CHAPTER 2:

Theoretical Prerequisites

2.0 Introduction

The purpose of this chapter is to lay the theoretical foundation for the discussion of tense in the following chapters by providing an overview of the formal mechanisms of mental space theory proposed by Fauconnier (1985, 1986a, 1986b, 1990, 1991, to appear) and elaborated in Dinsmore (1991). To that I end I will outline the relevant principles of the theory and the role which linguistic elements play in the cognitive construction process, showing how spaces are constructed and embedded, how spaces are structured, and how spaces and elements within different spaces are connected.

The structure of this chapter is as follows: Section 2.1 introduces the notion of *mental spaces* and mental space configurations, cognitive constructs which are created during the processing and production of language and which language depends on crucially for the interpretation of meaning. Section 2.2 is concerned with the construction of spaces, the embedding and hierarchical organization of spaces, and the process of *contextualization*. Sections 2.3 through 2.6 consider the ways in which spaces and elements within spaces may be linked and how spaces may be structured via these links. Section 2.4 shows how the presence of cognitive links between entities and the general *Access Principle* allows elements to be referred to via their counterparts. Section 2.5 considers cognitive links between roles and their values. Section 2.6 shows how spaces may be structured via links to frames or cognitive models, or via domain projection mapping, crucially involved in metaphor. Section 2.7 considers the notion of space

accessibility and the default transference mechanisms such as *optimization, spreading*, and *presupposition float,* which allow information to pass between parent and daughter spaces. The chapter concludes with section 2.8.

2.1 Mental Spaces

Under the mental space view, language comprehension and production involves the construction of hierarchically organized and interconnected cognitive domains, domains which are independent of language but which language depends on for the interpretation of meaning. Language is the superficial manifestation of these underlying, highly abstract cognitive constructions. Sentences give partial and underdetermined instructions for: the construction of domains; the subdivision or partitioning of information into different domains; the internal structuring of elements and relations within each domain; and the construction of connections between elements in different domains and connections between the domains themselves. These domains are referred to as mental spaces (Fauconnier 1985).

Mental spaces correspond to "understandings" of a sentence within a context (Fauconnier 1985). Mental spaces are very partial structures which may represent pictures, beliefs, hopes, stories, propositional attitudes, hypothetical realities, thematically or topically defined domains, quantified domains, situations located in time or space, etc... Each space is a partial representation of "some logically coherent situation or potential reality, in which various propositions are treated as true, objects are assumed to exist, and relations between objects are supposed to hold" (Dinsmore 1991:49).

The interpretation of discourse results in the construction of a complex configuration of hierarchically related and interconnected spaces. As each sentence of the discourse is processed, the configuration of spaces is dynamically updated, based on lexical and grammatical cues provided in the sentence. Building from the configuration already constructed from interpretation of the preceding discourse, linguistic cues impose constraints upon and provide partial instructions for the cognitive construction process. As the configuration of spaces is dynamically updated, spaces will be pragmatically elaborated from background knowledge packaged in the form of frames and Idealized Cognitive Models (ICMs) (Lakoff 1982). Spaces will also be elaborated by inferencing and reasoning processes. In general, the meaning of a given linguistic expression is its potential for generating a set of interpretations, i.e. a set of space constructions. The meaning of a given linguistic expression in a particular context is the difference between the space configuration before and after the processing of that expression.

Although language provides partial cues for the space construction process, construction takes place at the cognitive level which is distinct from language structure. The cognitive constructions are also distinct from the real world. Mental spaces are not representations of the world or representation of models of the world or of possible worlds. Cognitive constructions do, however, relate language to the real world and provide a format for inferencing and reasoning processes.

2.2 Construction of Spaces

As discourse is processed, new mental spaces may be built as a result of cues

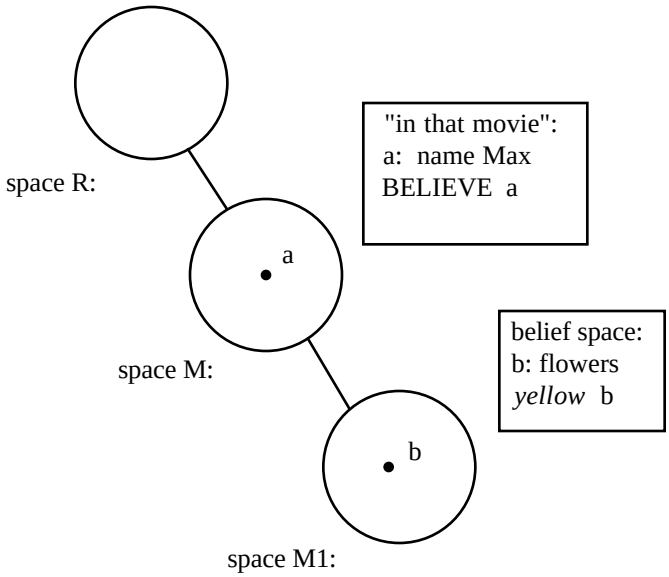
provided by *space-builders*, by grammatical markers such as tense and mood, or by pragmatic information. 'Space-builders' may take a variety of grammatical forms: prepositional phrases, connectives, complement taking clauses, etc... (For example: in the picture, in 1989, at school, from her point of view, if ___, Roger said ___, John believes ___, Mary hopes ___). In the absence of more explicit space-builders, tense and mood may cue construction of spaces. Spaces may also be built on the basis of implicit pragmatic cues. For example, a speech situation may implicitly set up a space for what is to be communicated between speaker and hearer. A space for the speaker's conception of reality, space R, is always constructed by default. Note that a space-building expression may also serve simply to relocate a space already constructed from the preceding discourse, in which case no new space is constructed.

Spaces constructed from cues provided by linguistic expressions (i.e. space-builders) are always established as subordinate to some 'parent' space, although the parent space may not be explicitly specified. The parent space may be a spatio-temporal situation, a hypothetical situation, etc..., as defined by context and/or by pragmatic information. The inclusion of a space in a parent space may also be indicated syntactically. For example:

(2.1) In that movie, Max believes that the flowers are yellow.

The interpretation of (2.1) results in a configuration of spaces as in Figure 2.1.

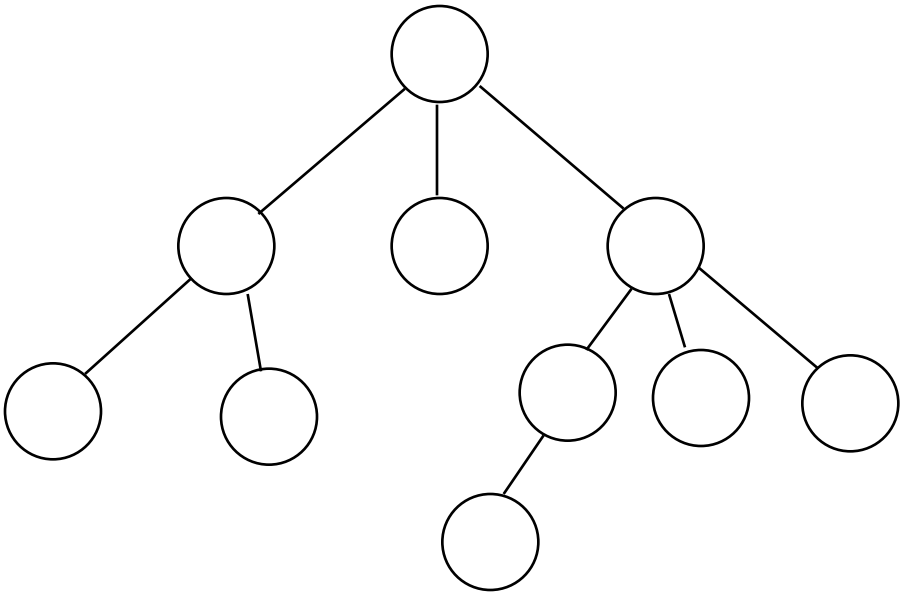
FIGURE 2.1 'In that movie, Max believes that the flowers are yellow'



Space R, speaker reality, is constructed by default. The space-builder 'in that movie' cues construction of space M which is structured by the expression 'Max believes'. Since no parent space is indicated by linguistic or pragmatic cues, speaker reality is the default parent space for space M. The space-building expression 'Max believes' cues construction of a daughter space M1, from parent space M. The syntactic embedding reflects the parent daughter relationship; it indicates that space M1 is subordinate to space M.

Since a space is always established in relation to a parent space, the interpretation of discourse results in a hierarchically structured configuration of spaces as in Figure 2.2 below.

FIGURE 2.2 Hierarchical Space Lattice



The interpretation of discourse results in the construction of one or more of these hierarchically ordered space lattices. Since the structure is updated and pragmatically elaborated with each sentence, the interpretation results in a succession of cognitive configurations. A different set of constructions will be built for each discourse.

The highest space in any hierarchical space lattice is the BASE space. The BASE space is the initial space, the starting space; it contains a temporally and spatially zero center of reference. In the canonical case, the BASE space is speaker reality, although other types of BASE spaces are also possible. Alternate BASE spaces will be the subject of chapter 7.

At any point in the interpretation process there is a space which serves as BASE; there is also a space which serves as FOCUS (Dinsmore 1991). The FOCUS space is the current, most active space; it is the space which a sentence is about, the space where

the attention of the speaker/hearer is focused. As discourse is processed, the FOCUS space may shift from space to space based on grammatical and pragmatic cues. As the focus of attention of the speaker/hearer shifts, so may the viewpoint from which the discourse situations are viewed. The notions of BASE and FOCUS, as well as the notion of viewpoint (V-POINT) will be discussed in more detail in chapter 3 and will be used throughout the chapters which follow.

As discourse is processed, information is partitioned into and distributed over a configuration of spaces based on contextualization cues. These cues *contextualize* (Dinsmore 1991) the information contained in the clause, indicating to the hearer how and where information introduced by a clause can be incorporated into the space configuration constructed from the preceding text or discourse. Contextualization cues help the speaker to determine which events can plausibly belong together in a space and which cannot, by restricting the set of possible spaces to which an expression can belong.

Contextualization cues may be grammatical, lexical, or pragmatic. Both Fauconnier (1985) and Dinsmore (1991) point out the important role tense plays in signalling to the hearer how and where information is to be integrated into the configuration of spaces built from the preceding discourse. Tenses, as well as moods, play an important role in the process of contextualization and in the signalling and tracking the space which is in FOCUS. Tense's function in relation to FOCUS space will be examined in detail as this dissertation unfolds. Lexical and pragmatic contextualization cues also work by restricting the set of spaces to which an expression can belong. A sentence can only structure a space where the information is relevant, interpretable, and plausible (Dinsmore 1991).

2.3 Structuring and Interconnecting of Spaces

Once the process of contextualization locates the appropriate space, spaces are internally structured based on cues provided by linguistic expressions. Noun phrases, for example, serve to set up elements within spaces. Indefinite articles cue the construction of new elements, while definite articles typically function to point out elements which already exist in spaces. Definite descriptions may also set up an element in a space where such an element does not already exist. Spaces may also be structured by frames and cognitive models via external links which relate elements and structures across spaces. Each space constructed in the discourse interpretation process may be externally linked to other domains, as well as to frames, and Idealized Cognitive Models (ICMs) (Lakoff 1982). The ability to link entities and structures across domains and to exploit these links is one of our basic cognitive capacities. The construction of cognitive links between domains, and the mapping of information across domains via these links plays a crucial role in the language interpretation process and in the construction of meaning. We will see how spaces may be externally linked, and how frames and cognitive models may structure a space below.

2.4 Cognitive Links and the Access Principle

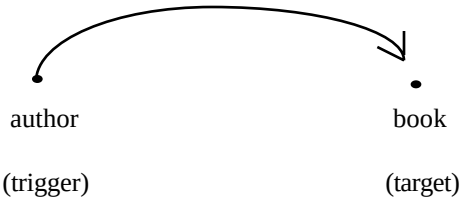
Cognitive links (connectors) may be established between different spaces and between elements in different spaces. Two or more elements may be linked for a variety of cognitive, sociological, cultural, and pragmatic reasons. Existence of a cognitive link between two elements has important linguistic consequences in that it allows one element to be referred to in terms of the element it is linked to. For example, *pragmatic functions*

(Nunberg 1978,1979) such as the link between a book and its author allow us to refer to one entity by a description of the entity to which it is linked. This may be exemplified in (2.2):

(2.2) Plato is on the top shelf.

The link between authors and their works is diagrammed in Figure 2.3.

FIGURE 2.3 Cognitive Link



The cognitive link between an author and book allows us to refer to the book by a description of its author. The author "Plato" may serve as a referential *trigger* for identification of the *target* "books" because of the cognitive link established between the two elements.

Many other types of cognitive links are possible. (2.3), a well known example, illustrates the cognitive link established between a restaurant customer and the dish ordered by that customer.

(2.3) The mushroom omelette just left without paying.

The pragmatic function which links a dish and the customer who ordered the dish allows

the customer (the target) to be referred to by the dish ordered (the trigger).

Another well-known pragmatic function links an image and its model, a representation and the thing represented (Nunberg 1978, 1979). Representations may be images, pictures, paintings, photographs, and the like. For example:

(2.4) Lisa saw herself in Len's picture

In (2.4), the reflexive 'herself' refers to the model, the thing represented, and is trigger for the identification of the target, the image or representation of Lisa in the picture. The link between the representation and thing represented allows one to be identified by a description of the other. Image-model links are open connections; either entity can be used to identify its counterpart.

Cognitive links or connections between domains allows us to use a word or expression from one cognitive domain to refer to an entity in another domain. A dish can be used to refer to a customer, a person to refer to an image in a picture or photograph, an author to refer to a book. A common type of link which will appear in throughout this dissertation is that between a self or an entity and its counterpart in some different time period. The cognitive links established between elements in different domains may be determined by ICMs, which are based on cultural, experiential, and psychological factors. Availability of a given link, thus, may vary in different contexts, in different linguistic groups, and among different individuals.

An important property of cognitive links, of connections between domains is that it allows an element in one space to be used to 'access' its counterpart in another space,

where those two elements are linked. This general principle of cognitive links is stated formally in the Access Principle.

(2.5) ***Access Principle*:**

> If two elements a and b are linked by a connector F(b=F(a)), then element b can be identified by naming, describing, or pointing to its counterpart a.

The Access Principle simply states that if two elements are linked by a connector, then a description of one element may be used to access its counterpart. Connections between entities and the Access Principle operate only between spaces which are accessible to each other. We will return to the notion of space accessibility in a moment.

Cognitive links and the Access Principle, which allows an element to be identified by its counterpart, have been used to account for a wide variety of referential phenomena.[24] The presence of cognitive links affects the behavior and acceptability of pronominal antecedents and reflexives, as in (2.4). Referential opacity and transparency are also special instances of the more general process of access.

Opacity and transparency refer to the ambiguity of readings available for verbs of propositional attitude, as in (2.6).

(2.6) Len believes that the girl with blue eyes has green eyes.

(2.6) is ambiguous between two possible readings: a contradictory (opaque) and a non-contradictory (transparent) reading. In the contradictory (opaque) reading, Len holds two

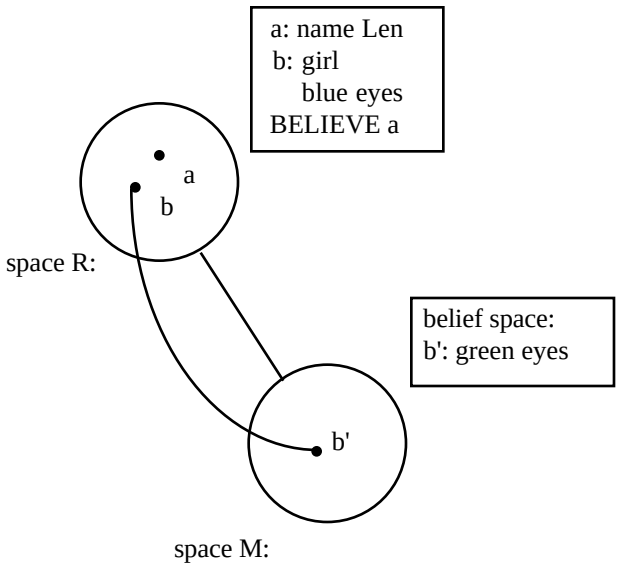
---

[24] See Fauconnier 1985.

contradictory beliefs, that the girl has blue eyes and that the girl has blue eyes. In the non-contradictory (transparent) reading, Len holds one non-contradictory belief that the girl has green eyes, although in reality she has blue eyes. Jackendoff (1975) notes that similar opacity/transparency phenomena are found with descriptions of pictures.[25]

Opacity-transparency effects are a direct result of the general properties of cognitive links. In the opaque reading, the target, the girl with green eyes, is identified via a trigger, the girl with blue eyes, within the belief space. The transparent reading is available because of the cognitive link across domains between an entity in speaker reality and its counterpart in Len's belief space. The transparent reading is diagrammed in 2.4 below.

FIGURE 2.4 'Len believes that the girl with blue eyes has green eyes'



[25] For example: 'In the picture, the girl with blue eyes has green eyes.'

The entity **b**, the girl with blue eyes in space R, speaker reality, is linked to a counterpart, entity **b'**, in Len's belief space. A description of the trigger **b** in space R, the girl with blue eyes, may be used to identify the target **b'**, the girl with green eyes, in Len's belief space, space M.

2.5 Cognitive Links Between Roles and Values

Another basic type of cognitive link is that between a 'role' and its 'value', the entity which serves as a particular role filler at a given instant. Roles are expressions such as 'the President', 'the queen of England', which may be filled by a particular values, such Clinton, Reagan, George Washington, Mary, or Elizabeth II. Roles have the inherent possibility of mapping onto (i.e. being filled by) multiple entities, although some roles may only be filled by a single entity at any given time. Frames, which contain structured background information about the world, may include roles for various participants and entities. For example, the frame for a wedding contains roles for 'the bride', 'the groom', 'the mother of the bride', 'the best man', 'the wedding cake', 'the ushers', etc...

Role-value links or connections have the same general properties as other types of cognitive links. Most importantly, they are subject to the Access Principle. Therefore, the role can be used as a trigger to identify its value, the target, as in (2.7).

(2.7) The President has only one daughter.

The role 'President' is used to access its value, a particular President. The role President serves as trigger for identification of the target, a particular President, the value which fills

that role. The property of having only one daughter is assigned to the target value, identified by the trigger role.

A property may also be assigned to the role itself, as in (2.8).

(2.8) The food at that restaurant gets better and better.

(2.8) does not mean that a particular instance of food gets better and better over time. Rather, it is the role food which is assigned the property of getting better and better.

The role-value distinction, the cognitive capacity to establish links between roles and their values, and the mapping behavior of frames will be important notions in the characterization of habitual and generic expressions in chapter 4. We will return to frames and mapping in a moment. Certain types of spaces, such as speech space or thought spaces, may also contain inherent roles (Sells 1987). The presence of inherent roles in speech spaces may have important grammatical consequences, as will be seen in chapter 6.

2.6 Cognitive Links and Structuring of Spaces

Part of our cognitive capacity is the ability set up frames and cognitive models which contain structured information about our world and how it functions. Frames and cognitive models of the world result from our ability to categorize entities, information, events, situations, sequences of events or situations into 'recurrent' types. Dinsmore (1991) stresses the importance of the this ability to categorize recurrent types from the

standpoint of information processing. Frames and ICMs greatly facilitate the inferencing and reasoning process, since for any instance of the category all of the knowledge in the associated frame or ICM is available.

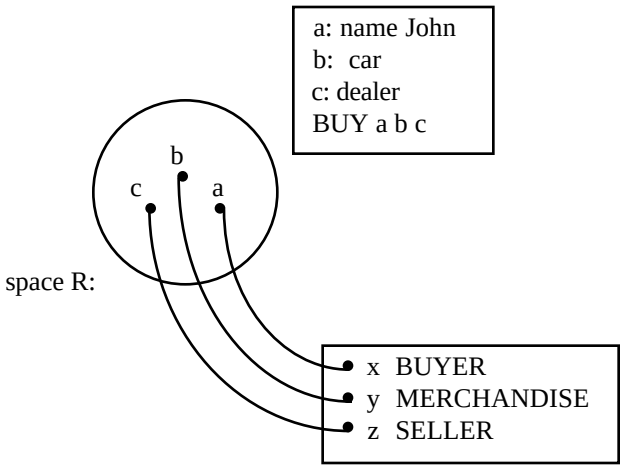
The dual cognitive capacities for categorizing information into frames and for recognizing, establishing, and exploiting cognitive links between domains allows spaces to be structured by frames and cultural models via mapping between domains. Since the speaker may rely on cognitive links, the speaker is not required to completely specify the contents of a space with linguistic information. In fact, a sentence or linguistic expression typically gives only very *partial* specifications for the structuring of spaces. The speaker may also rely on background or shared knowledge and information imported into the space from frames or ICMs via mapping between domains.

Mental space elements are connected by the lexical information in a sentence to corresponding frames and cognitive models which are a part of the speaker's background knowledge. Consider for example (2.10).

(2.10) John buys a new car from the dealer every 3 years.

The expression of the form 'x buys y from z' invokes a frame from background knowledge. The frame 'BUY x y (from) z' has three roles, one for the buyer, one for the seller, and one for the merchandise sold. The frame 'BUY x y z' will internally structure the space constructed for interpretation of (2.10), in this case the space structured is speaker reality by default. This is illustrated in Figure 2.5.

FIGURE 2.5 Mapping from Frame



The roles for buyer, seller, and merchandise will be filled by the elements 'John', 'dealer' and 'car' respectively. The space structured by the frame 'BUY' may also be structured by default information provided by the ICM tied to the 'BUY x y z' frame. This default information might include, for example, the notion that John paid money rather than shells or gold coins for the car.

The ability to use analogy and metaphor are also a direct result of cognitive links and mapping between spaces. The cognitive ability to set up links allows us to structure one domain in terms of another by domain projection mapping. Domain projection mapping allows us to use the vocabulary and structure of one domain (the source domain) to think and talk about and structure a target domain. Metaphors may be culturally or lexically entrenched, or they can be set up locally in creative ways.

2.7 Default Transference and Accessibility:

Optimization, Spreading, and Presupposition Float

Spaces may also be filled by default transference mechanisms which allow for the inheritance and spreading of information between hierarchically related parent and daughter spaces. These include space *optimization* strategies or *spreading*. Optimization (spreading) strategies allow information to pass from a parent to daughter space and from a daughter to its parent space. *Presupposition float* is one special case of the more general spreading process.

A space may "inherit" information from its parent via space optimization or spreading. A daughter space M will be structured implicitly so as to be maximally similar to its parent space R via default optimization strategies. If not stipulated to the contrary: elements in the parent space have counterparts in the daughter space; relations holding in the parent space will hold for the counterpart in the daughter space; and background assumptions in the parent space also hold in the daughter space. Optimization may be blocked by explicit contrary information. The general principle behind space optimization is that presuppositions may be inherited from one space to another by these strategies, until optimization is blocked by incompatible information. Optimization strategies may be guided by ICMs or grammatical information.

Presupposition float is another special type of spreading. Given a daughter space M and its parent space N, the Principle of Presupposition Float allows a presupposition in a space M to transfer to the parent space N. The transfer will be blocked if the presupposition already holds in N or if N contains contrary information. The basic idea is that presuppositions float from daughter to parent space until the presupposition meets

itself or its opposite. The Principle of Presupposition Float can be illustrated by the following examples from Sweetser and Fauconnier (to appear).

(2.11) a. Bill says that Joe wants to meet Laura's husband.

b. Bill says that Laura is single, but that Joe wants to meet Laura's husband.

c. Bill says that Laura is married and that Joe wants to meet Laura's husband.

Examples (2.11a-c) minimally involve the construction of three spaces: speaker reality, a speech space cued by the space-builder 'Bill says', and a want space cued by the space-builder 'Joe wants'. The expression 'Laura's husband' presupposes that Laura is married. This presupposition spreads in a different way for each of these examples. For (2.11a), the presupposition that 'Laura is married' floats from the want space, structured by the expression 'Laura's husband', to the speech space, to speaker reality. For (2.11b), the presupposition holds only in the want space. The contrary information 'Laura is single' blocks float of the presupposition into the higher speech space. For (2.11c), the presupposition in the want space cannot float into the speech space, since 'Laura is married' already holds in the speech space. In the speech space, the presupposition will meet itself. Since the presupposition does not float into the speech space, it also cannot float into speaker reality.

The ability of information and presuppositions to be inherited into or spread out of a given space is affected by the accessibility of the space vis-a-vis other spaces. Space accessibility also affects the ability of referents within a given space to be accessed via cognitive links to entities outside of that space. The accessibility of a space affects the operation of the Access Principle, and default optimization, spreading, and presupposition float mechanisms. Different types of space partitionings affect the accessibility of spaces

in different ways. Recent work by Mejias-Vicandi (1993, to appear), and Sweetser (to appear) suggests that verbal markers such as subjunctives and conditionals play an important role in marking and regulating the accessibility of spaces. Tenses also play a role in marking accessibility of information in spaces in relation to other spaces, as will be seen in chapters 4 and 5.

2.8 Conclusion

This chapter has given a brief overview of the important principles of mental space theory and the role which linguistic elements play in the cognitive construction process. The interpretation of discourse results in the construction of a complex configuration of hierarchically related domains and the partitioning and distribution of information over these domains. Linguistic expressions give partial and underdetermined instructions for building, interconnecting, and internally structuring these cognitive domains. The mental constructs created during the processing and production of language are separate from the real world and from language itself, yet language depends crucially on these constructs for the interpretation of meaning.

The cognitive links established between entities and structures in different domains play a crucial role in the language interpretation and meaning construction process. One important property of these links is the general Principle of Access which allows one entity (a target) to be identified by a description of an entity (a trigger) to which it is linked. In this way, the description of a role may be used to identify a particular value. Opacity and transparency phenomena are also a direct result of the Access Principle and the properties of cognitive links.

Another important property of cognitive links between domains is that they allow spaces to be structured by information mapped across domains via these links. By domain mapping, information may be imported into a space from frames, cognitive models, or from other domains, as in the case of metaphor. The role-value distinction is important for the domain mapping process, since frames contain roles which may map onto multiple values. Domain mapping allows the speaker to rely on background knowledge packaged in the form of frames and cognitive models and on the projection of structures and information across domains for the internal structuring of spaces. Spaces are also structured by the default transference mechanisms of optimization or spreading, and may be further elaborated via inferencing and reasoning processes. Hence, linguistic cues need only give very partial and underdetermined information for the meaning construction process.

Different types of domains with different types of accessibility may be set up for temporals, beliefs, images, hypotheticals, counterfactuals, etc, but the same basic principles and properties of construction, cognitive links and Access, roles and their values, optimization and spreading operate on domains of different types.

Having looked at the general properties of cognitive domains and the cognitive construction process, we turn now to the main body of the dissertation which develops a mental space approach to tense-aspect as a system and which develops an analysis of a wide variety of specific problematic tense-aspect data in the mental spaces framework.