPLEX OBJECTS and NATURAL PHYSICAL THINGS. The theory states that the place that an entity takes in the Great Chain

by Loolie can cue the cultural model of MARRIAGE, where the wife takes the husband's name; since Rapelle is Dov's last name, a possible conceptualization evoked here is that Dov is Loolie's husband. Importantly, Dov's initial surprise at meeting the girl, and his immediate reaction to Loolie's full name, can suggest an interpretation where the mental space where Dov is Loolie's husband is counterfactual with respect to the current mental space configuration.

Finally, Dov realizes what is wrong with his lover:

“You haven't asked me how old I am either,” she said quietly.

“So?”

“I'm seventy-five.”

“*Huh?*” Dov stared. No geriatrics imaginable could...

“Seventy-five years old. I am. Inside, I mean, me, now.”

Then he got it.

“You—you—“

“Yes. I'm time-jumping.”

(Tiptree 1973: 1999)

The expression *how old I am* generates a mental space which recruits the folk model of personal past, which in turn maps onto the structure of conventional models of TIME, as discussed above. In one mental space in the discourse configuration, Loolie is sixteen and not married to Dov. In another space, Loolie is seventy-five and married to Dov. The organizing frame of the blended space of the conceptual integration network produced in the conceptualization of the character of Loolie is a scenario where an agent engages in interaction with another person (Dov) in the PRESENT. The structure of the both input spaces shares the LOCATIONAL SELF / SUBJECT model delineated above, which is projected to the generic space and into the blended space, and the SELF, conceptualized as a BODY, is projected from the space where Loolie is sixteen.

of Being “depends strictly on its highest property” (Lakoff and Turner 1989: 168); under this interpretation, the essential properties of the highest level are conceptualized as the PERSON (see Lakoff and Turner 1989: 170-172 et seq. for definition of essentially human attributes). While the higher levels inherit the essential features of the lower levels, (e.g. a human still has the NATURAL PHYSICAL ATTRIBUTES of a NATURAL PHYSICAL OBJECT), the absence of the essential attributes at a given level often prompts the conceptualization in which an entity comes to be a member of a lower level in the hierarchy, and has ceased its existence at the previous level. A HUMAN devoid of its natural “higher-order” attributes can become an ANIMAL (e.g. a *pig*), but a brain-dead HUMAN, not displaying even the instinctual attributes essential to ANIMALS, becomes a PLANT (a *vegetable*). Without its essential biological attributes, the plant becomes a COMPLEX OBJECT (a *dead body*). Without the necessary structural attributes (e.g. after *decomposition* or *dismemberment*), a dead body becomes a NATURAL PHYSICAL THING (e.g. *meat* in the case of the dead bodies of ANIMALS). Finally, without its essential NATURAL PHYSICAL ATTRIBUTES, i.e. what can be perceived (by human senses), a NATURAL PHYSICAL THING becomes *no-thing*. See Fauconnier and Turner 2003: 241-247 for the discussion of the attributes and existence of *no-things*.

Importantly, in conventional model of the SELF, the SELF is defined as “that part of a person that is not picked out by the Subject,” which includes “past states” of the PERSON (Lakoff and Johnson 1999: 269). The present state of consciousness is conceptualized as located in the SUBJECT, which can only exist in the PRESENT (ibid.). In conventional model, there can be only one SUBJECT in one SELF in the PRESENT, as opposed to PAST states or instances of the SUBJECT, attributed to the many PAST SELVES. In one input space, the sixteen-year-old Loolie, located in the PRESENT, has a SUBJECT typical of a teenage girl. However, the SUBJECT in the blended space is projected from the space where Loolie is seventy-five. Since the SUBJECT in the blend belongs to the seventy-five-year old Loolie, and there can be only one SUBJECT in the OBJECTIVE PRESENT, back-projection from the blend can induce the conceptualization of a scenario where the SUBJECT of the teenage Loolie in input one is not in Loolie’s BODY, and not in the PRESENT. Since in the blended scenario, which is located in the PRESENT, Loolie’s body is sixteen years old, back-projection into the second input space, where Loolie is seventy-five years old, can induce the elaboration of that space in which a BODILY SELF, is devoid of a SUBJECT, since its SUBJECT is located in a different BODILY SELF. Since the models of personal past, and conventional models of TIME, can be activated by previous discourse, a possible conceptualization produced in the interpretation of the passage is that, since the sixteen-year-old BODILY SELF is located in the PRESENT temporal location, the seventy-year-old SUBJECT comes from a temporal location where Loolie is seventy-five years old, i.e. from THE FUTURE. This scenario can be conceptualized as congruent with the structure of the counterfactual scenarios described above, where Loolie (and her SUBJECT, conceptualized as a PERSON) is sexually experienced, and married to Dov.

Discussing the process of the interpretation of binominal compounds, Fauconnier and Turner state that “the formal unit names two elements in two different spaces, and directs the understander to find the rest” (2003: 356). In the interpretation of the compound *time-jumping*, *jumping* will probably be interpreted as having a transitive meaning, with *time* as the object of *jumping*, and the agent expressed by the word *I* in the sentence *I’m time-jumping* as the agent engaged in the jumping. One of the transitive meanings of the verb *jump* is defined in WNWD as “to pass over, to skip.” In other words, *jump* can induce a conceptualization of an abstract scenario where an AGENT quickly moves between a SOURCE and a GOAL, conceptualized as LOCATIONS IN SPACE, not necessarily engaging in direct interaction with whatever can be conceptualized as the LOCATIONS forming the trajectory between the SOURCE and the GOAL. For example, if I jump from square A to square C, I do not usually come in

direct contact with square B. In mental space theory, the comprehension of a linguistic unit is seen as dependant on the mental-space configuration generated by earlier (or adjacent) discourse (see section 2.2 above). Accordingly, the reading of the word *time* in the compound *time-jumping* must be related to the mental space configuration generated by previous or adjacent discourse, and fit the structure of the mental space generated in the interpretation of the word *jump*, enough for the formation of a generic space, which would in turn enable the creation of a scenario in the blended space, representing the meaning of the compound *time-jumping*. Here, I will assume that the interpretation of the word *time* in the context of a given discourse can activate conventional metaphorical models discussed in Chapters 1 and 2 above as conventional models of TIME. As pointed out above, the model of the personal past, prompted by earlier discourse, blends with the structure of the MOVING OBSERVER metaphor by default. That conceptual integration elaborates the schematic sequence of integrated episodic memories of events as a PATH IN SPACE, which maps onto the structure of conventional models of TIME, becoming a PATH in TIME, with an AGENT traversing locations constituting TIME'S LANDSCAPE. These models can be assumed to be available for the projection of conceptual substrate in the construction of the integrated scenario representing the interpretation of the passage above.

The content of the two input spaces evoked in the interpretation of the compound *time-jumping* shares the structure of the SOURCE-PATH-GOAL schema, which is projected into the generic space constructed in the formation of the conceptual integrated network evoked in the reading of the story. The blended space of the network receives this structure. Additionally, the interpretation of the word *time* can import the structure of the model of personal past, activated by previous discourse. The trajector of the SOURCE-PATH-GOAL schema is mapped onto the agent picked out by the word *I* in *I'm time-jumping*. The referent of the word *I* is Loolie, and by virtue of the Access Principle (see section 2.2 above), the structure of the blended space representing the character of Loolie (discussed above) is imported into the blended space of the network currently discussed. In the blended space, Loolie has a BODILY SELF projected from the temporal location marked as PRESENT, and a SUBJECT inhabiting and controlling Loolie's BODY in the PRESENT, but imported from the input space where Loolie is seventy-five (and located in the FUTURE). As the SOURCE and GOAL slots in the scenario evoked in the interpretation of the compound *time-jumping* are elaborated as temporal locations, and furthermore, map easily onto temporal locations in Loolie's personal past, the two temporal locations available in the conceptual integration network constructed in the course of structuring the mental space representing the character Loolie are recruited into the

new blend and mapped onto the temporal locations of the *time-jumping* scenario. As a result, the scenario in the blend contains an AGENT, moving between two temporal locations, conceptualized as the PRESENT temporal location, where Loolie is sixteen, and the FUTURE temporal location, where she is seventy-five. The SUBJECT moves along TIME'S LANDSCAPE, without traversing the temporal locations inbetween the two, as consistent with the scenario of movement evoked in the interpretation of the word *jump*. Because in the blend of personal past and TIME'S LANDSCAPE, the experiencer, engaging in mental time-travel, has direct experience of not only physical interaction in a physical location, but also direct experience of the objective PAST, PRESENT and FUTURE, the blended space created in the interpretation of the compound *time-jumping* can also include a frame where *time-jumping* is not only jumping over a part of the compressed representations of physical interaction in Loolie's personal past,³⁴ but also, at the same time, jumping over a part of the objective, universal path of TIME'S LANDSCAPE.

Although the scenario of *jumping* can sometimes have only one AGENT, the interpretation of the story can induce the conceptualization where two AGENTS (or SUBJECTS) are engaged in the *time-jumping*, and they switch places between their respective temporal origins. After the love-making, Loolie's sixteen-year-old bodily SELF becomes inhabited with a sixteen-year-old SUBJECT, who states that she does not recall what passed between herself and Dov ("I don't remember anything, you never do'," Tiptree 1973: 200), as consistent with the folk model where the SUBJECT is the locus of the experiencing consciousness, since the sixteen-year-old SUBJECT was not located in the PRESENT temporal location ("was not present") during the occurrence. However, Loolie reports memories of the FUTURE temporal location: "All I remember is being in some big old house, being seventy-five" (ibid.: 201). This induces the conceptualization of a scenario where the sixteen-year-old SUBJECT, not located in the sixteen-year-old SELF in the course of the interaction with Dov, was located in the FUTURE seventy-five-year-old bodily SELF. Conventionally, a SUBJECT can only exist in the PRESENT, and can only be located in the SELF. The operation of mental time-travel presents the experiencer with scenarios unrolling in the representations of many actual locations, where only one of them is usually conceptualized as occurring in the PRESENT, and in only one of them the SUBJECT is conceptualized as able to exert actual physical control over the BODILY SELF. Since normally a SUBJECT is not conceptualized as located in and able to exert control over in a PAST or FUTURE SELF, but must exist in THE PRESENT, a possible conceptualization evoked in the interpretation

³⁴ A process normally effected by episodic memory in mental time-travel, as in the following description of episodic memory retrieval: [*Older*] subjects have a hard time jumping back in time and retrieving the context that was associated with the recalled item (Example 4).

of the scenario of *time-jumping* in the context of the story is a scenario with two actual temporal locations, in which actual physical interaction is occurring concurrently, or two *simultaneous presents*.³⁵

Although the compressions over physical CHANGE OF LOCATION, DISTANCE IN SPACE, and TEMPORAL DISTANCE, used in the scenario of *time-jumping* discussed above, seem to be a direct reflection of the characteristics of the operation referred to as mental time-travel, in most novel scenarios of movement in TIME, the model of mental time-travel is extended to include the conceptualization of scenarios where the SUBJECT, located in a SELF conceptualized as PAST or FUTURE, can engage in control of the (BODILY) SELF, and so, engages in actual direct physical interaction with the environment. What follows is that in such scenarios, there can be more than one SUBJECT acting at one time, since the SUBJECTS, although connected with Identity links (as representations of many temporally located incarnations of one PERSON), are located in different actual PRESENT LOCATIONS, where interaction is unraveling in parallel.³⁶ For example, the story “Backward! Turn Backward!” by James Tiptree Jr., which depicts similar imagined time-jump technology as “Forever to a Hudson Bay Blanket,” begins with a passage describing two FUTURE SELVES as they are preparing for the scheduled time-jump back to the time of their youth. The story opens with a passage which can establish the conceptualization of two simultaneous present temporal locations, which will then be mapped onto the temporal origin and destination for the characters engaged in time-jumping:

It’s the day.

Both days. (Tiptree 1986: 208)

As discussed above, conventional models of CHANGE OF LOCATION IN TIME can provide compressions over the physical CHANGE OF LOCATION that occurred between the LOCATIONS in the representations of events provided by episodic memory. In science-fiction, these compressions are sometimes made literal. For example, in the story “Time Locker” by Henry Kuttner (2004), a locker modified by an inventor serves as a bridge between two simultaneous

³⁵ Admittedly, the conceptualization of a scenario where there is a present with a physical location exhibiting object-permanence, and all other scenarios figuring the conceptualizer are conceptualized as counterfactual in that they do not allow direct physical interaction and control by the SUBJECT, is by no means the only one possible, as evidenced by experiences such as flashback memories suffered by trauma victims or night-time dreaming.

³⁶ As a result, certain time-travel scenarios allow for the possibility of meeting and interacting with incarnations of oneself in other temporal locations (termed *temporal doppelgangers* in Rye 1997). See also sections 3.5.2.1, 3.5.2.2 and 3.5.2.4 below.

present temporal locations, so that an object inserted into the locker becomes located in a FUTURE temporal location.³⁷ Scenarios with many actual presents, or actual, non concurrent temporal locations where embodied physical interaction controlled by many SUBJECTS is occurring concurrently, are very common in time-travel science fiction (see, for example, the discussion of *multiple presents* in Rye 1997).

3.3.1.3. Chronesthetic time-travel

In certain time-travel scenarios, the operation of imagined technology which allows the physical CHANGE OF LOCATION in the process of time-travel is presented as bound by the characteristics of the process of mental time-travel. I will term this kind of time-travel *chronesthetic time-travel*.³⁸ In chronesthetic time-travel, although the time-travel is conceptualized as travel over LOCATIONS on the PATH of the objective TIME'S LANDSCAPE, a SUBJECT can only exist in a temporal location conceptualized as one of the locations that have been or will be experienced by a PAST or FUTURE SUBJECT as THE PRESENT. This scenario entails that the SUBJECT cannot occupy a location that is conceptualized as not being inhabited as a SELF, i.e. can only travel to places where a SELF had engaged or will engage in embodied physical interaction, which precludes travel to temporal locations where there is no BODILY SELF, e.g. before the creation of the BODILY SELF (i.e. birth, conception, etc), or after its disappearance, conceptualized as the TIME OF DEATH. As evidence, consider a passage where, in the story "Forever to a Hudson Bay Blanket," the young and happily married Dov and Loolie are considering "time-jumping" to a time when they're old. Dov seems to have some concerns, and Loolie tries to console him:

"We could time-jump tomorrow, *together*," Loolie smiled dreamily. "Then when we're old we could be young like we are for a while. Together."

"Absolutely not," said Dov. And he told her why it was an insane idea. (...)

"It's dangerous. What if one of us turned out to be dead?"

"Oh, if you're dead nothing happens, I mean, you can only switch places with yourself. The, the persona something symmetry, I mean, if you're not there nothing happens. You just stay here(...)"

(Tiptree 1973: 210-211).

³⁷ A list of stories exploiting similar imagined technology, termed "Time-Viewer Stories," can be found in Hornton 2006b.

³⁸ A list of stories featuring this model of time-travel, termed "Time-travel Via One's Own Thread of Consciousness," can be found in Horton 2006a.

One possible conceptualization conditioned by conventional metaphor EXISTENCE IS BEING LOCATED (Lakoff and Johnson 1999: 205-206) is that a person can only exist if they are located in the temporal location marked as present (i.e. it is possible to perceive their HIGHER-ORDER, INSTINCTUAL, BIOLOGICAL or NATURAL PHYSICAL ATTRIBUTES), or can *have* existed if they were located in an actual temporal location marked as PAST when considered from the Viewpoint marked as PRESENT. Additionally, conventional metaphor DEATH IS DEPARTURE (see Lakoff and Turner 1989: 7-8 et passim) induces the conceptualization of a DEAD PERSON as not physically located in an actual temporal location and the subsequent temporal locations. Arguably, in chronesthetic time-travel, the bodily SELF is conceptualized as part of the temporal location. In “Forever to a Hudson Bay Blanket” the entity that undergoes time-travel is the SUBJECT, which can only be located in a BODILY SELF. Since cultural models of CHANGE OF LOCATION are underpinned by the SOURCE-PATH-GOAL schema, in the case of the absence of a FUTURE SELF, or the absence of a FUTURE LOCATION, CHANGE OF LOCATION in the course of time-travel becomes impossible for the SUBJECT, since there is no LOCATION to map onto the GOAL slot in the SOURCE-PATH-GOAL schema.

In another chronesthetic time-travel story, “Backward, Turn Backward” (Tiptree 1988), the time-travel scenario also consists in a time-traveler’s instantaneous switching places between two temporal locations, with one intriguing difference. In “Forever to a Hudson Bay Blanket,” the sixteen-year-old bodily SELF is inhabited by a seventy-five-year-old SUBJECT, and the sixteen-year-old SUBJECT occupies another SELF in a simultaneous PRESENT temporal location, marked as FUTURE. In “Backward, Turn Backward,” two teenage characters, Diane and Don, engage in time-jumping, but here, the SUBJECT switches the temporal locations together with the BODILY SELF:

When a connection is made, there would come a lightning-swift transmutation, a reorientation—at the end of which their young selves would occupy the space-time niches in which their older bodies were found; and, nature being symmetrical, their older selves would find themselves back here. (Tiptree 1988: 213)

The expression *space-time niche* can activate the conceptualization where the person, contained in a temporal location, is conceptualized as the BODILY SELF containing the SUBJECT with the person’s essence and experiencing consciousness. As a result, it is the bodily SELF that exchanges location between the two simultaneous PRESENT locations in the process of time-jumping. This presents a conceptualization which contrasts with the time-travel scenario evoked in the interpretation of “Forever to a Hudson Bay Blanket,” where the locus of the

person's ESSENCE, and so, the ENTITY engaging in time-travel, is the SUBJECT, and the locations serving as temporal origin and destination are the PAST and FUTURE BODILY SELVES. As discussed above, this conceptualization is reinforced by language which can induce conceptualizations of the BODILY SELF (or parts of the bodily SELF) as containers of the SUBJECT. In contrast, the imagery of "Backward, Turn Backward!" reinforces the conceptualizations of the BODILY SELF as CONTAINER of the ESSENCE and the entity undergoing time-travel. For example, the story begins with the depiction of a scene where the older Diane and Don, discussing the time-jumping which they will soon engage in, are described in narration which foregrounds their physical attributes (using words which can activate conceptualizations based on the visual, aural and kinesthetic modalities), facilitating the formation of a scenario where THE PERSON is conceptualized as the bodily SELF containing the SUBJECT:

In the big double bed lies a naked old woman, clasping a naked old man in her shrunken, leathery arms. (...) Her once-sweet giggle is an old woman's cackle now. (...) She looks down at her age-ruined body. (...) He pulls one arm loose and holds it shakily up to look at. Impossibly thin and knotted, with what had been his muscles hanging like jelly-bags from the bone.(...)

"I'll see you as I never did."

Almost imperceptibly she flinches. "You saw me."

"Well, I was aware of this ravishing Queen-of-the-Prom type, flashing around with all the money boys. But I never really *looked* at you (...)" (Tiptree 1986: 208-209)

This conceptualization is reinforced later in the story, where a character rationalizes about the process of time-travel, and addresses the nature of the ENTITY which undergoes time-travel, foregrounding the physical boundaries of the BODILY SELF:

"(...) writing on your skin's no good, the ink or whatever stays behind. You'll arrive without that lipstick, by the way... But I figure a certain kind of scar could get through, like if I get a really sharp scalpel and bury a thread under my skin, like embroidery-writing (...), the thread couldn't get pulled out without leaving a scar. (...)" (ibid.: 211)

Interestingly, both the stories are in keeping with the Folk Theory of Essences, in that they suggest a conceptualization where the DEATH of the PERSON is conceptualized as caused by the destruction of what is conceptualized as the container of the essence, i.e. what induces the conceptualization of the entity undergoing time-travel as a PERSON as opposed to an ANIMAL or OBJECT. In "Forever to a Hudson Bay Blanket," the teenage Dov time-jumps to a temporal

location where the BODILY SELF is over fifty, and undergoing heart failure. Because of this, the time-jump results in a tragedy:

(...) Loolie Aerovulpa Rapelle returned from a meaningless stroll in a shopping arcade in Pernambuco to find herself holding Dov's dead body (...). Because dying, any time, is an experience you don't survive. (Tiptree 1973: 213)

Here, the referent of *you* can be conceptualized as the PERSON, i.e. the CONTAINER of the ESSENCE. Since, as discussed above, in this story the PERSON is conceptualized as the SUBJECT, and the location of the PERSON is the bodily SELF, the death of the person in the FUTURE temporal location (effected by interaction with the person's normal physical location, i.e. the FUTURE BODILY SELF) results in the return of a DEAD PERSON from that temporal location³⁹. A similar tragedy occurs at the end of "Backward, Turn Backward," structured as a scenario consistent with the conceptualization of the element undergoing the time-travel as the BODILY SELF containing the SUBJECT. Just as the time-jump to their original temporal location began, the teenage Diane shot Don in the back. Subsequently, Don returns from the future as a dead body:

When she comes to, Jeffrey Bowe is propped up on his elbows beside her, looking at some disturbance down the tunnel-hall.

"Wh—what is it?" she asks groggily, not caring.

"I don't know. I think somebody came back dead."

"Oh..." She has no memory of anything but going to sleep beside him here; she has never fired a gun in her life. (Tiptree 1986: 268)

Since, as discussed above, the story prompts the conceptualization of the PERSON undergoing time-travel as the BODILY SELF, Diane's action resulted in Don's demise, as the locus of his ESSENCE, conceptualized as the BODILY SELF in this story, was damaged beyond repair.

³⁹ Interestingly, this scenario contains what is referred to as a *temporal paradox* (how can Dov be dead in the temporal location where his body is that of a teenager, if the cause of his death is heart failure at age fifty, an age to which he will obviously not live), or, under a different interpretation, an *alternative future* (a future temporal location, visited by Dov, where Dov lives to fifty and dies of heart failure, co-existing with another future temporal location, where Dov has not lived till fifty, because he died in his teens). Both these notions will be addressed in section 3.5 below.

3.3.1.4. Ego-deictic time-travel

As discussed above, in certain chronesthetic time-travel stories, when the locus of the person's ESSENCE is conceptualized as the SUBJECT, the SUBJECT travels between temporal locations elaborated as the PAST or FUTURE BODILY SELVES. In the other time-travel scenarios discussed above, the locus of the person's essence is conceptualized as the BODILY SELF, and the temporal locations between which it travels are the physical locations that the PAST or FUTURE bodily SELF was or will be contained in. As explained above, chronesthetic time-travel stories seem to be based on a scenario reflecting the operation of mental time-travel, where the experiencer finds herself in episodic memories of located events from the PAST, and located events in the FUTURE, and the possible distance of time-travel is limited by the person's life-span. Other scenarios of time-travel, which I will term *ego-deictic* time-travel, resemble one of the types of chronesthetic time-travel in that the ENTITY undergoing the time-travel is conceptualized as the BODILY SELF containing the SUBJECT. However, ego-deictic time-travel extends and elaborates the model of the operation of mental time-travel to allow for time-travel into temporal locations in objective TIME. As a result, in ego-deictic time-travel, the temporal distance that can be traveled is not limited by the traveler's life span.

In one variation of ego-deictic time-travel, the normal location of the SELF (see section 3.2.2.1 above) is a cultural artifact, like *a room* or *building*, and the time-traveler journeys between two variations of the same normal temporal location. For example, if the time-traveler is in a room in the year 2000, and travels back fifty years, she will find herself in that room as it was in the year 1950. Such projection of the natural location of the SELF from the mental space representing the temporal origin into the location projected from the input space representing the temporal destination, and the creation of a blended scenario integrating the conceptualizations of LOCATION from the two input spaces, is what characterizes ego-deictic time-travel stories.

Discussing the natural locations of the SELF, Lakoff and Johnson note that one type of natural location is "on the ground, where we are in control of the effects of the force of gravity" (1999: 275). In conventional models of normal location, a person is located on THE GROUND, and THE GROUND maps onto the representation of the physical object which counteracts earth's gravitational pull in a way which allows human locomotion, and is characterized by

the feature ROOM, such as *a floor, stage, the surface of the earth*, etc.⁴⁰ Importantly, CHANGE OF LOCATION for a human AGENT usually involves traversing LOCATIONS in the course of interaction with what is mapped as THE GROUND. For example, if I am on the roof of one building, and want to pass from the roof of that building to the roof of another building, I will start out on the first roof, which will be conceptualized as THE GROUND, and then continue the CHANGES OF LOCATION by being pulled down to whatever can work as THE GROUND between the two buildings, since the AIR between the two buildings does not counteract earth's gravitational pull in a way which would allow me embodied locomotion, and so, does not map as THE GROUND.

In scenarios depicting locational ego-deictic time-travel, the mental space representing the temporal origin contains a natural LOCATION (like *a room*), and part of that location is conceptualized as the ground. Interestingly, in many ego-deictic time-travel stories, the space representing the temporal destination as it is reached in the course of time-travel represents a conceptual integration of the locational structure of the temporal origin, with *the ground* and the relation of the element mapped as the ground and earth's gravitational pull projected from the counterfactual temporal origin space. As a result, the force-dynamic relation between earth's gravity and what is mapped as THE GROUND in the temporal origin space can turn out to be counterfactual with respect to what is mapped as THE GROUND in the temporal destination and the relation of that element and gravity.

As noted above, scenarios elaborating CHANGE OF LOCATION as MOVEMENT IN TIME compress the physical movement that models of PHYSICAL MOVEMENT would normally structure into TEMPORAL MOVEMENT. In a time-travel scenario, idealized MOVEMENT IN TIME becomes literal movement between physical LOCATIONS, and because the actual physical movement can be compressed, these scenarios do not incorporate the entailment of conventional models of physical movement which gives rise to conceptualizations of CHANGE OF LOCATION as always involving traversing what is mapped as THE GROUND. For example, a character engaging in time-travel, starting out from her home laboratory located on the first floor of a building, might wind up in the temporal destination twenty feet up in the air and fall, since in the structure of the input space representing the temporal destination, the relation between the earth's gravitational pull and the element mapped as THE GROUND (here, *the air*) is such that it does not allow human actors to remain ten feet above ground level (since AIR is not dense

⁴⁰ Obviously, this scenario can be elaborated in many ways, which gives rise to many cultural models of movement, e.g. in water, air or outer space.

enough to counteract earth's gravitational pull in the way FLOORS do). These scenarios are possible due to the involvement of the compressions of physical CHANGE OF LOCATION provided by conventional models of MOVEMENT IN TIME, where the physical movement between two LOCATIONS can be abstracted from and as a result, CHANGE OF LOCATION does not require physical movement, and as such, is not bound by the entailments of conventional models of physical CHANGE OF LOCATION.

One science-fiction story which elaborates time-travel in this way is "A Gun For Dinosaur" by L. Sprague de Camp (2004). In this story, a group of time-travelers journey back over eighty-five million years in a *transition chamber*, to go dinosaur hunting:

(...) [We] appeared at Prochaska's laboratory one rainy morning (...).

The transition chamber is a little cubbyhole the size of a small lift. (...) The operator squeezed in after us, closed the door, and fiddled with his dials. He set the thing for April twenty-fourth, eighty-five million B.C., and pressed the red button.

The operator looked at his ground-level gauge and turned the handwheel that raised the chamber so it shouldn't materialize underground.

In this period, the chamber materializes on top of a rocky rise (...). (De Camp 2004: 116-117)

The word *laboratory* in the passage above serves as a space-builder (see section 2.2 above). The mental space opened up by the word *laboratory* recruits the reader's entrenched models of LABORATORY, which contain structure conceptualized as LOCATION. Since the concept LOCATION is underpinned by the CONTAINMENT schema, it inherits the entailments conditioned by it. One of the entailments of the CONTAINMENT schema, referred to as the *transitivity of containment*, states that "[if] B is in A, then whatever is in B is also in A" (Johnson 1987: 22). Accordingly, since the word *laboratory* opens up a space structured by a model of LOCATION, and the reader is given no information which would suggest that the agents in the scenario of CHANGE OF LOCATION evoked by the passage (the *time-travelers*) move out of that LOCATION, the element referred to as *the transition chamber* in the passage above will probably be conceptualized as located in the element activated by the word *laboratory*.

Before the time-jump can be completed, the operator adjusts the position of the *chamber* so that it is higher up and does not materialize inside solid rock. The word *raise* activates a scenario structured by the VERTICALITY schema (see Johnson 1987: XIV) and the SOURCE-PATH-GOAL schema; a TRAJECTOR is moved from a LOCATION mapped as SOURCE to a

LOCATION mapped as GOAL. Since the LOCATION embedded in the entrenched model of LABORATORY activated by the word *laboratory* in the passage above is probably similar to that evoked by the cultural model activated by the word *room*,⁴¹ the LOCATION mapped onto SOURCE in the interpretation of the passage will probably be the normal location of *the ground*, mapped onto the element of the cultural model of A ROOM evoked by the word *floor*. Accordingly, the phrase *ground-level* will probably be read as the LOCATION of the *transition chamber* in the temporal origin, as conditioned by the interaction between the chamber's weight, earth's gravity, and the structure in which the *floor* on which the *transition chamber* is placed is to be found. The temporal location traveled to does not contain that structure. The interpretation of the passage above can prompt the creation of a conceptual integration network in which one input space is the temporal location with the *laboratory*, and the other is the temporal location with the *rocky rise*. In the space with the *laboratory*, there is a ROOM with a FLOOR, and a scenario where the transition chamber occupies the natural location referred to above as THE GROUND, which is mapped onto the *floor* of the *room*. In the other space, there is a *rocky rise*, without a *room* and *floor*, and, importantly, with no specified element to map onto the natural location of THE GROUND. The blend has the *rocky rise* of the temporal destination, and the scenario of LOCATION where the transition chamber is located on *the ground*, projected from the space representing the temporal origin. In the blend, there is no *laboratory*, no *room*, and no *floor*, but the scenario where the *transition chamber* is situated on the natural location of *the ground* gets projected into the blend.

The expression *ground-level gauge* activates a scenario where the ground in the temporal origin space receives an absolute LOCATION in the vertical dimension, mapped onto the physical location in the source temporal location, i.e. the level of *the floor* in the *laboratory room*. That location is projected into the blend. Since the blended scenario receives the absolute location in the vertical dimension from the temporal origin, but, unlike in the locational structure in the space representing the temporal origin, there is nothing in the blend that could map onto *the ground* (projected from the temporal origin), the operator adjusts the vertical position of the *transition chamber* so as to locate it on something that can be mapped onto the natural location of *the ground*, i.e. the *slope of the rocky rise*. Importantly, although the space containing the representation of the temporal destination contains nothing that could map onto the element of the model of natural location referred to as *the ground* (only solid

⁴¹ Possibly, the cultural model evoked by the word *building*; however, as previous discourse (i.e. the sentence “[we] crowded into the chamber with our guns and packs,” de Camp 2004: 116) can activate a scenario of the time-travelers’ walking to the *laboratory*, the element of the cultural model of LABORATORY that this scenario will probably foreground is FLOOR, and therefore, ROOM. See the discussion of the notion of *active zone* in Croft and Cruse 2004: 48-50.

rock), in the blend, the two scenarios are integrated, and *solid rock* receives the element *ground* in the course of projection from the locational structure of the temporal origin.

3.3.1.5. Cosmic ego-deictic time-travel

Some cultural models of physical change of location represent the integration of counterfactual scenarios where AGENTS engaged in movement on THE GROUND are also engaged in movement through outer space, as in being engaged in the movement of the planet Earth around the sun, or in the movement of the solar system within the galaxy. These models are sometimes used together with the compressed scenarios of CHANGE OF LOCATION provided by time-travel, giving rise to what I will term *cosmic ego-deictic* time-travel. In cosmic ego-deictic time-travel, the natural location in the mental space containing the representation of the temporal origin, with its relation between Earth's gravitational pull and whatever is mapped as the ground, is elaborated as an absolute location in outer space.

In many conventional models of CHANGE OF LOCATION, the human AGENT is always bound to the earth and interacting with whatever is mapped as the ground. In other cultural models, astronomical objects are engaged in various sorts of movement: for example, the planet Earth orbits around the sun, engaging in CHANGE OF LOCATION within its natural location of the solar system (e.g. in heliocentric models of the universe). In other cultural models, the solar system, and many other ENTITIES, undergo CHANGE OF LOCATION in their natural location of the universe. If these models are blended with conventional models of CHANGE OF LOCATION, the integrated scenario has the AGENT undergoing the movement of another entity, e.g. the Earth or the solar system. The blend receives the force-dynamic structure of MOVEMENT on the gravity-bound GROUND from conventional models of movement, and the PATH of the CHANGE OF LOCATION from the cultural model of the MOVEMENT of an astronomic object in its natural location of *the universe*. If such a blended scenario is integrated with a compressed scenario of time-travel, the emergent scenario has a fixed LOCATION (*on the ground*) in the temporal origin space, and a LOCATION which would normally be reached in the manner of movement of conventional models of movement, i.e. would normally be reached with the SUBJECT undergoing movement on entities that interact with the Earth's gravity in a manner which allows them to be mapped as the ground. As in all ego-deictic time-travel, in cosmic ego-deictic time-travel the force-dynamic relation between what is mapped as THE GROUND and the Earth's gravity is projected into the blended space representing the temporal

destination, and this structure is integrated with the structure representing the physical location of the temporal destination. However, in cosmic ground-fixed time-travel scenarios, the temporal destination is a location on the path of the astronomical object, e.g. a LOCATION on the Earth's orbit around the Sun, or a location traversed by the solar system within the galaxy. Normally, the agent's movement to that location would take place in accordance with the force-dynamic relations of conventional models of MOVEMENT (so the agent would be brought there by the astronomic body whose gravitational pull is conceptualized as enabling natural interaction with what is mapped as the ground). However, the time-travel scenario compresses over that entailment, and *the ground* of the temporal origin maps onto a point in outer space in the integrated space representing the temporal destination. For example, in "Brown Robert" by Terry Carr, Arthur, a homicidal assistant, helps Robert Brown, a scientist, undergo the first manned time-jump into the future, omitting to share the knowledge of a fault in the project's design:

(...) Of course he could travel forward in time and reappear an hour later, but the Earth would not be there, because the Earth moved around the sun at about eighteen and half miles a second and for that matter the whole solar system seemed to be moving at about twelve miles a second toward a point in the constellation Hercules.

(...) So Robert had landed an hour in the future, but somewhere out in space, and he had died, the pressure of oxygen in his body hemorrhaging his blood vessels and bursting his lungs before he could even suffocate. (Carr 2006 (1962))

In another cosmic ego-centric time-travel story, "The Man Who Walked Home" by James Tiptree, Jr. (Tiptree 1973), a test subject is sent approximately fifty thousand years into the future in a laboratory experiment, and then sent back by another party, causing an explosion on his return, which in turn leads to wide-spread nuclear warfare. Following the nuclear holocaust, every year an apparition of that test subject, identified as John Delgano, can be seen in the center of the crater of the original explosion. After a few centuries of the rebuilding of scientific knowledge and social structure, a monument is raised in the crater, bearing the following inscription:

(...) HIS TRAJECTORY IS THOUGHT TO START AT THE POINT WHICH OUR SOLAR SYSTEM WILL OCCUPY AT A FUTURE TIME AND IS TANGENT TO THE COMPLEX HELIX WHICH OUR EARTH DESCRIBES AROUND THE SUN. HE APPEARS ON THIS SPOT IN THE ANNUAL INSTANTS IN WHICH HIS COURSE INTERSECTS OUR PLANET'S ORBIT AND HE IS APPARENTLY ABLE TO TOUCH THE GROUND IN THOSE INSTANTS. HE IS ALIVE IN OUR PRESENT. OUR PAST IS HIS FUTURE AND OUR FUTURE IS HIS PAST.

THE TIME OF HIS APPEARANCES IS SHIFTING GRADUALLY IN SOLAR TIME TO CONVERGE ON THE MOMENT OF 1156.6, ON MAY 2, 1989 OLD STYLE, OR DAY ZERO. (Tiptree 1973: 188-189)

In the scenario of time-travel depicted in the passage above, the AGENT (John Delgano) is traveling from one physical LOCATION (an absolute location of the solar system in the future) to another physical LOCATION (the absolute location of the solar system, and the earth, on May 2, 1989). The blended scenario includes structure from the cultural model of the movement of the solar system, elaborated as a line-like PATH between the temporal origin and the temporal destination. The change of physical LOCATION is compressed into change of LOCATION on the idealized PATH of TIME'S LANDSCAPE. However, unlike in the previous scenarios, this change is not elaborated as instantaneous, but instead, as constant movement between one LOCATIONS on a PATH, as conditioned by the phrase "HIS TRAJECTORY IS THOUGHT TO START AT THE POINT WHICH OUR SOLAR SYSTEM WILL OCCUPY AT A FUTURE TIME." The word *point* prompts the conceptualization of a temporal location, and the word *trajectory* evokes the conceptualization of a PATH IN SPACE, elaborated metonymically as MOVEMENT ON THE PATH (see section 2.4.2 above for the discussion of this metonymy). In the blend, human movement in space can only occur in scenarios where an element providing adequate interaction with earth's gravity is mapped onto the ground. At the same time, the blend receives the *movement of astronomical objects* frame, where an agent undergoing travel in space receives the fixity of LOCATION from scenarios which figure her as engaged in interaction with a *ground*. Consequently, the time-traveler's movement is still elaborated as a scenario of interaction with the element *ground*, but the LOCATIONS traversed are elaborated as LOCATIONS on the SPATIAL PATH of the astronomical object.

Since the structure of the blended scenario must fit the structure provided by adjacent discourse, i.e. figure the Earth as the temporal origin and the destination, the time-travel in the blend is elaborated as following the PATH of the solar system in the galaxy. However, since the AGENT engaged in the time-travel is a human agent, his movement is elaborated in terms of conventional MOVEMENT IN SPACE, i.e. movement in natural locations with something mapped onto the ground. Accordingly, in the blend, John Delgano's movement receives the PATH from the cosmic movement frame, but receives *the ground* from conventional MOVEMENT IN SPACE frame. Because of this, one possible interpretation constructed in reading the story is one in which John Delgano's MOVEMENT IN TIME can be conceptualized as a sequence of infinitesimally short instances of interaction with the *surface of the land*, mapped onto THE GROUND in conventional model of movement (which can be considered part of the

motivation for the title, “The Man Who Walked Home”).⁴² Similar scenarios, presenting the imaginative integration of counterfactual models of physical and temporal CHANGE OF LOCATION, will be discussed in the following section.

3.4. Clashes between models of physical and temporal LOCATION

As discussed above, conventional models of MOVEMENT IN TIME can sometimes provide human-scale compressions over the representation of a CHANGE OF LOCATION where no conventional models of physical CHANGE OF LOCATION are available. In such cases, MOVEMENT IN TIME between the physical LOCATIONS of two events conceptualized as actual and physical will be conceptualized as actual, but not physical, or not involving physical change of LOCATION. In time-travel stories, however, the compressions over change of location provided by conventional models of time are elaborated as literal, in the sense that travel between physical LOCATIONS can be carried out in the course of actual and physical travel along TIME’S LANDSCAPE, made possible due to the operation of some imagined technology. This elaboration can sometimes give rise to clashes between the frame of *physical interaction / movement in physical locations* and *temporal movement among physical locations*. Such clashes occur in cases when structure from conventional models of physical CHANGE OF LOCATION, counterfactual in relation to the compressed scenarios of CHANGE OF LOCATION in TIME, is activated together with the imagined models of CHANGE OF PHYSICAL LOCATION in the course of the idealized MOVEMENT IN TIME. For example, in *The Time Machine* by H.G. Wells (1895), a character identified as the Psychologist rationalizes about the demonstration of time-travel that he has just witnessed, wherein a miniature time machine vanished upon activation:

'It must have gone into the past if it has gone anywhere,' he said. (...)

'Because I presume that it has not moved in space, and if it travelled into the future it would still be here all this time, since it must have travelled through this time.'

'But,' I said, 'If it travelled into the past it would have been visible when we came first into this room; and last Thursday when we were here; and the Thursday before that; and so forth!' (Wells 1895)

⁴² Interestingly, one possible conceptualization evoked in the interpretation of the story is one in which interaction with what is mapped as THE GROUND also includes scenarios of interaction which do not involve being in direct physical contact with it, e.g. when tripping or jumping, as John Delgano is presented throughout the story in various stages of tripping or trying to hold his balance, not in direct contact with *the ground* e.g.: “His position was impossible, legs strained forward thrusting himself back, his arms frozen in a whirlwind swing” (Tiptree 1973: 186).

The word *gone* in the first line activates the frame of CHANGE OF LOCATION. Since the word *anywhere* can activate the conceptualization of a location construed as a physical location, the first sentence can evoke a blended scenario, in which an entity travels in TIME, with the temporal location activated in the interpretation of the phrase *the past* as the temporal destination. Importantly, in this scenario, idealized LOCATIONS on TIME'S LANDSCAPE are blended with physical locations in space, giving rise to the concept of temporal location discussed above. The Psychologist suggests that the physical LOCATION is identical for all the temporal locations ("it has not moved in space" Wells 1895). In the blended scenario of travel through temporal LOCATIONS, the physical LOCATION of the Psychologist also remains identical, and he conceptualizes himself as moving from one instance to another instance of that physical LOCATION along TIME'S LANDSCAPE. In the emergent scenario, the entity contained in the same temporal location as The Psychologist at the onset of the time-travel is elaborated as contained in the same physical LOCATIONS as The Psychologist, in its course of travel along all the LOCATIONS on the idealized PATH of TIME'S LANDSCAPE.⁴³

As noted in section 3.3.1.2 above, the metaphor EXISTENCE IS BEING LOCATED HERE (see Lakoff and Johnson 1999: 205-206) lends existence to entities contained in natural locations, and exhibiting their essential attributes (including the no-attributes of a no-thing). One possible entailment of the conceptualizations underpinned by this conventional metaphor is that, for a PHYSICAL OBJECT to be conceptualized as existing in a PRESENT temporal location, or having existed in a PAST temporal location, it must be possible for it to exhibit its NATURAL PHYSICAL ATTRIBUTES, i.e. it must be or must have been possible to perceive it. Accordingly, since the Psychologist is not perceiving the miniature time machine in his current temporal

⁴³ Importantly, as discussed above, models of CHANGE OF LOCATION IN TIME compress over certain entailments of conventional models of movement in space. One example of this can be seen in conceptualizations underpinned by conventional metaphorical model CHANGE OF STATE IS CHANGE OF LOCATION (see e.g. Lakoff and Turner 1989: 8, et passim). This model uses the object permanence frame to integrate the structure of multiple mental spaces, so that the blended space in the network contains one Unique element. In the emergent scenario, the representations of a number of temporal locations (containing structure which is fused to yield the conceptualization of the Unique element) are conceptualized as STATES. The metaphor CHANGE OF STATE IS CHANGE OF LOCATION composes the representations of the temporal locations with the SOURCE-PATH-GOAL schema, where at least one temporal location is mapped onto the SOURCE, at least one temporal location is mapped onto the GOAL, and the fused element in the blend is mapped onto the TRAJECTOR. In the emergent scenario, the fused element engages in movement in time between one temporal location and another, and since the representations of the element in the particular temporal locations are fused in the blend, they are conceptualized as states of a single element. The blend can recruit additional structure from a model of CAUSATION to provide a conceptualization of the force which moves the TRAJECTOR from one temporal location to another. Importantly, although in scenarios of physical movement there is normally more than one physical location involved, the movement between the temporal locations in networks integrated with the CHANGE OF STATE IS CHANGE OF LOCATION metaphor is conceptualized as idealized MOVEMENT IN TIME, and as a result, the physical locations embedded in the temporal locations can be fused in the blend, without the emergence of counterfactuality with respect to conventional models of physical CHANGE OF LOCATION in the blend.

location, the metaphor EXISTENCE IS BEING LOCATED HERE can condition the formation of a scenario where the miniature time machine is not contained in the same temporal location as the Psychologist. Similarly, the narrator asserts that the entity undergoing time-travel has not been contained in the temporal locations conceptualized as leading up to the temporal origin in its time-travel, since it has not been perceived. The Psychologist finally attempts to provide a compression over-riding the clash of the two counterfactual frames of physical motion in space and idealized motion in time, in accordance with the model of EXISTENCE described above:

'Of course,' said the Psychologist, and reassured us. 'That's a simple point of psychology. (...) We cannot see it, nor can we appreciate this machine, any more than we can the spoke of a wheel spinning, or a bullet flying through the air. If it is travelling through time fifty times or a hundred times faster than we are, if it gets through a minute while we get through a second, the impression it creates will of course be only one-fiftieth or one-hundredth of what it would make if it were not travelling in time.' (...) He passed his hand through the space in which the machine had been. 'You see?' he said, laughing. (Wells 1895)

The scenario used for compression is one in which an object in very fast motion, although it cannot be perceived as it normally would be, is conceptualized as existing (i.e. co-located in the same temporal location). This compression is lent by the *object permanence* frame, which imposes the formation of a conceptual integration network where one input space contains a scenario in which an entity is perceived in a particular LOCATION, and another input space contains a scenario where an entity is not perceived, and thus, under the metaphor EXISTENCE IS BEING LOCATED HERE, does not exist or is not contained in the same location. The blended space emergent in the construction of the integration network activated by the *object permanence* frame contains the emergent notion of the STATE of an OBJECT, where an OBJECT can *potentially* exist or be located in a particular location, although it is not being perceived.⁴⁴ In the passage above, this scenario is elaborated with the cultural model of VISUAL PERCEPTION, in which fast-moving objects are blurred, and hard to catch a glimpse of (under the metaphor SEEING IS TOUCHING; see Lakoff and Turner 1989: 141-142 et passim), even though “we know they are there” thanks to the *object permanence* frame.

The generic space of the conceptual integration network constructed in the course of the interpretation of the passage above contains the scenario of a physically located physical

⁴⁴ Tests of object permanence in infants can involve ascertaining the occurrence of seeking, i.e. anticipation of an object previously perceived in a certain situation, when the perception is made impossible in the test-task, due to e.g. occlusion (Meltzoff and Moore 2003: 624 et passim).

object moving along physical locations in TIME, i.e. moving through temporal locations. The blended scenario receives the model of physical LOCATION from the model of existence which entails that physical things moving along the PATH of TIME'S LANDSCAPE are also located physically in all temporal locations traversed, and the *time machine* is conceptualized as physically located in the PAST, PRESENT and FUTURE temporal locations, in which it should be perceived (i.e. conceptualized as EXISTING). Additionally, the blend receives the model of perception from the cultural model of perception of fast-moving things, where an ENTITY, conceptualized as having the NATURAL PHYSICAL ATTRIBUTES of NATURAL PHYSICAL OBJECTS, is physically located in the same temporal location as the experiencer, and moves physically through temporal locations in accordance with conventional models of CHANGE OF PHYSICAL LOCATION, but cannot be perceived. This model contains the frame of EXISTENCE provided by the *object permanence* frame, which allows for an object to be conceptualized as existing although it is not being perceived. This frame, as well as the model of perception of fast-moving objects, are projected into the blend. As a result, the blend contains a scenario where an actually existing PHYSICAL OBJECT moves through temporal locations in accordance with conventional models of PHYSICAL CHANGE OF LOCATION, and actually exists although it cannot be perceived. This scenario provides appropriate human-scale compressions over the counterfactual scenarios of temporal and physical CHANGE OF LOCATION.

Interestingly, in the cultural model of the perception of fast-moving OBJECTS, the OBJECTS, conceptualized as physically located but impossible to perceive, are impossible to perceive visually, but possible to perceive with the sense of touch, i.e. a fast-moving object cannot be seen but will still hit you if you stand in its way. The blended scenario discussed above does not receive this structure from the input space structured by the cultural model of the perception of fast-moving objects, but instead, receives the more abstract scenario of *not able to be perceived but existing* from the object permanence frame, and as a result, the Psychologist's hand can intersect with the physical location of the physical *time machine* without the occurrence of any tactile perception of the *time machine*.

Another interesting attempt at compensating for the counterfactuality between the frames of physical and temporal CHANGE OF LOCATION can be found in the story "Fault" by James Tiptree Jr. (1975). In "Fault," a character named Mitch has some of his "friction in time" (170) taken away as punishment:

When a thing slips, it is because of a lack of friction holding on to some matrix. The Shodars took away (...) some of your friend's friction. Not (...) friction in space. No. They modified his friction in time. (Tiptree 1975: 170)

A scientist points out the consequences of this “slipping in time” to Mitch's friend, the narrator:

“[Mitch is] here, (...) but behind. (...) He seems to be present only at points which he will occupy” (Tiptree 1975: 170-171).

The schema evoked by the word *slip*, and elaborated in the interpretation of the scientist's explanation presented above, contains an agent traveling along TIME'S LANDSCAPE, and located in TIME behind the point mapped as the temporal location of the objective OBSERVER, i.e. THE PRESENT. Due to entailments from the domain of MOVEMENT IN OBJECTIVE SPACE (conceptualized as a physical LOCATION exhibiting object permanence), all the experiencers moving along the same objective PATH in conventional model of MOVEMENT IN TIME must traverse all the locations on TIME'S LANDSCAPE between any point in THE PAST and the location marked as PRESENT (either as HUMAN BEINGS or *no-things*). Accordingly, if an entity is conceptualized as having shared the past and present temporal locations, and all the temporal locations inbetween, with an observer, it must have confirmed to one of the models of physical EXISTENCE discussed above, since being physically located in a temporal location entails existing.

In “Fault,” the character Mitch can be seen in the OBJECTIVE PRESENT, but not physically interacted with; what he can see and respond to is physical interaction that took place a minute, several hours, and finally, over three days before the time he is perceived by others. Attempts at physical interaction with Mitch, apart from his slow response time, are characterized as successful, but not conforming to the characteristics of natural interaction with physical, BODILY SELVES:

I had taken Mitch's arm once to hustle him through a door, and it was, well—oily, somehow. But there was no oil, only a rough jacket. (Tiptree 1975: 170)

[Mitch] was pawing her shoulder, dragging at her. (...) One of his arms seemed to slide almost through her head. (171)

In one input space activated in the formation of the conceptual integration network formed in the interpretation of the notion of “slipping in time” (Input Space 1), Mitch engages in actual physical interaction in an actual physical LOCATION. In another (Input Space 2), marked as the OBJECTIVE PRESENT, everybody else engages in physical interaction in an actual physical LOCATION. Since Mitch, conceptualized as the NATURAL PHYSICAL OBJECT of his BODILY SELF, cannot be interacted with physically in the temporal location of Input Space 2, and so exhibits the essential attributes of a *no-thing*, he is conceptualized as not existing in that space. In yet another space, Mitch can be seen and heard in a temporal location marked as the OBJECTIVE PRESENT, and so is conceptualized as EXISTING. Another space contains the scenario structured in the interpretation of the phrase *present only at points which he will occupy*. This space contains a scenario representing the integration of two counterfactual spaces, where one entity is contained in two actual temporal locations, and one of those temporal locations is marked as FUTURE with respect to another. In this space, Mitch is conceptualized as being present (physically located in an actual temporal location) at a FUTURE temporal location (which normally would be conceptualized as non-present, and so, non-physical, or impossible to be interacted in physically in the OBJECTIVE PRESENT).

Early in the story, a scientist advises the narrator to “treat [Mitch] like a viscous liquid” (Tiptree 1975: 169). A liquid characterized by high viscosity is similar to SOLID OBJECTS in that it is relatively different from EMPTY SPACE in that it resists embodied interaction in a similar way to a SOLID OBJECT, but is also similar to LIQUIDS in the sense that adequate application of force would probably enable movement through it.⁴⁵ In a sense, a viscous liquid shares some characteristics of a *no-thing* and some characteristics of a NATURAL PHYSICAL OBJECT. In the interpretation of the nature of Mitch’s affliction in the story “Fault,” the conceptualizer can make use of the entrenched model of the perception of a viscous liquid as mapped into the scenario of the perception of a BOUNDED PHYSICAL OBJECT of the human agent (Mitch), conceptualized as a BODILY SELF. As a result, the OBJECT can be seen, but physical interaction with it is counterfactual with respect to cultural models of physical interaction with HUMAN BODIES, and compatible with models of physical interaction provided by the *viscous liquid* frame. Like the structure projected from the cultural model of the perception of fast-moving physical objects in the passages from “The Time Machine” discussed above, the *viscous liquid* frame helps to integrate two counterfactual scenarios of physical interaction. In the integrated scenario, what can be seen and heard of Mitch is

⁴⁵ On this reading, LIQUIDS share some of the characteristics of EMPTY SPACE in that one can move through them, but are unlike in some respects. See the discussion of conventional and novel LIQUID metaphors in Nowakowska 2006.

conceptualized as located in the temporal location marked as the OBJECTIVE PRESENT, and he generally conforms to the models of normal visual and aural perception of a HUMAN AGENT in the present.

Since Mitch is a HUMAN AGENT, he must be conceptualized as having a SUBJECT, which can perceive and interact with the environment only in a temporal location marked as PRESENT. However, in the process of conceptual integration of the content of the many input spaces described above, Mitch's physical LOCATION is projected from the scenario with actual physical interaction in an actual physical LOCATION (Input Space 1), which is marked as PAST, since the events depicting interaction with Mitch are construed from the Viewpoint of the temporal location marked as the OBJECTIVE PRESENT (Input Space 2). In the integrated scenario, Mitch is contained in the temporal location marked as PRESENT, due to the frame of the model of EXISTENCE which lends existence to objects that can be seen and heard (i.e. the Folk Theory of Essences combined with the metaphor EXISTENCE IS BEING HERE).⁴⁶ At the same time, Mitch is sometimes elaborated as not contained in it, due to the absence of NATURAL PHYSICAL ATTRIBUTES in the PRESENT temporal location:

Bruno asked me if I wanted to greet him.

“You mean, go in and talk and shake hands with empty air?” (Tiptree 1975: 172)

The clash between the two scenarios of physical LOCATION, and hence, two scenarios of existence (as a HUMAN BEING and as a *no-thing*) in the temporal location marked as the OBJECTIVE PRESENT, can be resolved due to the compression of the counterfactual scenarios of physical interaction with Mitch with the entrenched model of physical interaction with a viscous liquid, mapped onto Mitch's bodily SELF.

Science-fiction literature has managed to come up with numerous frames allowing the counterfactual compressions over scenarios structured by the counterfactual frames of physical and temporal CHANGE OF LOCATION. The instantaneous time-jump discussed in section 3.3.3.2 above seems to derive its model of time-travel, and hence, the counterfactual compression, from the entrenched model of mental time-travel, which allows for the

⁴⁶ Interestingly, this integration suggests that what may be essential in conceptualizing an entity as a human being is for it to exhibit higher-order behavior (e.g. linguistic behavior), but also, to conform to the appearance of the typical human being, including exhibiting behavior typically human in appearance. For example, a metal box which has language and all the mental attributes conceptualized as typically human will be conceptualized as human less readily than a robot perfectly resembling a human being in appearance and engaged in combing her hair.

conceptualization of instantaneous change of temporal location between two temporal locations, where at least one of them is normally conceptualized as non-actual and non-present. Importantly, such compressions can also be borrowed from many other models of non-physical change of temporal location, like the entrenched model of SLEEP, where an experiencer travels from one temporal location (e.g. *the bedroom at midnight*) to another temporal location (e.g. *the bedroom in the morning*), without traversing the temporal locations inbetween, and with no necessary conceptualization of physical CHANGE OF LOCATION (see Flynn 2003 for examples of the use of this frame in time-travel stories). Other scenarios, using structure from the cultural models of *time dilation* (see Hughes 2005: 101-102 et passim) allow the conceptualization of a SHORTER WAY between two temporal locations. This *shorter way* is conceptualized as a physical location in SPACE traversed by a VEHICLE (e.g. a spaceship) traveling at a very high speed (e.g. at the speed of light), which results in change of temporal location, at a speed relatively higher than the normal speed of travel between two temporal locations along the objective, idealized path of TIME'S LANDSCAPE. Obviously, science-fiction authors, and imaginative scientists, employ many other cultural models to bring their novel scenarios of change of location to human scale (see Flynn 2003, Gribbin 1996 and Turtledove 2004 for examples).

3.5. Extensions of conventional models of CAUSATION

The theme that time-travel science fiction seems to explore the most often is the effect of the implementation of the novel scenarios of MOVEMENT IN TIME on event-sequences structured by conventional folk theories of CAUSATION (see e.g. Rye 1997). Lakoff and Johnson note that there is no single folk theory of causation, but the conceptualizer, in construing an element of conceptual structure as a CAUSE, can make use of one or more variations of models of CAUSATION, which together form a radial category of CAUSATION, with all the theories fitting “a very basic, skeletal structure common to all causations” (1999: 176). Discussing that skeletal structure, Lakoff and Johnson relate the findings of Srinivas Narayanan concerning “a single general structure governing all neural control systems for bodily movements,” from which arises “our structuring of all events, concrete or abstract” (1999: 176). That structure is presented as follows:

Initial State: Whatever is required for the event is satisfied

Start: The starting up process for the event

End of Start: The end of the starting up process and the beginning of the main process

Main Process: The central aspects of the event
Possible Interruptions: Disruptions of the main process
Possible Continuation or Iteration: The perpetuation or the repetition of the main process
Resultant State: The state resulting from the main process
(Lakoff and Johnson 1999: 176)

According to Lakoff and Johnson, all theories of causation are based on extensions of this structure, with MANIPULATION OF OBJECTS BY FORCE serving as the causal prototype at the center of the conceptual category of CAUSATION (1999: 177). Various conceptual models available to the conceptualizer can condition the conceptualization of an element of conceptual structure, like an EVENT or OBJECT, as “a determining factor for a situation” (Lakoff and Johnson 1999: 178). Importantly, all conventional folk models of causation require that the determining factor occur *before* the event caused (i.e. the EFFECT). As discussed above (section 2.4.2), ordered events map in routine ways into the structure of the Timepiece blend, termed M in Fauconnier and Turner 2006. Conventional models of TIME in the M network allow the conceptualizer to map spatial order onto the order of EVENTS in TIME. Therefore, what is construed as the determining factor for a state of events can naturally be conceptualized as occurring *before* another event (the EFFECT), and very often, as situated before the effect in the spatial structures embedded in conventional models of time. Additionally, in the E / X blend discussed in section 2.4.2 above, “an event becomes a path, and completing the event is traversing the path” (Fauconnier and Turner 2006:10), and in the E / X / M network, completing the event is traversing the path of a universal event from the M network which the event is mapped onto. Because of this, traversing a sequence of events, in which an event conceptualized as CAUSING the following event(s) in the sequence, can be conceptualized as traversing a temporal PATH. In other words, CAUSING an event becomes going through two events (the CAUSE and the EFFECT) in TIME.

3.5.1. Extensions of conventional models of CAUSATION based on the metaphor TIME IS A CHANGER

Admittedly, very often the conceptualizer is able to use a specific theory of CAUSATION to construe the specific nature of the cause of a perceived event. For example, the conceptualization formed in the interpretation of the sentence *Cigarette smoke and alcohol caused him to look this old* can make use of a theory of CAUSATION where a chemical substance can lead to the state of a person’s BODY commonly characteristic of AGED PEOPLE.

This cultural model lends the conceptualizations underpinned by it many useful human-scale compressions, such as the mapping in which the prolonged exposure in TIME to the chemical is compressed into *the chemical*. However, interestingly, the fact that temporality is an inherent part of any sequence of events conceptualized as CAUSATION surfaces in cases where no conventional model of CAUSATION seems to be available, and then TIME itself can be conceptualized as the causing agent (see section 1.2.2.3 above), giving rise to the production of sentences like *Time destroyed his beauty*. Additionally, very often the temporal precedence of an event adjacent to another event is conceptualized as a CAUSE-EFFECT relation, under conventional metaphorical model of CAUSAL PRECEDENCE (see Lakoff and Johnson 1999: 209). For example, the sentence *Whenever you come over, I get a cold* prompts for the conceptualization of the compression of a sequence of events with a model of CAUSATION where *colds* can potentially be caused by *the visitor*, *the visit*, or anything particular that another theory of causation will enable the conceptualizer to construe as the specific CAUSE of the illness.

The interconnectedness of conventional models of causation and conventional models of time surfaces evidently in unconventional scenarios of movement in TIME. For example, in the following passage, concerning the re-collapse of the universe, the author considers the physical results of the reversal of the direction of movement on the idealized TIME'S LANDSCAPE:

Originally, I thought that the [collapse] would be the time reverse of the expansion. This would have meant that the arrow of time would have pointed the other way in the contracting phase. People would have gotten younger, as the universe got smaller. Eventually, they would have disappeared back into the womb. (Hawking 2006).

In a culturally prominent folk theory, underpinned by conventional metaphor TIME IS A CHANGER (see section 1.2.2.3 above), TIME is conceptualized as the agent causing deterioration of the human body. In this theory, the FORCE OF CAUSATION receives a front-back orientation from the models of TIME. As a result, the event of aging the body is a movement on TIME'S LANDSCAPE, with a beginning, which is mapped as a LOCATION on TIME'S LANDSCAPE (depending on the conceptualizer's cultural models, this location can be elaborated as *after sixty*, *after forty*, *at birth*, etc). In the scenario of *aging by time*, the ageing is linked with a cultural model representing the stages of normal human biological development, in which old age is construed as such a stage, preceded by others, such as

adulthood, youth and infancy, and the beginning stage of that sequence is considered to be *the birth* of the individual.⁴⁷

The passage above presents a novel scenario of movement in TIME, in which the direction of movement is reversed. The new model of MOVEMENT IN TIME projects back to folk theories which conventionally receive a front-back orientation from conventional models of TIME, including the cultural model where TIME is seen as an agent causing the gradual deterioration of the human body. This scenario is consistent with one of the folk models of causation, i.e. CAUSATION IS THE FORCED MOVEMENT OF AN ENTITY (THE AFFECTED ENTITY) TO A NEW LOCATION (THE EFFECT) (see Lakoff and Johnson 1999: 198-200), where STATES are conceptualized as LOCATIONS (see section 3.4 above). In the cultural model of TIME AGES, the causal force is mapped onto the MOVEMENT OF TIME (under TIME IS A CHANGER), and deterioration of the body is conceptualized as a scenario where TIME is the force which causes the movement of an individual from one stage of biological development to another. In the novel scenario of MOVEMENT IN TIME, activated in the interpretation of the passage above, the reversal of the MOVEMENT IN TIME produces a scenario where the EFFECTS of the CAUSAL FORCE in the frame of *time ages* are preserved, but the MOVEMENT OF TIME, and hence the CAUSAL FORCE, are reversed. As a result, in the novel scenarios, the reversed movement of TIME causes the same effects in reverse: it rejuvenates old people, instead of making young people old. Accordingly, the reversal of the MOVEMENT OF TIME results in the CAUSAL FORCE of TIME pushing the human being back through the stages of aging, into infancy, the delivery ward and back into the womb.

In science fiction, scenarios underpinned by the TIME IS A CHANGER metaphor are sometimes extended due to the formation of a novel model of MOVEMENT IN TIME, where the movement is reversed, but there are also cases where the MOVEMENT OF TIME is elaborated as movement faster than the OBJECTIVE MOVEMENT of the OBSERVER on TIME'S LANDSCAPE, which results in, for example, the accelerated ageing of a human being. Interestingly, as there are theories of causation which prompt the conceptualization of the force of causation which effects the passage from one stage of biological development to another as something different from the MOVEMENT OF TIME, the projection of these theories into the structure of blended spaces containing novel scenarios of MOVEMENT IN TIME can result in the emergence of the awareness of counterfactuality, which can then be elaborated in interesting ways, e.g.:

⁴⁷ As evidenced, for example, by the practice of calculating one's age from one's date of birth, not conception; alternative theories of life frame the moment of conception, or the development of the fetus, etc, as the beginning of life.

People caught in freak Time-travel accidents will be left older (I wonder - does an egg turn into a rotten egg, a chicken, or a KFC Bargain Bucket?), or occasionally younger (just as the victims of stepladder accidents end up two feet tall, no doubt). (Rye 1997)

3.5.2. Temporal paradoxes

Theories of CAUSATION provide useful compressions over many representations of events and cultural models. These compressions form the basis of rationalizing about the events in a cultural word guided by the cultural reality of conventional models of TIME. Since time-travel scenarios go against that rationality, they also allow for elaborating a model of causality so that the conceptualizations structured by that novel model become irrational. These leads to the conceptualization of the counter-intuitive scenarios sometimes referred to as *temporal paradoxes*.

3.5.2.1. The grandfather paradox

One of the most well-known temporal paradoxes is the *grandfather paradox*, which can be stated in the following way:

Suppose you travelled back in time and killed your biological grandfather before he met your grandmother. Then you would never have been conceived, so you could not have travelled back in time after all. (Wikipedia 2)

The passage above evokes conventional model of causation referred to as CAUSING IS MAKING (see Lakoff and Johnson 208-209), which underpins conventional model of HUMAN REPRODUCTION, where biological parents *make* their children, and can sometimes be conceptualized as the CAUSE of the child's EXISTENCE. The grandfather paradox, as presented above, enforces the formation of a conceptual integration network, with one input space (Input Space 1) where conventional theory of CAUSATION holds true (the time-traveler's grandfather, conceptualized as the cause, fathered at least one of the time-traveler's parents, who in turn "made" the time-traveler, conceptualized as the EFFECT), and another input space (Input Space 2), containing a scenario where this theory of CAUSATION also holds true, and a male human being dies childless, due to the intervention of a murderer. The blended space in this conceptual integration network receives both the scenario where the time-traveler is

created, and the scenario from Input Space 2. The *murderer* in Input Space 2 is fused with the *time-traveler* in the blend. This blended scenario can be elaborated, as in running an imaginative scenario of the time-traveler murdering the grandfather. However, this elaboration can induce another conceptual integration, where the murderer in the blend is fused with the time-traveler projected from Input Space 2, the blend receives the *grandfather* frame with its causal structure from Input Space 1, and the male human being in Input Space 2 is fused with the Value in the Role-Value network of the *grandfather* frame. Since in the blend, the male human being is killed, this structure can project back into Input Space 1, to induce the conceptualization where the time-traveler does not exist (in accordance with the folk model of human biological reproduction, where the parents' parents are conceptualized as a non-immediate CAUSE of the children's existence). However, the causal structure behind that back-projection requires that the time-traveler exist, since in the cultural model of murder, the murdered must exist for the murder to take place, and in the blend, the murderer is fused with the time-traveler. This can induce the emergence of the awareness of the counterfactuality of the input spaces.⁴⁸

Importantly, the construal of counterfactuality between the scenarios in the Input Spaces is brought about by a very primitive, and, arguably, embodied aspect of the structure of all theories of CAUSATION, i.e. the entailment of the single general structure governing all neural control systems for bodily movements referred to above, which states that "if you haven't started, you haven't finished" (Lakoff and Johnson 1999: 176). In the blended scenario, the process of CAUSATION involved in the creation of the time-traveler has been finished (since the time-traveler is deemed to exist), but it has not been started (as the crucial causal event of the time-traveler's grandfather existence prior to the existence of the time-traveler has not taken place). In other words, there is an EFFECT, without a CAUSE. Additionally, as many theories of CAUSATION can be involved in the conceptualization of a particular event, the counterfactual scenario imposes counterfactuality on related scenarios, compressed with theories of CAUSATION which figure either of the participants as a CAUSE. For example, in another cultural model of CAUSATION, for somebody to be killed by a murderer, the murderer must exist. This aspect of the cultural model of MURDER can be projected to the blended scenario, giving rise to the emergence of another counterfactuality link: in one scenario, the time-traveler does not exist, so she cannot murder the grandfather, and in another, her

⁴⁸ Especially that the integration of these counterfactual scenarios is encouraged, i.e. the paradox is presented as something to be run as an imaginative scenario, which, admittedly, discourages settling on the emergent notion of counterfactuality of the blended space in relation to culturally prominent theories of causation as a response to the paradox thus stated (i.e. explaining the paradox as *nonsense*).

nonexistence is caused by her murdering the grandfather. Again, the suggested mapping of the murderer onto the time-traveler induces the emergence of the awareness of counterfactuality with regard to culturally basic theories of CAUSATION, namely CAUSING IS MAKING, and the special case where biological parents and their parents are conceptualized as the CAUSE of the physical existence of an individual.

Importantly, Fauconnier and Turner stress that the “literal falsity” of the relations in some blended spaces is “irrelevant to the reasoning process” (2003: 237). This refers to cases where a “counterfactual compression” in the blended space aligns the input spaces so that the structure in the input spaces is preserved, and the compression enables the creation of a blended space with no emergent awareness of counterfactuality. Interestingly, there are cultural models which can enable the formation of a scenario which “solves” the grandfather paradox. One of them concerns *parallel universes* (see Wikipedia 3). The model of a parallel universe represents a scenario with two actual, simultaneous PRESENT temporal locations (see section 4.6 above). In the case of the grandfather’s paradox, the models of parallel universes enable the creation of two input spaces, one containing the scenario where the time-traveler exists (Input 1), and the other containing a scenario where a murderer kills a man, so that all his possible offspring will not come to exist (Input 2). The blended space receives the temporal location from Input 2, and the representation of the time-traveler from Input 1. Although in Input 2 there is no future offspring in the temporal location where the *time-traveler* kills a man, the blended scenario receives the frame of the grandfather causing the grandchild to exist from Input 1, and the killed man is connected with the Value of the Role-Value network grandfather in Input 1 with an Identity link. The CAUSATION frame from Input 1, where the grandfather is the CAUSE of the existence of the time-traveler, is projected into the blend. The Value in the Role-Value structure of that frame is projected from Input 1. In effect, although the man killed by the time-traveler *is* the time-traveler’s grandfather, due to the Identity link between the two values, in the blend, he is not the CAUSE of the time-traveler’s existence. As a result, the time-traveler can exist, and is mapped onto the murderer slot provided by the cultural model of murder without the emergence of the counterfactuality which characterized the blended scenarios above.⁴⁹ See Wikipedia 2 for the discussion of

⁴⁹ If the parallel world compression does not require any previous causal events to differ in order for the counterfactuality to be avoided, it is sometimes referred to as an *alternative* or *possible future*. For example, in the story “Backward! Turn Backward” by James Tiptree Jr. (Tiptree 1988), the teenage Diane, having awakened at the side of the nerdy Don after the time-jump, is less than thrilled at the circumstances she witnesses as her future life: “I see now. This is a *possible* future. As that thing said, it isn’t reality yet. (...) I’ll change it, I’ll do something differently (...)” (Tiptree 1988: 221). Having killed Don, she experiences a scenario tragically unlike the one after the time-jump.

alternative cultural models providing adequate compressions for solving the grandfather paradox.

3.5.2.2. The ontological paradox

Another temporal paradox, referred to as the *ontological paradox*, causes counterfactuality to emerge because the scenarios that it suggests the reader must integrate clash, going against the causal precedence embedded in the CAUSING IS MAKING metaphor. The paradox can be stated in the following way:

A professor travels forward in time, and reads in a physics journal about a new equation that was recently derived. He travels back to his own time, and relates it to one of his students who writes it up, and the article is published in the same journal which the professor reads in the future.
(Wikipedia 4)

The interpretation of the passage creates a mental space which contains a scenario underpinned by the CAUSING IS MAKING metaphor, in which the existence of an equation is mapped as the EFFECT, and *the professor's knowledge of the equation* is mapped as the CAUSE. Additionally, the interpretation of the passage activates another scenario, where a folk theory of interpretation of text evokes the construal of *the article* as the CAUSE of the emergence of the professor's knowledge of the equation. Importantly, another mental space created in the interpretation of the passage has *the student's knowledge of the equation* mapped as the CAUSE, and the article as the effect. The scenarios of causation described above share temporal structure underpinned by the TIME ORIENTATION metaphor, where the CAUSE is conceptualized as PAST relative to the EFFECT, marked as FUTURE. Considered from the Viewpoint of the temporal location where the professor is telling the student about the equation, the temporal location with the CAUSE of the professor's knowledge, i.e. *the article*, is marked as FUTURE in relation to the EFFECT, the knowledge of the equation, and cannot, therefore, be conceptualized as a CAUSE. Additionally, considered from the Viewpoint of the space representing the event of the professor's imparting his knowledge of the equation to the student, the space containing the representation of the professor's trip in time to the future and back is marked as PAST. Accordingly, the temporal location with *the article* is marked as PAST, and so it cannot be mapped as the future EFFECT of the professor's knowledge. The integration of these scenarios requires the creation of an imaginative scenario, where one temporal location (representing the scenario of reading the article) is marked as both PAST and

FUTURE. This structure is counterfactual with respect to conventional models of CAUSATION evoked in the interpretation of the passage. Very similar conceptual integration can be carried out for a variety of time-travel stories involving the CAUSING IS MAKING metaphor (see, for example, the story “All You Zombies” by Robert A. Heinlein, in which a character is his/her own biological father and mother).

3.5.2.3. The predestination paradox

The *predestination paradox* (discussed as *pre-ordained time-travel* in Rye 2006) represents scenarios characterized by causal structure similar to the one evoked in the interpretation of the ontological paradox, in which a PAST EVENT is conceptualized as an EFFECT, and an event marked as FUTURE with respect to the event marked as PAST is conceptualized as the CAUSE. This paradox is presented in the following example:

A man travels back in time to discover the cause of a famous fire. While in the building where the fire started, he accidentally knocks over a kerosene lantern and causes a fire, the same fire that would inspire him, years later, to travel back in time. (Wikipedia 5)

Considered from the Viewpoint of the temporal location of the building before the fire, the CAUSE of the fire, i.e. the man’s decision to travel into the past, is marked as FUTURE in relation to the EFFECT (*the fire*). Considered from the Viewpoint of the temporal location where the man learns of the fire, the EFFECT (the existence of the information about the fire) is marked as PAST in relation to the CAUSE (the man’s learning about the fire). The source of the awareness of the counterfactuality emerging in the conceptual integration of these two scenarios is their incompatibility with the CAUSING IS MAKING schema, where the EFFECT cannot exist if the CAUSE is not conceptualized as PAST, i.e. as having occurred.

This paradoxical scenario is commonly used in science-fiction, perhaps due to the dramatic effect of the futility evoked by the time-traveler’s decision to prevent a present or future effect, which she actually winds up as causing due to her decision to prevent it in the course of the time-travel. As an example, consider the story “The Man Who Walked Home” by James Tiptree Jr. (1973; see also section 3.3.1.5 above). In that Story, John Delgano has been sent back from the future, and appears annually in the middle of a crater created in the explosion of a laboratory, which in turn sparked off a nuclear holocaust. The society which developed in the course of the several centuries that the story spans comes to see the

apparition as an object of religious admiration, and annually showers it with gifts. At some point in the story, one of the characters hints as to what effect this admiration could have on John Delgano:

“(…) He’s falling. Trying to check his—well, call it velocity. (…) He must have slipped or stumbled. (…) Did somebody trip him?”

“You mean (…) whoever made him fall caused all the, caused—”

“Possible (…)” (Tiptree 1973: 183-184)

This passage can prompt the creation of a scenario in which an effect conceptualized as PAST (*the explosion in the laboratory*) is conceptualized as CAUSED in a temporal location marked as FUTURE (*the annual celebrations*). At the same time, the CAUSE of the celebrations (*the development of the new culture and the annual celebrations after the nuclear holocaust*) is conceptualized as PAST (*the explosion in the laboratory*). Interestingly, in the process of the reading of the story, these counterfactual scenarios, characterized by opposite vectors of MOVEMENT IN TIME, can be integrated due to the compressions borrowed from the human-scale frame of a human agent walking along a path in reverse direction to other agents engaged in movement on the path. In “The Man Who Walked Home,” John Delgano’s direction of MOVEMENT ON TIME’S LANDSCAPE is presented as the opposite of the direction of movement of the OBJECTIVE OBSERVER traveling on TIME’S LANDSCAPE, and can be elaborated as walking (see section 3.3.1.5 above), which can be considered as part of the motivation for the title of the story.

3.5.2.4. Autoinfanticide and coincidences

Some variations of the grandfather paradox discussed above figure the time-traveler as returning to a temporal location in the past and killing themselves as they were then (for example, as a child). This version of the paradox is referred to as *autoinfanticide*. One interesting solution to this temporal paradox is based on the notion of coincidences; an attempt at committing the autoinfanticide would be prevented by the homicidal time-traveler suddenly slipping on a banana peel, or some other felicitous happening which would make the murder impossible (see Sider 2002: 4 et seq. for discussion).

Like the grandfather paradox, autoinfanticide goes against conventional theories of CAUSATION, and in the solution involving the coincidences, a rational, material world guided

by them is conceptualized as laboring to prevent the impossible occurrence from happening. This interesting scenario is made possible by the cause-effect compression in perception, discussed in section 3.2.2.1 above. Under this compression, a feature of an entity is conceptualized as residing in the entity, and not as a conceptualization by the ego (e.g. a conceptualization structuring sensory input to yield the awareness of the color *blue*). If an aspect of the cultural world is conceptualized as the CAUSAL FORCE which results in the transfer of an element of an imaginative scenario into a resultant state (THE EFFECT), that aspect will also be conceptualized as being a feature of the objective outside world, and will be fused with the CAUSE in a cultural model of CAUSATION. In effect, an element of conceptual structure conceptualized as existing objectively in the world can be conceptualized as a CAUSE, and that cause can then be construed as objectively (although not physically) existing in the world.

Importantly, conceptualization of an EFFECT entails conceptualization of a CAUSE, and as a result, effects in objective reality that do not occur do not have causes in objective reality. In the imaginative scenario prompted by the temporal paradox of autoinfanticide, there is an EFFECT which should not occur, i.e. the counterfactual scenario where an EFFECT (the time-traveler) has no CAUSE (the time-traveler living up to the moment of her engaging in time-travel). In cases where an EFFECT is conceptualized as existing, although its existence is counterfactual with the entailments of conventional theories of causation (in the sense that there is no conventional theory of causation which would provide a CAUSE for the existence of the unconventional EFFECT), a conventional theory of CAUSATION can be imported into the blended space of the conceptual integration network created in the formation of the scenario containing the impossible EFFECT, and project back to one of the spaces constructed in the formation of the scenario in question to remove the CAUSE, and consequently, the unwanted EFFECT. The resultant integrated scenario adheres to the model of the world where EFFECTS must have CAUSES. The example with the banana peel, for instance, uses a theory of CAUSATION whereby slipping on a banana peel causes temporary immobilization of a human agent, and another theory of CAUSATION, which states that a murderer lying helpless and immobile on the ground cannot temporarily commit murder and so, she can lose the chance of following through with it altogether (which consists in removing the CAUSE of the improbable effect, and so, the EFFECT, so the scenario under consideration can be consistent with conventional theories of CAUSATION). As a science-fiction example, consider *Brightness Falls*, a science-fiction novel by James Tiptree, Jr. (1985), where a character called Baram witnesses the death of another character, Linnie, caused by a projectile device which attaches

to the victim and administers poison. Baram is then accidentally transported into the past, and manages to avert the death of Linnie. Very soon afterwards, the weapon “accidentally” attaches to Linnie again:

[the] damned triple barb had tangled itself in her hair, and he'd barely caught it starting to drag across her throat. (Tiptree 1985, Chapter 18, 295).

Here, conventional theories of CAUSATION, e.g. the theory which states that the NATURAL STRUCTURAL ATTRIBUTES of certain OBJECTS cause them to get entangled in human hair, are used to remove the unconventional effect of *Linnie being alive although she died*. Interestingly, Baram attempts to induce the conceptualization of Linnie as alive in other characters, to make the irrational effect part of the OBJECTIVE PRESENT, and so, construed as EXISTING (under the metaphor EXISTENCE IS BEING HERE; see section 3.4 above):

[He] frantically set about making this reality—the reality of [Linnie] alive—real. He made her speak to Kip and Cory, hand them objects, move chairs—anything to build the living [Linnie] into [others'] memories, to make her mark on *this* present. (ibid.)

In *Brightness Falls*, the rational world continues its attempts to remove the CAUSE-LESS EFFECT from the OBJECTIVE PRESENT. Time-travel science fiction presents many varied approaches to the problem of how the rational world would react to the occurrence of an EFFECT without a CAUSE which would adhere to conventional theories of CAUSATION. A comprehensive list of these approaches, termed *laws of chronophysics*, can be found in Rye 1997.

CONCLUSIONS

In 2005, students of the Massachusetts Institute of Technology organized the first Time Traveler Convention. The event was announced in advance, with Amal Dorai, the student who thought up the convention, suggesting that people “[write] the details down on a piece of acid-free paper, and slip them into obscure books in academic libraries” (Belluck 2005), so that the information about the convention would have a chance of surviving until a future time-traveler is able to make the time-jump and come to attend. A landing area for materializing time machines was roped off for safety, and the organizers posted the latitude and longitude of the venue on the convention’s website, in case East Campus Courtyard happened not to exist anymore in the future temporal location from which the expected time-travelers would start off on their temporal journey to the day of the convention. Sadly, no time-traveler showed up, but Amal Dorai argued that this fact by itself does not prove that time-travel is impossible (Belluck 2005).

The story of the Time Traveler Convention can be held to prove the claim that the notion of time-travel has some sort of cultural existence; the organizers of the conference and the three hundred participants not only entertained some understanding of what time-travel is, but also endeavored to make it possible for it to occur. Admittedly, the phenomenon of time-travel had already existed, in a way, for a long time before the convention took place, in the form of the various hypotheses concerning the possibility of time-travel presented in scientific text (see Gribbin 2006). Importantly, such hypotheses also provided the material for science fiction writers, who usually endeavor to set their stories in worlds bound by rules of a science.

The rules, laws and models provided by strict sciences are often assumed to represent the world as it really is, and as such, they can be taken to define part of the basis of rationality. A rational human being will be able to recognize what aspects of the scenarios her imagination presents her with can be made part of actual, physical reality. For example, although the folklore and mythologies of the world may have depicted flying beings since prehistoric times, before the invention of the airplane and the dissemination of the knowledge of the existence of that new technology the assertion that people can actually fly through the air could have met with disbelief (especially that applications of such a scenario in physical reality would invariably fail). In contrast, the knowledge of the possibility of engaging in air travel in actual physical reality, shared by members of most modern communities, renders

assertions concerning the possibility of traveling through the air completely realistic, rational, and not at all insane, even though it may be impossible for the specific person who makes the assertion to ever actually partake of the joys of flight.

As demonstrated by the example discussed above, the development of a technology can lead to the development of novel cultural models which, among other things, can in turn begin to constitute the origin of the rules which draw the line between the realm of rational imagination and fantasy. Extension of locational models of the world can enable, facilitate or inspire the creation of novel scenarios of change of location within the world, such as those structured by the models concerning change of location on the *planet Earth*, as opposed to cultural models concerning change of location on a flat Earth, which can include the conceptualization of scenarios of travel beyond a point construed as the world's extremity as *fantastic, dangerous, or irrational*. Interestingly, scientific theory has already attempted to provide models of location in space and time which could allow the travel through time to a location in space (see Gribbin 2006, Artzenius and Maudlin 2005). Although, as demonstrated above, the knowledge of these models may already have seeped into the minds of some members of some human communities, it has not yet been possible to test these models in physical reality, and accordingly, it probably will still often be considered somewhat irrational to consider the possibility of *actually* traveling through time.

As much as science relies on experiment to make its theories into actual reality, science fiction picks up the theories of science and, as fiction, presents the reader with beautiful lies about the possible practical application of time-travel theory, very often supplementing the scientific models with its own, fictitious theories presented in, or in reference to, scientific discourse. Importantly, however, both science and science fiction are probably constructed by the imagination of cognitively mature human beings. Notably, models of the rules, structures and processes of imagination, as exercised by cognitively mature human beings, are amply provided by cognitive linguistics theories. Additionally, cognitive linguistic research characterized models of certain conventional structures which the mind can work on to extend the convention and produce novel scenarios. It can be assumed that both the scientist and the science fiction author share a lot of those conventional models, and that their imagination is bound by the same rules, structures and processes.

In this thesis, I provided an overview of what cognitive linguistics presents as the conventional models of TIME, as well as providing a description of selected aspects of the

creative operation of the mind, as modeled by conceptual metaphor theory and conceptual blending theory. In the final chapter, I analyzed the ways the conventional models of TIME are extended by science fiction authors to provide novel scenarios of movement in TIME. Although the creation of these scenarios is not bound by rules similar to those which govern scientific research, it can be argued that the operation of human imagination that gave rise to these novel creations is bound by the same rules, and uses the same conventional structures of knowledge, as the processes of imagination that gave rise to the creation of hypotheses and theories concerning time travel found in science. Therefore, it would seem interesting to carry out similar analyses of the extensions of the conventional thinking about TIME as they are presented in scientific discourse. Admittedly, such an analysis could provide insight into how and why scientific thinking can be bound by the entailments of the conventional models of TIME with their innate spatial topology, the resulting entailments, and the possible conceptual integration that occurs in the creation of novel, unconventional scenarios of movement in TIME. Additionally, since it can be assumed that both scientists and science fiction authors build their novel theories with recourse to conventional models of TIME, as well as to the same, scientific models of the rational physical world, it seems that the discussion of the extensions of conventional models of TIME as presented in science fiction by itself can probably shed at least some light on the conceptual operation behind the models of time-travel presented in scientific theory.

More importantly, however, the analyses that this thesis presents portray only a tiny fraction of the huge body of extensions of conventional conceptual models that science fiction writers created. Science fiction authors push the boundaries of conventional models of the world with their rational entailments in all directions imaginable. Since cognitive linguistics aims to describe the operation of the human mind, providing models of the conventional products of imagination, as well as the tools that can be used to analyze the creation of quite unconventional scenarios, it seems to be a suitable theoretical framework for the analysis of the imaginative extensions of conventional conceptual models in a genre that, admittedly, bears the extension of conventional conceptual models as its trademark. It is for this reason that I chose to employ the theoretical framework of cognitive linguistics in my discussion of the unconventional scenarios of movement in time in science fiction, and time will tell whether this approach can benefit the exploration of the many other types of unconventional scenarios that science fiction authors have forged.

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SUMMARY

This thesis overviews conventional conceptual models of TIME, as described by cognitive linguistics, as well as the novel extensions of conventional models of TIME found in science fiction. The first chapter presents an overview of conceptual metaphor theory and a discussion of conventional metaphorical models of TIME, such as the MOVING TIME and MOVING OBSERVER metaphors. Chapter two provides an outline of conceptual blending theory, and presents a conceptual blending account of the structure of conventional models of TIME. The third chapter contains a discussion of the role of episodic memory, mental time travel, and conventional models of LOCATION and CHANGE OF LOCATION in the conceptualization of the MOVEMENT IN TIME, the analysis of novel scenarios of MOVEMENT IN TIME in science fiction, in relation to the model of NATURAL LOCATIONS of the SELF that the particular scenario activates, the discussion of the possible clashes between the frames of MOVEMENT IN TIME and MOVEMENT IN SPACE in time-travel science fiction, and a survey of several extensions of conventional models of CAUSATION, as related to the novel extensions of conventional models of TIME in science fiction. The analyses employ theoretical models provided by cognitive linguistics, notably conceptual blending theory and conceptual metaphor theory. The source texts discussed in the third chapter include science fiction stories by Terry Carr, L. Sprague de Camp, Henry Kuttner and James Tiptree Jr., as well as the novel *The Time Machine* by H.G. Wells.