

**An Integrated Approach to Discourse Connectives  
as Grammatical Constructions**

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# Abstract

This dissertation analyzes discourse connectives in English, such as *therefore*, *although*, and *in fact*, in the framework of Construction Grammar (Goldberg 1995, 2006). In order to describe the general structure of discourse connectives comprehensively, the present study adopts an “integrated” approach that examines both discoursal and semantic aspects of multiple domains of meaning involved in their usages. Accordingly, the study clarifies the following three points.

Firstly, the descriptive method must fully reflect the linear nature of language for it to deal with such discoursal elements as connectives. Thus, the present study introduces a constructionist model that integrates the notion of current discourse space (CDS) proposed by Langacker (1990a, 2008a). In this model, a discourse connective conjoins two propositions, of which one must be retrieved dynamically from the CDS available at the time of the utterance, and the other is presented right after the connective more explicitly. These propositions participate in a particular relationship specified by the connective, and the CDS gets updated with the result. It is also suggested that Construction Grammar might benefit from the concept of monad computation of the functional programming paradigm in computer science, just as it has had significant influence from the concept of the hierarchical network model in the object-oriented programming paradigm since the early days of its theoretical development (Goldberg 1995: Section 3.3).

Secondly, the meaning of a discourse connective is not static; rather, it is determined dynamically within a specific range according to the context in which it appears. This happens primarily due to the fact that proposition retrieval is accompanied by inferential reasoning based on contextual information. Discourse connectives, as with many other linguistic elements such as modals and conditionals, can involve three different domains of meaning discussed by Sweetser (1991): the content domain, the epistemic domain, and the speech-act domain. In many cases, one of these three domains appears to be exclusively prominent in individual usages. Examination of

the data from a corpus, however, reveals that there are also instances in which multiple domains of meaning are involved, suggesting that the meaning of discourse connectives is highly flexible and context-dependent.

Thirdly, discourse connectives are devices that not only benefit the hearer by providing guidance that improves the efficiency and accuracy of the interpretation but also serve the speaker, reducing the cognitive load in constructing a coherent discourse. Discourse connectives specify semantic/discoursal types for the two propositions they conjoin. Among such types are causal relations, adversative relations, and elaborative relations, for instance. While these type specifications help the hearer determine the way in which propositions are expected to be processed, no explicit constraints are imposed on what formal properties they should have in the actual utterance. The task of extracting a proposition of the specified type from whatever utterances that have taken place is delegated to the hearer. The speaker is exempt from taking the trouble of explicitly specifying the formal realization of the propositions. The latter trait of discourse connectives has much in common with what has often been called type-coercion in previous research focused on sentence-level phenomena, suggesting the validity of the presupposition held in this study that many sentence-level and discourse-level phenomena are founded on the same set of inferential mechanisms.

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# Chapter 1

## Introduction

### 1.1 Purpose of the Present Study

One of the purposes of this study is to clarify the structure of discourse connectives using the framework of Construction Grammar. Another objective is to set forth a new theoretical proposal to describe the discursual aspects of connectives that cannot be fully captured by existing theoretical tools that mainly focus on sentence-level phenomena. The category *discourse connectives* refers specifically to expressions such as those included in the following examples in (1).

- (1) a. It was raining. *So* the game was cancelled.  
b. I stayed home all day. *Because* I didn't want to see anyone.  
c. Warm up before you begin. *Otherwise* you can cause damage to your muscles.

One of the most critical linguistic properties common to these discourse connectives is that they refer to the prior discourse in some way, as mentioned in the following citation from Levinson (1983).

... there are many words and phrases in English, and no doubt most languages, that indicate the relationship between an utterance and the prior discourse. Examples are utterance-initial usages of *but, therefore, in conclusion, to the contrary, still, however, anyway, well, besides, actually, all in all, so, after all*, and so on. It is generally conceded that such words have at least a component of meaning that resists truth-conditional treatment ... what they seem to do is indicate, often in very complex ways, just how the utterance that contains them is a response to, or a continuation of, some portion of the prior discourse (Levinson 1983: 87f).

This study considers how discourse connectives refer to information from previous discourse when they combine one proposition and another proposition, constructing a new conceptual structure involving a relationship between the two.<sup>1</sup> Usages like those in (2), which do not have the property of referring to the “preceding” discourse, are excluded from the primary analysis of the study, though these “fronted connective constructions” are mentioned in the following chapters from time to time with the aim of clarifying the characteristics of non-fronted discourse connectives.

- (2) a. *Since* the weather has improved, the game will be held as planned.  
b. *Because* we offered to pay him, he will help us.  
c. *Although* Mary wanted it, John gave it away.

Notice that in the examples of (non-fronted) discourse connectives in (1), connectives appear at the beginning of independent sentences (that is, they appear after a period at the end of the previous sentence). That is not necessarily important, however. There are connective usages that refer to discourse content presented in the same sentence, where a comma or a semicolon is often placed immediately before the connective instead of a period in the written language, or a short pause occurs in the spoken language. This study does not make a distinction between whether the

---

<sup>1</sup> Since discourse connectives refer to information from the previous discourse, one might be inclined to regard them as “anaphoric.” However, we refrain from using the term “anaphoric” to distinguish the two related but somewhat different types of processes, anaphoric reference, on the one hand, and proposition retrieval, on the other. The former is mainly concerned about a particular linguistic unit, whether it is a word or a sentence, in an attempt to make sense of pronouns and the like (Halliday and Hasan 1976: 14-15). The latter may be more indirect or even implicit: The reference to the preceding text only occurs so that the hearer can place a newly stated proposition in the desired contextual background. The present study focusses on processes of the latter type that are typically instigated by the use of discourse connectives.

text representing the preceding proposition appears in a separate sentence or the same sentence. Hence, the two examples in (3) below are not distinguished as different kinds of usages.

- (3) a. We paid him a very large sum. *So* he kept quiet about what he saw.  
b. We paid him immediately, *so* he left contented.

However, it should be noted that the meaning and function of *so* in these two examples are not exactly the same. This is a natural consequence of the fact that the formal properties are different: In (3a), a sentence is completed before the connective appears and another sentence begins, whereas in (3b), the first and the second clause are both included in the whole sentence. Yamanashi (1989) points out that connectives behave differently when they conjoin clauses or when they connect separate sentences. More specifically, when a connective combines clauses, the entire expression as a whole will exert a single illocutionary force (Austin 1962; Searle 1970, 1985). However, when a connective combines sentences, one speech act could have been done when the connective appears. Thus, strictly speaking, we should regard the connective constructions in (3a) and (3b) as distinct from each other. However, it is also true that it is not always easy to distinguish between the two types of linguistic structures, particularly in spoken language. Therefore, to explore the nature of discourse-connective constructions as a rather broad category, I would like to deal with the whole category without making a rigid distinction.

The definition of discourse connectives used in this study is not necessarily widely shared among researchers. Many researchers use different terms to represent slightly different categories that consist of expressions that partially overlap with the discourse connectives in this study. Among them are *discourse connectives* (Warner 1985; Blakemore 1987, 1992), *discourse markers* (Fraser 1999, 2006a, 2009; Urgelles-Coll 2010), *discourse operators* (Redeker 1990, 1991), *cue phrases*

(Knott and Dale 1994), *discourse particles* (Schourup 1985), and *pragmatic markers* (Schiffrin 1987; Brinton 1996, 2017; Aijmer 2013).<sup>2</sup>

Although the analysis and discussion in this study are mostly consistent with these previous studies, there is a difference. This study regards the form and meaning of discourse connectives as components of constructions. The term *construction* here refers to the concept defined in Construction Grammar, which views linguistic expressions of any scale as structures consisting of a symbolic pair of form and meaning.<sup>3</sup>

Construction Grammar has a variety of variants, each reflecting a somewhat different view of language, albeit to varying degrees (Östman and Fried 2005). However, this study uses a variety of Construction Grammar with a cognitive linguistic basis (Fillmore 1988; Goldberg 1995; Croft 2007; Boas 2013; Hilpert 2014). This variety has three essential characteristics as follows.<sup>4</sup>

Firstly, researchers of (cognitive) Construction Grammar look not only at the core linguistic phenomena that have traditionally attracted much attention but also at seemingly marginal or peripheral phenomena in the hope that close observation of them will eventually reveal the core features of the language.

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<sup>2</sup> Studies of these particle-like linguistic units have been conducted mainly within the fields of pragmatics and semantics. There have been a few attempts to approach those rather syntactically, however. Among such exceptions are Warner (1985) and Urgelles-Coll (2010). Warner (1985) analyzes several discourse connectives collected from a hand-crafted corpus using the basic principles of Generative Grammar. Urgelles-Coll (2010) uses Head-Driven Phrase Structure Grammar and Segmented Discourse Representation Theory to examine not only the semantics but also the syntax of the connective *anyway*.

<sup>3</sup> Note that, nowadays, the concept of *constructions* are not only mentioned and discussed in the so-called cognitive-linguistic research community but also outside it. Those researchers who had been engaged in linguistic research based on Generative Grammar, such as Peter Culicover and Ray Jackendoff, started to point out the importance of the construction as a linguistic unit (e.g., Culicover and Jackendoff 2005). For varieties of perspectives toward the concept of constructions in linguistic research, see Östman and Fried (2005), and also van Trijp (2015).

<sup>4</sup> For fundamentals of cognitive-linguistic views of language, see Lakoff (1987), Langacker (1987a), Croft and Cruse (2004), Taylor (2004), Evans and Green (2006), and Yamanashi (2016).

Secondly, Construction Grammar based on a cognitive linguistic perspective does not assume that there is a clear boundary between semantics and pragmatics. There is a gradience between semantics and pragmatics, and they always influence each other. Therefore, it is not possible to determine the actual meaning of an expression just by seeing an isolated sentence. Ultimately, the meaning of an utterance results from the influence of various contextual factors.

Thirdly, Construction Grammar emphasizes conformity to the usage-based model of language, one of the basic principles of cognitive linguistics (Langacker 1988; Barlow and Kemmer 2000; Tomasello 2003). More specifically, Construction Grammar emphasizes the observation of real-world examples of language use gathered from actual utterances, though examples artificially created for analytical purposes are also used more often than not.

Nevertheless, it is difficult to thoroughly analyze and describe highly discursal phenomena, including discourse connectives, using the Construction Grammar framework as it is. Necessary extensions are mandatory while maintaining the essential features of the theoretical framework. More specifically, this study proposes an extension of Construction Grammar on the following two points.

The first extension concerns the symbolic relationship between form and meaning. To date, Construction Grammar has valued highly network structures based on semantic hierarchy. On the other hand, it reflects the linearity inherent in the language only in the formal/syntactic aspects of construction. The linearity of language is also related to the semantic aspects of construction, however. Expressions made in actual utterances produce meaning according to the information from the preceding discourse available at the moment of utterance. Therefore, to fully describe the structure of discourse connectives, it is essential to look not only at the hierarchical nature of language but also at the process of linear development of discourse.

The second point in extending Construction Grammar is to consider how to incorporate multiple domains of meaning into the construction description. Sweetser (1991) argues that the

meaning of many linguistic phenomena involves one of three different domains: the content domain, epistemic domain, and speech-act domain. These domains of meaning are also involved in the conceptual structure of many discourse connectives. This does not mean the structure of a discourse connective incorporates a particular domain of meaning in itself, however. According to Sweetser (1991: 111), the domain of meaning is *pragmatically determined*. It is more appropriate to consider that the structure of a discourse connective potentially allows multiple domains of meaning, instead of only one of them at a time.

Based on the above consideration, this study presents an integrated approach to discourse connectives as grammatical constructions. There are three reasons for using the term *integrated* here as well as in the very title of this study. The first is that this research pursues a theory that combines semantics and pragmatics in analyzing and describing grammatical constructions. Second, this study aims to explain both the hierarchical and linear properties of meaning. The third reason is that the present work attempts to include the notion of domains of meaning proposed by Sweetser in the Construction Grammar framework developed by Goldberg and others.

In order to achieve the objectives described above, this study presents a review of previous studies, proposes a necessary adjustment to existing theories, and analyzes examples based on the modified framework. The rest of this chapter shows the purposes and organization of each of the chapters comprising the entire work.

## **1.2 Architecture of Construction Grammar and Its Limitations**

Chapter 2 discusses the current design and architecture of Construction Grammar. First, in order to sort out its features and advantages, the explanation of argument-structure constructions by Goldberg (1995) is examined. Then discussed are two particular points of Construction

Grammar that are problematic for dealing with discursal phenomena, including connectives. One is sentence-structure centrism, and the other is a lack of consideration on the linearity of language.

Sentence-structure centrism is not limited to Construction Grammar. It is a matter common to most grammatical frameworks. Construction Grammar treats verbs and other predicates as kinds of functions, and they take noun phrases as arguments. Each verb or verb class has a set of argument types, and constructions are formed by generalizing this kind of information to varying degrees of abstraction. The present work argues for capturing discourse structures in a parallel fashion using analogies of functions and arguments in terms of computer programming paradigms.

The lack of consideration of the linearity inherent in the language is not unique to Construction Grammar either. In fact, in Construction Grammar, the linear order is reflected in the formal aspect of construction. However, it is not clear how the semantic structure of a construction interacts with the context. Moreover, little has been discussed yet about the linearity of expressions beyond the boundaries of the clause.

The abovementioned issues in Construction Grammar are thought to be a consequence of its traditional emphasis on the concept of construction networks. In cognitive linguistics, which includes the Construction Grammar framework, linguistic knowledge has been regarded as a kind of network structure, as exemplified by the pioneering research on the interrelationship of different metaphoric meanings of a linguistic expression by Brugman and Lakoff (1988). Goldberg (1995) introduced this idea extensively in her model of Construction Grammar and argued that constructions consist of four types of links (polysemy links, subpart links, instance links, and metaphorical extension links).

The emphasis on the network structure widely observed in cognitive linguistics is worthy of attention. It agrees in many ways with the object-oriented paradigm in computer programming (Goldberg 1995: Section 3.3; Bergen and Chang 2003; Hasebe 2005). In object-oriented

programming, various units of computation are connected by HAS-A and IS-A relations, and the whole constitutes one extensive network (cf. Hudson 2007; Dehmer and Emmert-Streib 2009). Many concepts in cognitive linguistics, such as the distinction between types and instances (Langacker 1990a) and the distinction between prototypes and extensions (Geeraerts 1997; Tuggy 2001) can be similarly redefined using HAS-A and IS-A relations.

However, the analogy to concepts in object-oriented programming does not work for all aspects of the natural language, unfortunately. We make specific proposals on how to incorporate linearity, an intrinsic property of language, into the Construction Grammar framework, later in Chapter 4.

### 1.3 Domains of Meaning

Chapter 3 discusses domains of meaning in discourse. Sweetser (1991) pointed out that the following three domains listed in (4) are involved in the meaning of various linguistic phenomena (e.g., modal auxiliary verbs, conjunctions, and conditional clauses).

- (4) a. **Content domain**  
Domain for the conceptualization of real-world events and their relations
- b. **Epistemic domain**  
Domain for reasoning and inferences about real-world events
- c. **Speech-act domain**  
Domain for acts to exercise illocutionary force through utterances

For instance, the use of the connective *so* involves three domains of meaning, as shown in (5).

- (5) a. **Content usage**  
He heard me calling, *so* he came.

**b. Epistemic usage**

(You say he's deaf, but) he came, *so* he heard me calling.

**c. Speech-act usage**

Here we are in Paris, *so* what would you like to do on our first evening here?

(Sweetser 1991: 79)

There seems to be no doubt that these domains of meaning concern the analysis of constructions. Redeker (1990) and Langacker (2008a) propose concepts of domains of meaning similar to Sweetser's. It is important to note, however, that they are not properties hard-coded within individual constructions. Unlike some other properties that are specific to constructions, it is the context at the time of the utterance that determines the domain of meaning.

Also relevant here is that the domains of meaning are not mutually exclusive. Nor is there a clear boundary between them. These points are self-evident when considering the following statements made in previous studies.

(6) a. A linguistic utterance is a verbal representation of a construal with an epistemic stance.

(Langacker 1985, 2002, 2017)

b. Every utterance is made to be a part of a particular speech act. Even regular root clauses are independent speech acts of assertions.

(Searle 1970; Hooper and Thompson 1973)

c. A speech act gives rise to some social reality. It creates a new fact, after which the world is different.

(Stenius 1967; Searle 2000)

The statement (6a) implies that the boundary between content utterances and epistemic utterances could be somewhat blurry. The statement (6b) means that an utterance of the content domain or epistemic domain is eventually converted to or integrated into some speech act. The

statement (6c) implies that a speech act utterance must contain propositional content of some kind, even if it is highly abstract or schematic, so that it could change the world, creating a new fact.

Thus, ultimately, the distinctions between the content domain, the epistemic domain, and the speech-act domain are not categorical ones. When it appears that there are different types in the usages for a particular construction, what is happening is that one of the three domains is more foregrounded than the others.

Based on the view described above, the present study defines a discourse connective to be an element that links Proposition 1, extracted from the preceding discourse, with Proposition 2, introduced in the expression following the connective. Figure 1.1 diagrammatically represents the basic formal configuration of the elements relevant to the use of a discourse connective.

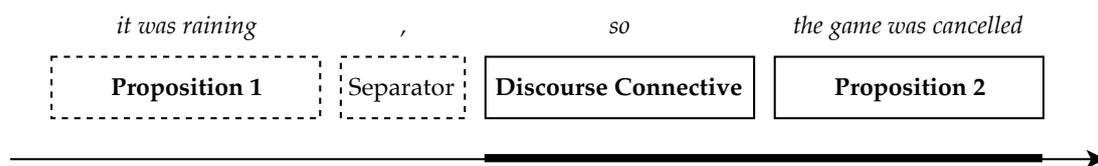


Figure 1.1: Basic Configuration of Discourse Connective

Proposition 1 is a past element at the time when the construction containing the connective and Proposition 2 appears, and it could be either implicitly or explicitly presented in the discourse. The dashed line surrounding Proposition 1 (and the separator just before the connective) in Figure 1.1 indicates this.<sup>5</sup> On the other hand, Proposition 2, which immediately follows the connective, is an element that always has an explicit form. The boxes surrounding such elements are drawn in solid lines to indicate that. The horizontal arrow at the bottom represents the flow of time through which the speaker utters this construction. Only a limited segment of the line is displayed as thick

<sup>5</sup> The separator may be either a comma, semicolon, or a period in the written language. These choices are not available in the spoken language. Insertion of a pause of the variable length is possible, though.

to show the time segment during which the construction's formal structure unfolds in the discourse. Various types of relationships connect two propositions. Typical examples are causal relationships, adversative relationships, and elaborative relationships, which are discussed in detail in Chapter 5, using many actual usages from a corpus.

Depending on the context, the type of domain that Proposition 1 involves differs. Therefore, the retrieval of Proposition 1 presupposes an inferential effort of both the speaker and the hearer. In some cases, the proposition in question is about an event that occurs in the real world, or it may be a proposition that derives from some reasoning or interpretation. Alternatively, it may be about a speech act that is being conducted in the discourse. Besides this, there are cases where the categorization is not easy, and it seems possible that the utterance concerns multiple domains at the same time.

Based on the above observation, the present study draws the following conclusions. The process of encoding/decoding discourse connectives involves multiple domains of meaning. Discourse connectives do not have an exclusive association with any of these domains in advance as their static properties. A domain can be foregrounded or backgrounded according to the context information, which is only available at the moment of the actual utterance.

## **1.4 Linearity of Discourse**

Chapter 4 examines the following issues: how the extraction of Proposition 1 from context is carried out, how Proposition 1 and Proposition 2 can be linked by the connective, and how a new context for subsequent discourse comes about as a result of these procedures. In short, this chapter attempts to clarify how the linearity of language is reflected in the structure of the discourse-connective construction.

The concept of the current discourse space (CDS) proposed by Langacker (2008a) proves useful here, though it is necessary to add some specifications to the original concept. The CDS defined in the present study is not like a landscape viewed through a window of a railroad train that changes along the timeline of discourse. It is instead like a pile of documents with newer pages stacking on top of older ones over time. New elements and events remain accessible near the surface of the stack, but old elements and events are gradually obscured from immediate attention.

In the framework adopted in the present study, the CDS is a concept that replaces the abstract notion of *context*. In this view, every linguistic utterance is a process of applying a discourse function to the CDS, and the mental process behind an utterance involving a discourse connective is an application of the following discourse function.

$$(7) \quad \textit{Discourse-Function} ( CDS_{in} , REL , PROP_2 ) \Rightarrow CDS_{out}$$

*Discourse-Function* in (7) takes three arguments. The first argument,  $CDS_{in}$ , is an element that holds contextual information derived from the discourse before the utterance of the construction. Notice that Proposition 1 does not have its place in the argument list. This is because Proposition 1 is an element extracted from  $CDS_{in}$ . The second argument to the function,  $REL$ , is an element that represents the relationship between the propositions. The connective used in the construction explicitly specifies the type of relationship. The last argument,  $PROP_2$ , is the proposition included in the text following the connective. The element  $CDS_{out}$  to the right of the double arrow in (7) is the return value obtained as a result of applying the discourse function.<sup>6</sup>

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<sup>6</sup> Obviously, this is a recursive function in that the process involved accepts its own direct output as new input. The present study does not delve into the discussion on human capacity of recursive processing as the origin of natural language (cf. Hauser, Chomsky, and Fitch 2002). It is worth noting, however, that Levinson (2014) suggests that the recursion in discourse is far less restrictive than that of syntactic structures. For instance, so-called *center-*

Note that the concept of function application, as shown in (7), is a kind of metaphoric expression. The cognitive processes behind linguistic utterances are virtually imperceptible. A large part of it is out of reach of conscious awareness of the language user. Hence, linguistic theorization requires analogical representation in one way or another.<sup>7</sup> In a sense, the process by

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*embedding*, as observed in sentences like (i), is known to demand a higher cognitive load in syntax than *edge-recursion* as in (ii), and thus the levels of embedding do not grow easily (cf. Pinker and Jackendoff 2004).

(i) The rat the cat killed ate the malt.

(Chomsky and Miller 1963: 286)

(ii) John thought he'd come.

However, an isomorphic structure involving center embedding may not be so restrictive when it manifests in the sequence of discursial utterances as in (iii).

(iii) A: May I have a bottle of Mich?  
 B: Are you twenty one?  
 A: No  
 B: No

(Merritt 1976: 333)

Levinson (2014) suggests that recursion in syntax may not be so much a fundamental mechanism in human cognition as recursion in pragmatics, that is, recursion of speech acts in interactive discourse. There is no wonder a discourse function like (7) is recursive in nature if this is the case. See also Corballis (2011) for a discussion on the relationship between recursive structures of thought and language and human capacity of episodic memory.

<sup>7</sup> One may find that such a usage of the term *function*, i.e., the use of the term to refer to something as if it were a mathematical/computational process, sounds rather incongruous with cognitive-linguistic views of language. However, in fact, Cognitive Grammar adopts it in defining theoretical concepts. For instance, *grounding*, one of Cognitive Grammar's most fundamental concepts, is defined as follows (Langacker 1990a).

which theoretical linguistics has developed has been a series of attempts to describe these cognitive processes using better metaphors (Lakoff and Núñez 2001).

Chapter 4 also introduces another type of metaphor in addition to the function-based one. It compares the discourse to a process of passing along a “container.” A The container, which has some contents inside, gets carried over from one moment to next. The use of discourse connectives thus is likened to 1) unwrapping the container, 2) extracting the contents, 3) attaching some new content, and 4) returning the resulting contents to the original container and passing it further along to the subsequent discourse.

This wrap/unwrap metaphor is more than a means to explain the cognitive mechanisms behind discourse connectives: it is essentially the same explanatory tool used to describe the mechanism of monad computation, which is one of the concepts in functional programming, another paradigm in computer programming like object-oriented programming.

Monad computation is a mechanism that makes it possible to perform various processes on values with an “environment” while keeping the data structure constant (Wadler 1995; Petricek 2018). As stated earlier, the network architecture of Construction Grammar is in high agreement with the concepts of object-oriented programming. Likewise, theoretical concepts of other paradigms of computer programming, including that of functional programming, are purported to help to elucidate the mechanisms of natural language. Furthermore, the discovery of commonalities across different disciplines provides supporting evidence for the soundness of

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[Grounding is] *a semantic function* that constitutes the final step in the formation of a nominal or a finite clause (Langacker 1990a: 549, emphasis added).

analyses conducted separately in both fields. In fact, the latter is the very strategy that cognitive linguistics has widely adopted since its early days.<sup>8</sup>

The end of Chapter 4 shows that our approach to discourse connectives has significant implications for a controversy fought around the treatment of discourse connectives in the past literature. Blakemore (1987, 1992) argued that appositional discourse markers (e.g., *and*, *but*, and *so*) have no conceptual meaning but only procedural meaning. According to Blakemore, the functions of these discourse markers are merely presentations of the types of mental processes that connect the propositions. On the other hand, Fraser (2006b) disagrees with this idea. He argues that appositional discourse markers also have some conceptual meaning. From the perspective of the present study, Fraser's idea is more appropriate. Discourse connectives (or discourse markers in Fraser's terminology) heavily depend on the context. In that sense, they are procedural, but they do evoke concepts of two propositions to be combined, if only schematically. Hence, it must not be correct to regard discourse connectives as exclusively procedural.

## 1.5 Analysis of Discourse Connectives

Chapter 5 analyzes three types of discourse connectives using examples from a corpus. What we undertake here is not an exhaustive classification of discourse connectives, nor do we enumerate all the meanings and usage lists for these types of discourse connectives. The aim here is only to observe real-world examples of different types of discourse connectives and see what

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<sup>8</sup> In cognitive linguistics, there are many instances of the employment of concepts from disciplines outside of linguistics. Some of the most conspicuous of them, among others, would be the concept of Gestalt in a series of psychological works by German scholars in the early 20th century; the prototype theory in experimental psychology (Rosch 1975); the concepts of domains and mappings in mathematical category theory; and Wittgenstein's philosophical concept of family resemblance of category members (Wittgenstein 1953/2009).

structures they have in common. The three types of connectives examined here are connectives of causal relationships, connectives of adversative relationship, and connectives for elaboration. (8)–(10) below are lists of examples of each of these connective types examined in Chapter 5.

(8) **Connectives of causal relationship**

- a. *because* (result/consequence ↔ cause/base)
- b. *since* (result/consequence ↔ cause/base::shared/inferable)
- c. *so* (cause/base ↔ result/consequence)
- d. *therefore* (cause/base::discoursal ↔ result/consequence)

(9) **Connectives of adversative relationship**

- a. *although* (reference-statement ↔ adversative-statement)
- b. *in contrast* (reference-statement ↔ contrastive-statement)
- c. *instead* (reference-statement ↔ alternative-statement)

(10) **Connectives for elaboration**

- a. *in fact* (reference-statement ↔ evidence/support::new)
- b. *in other words* (reference-statement ↔ reformulative statement)
- c. *that is (to say)* (reference-statement ↔ reformulative statement)

The information in parentheses on the right side of each connective in (8)–(10) shows the types of Proposition 1 and Proposition 2. To the left side of the bidirectional arrow (↔) is the type of Proposition 1, and to the right side is that of Proposition 2. What follows after the double colon (::) is an additional constraint on that type. For example, *because* in (8a) specifies that Proposition 1 is an element of the “result/consequence” type, while Proposition 2 is an element of the “cause/base” type. Similarly, for *since* in (8b), Proposition 1 is designated as the “result/consequence” type, while Proposition 2 is of the “cause/base” type with a constraint that the element must be “shared/inferable.”

Analysis of these examples reveals two things. First, the idea of domains of meaning proposed by Sweetser (1991) helps describe the range of usages of connectives. There is a caveat, however: though various features may seem specific to each connective type, and many of them may be easily associated with a particular domain of meaning, more important is that there is a structure common to all connectives. That is, every domain of meaning is, in fact, immanent to every instance of the discourse-connective construction. The relative degree of their saliency depends on the contextual information provided dynamically at the time of the utterance. The data examined in Chapter 5 offers substantial evidence for that.

Second, of the two propositions combined by the connective, the first one is not necessarily presented explicitly and must be extracted from the context (= the CDS). The proposition extraction accompanies inferential reasoning that makes sure the requirements on types and constraints for the propositions specified by the connective are all met. Observation of the corpus data presented in Chapter 5 confirms that this observation is valid for all three of the discourse connective types discussed therein.

Before I finish this section, there is one thing that needs to be discussed. Why should individual connectives, such as those in (8)–(10), be analyzed as part of constructions? One can argue that they are just expressions with particular meanings and functions and that it is enough to treat them as such. In this study, however, I intend to extend the basic notion of constructions and regard them as argument-taking functions of a certain kind and try to see connectives as discourse functions that take certain types of propositions as arguments. This will reinforce, I argue, the cognitive linguistic view of language by showing that the symbolic relationship between form and meaning plays an essential role in the broader domain of discourse, as well as in sentence-internal argument structures.

## 1.6 Inferences in Discourse Connectives

Chapter 6 examines how inferential reasoning works in utterances that include discourse connectives. In encoding/decoding connectives, the accompanying propositions must be of the appropriate types. If there is an apparent discrepancy, corrective effort to match the types must be made. Many types of necessary inferential reasoning are shown to be similar to those found in phenomena called *coercion* discussed in the past literature. The latter point implies that basically, both sentence-level and discourse-level linguistic phenomena involve the same set of cognitive processes.

- (11) a. My program ran for a few minutes.  
b. My program ran less than four minutes (this morning).

(De Swart 1998: 360)

Example (11) shows an instance of type coercion for the verbal aspect morphosyntax. The verb *ran* in (11a) implies that the execution of the *program* takes a certain amount of time from start to finish. It is a usage that does not deviate from the underlying meaning of the verb *run*. On the other hand, (11b) contains the same verb *ran* but has slightly different characteristics. Here, the sentence implies that the process expressed by the verb takes a certain amount of time to start. In this sentence, the meaning of the verb is “coercively” adjusted to be consistent with the co-occurring phrase *less than four minutes*.

In the traditional view, type coercion is a phenomenon that occurs across various areas of the lexicon. One of the most widely known studies of coercion is Pustejovsky (1995, 2011) in the framework of Generative Lexicon. Pustejovsky gives many examples of type coercion of lexical items of a wide variety of categories. For example, (12) presents place/people alternations that researchers of cognitive linguistics also have long discussed as examples of metonymy. According

to Pustejovsky, the meaning of lexical items dynamically develops according to the compositional relationship with their co-occurring words.

(12) **Place/People Alternation**

- a. John traveled to *New York*.
- b. *New York* kicked the mayor out of office.

(Pustejovsky 1995: 32)

Although the approach to coercion in Generative Lexicon is itself attractive, the present study does not adopt it because of its fundamental view of linguistic meaning. Pustejovsky (2005) states that the phenomenon of semantics and discourse are better considered separate areas of interest. This idea is inconsistent with the basic principle of Construction Grammar.

Researchers in Construction Grammar also discuss the concept of type coercion. Michaelis (2004) describes the conditions under which coercions influence the meaning of lexical items as the Override Principle, presented in (13) below.

(13) **Override Principle**

If a lexical item is semantically incompatible with its syntactic context, the meaning of the lexical item conforms to the meaning of the structure in which it is embedded.

(Michaelis 2004: 25)

Michaelis (2005) argues further that type coercion occurs not only at the lexicon level but also at the construction level. She states as follows.

Grammatical constructions refer in the same way that words do: they denote types—among them classes of entities and events. Accordingly, coercion is not merely the

resolution of semantic conflict, but is instead the resolution of conflict between constructional and lexical denotata (Michaelis 2005: 49).

Boas (2011) also addresses the issue of coercion from the perspective of Construction Grammar. According to Boas, even if some components of construction do not have an appropriate type and are considered unacceptable at first glance, their acceptability is much improved in certain types of environments. Consider the following example in (14).

- (14) a. Ed hammered the metal flat.  
b. ?? Ed hammered the metal safe.

(Boas 2011: 1271)

While (14a), a typical example of the resultative construction, presents no problems, the acceptability of (14b) somewhat decreases. Notice that the only difference between the two is the choice of the adjective that expresses the resulting state, *flat* and *safe*. The acceptability of the latter sentence, however, is much improved if given an appropriate context and support from inferences derived from it. For instance, the same sentence as (14b) embedded in the episodic context of (15) does not sound as unnatural as otherwise.

- (15) The door of Ed's old Dodge had a piece of metal sticking out. When getting out of the car, Ed had cut himself on the metal and had to go to the hospital to get stitches. The next day, *Ed hammered the metal safe*.

(Boas 2011: 1272)

Boas (2011) calls this phenomenon *leakage* and argues that the Override Principle becomes active for a sentence like the one in (14b) when certain conditions are met, resulting in an improvement in acceptability. One of the conditions is that another construction analogically

related to the main construction is available. Another is that the degree of entrenchment of such an alternative construction must be sufficiently high. Third, there must be a context that plays a role in supporting the establishment of such an analogy. In the case of (15), the main construction is the resultative construction, and as an extra construction, the *make X safe* construction is associated with it by analogy. Normally, the properties of one construction will not leak to another construction, but when the three conditions above are satisfied, a kind of coercion takes place to remedy the problem.

Chapter 6 shows that the process of such inferential reasoning involved in coercion and leakage phenomena at the sentence level plays a crucial role as well in the processing of utterances involving discourse connectives. When a discourse connective combines two propositions, the connective requires that each proposition have a specific semantic/discoursal type. However, these propositions can appear with diverse formal characteristics, and therefore there is no guarantee that their external linguistic representations will correspond precisely to the types that are specified. Thus, various sorts of inferences are made to make sure that types match between the actual propositions and those that the connective specifies.

Chapter 6 also touches on the issue of the fundamental role of discourse connectives in terms of communication efficiency. In a sense, a discourse connective is an explicit type-shifting device that benefits the hearer in that he or she obtains guidance as to the way the two propositions are related to each other. At the same time, a discourse connective affects communication efficiency on the part of the speaker. Since the inferential efforts to match the propositions to the types specified by the connective are left to the hearer, the speaker can spare himself/herself the cognitive burden of going the extra mile to specify the details for the hearer. This dual nature of a discourse connective as a grammatical construction makes it a highly complex but intriguing subject of study.

## 1.7 Corpus Data Used in the Present Work

The corpus used in Chapters 4 to 6 of this study needs some explanation. The discourse connectives defined in this study are not only used in the written language but are widely used in the spoken language as well. Furthermore, the linearity of language imposes more restrictions on the spoken language than it does on the written language. Thus, in order to collect instances of discourse connectives in actual contexts, the present study uses the TED Corpus, a corpus containing about 3,000 transcripts of English oral presentations. The TED Corpus is available online, and it is fully searchable via the TED Corpus Search Engine (TCSE) system developed by the author of the present work (Hasebe 2015).<sup>9</sup>

There is another reason for using the TED Corpus: it provides comprehensive contextual data needed to examine discourse connectives. The TED Corpus contains presentation transcripts in their entirety so that one can understand every segment of the talk with the necessary background information. This feature is indispensable in researching discourse connectives since they are expressions that heavily rely on the prior discourse.

There are some drawbacks to using the TED corpus, however. One of them is that the topics of the texts included in the corpus are necessarily limited to those covered by TED Talks. Considering the purpose of this study, however, which is to analyze the structure of the usages of discourse connectives, the somewhat limited selections of topics in the data will not have a critical effect.

Another possible drawback is that the text format is somewhat homogeneous. TED Talks is a collection of talks of roughly 10 to 20 minutes, using a monolog format. Every talk is well prepared,

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<sup>9</sup> The TCSE is available online at the author's website (<https://yohasebe.com/tcse>). It was initially released in 2014 and has been updated regularly, increasing the number of talks available. The total number of talks searchable is 3,166 as of this writing. The TCSE uses data retrieved via TED's official API under its terms of use.

and the message is relatively clear. Hence, although it is a corpus of spoken English, the language is in a style that has some properties characteristic to the written language. Therefore, we cannot expect the full diversity of styles that large-scale balanced corpora such as the British National Corpus (BNC) or the Corpus of Contemporary American English (COCA) would provide. Still, being aware of the existence of such restrictions in advance can reduce the possibility of inadvertently overgeneralizing the results of the observation.

Lastly, the language spoken by the speakers of the presentations making up the TED Corpus is not limited to a single variety of English. The presenters, furthermore, include not only native speakers of English but also non-native ones. Therefore, the data used in the analysis may include expressions that are not entirely natural for some speakers of English. However, considering the current situation in which the English language plays the role of a global language, it seems reasonable to attempt to capture facts on language using a dataset with non-standard varieties of English included.<sup>10</sup>

Though corpus-based studies are becoming more and more common in cognitive linguistics and, more generally, in theoretical linguistics, not many researchers have embarked on the endeavor of investigating discourse-level phenomena from a constructionist perspective.<sup>11</sup> The

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<sup>10</sup> Admittedly, using a dataset consisting of utterances of speakers of different cultural backgrounds may involve other issues than those that are mentioned here. Among them are different styles of argumentation and different ways of using figurative language (cf. Danesi and Rocci 2009). The present study does not address these issues though they are worth considering in future research.

<sup>11</sup> Groom (2019) also makes a statement to the same effect. He maintains that it is necessary to integrate concepts and methods of Construction Grammar into the corpus-based analysis of discourse. Nevertheless, the intention underlying his statement is somewhat different. Groom (2019) presents a case study of *THE WAY IN WHICH* construction as an example of the constructionist approach to the corpus-based analysis of discourse using corpus data from six different sub-genres of academic text: English literature, history, sociology, economics, cell biology, and electrical engineering. Apparently, his primary aim is to clarify different features of language in different types of discourse using Construction Grammar as a means of investigation. Though the research program advocated in

present study thus explores methods of approaching discourse-level problems throughout the later chapters, using real-world data, rather than artificial examples wholly detached from any context.

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Groom (2019) and that of the present study undoubtedly have much in common, there are also differences in primary theoretical interests.

## Chapter 2

# Construction Grammar Architecture

This chapter discusses the design of current Construction Grammar. First, we examine definitions of construction. Then, in order to clarify its features and advantages, the explanation of argument-structure constructions by Goldberg (1995) is examined. After that, we discuss two issues regarding Construction Grammar that could become obstacles to dealing with discourse connectives. One of them is sentence-structure centrism, and the other is a lack of theoretical consideration of the linearity of language. Also discussed in this chapter is the hierarchy/network view of linguistic structures, which is one of the characteristics of Construction Grammar. At the end of this chapter, a proposal will be made suggesting what is needed to extend the Construction Grammar framework so that it can better analyze and describe discourse connectives and possibly other discursal phenomena.

## 2.1 Overview of Construction Grammar

### 2.1.1 Definitions of Construction

The definition of the concept of construction is not necessarily the same among researchers. However, many regard the one held by Charles J. Fillmore, who first proposed Construction Grammar with his collaborators in the 1980s, and the one advanced by Adele E. Goldberg, who developed it further in the 1990s, as the standards. The present work also largely adopts their definitions, which we briefly review in the following. Fillmore (1988) defines the concept of grammatical construction as follows.

By grammatical construction we mean any syntactic pattern which is assigned one or more conventional functions in a language, together with whatever is linguistically conventionalized about its contribution to the meaning or the use of structures containing it (Fillmore 1988: 36).

Goldberg's (1995) definition is compatible with Fillmore's, but it is somewhat more formalized.

C is a CONSTRUCTION iff<sub>def</sub> C is a form-meaning pair  $\langle F_i, S_i \rangle$  such that some aspect of  $F_i$  or some aspect of  $S_i$  is not strictly predictable from C's component parts or from other previously established constructions (Goldberg 1995: 4).

Notice that in Goldberg's (1995) definition, a construction is not just a structure with the form (F) and the meaning (S) sharing the same index; rather, it is defined to be a structure that has some aspect that one cannot predict solely from knowledge about its components or existing constructions. Goldberg (1995) clearly states that the constructions have their meaning as lexical items do and that they qualify as full-fledged linguistic units. Her claim was widely accepted, and it prompted the start of numerous research projects in the framework of Construction Grammar.

However, Goldberg later revises her definition of construction as follows.

Any linguistic pattern is recognized as a construction as long as some aspect of its form or function is not strictly predictable from its component parts or from other constructions recognized to exist. In addition, patterns are stored as constructions even if they are fully predictable as long as they occur with sufficient frequency (Goldberg 2006: 5).

Especially relevant here is the last sentence of the quote above. For a pattern to be considered a construction, the pattern no longer needs to convey a "novel" meaning. If a pattern appears frequently enough, conveying a specific meaning, the pattern bears the status of a construction. Since this is the de facto standard in today's Construction Grammar, the present study regards it

as the basic definition of the concept of construction for the analyses and discussions presented throughout this study.

### 2.1.2 Argument-Structure Constructions

Since the publication of her milestone monograph in 1995 titled *Constructions: A Construction Grammar Approach to Argument Structure*, argument-structure constructions have served as a primary means to introduce the features and merits of Construction Grammar in many of the works by Goldberg (2005, 2006, 2019, inter alia).

Argument-structure constructions are constructions that take verbs with arguments of a certain number and type as core elements. This type of construction provides a good illustration of construction in general because its specifications of types of arguments often do not match the type specifications by the verbs used within; accordingly, it calls for an inference-based adjustment of the semantic structure of the construction. While such processes might seem rather exceptional and peripheral at first sight, they are highly prevalent in everyday use of language and significantly contribute to the expressiveness and efficiency of communication.

In order to establish a solid theoretical ground upon which the investigation of discourse connectives as grammatical constructions is given later, in what follows, we review Goldberg's (1995, 2005) analysis of three types of argument-structure constructions: the ditransitive construction, the resultative construction, and the caused-motion construction.<sup>1</sup>

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<sup>1</sup> There are many types of argument-structure constructions other than those discussed here. Among them are the passive construction (Croft 2005; Hilpert 2014), the middle construction (Taniguchi 1994; Goldwater and Markman 2009), and the dative construction (Gries and Stefanowitsch 2004; Bresnan et al. 2005).

### 2.1.2.1 Ditransitive Construction

The ditransitive construction is a construction that represents the meaning of CAUSE-RECEIVE (“X causes Y to be received by Z”).<sup>2</sup> It takes two objects as arguments, in addition to the subject argument. In this construction, the syntax (form) and semantics (meaning) correspond in the following way: the subject in the syntactic structure corresponds to the agent of the event in the semantic structure, the first object corresponds to the recipient, and the second object corresponds to the theme. Example (1) shows a simple instantiation of this construction. Notice that the verb *send* used here is wholly consistent with the CAUSE-RECEIVE meaning of the ditransitive construction; that is, there is virtually no need for inferential adjustments.

- (1) He *sent* her a letter.

Figure 2.1 illustrates the basic configuration of the ditransitive construction.

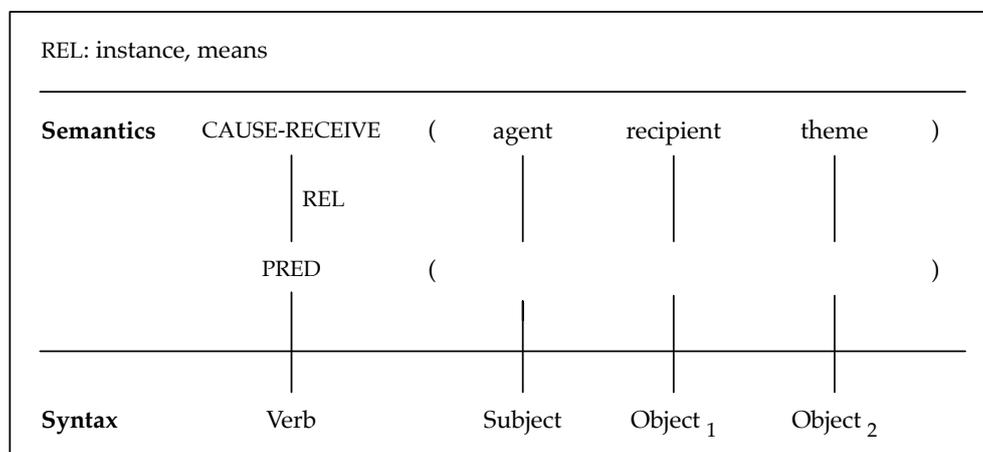


Figure 2.1: Ditransitive Construction

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<sup>2</sup> See also Mukherjee (2005) for a detailed account of the English ditransitive construction based on ample evidence from corpora.

The notation needs some explanation. PRED stands for a predicate to be replaced by a specific verb in an actual instance of the construction. In the case of (1), the verb occupying PRED is *send*. REL represents the relation between the general meaning represented by this construction and that of the actual predicate; that is, the relationship between CAUSE-RECEIVE and PRED. In the case of (1), since *send* represents the meaning consistent with that of the construction without needing any adjustments, REL is considered to be “instance.”

A verb used with an argument-structure construction must have an overlapping argument structure, even if they do not entirely match. In addition to this, the verb’s meaning must be one that the hearer can inferentially link to the construction’s meaning. For example, the verb *kick* is a verb with an argument structure that takes one subject and one object, and such an argument structure is a subset of the argument structure of CAUSE-RECEIVE. Also, the action that the verb *kick* implies can be naturally linked to CAUSE-RECEIVE by a “means” relationship. Example (2) below presents the argument structure of *kick* (= 2a) and an example sentence using it (= 2b).

- (2) a. *kick* ⟨kicker, kicked⟩  
b. Pat *kicked* her the ball. (= Pat causes her to receive the ball)

(Goldberg 2005: 35)

Figure 2.2 illustrates the ditransitive construction with its PRED slot filled by *kick*.

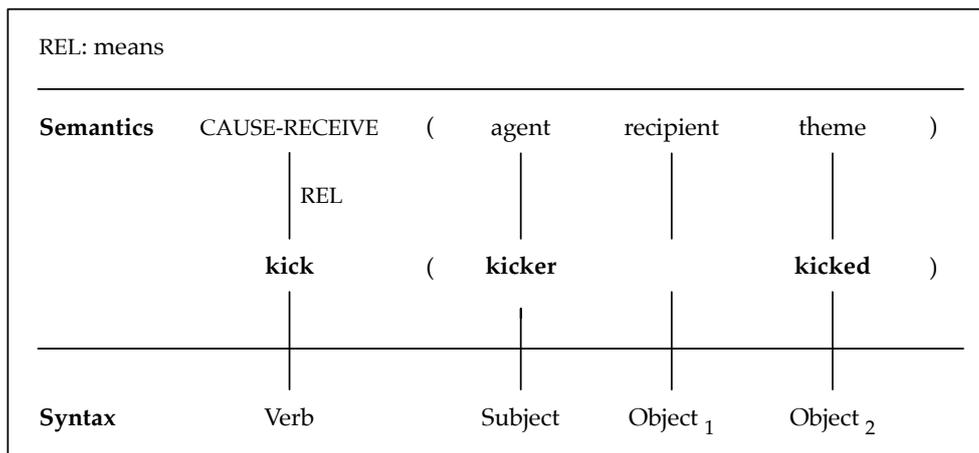


Figure 2.2: Ditransitive Construction + kick

Notice that the slot in the semantic structure in Figure 2.2 for “recipient” is left unfilled. Nonetheless, the referent of Object<sub>1</sub> in the syntactic structure of the construction will fill this gap implicitly. Such flexible adjustments in constructions increase language efficiency and expressiveness and make the mechanism of constructions an integral part of the language.

### 2.1.2.2 Resultative Construction

The general principles of constructions shown above also apply to the resultative construction discussed next.<sup>3</sup> The resultative construction is a construction that represents the meaning of CAUSE-BECOME (“X causes Y to become Y”). It takes one object and one oblique element (typically realized by an adjective or prepositional phrase) as arguments in addition to the subject argument. In this construction, the syntax and semantics correspond in the following way. The subject in the syntactic structure corresponds to the agent of the event in the semantic structure; the object corresponds to the patient; and the oblique element corresponds to the result or goal. Example (3)

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<sup>3</sup> See Boas (2003) for a more comprehensive discussion on the resultative construction not only in English but also in German from the perspective of Construction Grammar.

shows a simple instantiation of this construction. The verb *make* used here is wholly consistent with the meaning of CAUSE-BECOME represented by the resultative construction.

(3) He *made* the metal safe/pretty/tabular/damp/dirty.

(Goldberg 1995: 196)

Figure 2.3 illustrates the basic configuration of the resultative construction.

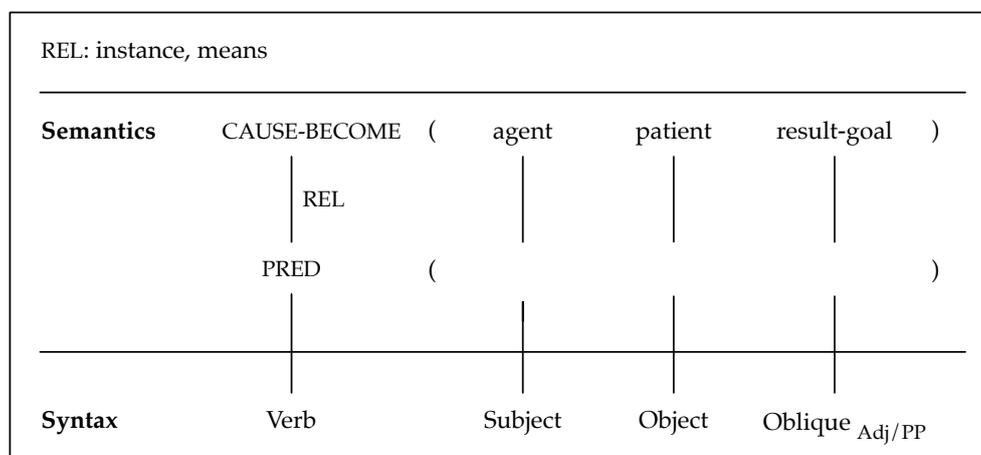


Figure 2.3: Resultative Construction

In the case of (3), REL, which represents the relationship between CAUSE-BECOME and PRED, is “instance” since the meaning of *make* corresponds to that of the construction without needing any extra adjustments.

As with the case of the ditransitive construction, REL in resultative constructions can be the extended type of “means.” An instance of a verb with which the construction includes REL of the “means” type is *wipe*. The argument structure and meaning of this verb do not contradict those of the resultative construction, as illustrated in (4a) below. Hence, it is used in the construction without causing a problem, as exemplified in (4b).

- (4) a. *wipe* ⟨wiper, wiped⟩  
 b. He *wiped* the table clean. (= He causes the table to become clean)

(Goldberg 1995: 189)

Figure 2.4 illustrates the resultative construction with its PRED slot filled by the verb *wipe*.

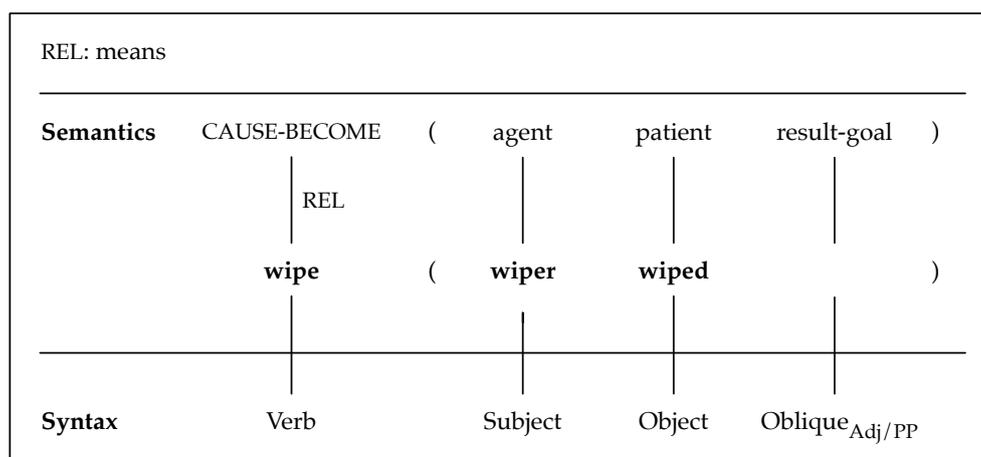


Figure 2.4: Resultative Construction + *wipe*

Again, notice that one of the slots in the semantic structure of the verb *wipe* in Figure 2.4 is left unfilled. Thus, the relevant portion of the construction, “result-goal,” compensates for this, making the resulting sentence convey a hybrid structure of the verbal meaning and the constructional meaning.

### 2.1.2.3 Caused-Motion Construction

A third argument-structure construction examined here is the caused-motion construction. The caused-motion construction is a construction that represents the meaning of CAUSE-MOVE (“X causes Y to move Z”). It takes one object and one oblique element (typically realized by an adverb or prepositional phrase) as arguments in addition to the subject argument. In this construction, the

subject in the syntactic structure corresponds to the agent in the semantic structure. The object corresponds to the patient, and the oblique element corresponds to the result or goal. Example (5) presents an example of this construction. The verb *move* in (5) is consistent with the meaning of CAUSE-MOVE of the resultative construction. Thus, virtually no adjustment is required here.

(5) We *moved* the piano upstairs.

Figure 2.5 illustrates the basic configuration of the ditransitive construction.

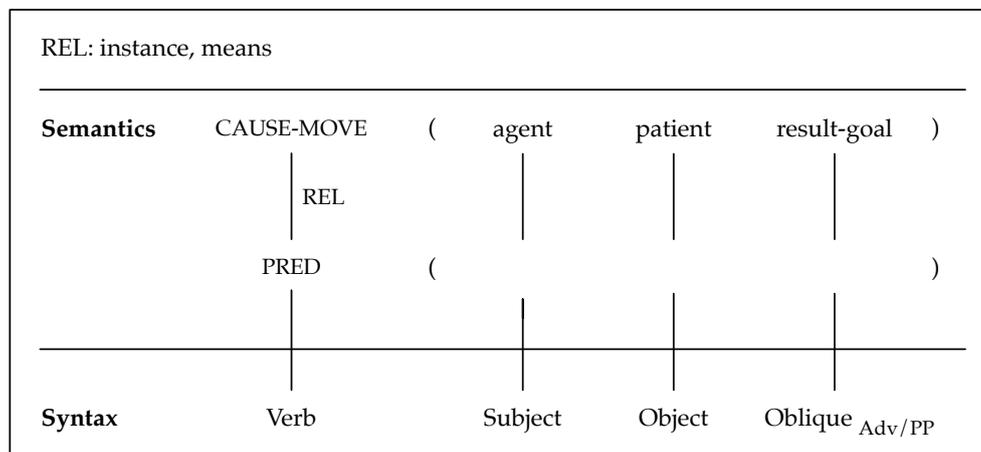


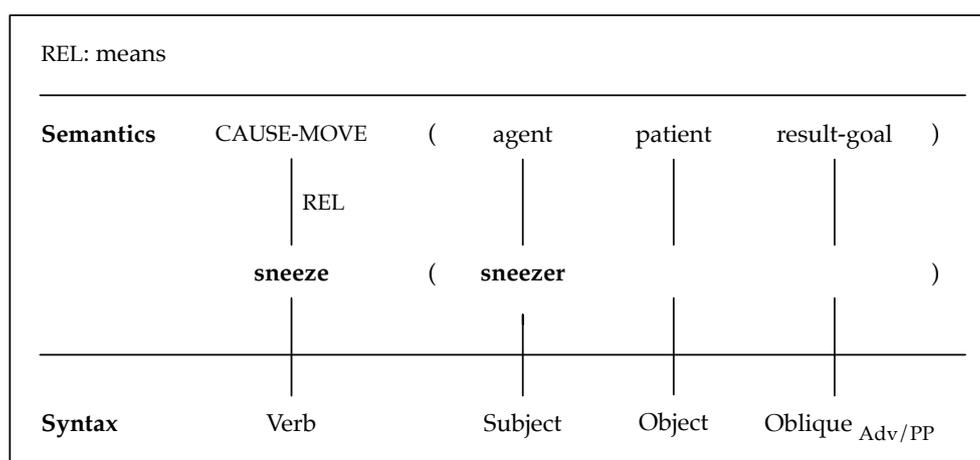
Figure 2.5: Caused-Motion Construction

In the case of (5), the verb meaning corresponds with the meaning of the construction, so REL here is of the “instance” type.

Any verb could replace PRED if its semantic properties have an aspect of meaning interpretable as the “means” of the schematic event of CAUSE-MOVE specified by the construction. For example, one can use even the intransitive verb *sneeze* in this construction. Since *sneeze* is a unary verb that only specifies the agent of the event, as shown in (6a) below, the patient and the result-goal slots are left unspecified. Still, the complementary effects of the combination of the verb and the construction can adjust for the discrepancies and make a felicitous sentence like (6b).

- (6) a. *sneeze* ⟨sneezer⟩  
 b. He *sneezed* the napkin off the table. (= He causes the napkin to go off the table)
- (Goldberg 1995: 55)

Figure 2.6 illustrates the caused-motion construction with its PRED slot filled by *sneeze*.



*Figure 2.6: Caused-Motion Construction + sneeze*

These three examples of argument-structure constructions show how constructions work to expand the range of lexical meanings in utterances. Although the verb has its argument structure that specifies the number and types of arguments it takes, the limitation is adjusted for and alleviated by the construction if necessary conditions are met. Thus, constructions contribute to the efficiency of communication and the effect of linguistic expressions.

## 2.2 Issues in Construction Grammar

Later in this work, we attempt to extend Construction Grammar so that it can analyze the structure and usages of discourse connectives. In connection with this objective, we need to

address two issues concerning the architecture of Construction Grammar. The first issue discussed here is the fact that Construction Grammar is a theory that primarily deals with sentence-level phenomena.

As clearly presented in the definitions of Fillmore (1988) and Goldberg (1995, 2006), constructions consist of pairs of syntactic patterns and semantic structures. These symbolic pairs combine with other elements to form continuously larger units. Formally speaking, it may be true that these compositional processes seemingly aim at building sentences. The design features of many grammatical devices, in fact, concern the unit of “sentence,” and the process of composition ends there. For instance, categories such as “subject” and “object” refer to functional positions that certain types of elements occupy in a sentence, and notions such as tense, mood, and aspect describe the functions of the predicate verb of a sentence. In that sense, the sentence centrism in Construction Grammar, or any other theories for that matter, makes sense to some extent.

However, in actual usage events, sentence-level utterances do not function independently. A sequence of sentences unfolds in a linear continuum of time, with each of the sentences connected at a higher level of organization, giving rise to a coherent discoursal structure (Halliday and Hasan 1976; Hobbs 1990; Kehler 2002, *inter alia*). A sentence is a product of lower-level elements and, at the same time, a component of a higher-level composition. Otherwise, language could end up being a system solely for elementary and primitive types of communication (and “discourse” will be non-existent). Notwithstanding the current limitations of the architecture of Construction Grammar, the notion of a construction itself is a linguistic unit that has no specification regarding size; thus, it must concern phenomena of scales beyond isolated sentences.

A second issue that the present study must address regarding current Construction Grammar is related to the last one: it does not adequately and sufficiently reflect the linear nature of language. Although the order of arguments of a construction is indeed specified in many constructionist analyses, this is not enough. An analysis of discourse-level phenomena calls for a framework in

which the linear order of certain types of semantic processing can be specified. Use of a discourse connective, in fact, includes a sequential process in which the extraction of a proposition from the preceding discourse first occurs, and then the introduction of another proposition related to the first one takes place. It is not easy for the framework of Construction Grammar as it stands to offer a theoretical explanation and ways of representing the mechanisms of these processes.

Preliminary proposals for overcoming these issues will be the topics discussed later in this chapter. Before that, however, we look at another aspect of the Construction Grammar framework, namely, a hierarchical view of various semantic phenomena. It will be shown that it has a notable resemblance to the approach that has been prevalent in the practice of the object-oriented programming paradigm of computer programming, as is the case with other research programs in cognitive linguistics, such as Cognitive Grammar.

## **2.3 Hierarchical Structures in Construction Grammar**

### **2.3.1 Network of Constructions**

Goldberg (1995) argues that constructions are not independent entities; they constitute a network as a whole through various local connections with other related constructions. Goldberg (1995) lists four types of link concepts, shown in (7) below, as examples of such local connections.

- (7)
- a. Polysemy link
  - b. Subpart link
  - c. Instance link
  - d. Metaphorical extension link

In the following, we will review each of these four links and see how much Construction Grammar's theoretical framework depends on the hierarchy model in structuring linguistic knowledge.

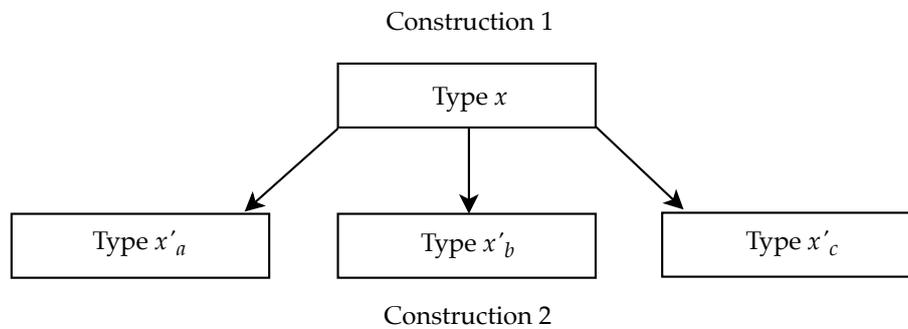
### 2.3.1.1 Polysemy Link

A polysemy link refers to a link that connects a construction at one level and more specific constructions at lower levels. It is observed in a configuration involving a construction with multiple semantic variations. For example, the ditransitive construction discussed in 2.1 has various variations that differ from each other, as listed in (8).

- (8)
- a. X CAUSES Y to RECEIVE Z (central sense)  
Joe gave Sally the ball.
  - b. Conditions of satisfaction imply X CAUSES Y to RECEIVE Z  
Joe promised Bob a car.
  - c. X ENABLES Y to RECEIVE Z  
Joe permitted Chris an apple.
  - d. X CAUSES Y not to RECEIVE Z  
Joe refused Bob a cookie.
  - e. X INTENDS to CAUSE Y to RECEIVE Z  
Joe baked Bob a cake.
  - f. X ACTS to CAUSE Y to RECEIVE Z at some future point in time  
Joe bequeathed Bob a fortune.

(Goldberg 1995: 75)

The polysemy link is a kind of inheritance relationship, wherein a parent structure passes down all its properties to child structures.<sup>4</sup> Figure 2.7 schematically represents its basic structure.



*Figure 2.7: Polysemy Link*

Notice that in Figure 2.7, the arrows indicating the relationships go from the more general construction to more specific ones. This is a notational convention used in Goldberg (1995). The reverse notation is used, however, in the object-oriented paradigm of computer programming, as will be discussed later.

### 2.3.1.2 Subpart Link

Many constructions have slots for arguments they take. The number of arguments and their types constitute the “signature” of a construction. Subpart links concern the overlaps and differences between signatures of related constructions. For instance, consider (9) below.

- (9) a. She walked the toddler to the door.

---

<sup>4</sup> Each of the child structures can override inherited properties independently—a point that can be most strongly associated with the inheritance-based architecture of the object-oriented programming paradigm, as will be discussed in more detail later in this chapter.

b. The toddler walked to the door.

(Traugott and Trousdale 2013: 60)

(9a) is an example of the cause-motion construction introduced in 2.1. Here, *walk*, which is originally an intransitive verb, is used as a transitive verb and takes the object argument. On the other hand, (9b) is an example of the intransitive-motion construction. The verb *walk* is used here as an intransitive verb and does not take an object. These two sentences are realizations of different constructions, but they have a “part and whole” relationship in both form and meaning. Figure 2.8 illustrates this relationship.

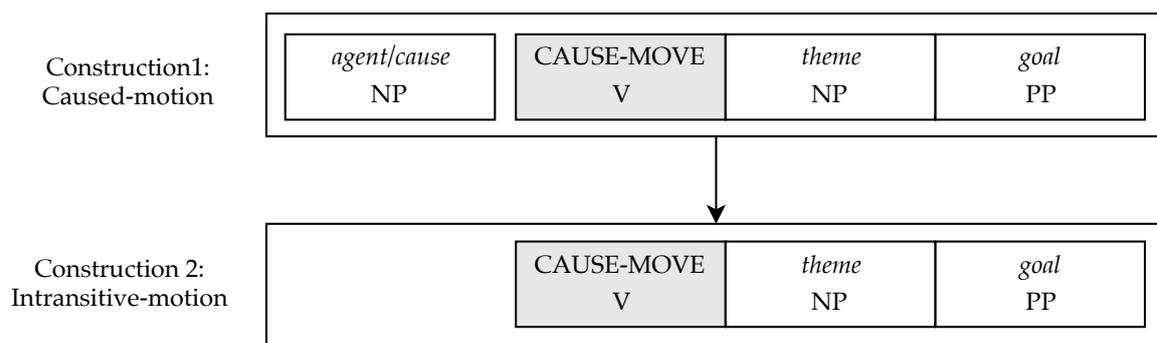


Figure 2.8: Subpart Link

As discussed in detail later, the concept of construction networks in Construction Grammar consists of IS-A relationships and HAS-A relationships. The subpart link is a link type of a HAS-A relationship, while the polysemy link (or the inheritance link) is a link type based on the IS-A relationship.<sup>5</sup>

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<sup>5</sup> As mentioned earlier, there are many varieties of construction grammar. It is worth noting that one of those varieties, Radical Construction Grammar (Croft 2001), rejects *meronomic* links, or part-whole relationships, between different constructions. Also, it does not posit syntactic relations between elements in constructions. Thus, subpart links are not part of the construction network in the latter framework (Croft 2001: 59).

### 2.3.1.3 Instance Link

An instance link is, just like a polysemy link, entails an inheritance relationship between a higher-level construction and a lower-level construction. However, the lower-level construction connected by the instance link has a unique restriction not found in the higher-level construction. Consider the examples in (10).

- (10) a. Chris drove Pat mad/crazy/over the edge.  
b. \* Chris drove Pat silly/dead/angry/happy/sick.

(Goldberg 1995: 79)

(10a) is an example of the resultative construction introduced in 2.1. When the verb *drive* appears in the resultative construction as in (10a), the *drive* + object + oblique<sub>adj</sub> pattern constitutes a child construction linked to the parent by an instance link. This is because, in the above sub-construction, there are restrictions on the expressions that can fill the slots for oblique<sub>adj</sub>. An adjectival expression such as *mad*, *crazy*, or *over the edge* will make a felicitous sentence of the *drive* + resultative construction, whereas a seemingly similar expression with *silly* or *happy* in (10b) makes the sentence infelicitous.

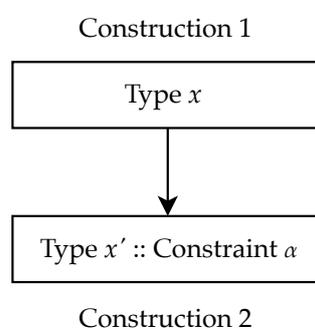


Figure 2.9: Instance Link

In terms of the object-oriented programming paradigm, the relationship between constructions linked by an instance link is an IS-A relationship. From that perspective, there is almost no substantial difference between an instance link and a polysemy link, considering that child elements in an inheritance relationship can override the properties of the parent element.

#### 2.3.1.4 Metaphorical Extension Link

A metaphorical extension link theoretically rests on the concept of metaphorical mapping developed in cognitive linguistics. Since Lakoff and Johnson's (1980) landmark work, cognitive linguists have argued that many everyday language expressions involve metaphorical mapping from the source domain to the target domain.

Goldberg (1995) states that the metaphorical extension link is involved in the semantic extension of constructions. For example, (11a) is a variation of the intransitive-motion construction, in which the movement verb *go* does not represent a spatial movement of the object but metaphorically represents a change in its physical state. (11b) is an instance of a variation of the caused-motion construction, where *pull*, a verb that implies movement, does not represent spatial movement but a change in psychological state.

- (11) a. The jello *went* from liquid to solid in a matter of minutes.  
b. He couldn't manage to *pull* himself out of his miserable state.

(Goldberg 1995: 83)

Figure 2.10 illustrates the metaphorical extension link between constructions.

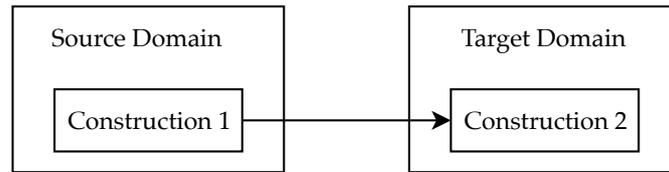


Figure 2.10: Metaphorical Extension Link

Goldberg’s (1995) analysis, which attempts to integrate various constructions into an extensive network, seems reasonable and convincing, especially when considering such a network consists of IS-A and HAS-A relationships, essential components also in the object-oriented programming paradigm. The latter fact suggests that the idea of the network of constructions does exist not only as a theoretical construct to explain certain linguistic phenomena but also as a variation of a widely applicable means to structure knowledge in seemingly different cognitive domains. We will look at this in more detail in the next subsection.

### 2.3.2 Hierarchical Organization of Meaning

Goldberg herself admits that the network architecture of Construction Grammar is under the influence of the object-oriented programming paradigm (Goldberg 1995: 3.3). In what follows, we discuss how two concepts in object-oriented programming, the IS-A and HAS-A relationships, are in high agreement not only with Construction Grammar but with cognitive linguistics more generally.<sup>6</sup>

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<sup>6</sup> Richard Hudson’s Word Grammar is another linguistic framework that extensively relies on inheritance networks similar to those assumed in the paradigm of object-oriented computer programming (Fraser and Hudson 1992). Recent versions of Word Grammar, however, do not regard HAS-A as an essential relation, while they include IS-A as the fundamental design feature of what Hudson calls *language networks*. Hudson (2007: 19) states that IS-A “is not dependent on any other relation and does not involve either an existential claim or a numerical one; it is simply about class membership,” while HAS-A “combines two separate bits of information.” The latter statement refers to

An important implication of the discussion here is that cognitive linguistic frameworks thus far tend to overlook the significance of the linearity of language. The network view of language indeed provides a convenient means to explain many semantic phenomena. However, such explanations are partial, as is evident from the Saussurean distinction of syntagmatic relations and paradigmatic relations (Saussure 1916). The network view of language profiles only the latter; thus, a complementary means is called for to examine the mechanism of syntagmatic relations, one that can deal with not only sentence-level but also discourse-level phenomena.

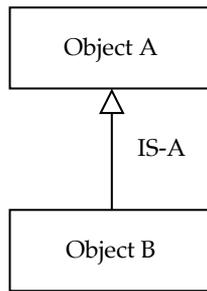
### 2.3.2.1 IS-A and HAS-A relationships

In object-oriented programming, program components (objects) can inherit properties from other components. Such inheritance of properties constitutes the IS-A relationship (Brachman 1983; Meyer 1997; Weisfeld 2013). In relationships of this kind, every child object is an element that can be referred to by the same name as the parent object (e.g., a *hybrid car* can be referred to as a *car* or a *vehicle*). Figure 2.11 illustrates the IS-A relationship using Unified Modeling Language (UML), a standard format for diagramming relationships between objects in object-oriented programming. Notice that in UML, arrows between elements go in the opposite direction from those in Construction Grammar diagrams.<sup>7</sup>

---

the fact that a HAS-A relationship consists of a type of relation (e.g., *A has B*) and the number or a range of objects (the number of B can be either 0, 1, or *n*). Thus, Hudson argues that IS-A is more primitive and fundamental than HAS-A. There is room for doubt about this assumption, however. Even IS-A could be considered as having two components: the relation itself (*A is a B*) and the number of levels (or distance) intervening between the object A and its super-class B. It can be either 0, 1, or *n*, with *n* being any number larger than 1. The present study regards both IS-A and HAS-A as relations that are equally fundamental for the network configurations underlying many linguistic phenomena.

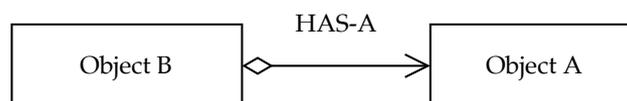
<sup>7</sup> More technically, Figure 2.11 is a structure diagram in UML. The Object Management Group, the consortium that designs and standardizes UML, defines three types of diagrams: structure diagrams, behavior diagrams, and interaction diagrams. See Scott (2001) and Fowler (2003) for the detailed specification of UML.



*Figure 2.11: IS-A Relationship between Objects*

Among the four types of links connecting the constructions discussed earlier, the polysemy link and instance link are links based on the IS-A relationship in Figure 2.11.

The other type, the HAS-A relationship, represents a “composite relationship.” In other words, the HAS-A relationship expresses the relationship between two elements, with one being a component of the other. Among the four types of links proposed by Goldberg (1995), the subpart link is a HAS-A type relationship. Figure 2.12 illustrates the relation of this type in UML.



*Figure 2.12: HAS-A Relationship between Objects*

As for metaphorical extension links, it is somewhat more difficult to interpret them as either IS-A or HAS-A relationships than is the case with other types of links. However, the process of “extension” from a prototype to peripheral members of a category contains a structure based on IS-A relationships, as shown in Figure 2.13 below.

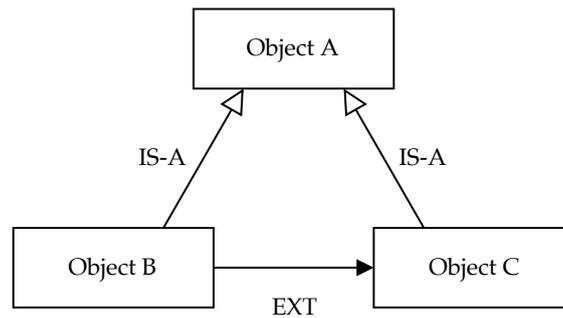


Figure 2.13: Extension Relationship between Objects

Suppose Object B is the source domain construction, and Object C is the target domain construction. If there is a higher-level construction, Object A, that is the super-construction for both Objects B and C at the same time, then the relationship between B and C constitutes an extension (EXT) link.

Thus, the network of constructions discussed by Goldberg (1995) is composed of different types of links, each of which is a variation or composite of IS-A and HAS-A relationships. It proves that the two seemingly distant areas of study, Construction Grammar in linguistics, on the one hand, and object-oriented programming in software engineering, on the other, are highly compatible with each other.<sup>8</sup>

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<sup>8</sup> Kowalski (2011) takes up the paradigm of object-oriented programming, among other computational paradigms, in his monograph that examines the parallel structure between human thinking and various aspects of computational logic. He compares the popularity of object-orientation among software engineers for the past thirty years to behaviorism in psychology in the mid-twentieth century. He points out that while (traditional) computational logic is concerned with representing knowledge, object-orientation is concerned with structuring knowledge representations. Though Kowalski's analysis and evaluation of object-orientation are not entirely agreeable, it seems true that the network-based representation of knowledge does not explain fully how natural language is implemented or put to use in the real world.

### 2.3.2.2 Hierarchical Organizations in Cognitive Grammar

Construction Grammar is not exceptional in that it adopts the model of hierarchical networks. Many theorists in cognitive linguistics and adjacent areas of research propose a model sharing the same view for the most part. Here we look at hierarchical networks of verbal and nominal elements in Cognitive Grammar presented by Langacker (1987b, 2008a) as an example showing the extent to which the hierarchical way of modeling knowledge is rooted deeply and broadly in the cognitive-linguistic enterprise.

Cognitive Grammar stipulates that the conceptual structure of any linguistic expression is either an instance of a *thing*, *relation*, or any type derived from either of these. A thing is a structure defined as a conceptual element identified in the spatial domain. A relation, on the other hand, is defined as a concept that is relatively more complex and occurs in the temporal domain. Typically, a nominal expression represents a thing, while verbs and many categories of elements other than nominals represent relations.

In addition to these two fundamental conceptual categories, there is an even more abstract element type that is superordinate to things and relations; it is called an *entity*, which is the very root of the entire network of conceptual structures of lexical items. Figure 2.14 shows the relationships between these three types. Conventionally, a square represents an entity; a circle represents a thing; and a complex shape composed of a thing, an entity, and a connector between them represents a relation.<sup>9</sup>

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<sup>9</sup> In Cognitive Grammar, a relation is a *dependent* structure while a thing is *autonomous* since the conception of a relation necessarily presupposes the conception of at least one thing. In other words, a relation is always “about” something. Thus the schematic illustration of a relation is composed of a thing and an entity. The reason an entity must be included in the conceptual structure of a relation is somewhat less apparent than that of a thing, however. Radden and Dirven (2007) suggest that the entity in a relation represents the landmark (*vis-à-vis* the trajector), which could be either a second-most-prominent thing in the structure, as in the case of a ditransitive relation where

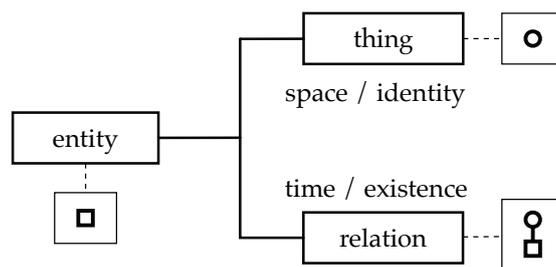


Figure 2.14: Type Hierarchy in Cognitive Grammar

The IS-A relation is the foundation of the type hierarchy in Cognitive Grammar: a thing, a relation, and many subtypes of these are all descendants of entity. Figures 2.15 and 2.16 are hierarchical structures having thing and relation as their root elements, respectively.<sup>10</sup>

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an object is necessarily involved in addition to the subject, or an auxiliary element needed for the conception of a certain kind of state or process. The adjective *high*, for instance, requires a scalar base on which a point should be specified in relation to another point that functions as the standard for comparison. See also Taylor (2002) for a systematic examination of conventions of schematic illustrations of Cognitive Grammar.

<sup>10</sup> These two hierarchies are presented separately because of the large sizes, but they are part of a single hierarchy with the *entity* in Figure 2.14 at the root of the organization. Langacker explicates different aspects of conceptual types in many papers and monographs. Thus, I created Figures 2.14, 2.15, and 2.16 so that one can see the overall structure of the network more efficiently, while the presentation is still entirely based on the original analyses presented in Langacker's works.

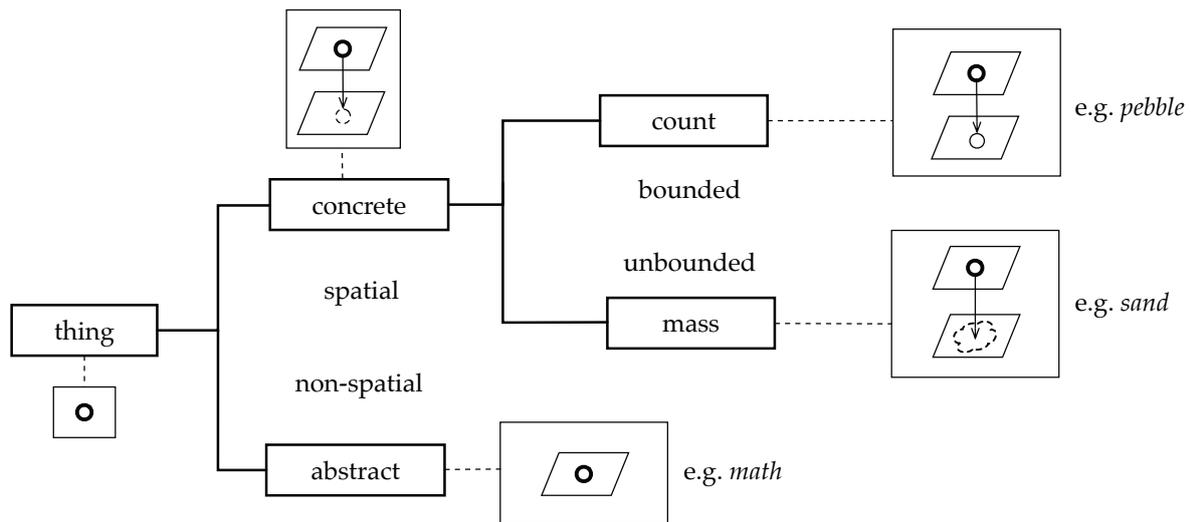


Figure 2.15: Thing Type Hierarchy in Cognitive Grammar

Figure 2.15 illustrates the *thing* type and its subtypes. In Cognitive Grammar, a thing is conventionally illustrated by a circle shape (often with an enclosing box that represents the base, a cognitive domain on which the mental demarcation for conceptual elements is made), as presented under the box labeled “thing” in the figure. A thing may be either *concrete* or *abstract*, depending on whether the primary domain of instantiation is spatial or non-spatial. The conceptual structure of a concrete thing consists of a type plane and an instance plane. Designated in the former plane is an abstract type, while in the latter, the type’s instances are projected. Concrete things are further sub-typed into two categories, that is, the *count* type and the *mass* type. On the instance plane of the count type, one or more discrete instances are projected in a way that they can be distinguished from each other. The conceptual structure of the noun *pebble* is a typical example. On the instance plane of the mass type, in contrast, the projected entity does not have a rigid boundary that separates it from other instances. In fact, it does not have a discrete shape that defines it even partially. Nouns like *sand* are of this category. The conceptual structure of an *abstract* thing is rather simplistic. It only consists of a type plain. The noun *math*, for instance, has a structure of this type.

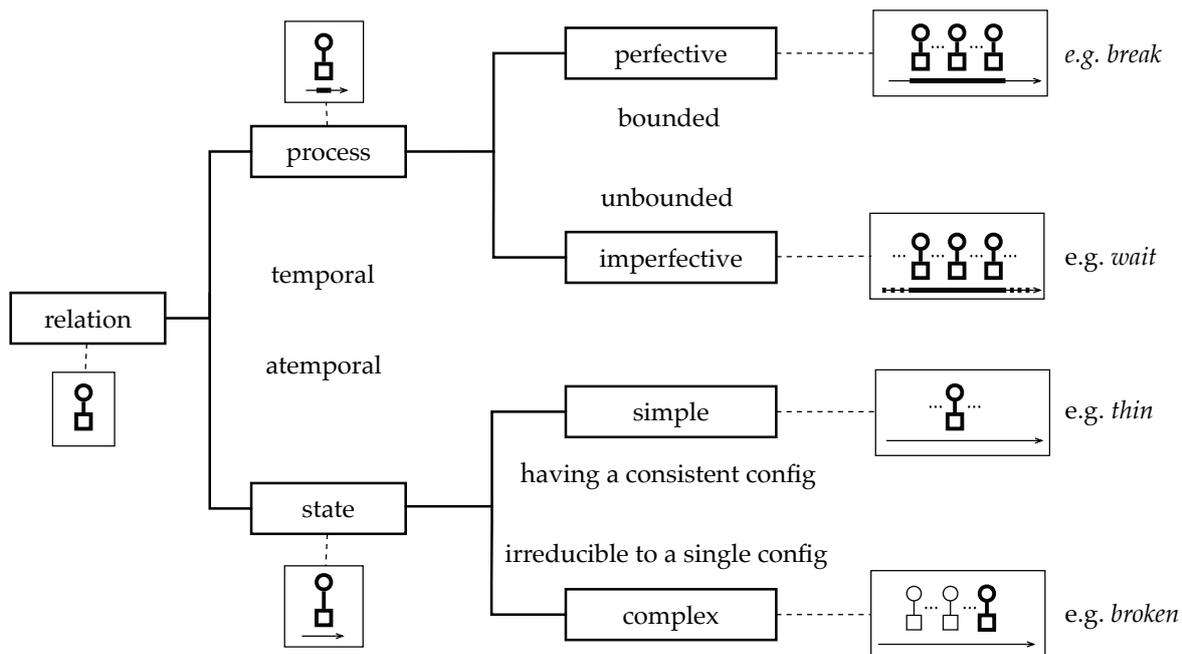


Figure 2.16: Relation Type Hierarchy in Cognitive Grammar

Figure 2.16 illustrates the *relation* type and its subtypes. A relation may be a *process* or a *state*. The primary domain of instantiation for a process is temporal, while that of a state is atemporal. This temporality is conventionally represented by a thick line segment overlaid on an arrow. Thus, in a schematic illustration for process, an arrow under the shape representing a relation has a thick line segment. If the temporal continuity of a process is bounded by a beginning and an end, it is a *perfective* process, exemplified by a verb like *break*. A conceptual structure without such clear boundaries as that of the verb *wait*, on the other hand, is categorized as an *imperfective* one.

Similarly, the state type can be sub-typed into two categories. A state with a conceptual structure where the relation is constant (that is, no changes are assumed to have occurred in the preceding time span) is labeled a *simple* state, while a state of a conceptual structure involving a preceding change that has led to the resulting configuration is labeled a *complex* state. The lexical items that exemplify the simple state are such adjectives/participles as *thin*, and the lexical items that exemplify the complex state are adjectives/participles, such as *broken*.

In order to avoid overly deviating from the primary purpose of this section, we will not delve into further details of the lexical hierarchies presented by the diagrams in Figures 2.14 to 2.16, but note here that not only IS-A relationships but also HAS-A relationships play a part in the overall lexical type hierarchy in Cognitive Grammar. The conceptual structures of relation and their derived types always include at least one thing-type element, reflecting the fact that the conceptualization of a relationship is always dependent on the conceptualization of its participant elements. The relation *throw*, for instance, requires at least the conceptualization of two autonomous (thing-type) elements: the agent (the person who throws) and the theme (the thing that is thrown). Similarly, the conceptual structures of a thing and its derived types may contain relations; deverbal nouns/gerunds (e.g., *catching* and *hitting*) are typical examples. Hence, it can be said that the thing-type elements in Figure 2.15 and the relation-type elements in Figure 2.16 are interdependent via HAS-A relationships.

As stated earlier in this section, although describing and explaining the meaning of linguistic expressions using the hierarchical model is valid and meaningful in itself, it is not enough to comprehensively deal with linguistic phenomena beyond the sentence-level.<sup>11</sup> We need another model to have a close look at discursal phenomena such as utterances involving the use of connectives. The next section makes a preliminary proposal regarding the above issue.

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<sup>11</sup> We must mention that Langacker's works in Cognitive Grammar have attempted to describe and explain discursal phenomena using theoretical concepts not confined to the limit of hierarchical networks. Among them are current discourse space (Langacker 2008a: Chapter 13), windows of attention (Langacker 2009, 2012), and baseline/elaboration organization (Langacker 2016). We consider that a similar attempt must be made in Construction Grammar in some way, and that is one of the very purposes of the present study.

## 2.4 Discourse-Connective Construction

As stated by Levinson (1983), discourse connectives represent “how the utterance that contains them is a response to, or a continuation of, some portion of the prior discourse.” Figure 2.17 (= Figure 1.1) illustrates the structure common to various uses of discourse connectives.

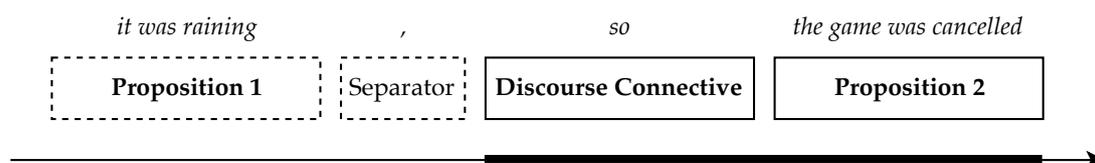


Figure 2.17: Basic Configuration of Discourse Connective

Let us reiterate the basic structure of discourse connectives in Figure 2.17, which was already introduced in Chapter 1. Boxes in dashed lines are elements outside the formal structure of the construction. With Proposition 1 being such an element, the use of a discourse connective requires the hearer to retrieve it in a manner consistent with the contextual properties. The *separator* placed after Proposition 1 is a short pause in the case of spoken language. In the case of written language, it corresponds to a comma, semicolon, or a period. These two elements, Proposition 1 and the separator, reside outside the formal structure of the discourse-connective construction. There are two reasons for this.

Firstly, as we will see in more detail in later chapters, Proposition 1 does not necessarily appear as a single sentence or even as a sequence of clauses immediately preceding the connective. Often, Proposition 1 must be retrieved somewhat heuristically from a more extensive chunk of text in the discourse. (12) below presents an example of the discourse connective *so* that prompts the hearer to retrieve a proposition that is not given as an explicit form of a sentence or a clause but rather is provided in a broader range of text preceding the connective.

- (12) [The speaker has listed many options that one can take in life before he continues to say the following] *So here's our choice. We can either be complacent about our future, taking as an article of blind faith that any new technology is guaranteed to be beneficial, and just repeat that to ourselves as a mantra over and over and over again as we drift like a rudderless ship towards our own obsolescence. Or we can be ambitious—thinking hard about how to steer our technology and where we want to go with it to create the age of amazement* [TCSE 17851 | Max Tegmark: How to get empowered, not overpowered, by AI].

Secondly, at the moment when the speaker has just uttered the linguistic expression corresponding to Proposition 1, it is often the case that the hearer (and possibly the speaker as well) cannot assume it to be part of the discourse-connective construction since the speaker often adopts the latter construction as an afterthought. (13) below is such an example where the discourse-connective construction is used to make a supplementary comment on the previous statement.

- (13) *So that leaves the mosquitoes, and here's how we control them now: spraying insecticides. The protective gear is necessary because these are toxic chemicals that kill people as well as bugs. Although it does take quite a lot more to kill a person than to kill a bug* [TCSE 2793 | Nina Fedoroff: A secret weapon against Zika and other mosquito-borne diseases].

Thus, the formal structure of the discourse-connective construction consists of the connective and subsequent clausal structures. In Figure 2.17 above, solid boxes indicate these elements. Notice that like Proposition 1, Proposition 2 is not necessarily composed of a single clause or sentence, either. However, unlike the text passage containing Proposition 1, it is clear to both the speaker and the hearer that the text segment immediately following the connective is intended to express Proposition 2.

The semantic/discourse structure of the discourse-connective construction, on the other hand, must include not only Proposition 2 but also Proposition 1 since the relation specified by the connective necessarily refers to both propositions.

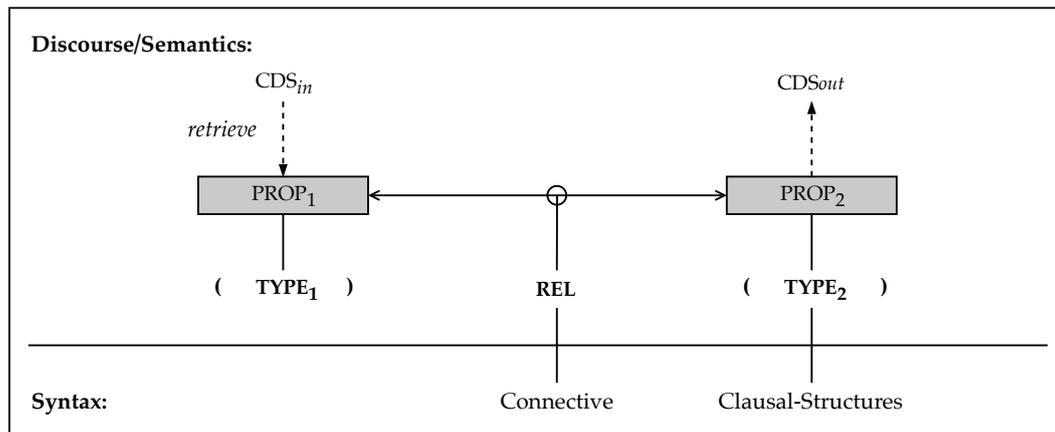


Figure 2.18: Discourse-Connective Construction

Figure 2.18 illustrates the schematized structure of discourse connectives as a grammatical construction. The details of this diagram will be explicated in Chapter 4. Notice that the descriptive means used in Figure 2.18 accommodates the syntactic and semantic/discoursal structures of discourse connectives, which do not necessarily fit within the sentence-level descriptive means examined earlier in this chapter.

The idea of constructions across sentence boundaries is not necessarily novel. For example, Yamanashi (2009: Ch. 6) argues that some constructions used as idiomatic phrases have meaning only in adjacency pairs in dialogue. The italicized expressions uttered by B in (14)–(17) do not have a literal meaning that can be understood on their own but are interpreted based on the content of A’s immediately preceding utterance.

(14) A: Drinking too much is not good for your health.

B *I wasn't born yesterday.*

(15) A: Can you lend me 100 dollars?

B: *I'm not made of money.*

(16) A: Take Bill to the bar. One or two will fix him up.

B: Oh no. With him, *the sky is the limit.*

(17) A: That meeting was awful!

B: *You can say that again.*

(Yamanashi 2009: 234)

Adjacency pairs are linear linguistic structures constructed cooperatively by the discourse participants. This linearity allows B in (14)–(17) to use the preceding utterance of A as an argument for the italicized expression.<sup>12</sup> Similar phenomena may occur in rather nomological situations, and the discourse-connective construction, as shown in Figure 2.18, can be considered as one such example.

Analysis and description of phenomena beyond the level of sentences require an approach that appropriately takes into consideration the linear nature of language. The hierarchical model of meaning is valid and useful in itself, but it does not explain the whole picture. More specifically, the linear sequence involved in the utterance of discourse connectives consists of 1) a proposition retrieval from the preceding context, 2) the introduction of a new proposition and conjugation of the two propositions, and 3) the updating of the context with the results. In Chapter 4, we revisit the issue of linearity and attempt to give it a more detailed characterization with special attention to how it is reflected in the usages of discourse connectives.

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<sup>12</sup> Yamanashi (2009: 236) calls constructions of this type “global constructions.”

## 2.5 Summary of Chapter 2

This chapter discussed the architecture of current Construction Grammar and issues with it that can become obstacles to a comprehensive analysis of discourse connectives. First, we examined the definitions of a construction of Fillmore (1988) and Goldberg (1995, 2006). Then, we examined Goldberg's (1995) analysis of the three argument-structure constructions: the ditransitive construction, the resultative construction, and caused-motion construction. It was pointed out that due to current Construction Grammar's sentence-centric tendency, the framework needs to be modified and extended so that it can cover linguistic phenomena at the discourse level as well.

Next, we reviewed the network model of constructions discussed in Goldberg (1995), examining four types of links constituting the network. Also reviewed was a similar hierarchical model by Langacker (2008a) for describing the relationships among nominal and verbal elements in the framework of Cognitive Grammar. These observations revealed that such hierarchical models are composed of IS-A and HAS-A relationships—concepts regarded as essential in the object-oriented computer programming paradigm. One may speculate that the hierarchical model widely adopted in cognitive-linguistic research reflects a part of the universal nature of human knowledge-structuring abilities in general. In order to deal with discourse phenomena such as connectives, however, it is imperative to look at the process of retrieving the relevant information from the preceding discourse, performing some processing on it, and handing over the updated context to the later discourse. This chapter offered a preliminary proposal of a theoretical means of reflecting this process to analyze and describe the semantic/discourse structure of discourse connectives as grammatical constructions.



## Chapter 3

# Domains of Meaning in Discourse

In this chapter, we discuss domains of meaning involved in usages of discourse connectives. Sweetser (1991) claims that various linguistic phenomena have usages in three domains of meaning: the content domain, epistemic domain, and speech-act domain. Discourse connectives are among such expressions.

This chapter also offers a new definition of the concept of *proposition*. A proposition in the present study covers a wide range of states and events having varying degrees of schematicity, conceptualized from different types of perspectives. This redefinition of the term is necessary for our analysis of discourse connectives because connectives combine two propositional elements residing in different domains of meaning. The range of states and events described could be diverse; therefore, the propositions as components of the connective construction must be regarded as entities that are abstract enough to accommodate such diversity.

An extra set of evidence presented later in this chapter provides support for the definition of propositions as such. There are usages of linguistic expressions that are associated with not one single domain of meaning but multiple domains. The existence of these cases suggests that all three domains of meaning proposed by Sweetser (1991) actually “co-exist” in every usage event, and the only difference is in the degree to which those domains of meaning get foregrounded in the discourse/semantic structure.

### 3.1 Three Domains of Meaning

That there are multiple usages for a discourse connective had been known before Sweetser pointed it out. For example, Quirk et al. (1985) mention that *because* has usages as a *content disjunct* and a *style disjunct*, as shown in the following examples.

(1) a. **Content disjunct *because***

We have no electricity, *because* there's a power failure.

b. **Style disjunct *because***

I have nothing in my bank account, *because* I checked this morning.

(Quirk et al. 1985: 1072)

Quirk et al. (1985) describe the differences between these two usages as follows.

Style disjuncts are distinguished semantically in that they generally imply a verb of speaking and the subject *I*. The style disjuncts implicitly refer to the circumstances of the speech act, while the content disjuncts refer to the content of the matrix clause. The style disjuncts are therefore more peripheral to their superordinate clause than are the content disjuncts (Quirk et al. 1985: 1072).

Sweetser follows this tradition by observing that multiple areas of meaning are involved in a wide variety of linguistic expressions. She introduces the speech-act domain, the third domain of meaning, in addition to the two domains corresponding to the two different types of usages of *because* discussed by Quirk et al. (1985). She calls one of them the content domain, a domain associated with external events in the real world, and the other one the epistemic domain, a domain associated with the subjective world of inference and reasoning. As briefly addressed in Chapter 1, these three domains of meaning are informally defined as follows.

(2) a. **Content domain**

Domain for the conceptualization of real-world events and their relations

b. **Epistemic domain**

Domain for reasoning and inferences about real-world events

c. **Speech-act domain**

Domain for acts to exercise illocutionary force through utterances

The rest of this subsection introduces Sweetser's (1991) observations on the involvement of these semantic domains in various linguistic expressions. The three grammatical categories used here as examples are modal auxiliaries, conditionals, and coordinate conjunctions.

### 3.1.1 Modal Auxiliaries

Distinguishing different domains in examples of the modal auxiliary *may* is relatively easy. Consider (3) below.

(3) a. John *may* go.

John is not barred by (my or some other) authority from going.

b. John *may* be there.

John is not barred by my premises from the conclusion that he is there.

c. *May* I ask you where you're going?

I am wondering if I am barred from asking by your current availability.

(Sweetser 1991: 61, 73)

In the traditional categorization of the usages of modal auxiliaries, that of *may* in (3a) is called *deontic* or *root*. It concerns a situation in the real world, and it presupposes the existence of some authority that admits the event to happen. In (3a), the influences of the authority upon the

occurrence of John's going is considered to be part of the world-knowledge shared by the interlocutors (i.e., the speaker and the hearer).

The usage of *may* in (3b) is different in that its meaning reflects the result of inferential reasoning. Though this reasoning is attributable to some real-world evidence, it is still epistemic since the meaning of this utterance primarily concerns the speaker's mental processes of contemplating the evidence and arriving at a conclusion.

*May* in (3c) deals with an event in the speech-act domain. The propositional relation in this sentence (that of the speaker's asking a question to the hearer) is not for conveying particular information to the hearer but for literally performing the act of asking and for establishing a kind of social reality between the interlocutors (Stenius 1967; Searle 2000).

### 3.1.2 Conditionals

Conditional sentences form another category involving multiple domains of meaning. An example of the content-domain usage of a conditional is given in (4).

(4) *If* the weather isn't bad, (then) we will go to the park tomorrow.

Some researchers have pointed out the existence of conditionals in domains of non-content types. One of the earliest among such scholars, J. L. Austin, presented an example that concerns the speech-act domain of meaning, as in (5).<sup>1</sup>

(5) There are biscuits on the sideboard *if* you want them.

(Austin 1970: 210)

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<sup>1</sup> See also Yamanashi (1975) and van der Auwera (1986) for early analyses of speech-act conditionals.

More recently, Krifka (2014) has also discussed speech-act conditionals, such as those in (6).

- (6) a. *If I want biscuits, where can I find them?*  
b. *If she wants biscuits, give her some.*  
c. *If you want biscuits, I promise you that there are some on the sideboard.*

(Krifka 2014: 84)

There are some variations in conditionals in the speech-act domain. Among the three examples above, (6a) contains the speech act of “inquiry,” (6b) features the speech act of “order,” and (6c) implements a speech act of “promise.” Still, every instance has a shared basic structure, that is, “the speech act represented in the apodosis is conditional on the fulfillment of the state described in the protasis (the state in the protasis enables or causes the following speech act)” (Sweetser 1991: 118).<sup>2</sup>

The usages of the condition construction in the epistemic domain may not be so frequent as those in content and speech-act domains. Still, there exist epistemic uses of the construction. The examples in (7) below are such usages.

- (7) a. *If she’s divorced, (then) she’s been married.*  
b. *If John went to that party, (then) he was trying to infuriate Miriam.*

(Sweetser 1991: 116)

Sweetser (1991) states the characteristic features of the conditionals of this type as follows.

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<sup>2</sup> The *apodosis* here refers to the main clause in a conditional sentence expressing the logical consequent, while the *protasis* refers to the subordinate clause expressing a condition.

In the epistemic domain, *if-then* conjunction expresses the idea that knowledge of the truth of the hypothetical premise expressed in the protasis would be a sufficient condition for concluding the truth of the proposition expressed in the apodosis (Sweetser 1991: 116).

According to Sweetser (1991: 116–117), the utterance (7a) constitutes an epistemic usage because this sentence affords an interpretation as follows: the *if*-clause in the protasis states a proposition *she's divorced*, which is either true or false. Furthermore, the speaker of this sentence believes that if this proposition is true, it will be good evidence to conclude that the proposition in the apodosis, *she's been married*, is also true. Similarly, as in (7b), it is supposed that the speaker of this sentence assumes that if the proposition in the protasis, *John went to that party*, is true, it will be sufficient evidence for him/her to conclude that the proposition in the apodosis that follows, *he was trying to infuriate Miriam*, is also true.

In her analysis of linguistic expressions in the three domains of meaning, Sweetser (1991) uses verbalized conditions for categorizing usages, as in the explanation of (7) presented above. The present study adopts this method from time to time in determining the domains of meaning relevant to utterances under examination.

### 3.1.3 Coordinate Conjunctions

The category of coordinate conjunctions (e.g., *and*, *or*, and *but*) partially overlaps with that of discourse connectives and includes usages that span all three domains of meaning. The examples in (8) and (9) present usages of the coordinate conjunction *and* in the content domain and the epistemic domain, respectively.

- (8) a. John eats apples, *and* Mary eats pears.  
b. John took off his shoes, *and* he jumped in the pool.

(Sweetser 1991, with minor modification)

(9) A: Why don't you want me to take basketweaving again this quarter?

B: Well, Mary got an MA in basketweaving, *and* she joined a religious cult.

(Sweetser 1991: 87)

Sweetser (1991) mentions characteristics observed in many instances of content usages of *and* as in (8a) and (8b) and epistemic usages as in (9). She states that *and* in the content domain is likely to invite the reading of the elements as a temporal sequence, i.e., an "and ... then" reading, whereas *and* in the epistemic domain would invite the reading of the events as a logical sequence, i.e., an "and ... so" reading (Sweetser 1991: 111).<sup>3</sup>

Coordinate conjuncts can also allow usages in the speech-act domain, which is more frequent in colloquial styles, as exemplified in (10).

(10) a. Go to bed now! *And* no more backtalk!

b. Thank you, Mr. Lloyd, *and* please just close the door as you go out.

c. The Vietnam War was morally wrong, *and* I'll gladly discuss the reasons why I think so.

(Sweetser 1991: 88)

It is interesting to note that the connective *and* adds virtually no semantic content to the utterance when used in the speech-act domain. Thus, it is possible to remove *and* in (10) without altering much of the overall meaning. This is partially the case with usages of *and* in other domains as well, but it is especially noticeable in speech-act usages.

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<sup>3</sup> See also Warner (1985) and Schourup and Waida (1988) for observations basically to the same effect.

Now consider (11), an example of the epistemic use of another coordinate conjunction: *or*. An instance of *or* in the epistemic domain implies the speaker's act of reasoning that leads him/her to some "conclusion" that one of the two propositions presented must be true. Notice also that in the usage of *or* in the epistemic domain, unlike that in the content domain, the two propositions are not necessarily equal in their significance. The first message is typically the one that conveys the central message of the utterance.

- (11) a. John is home, *or* somebody is picking up his newspapers.  
b. John will be home for Christmas, *or* I'm much mistaken in his character.

(Sweetser 1991: 94)

In (11a), the speaker of the sentence concludes that Proposition 1 ("John is home") is true based on some evidence. The speaker only presents Proposition 2 ("somebody is picking up his newspapers") as a fallback statement in case Proposition 1 turns out to be false. The same applies to (11b). The speaker concludes that Proposition 1 ("John will be home for Christmas") should be the case. Proposition 2 ("I'm much mistaken in his character") is presented only as a supplementary comment to express, rather periphrastically, how confident the speaker is about Proposition 1.

Next, consider (12), examples of the usage of *or* in the speech-act domain.

- (12) a. Have an apple turnover, *or* would you like a strawberry tart?  
b. King Tsin has great mu shu pork, *or* China First has good dim sum, *or* there's always the Szechuan place just around the corner.

(Sweetser 1991: 95)

In (12a) and (12b), the choices presented are not the result of the speaker's inferential reasoning; rather, both choices are possible real-world events. There is some content-domain aspect since one of the events would take place in reality.<sup>4</sup> Thus, unlike the content usage in (11), the speech-act usages in (12) designate events that only come about as a result of an act instigated by the participant(s) of the ongoing conversational event.

Now, let us turn to yet another coordinate conjunction: *but*. Sweetser (1991) only presents examples of this coordinate conjunction in the epistemic and the speech domains. Consider (13), which presents examples of *but* in the epistemic domain.

(13) a. John keeps six boxes of pancake mix on hand, but he never eats pancakes.

b. A: Do you know if Mary will be in by nine this evening?

B: Well, she's nearly always in by then, but (I know) she has a lot of work to do at the library, so I'm not sure.

(Sweetser 1991: 100)

Sweetser (1991: 100) explains the epistemicity of (13a), describing its background reasoning as follows: the premise that John keeps six boxes of pancake mix would lead the speaker to the conclusion that he is a pancake-eater, which clashes with the otherwise well-evidenced conclusion that he never touches a pancake. Here, again, the primary domain of the usages of *but* is decided by checking if the proposition introduced by the conjunction concerns a real-world event (the content usage) or inferential reasoning (the epistemic usage), with the result that the latter is the case.

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<sup>4</sup> There is a possibility in reality that neither option mentioned turns out to be the case. However, that possibility can be ignored here since it is not part of the semantic/discourse structure of *or* anyway.

Nevertheless, the above test is not quite meaningful. As Sweetser admits, in usages of *but*, the content domain is almost always overshadowed by the epistemic domain. She does not offer a definite reason why this is so. She only implies that the adversative relationship between propositions expressed by *but* does not have any real-world alternative, as in the cases with *and or*. Sweetser writes as follows.

That is to say, in the real world A may cause B, or A and B may coexist, or A and B may be the only possible alternative outcomes of a given real-world situation. But what does it mean to say that A and B “clash” or “contrast” in the real world? How can discordance or contrast exist outside of the speaker’s mental concept of harmony or non-contrast? In a sense, if two states coexist in the real world (and conjunction with *but* does present both conjuncts as true), then they cannot be said to clash at a real-world level (Sweetser 1991: 103–104).

This seemingly inherent orientation of *but* toward the epistemic domain instead of the content domain also seems to exist in usages of *however*, another connective of the adversative relationship. Consider the examples from Fraser (1999) in (14) below.

- (14) a. He drove the truck through the parking lot and into the street. Then he almost cut me off.  
After that, he ran a red light. *However*, these weren’t his worst offenses.
- b. A: I don’t want to go very much.  
B: John said he would be there.  
A: *However*, I do have some sort of obligation to be there.

(Fraser 1999: 938)

Now, let us turn to usages of *but* in the speech-act domain. Consider the examples in (15).

- (15) a. (Please) look up that phone number—*but* don't bother if it will take you more than a few minutes.
- b. King Tsin has great mu shu pork, *but* China First has excellent dim sum.

(Sweetser 1991: 101)

One may ask why *but* has speech-act domain usages even though it has virtually no content-domain usages since, as mentioned earlier, the contents of the propositions in the usages of the speech-act domain belong to the real-world. This question can be answered as follows. Speech acts are “intentional” actions to construct social reality, as it were (Stenius 1967; Searle 2000). Accordingly, utterances in the speech-act domain necessarily possess a certain degree of epistemicity. This epistemic nature of speech acts seems to be (at least) one of the factors that cause *but*, which is inherently epistemic, to have speech-act domain usages.

Notwithstanding Sweetser's argument that adversative conjunctions are highly epistemic and there seem to be no purely content-domain usages of them, we emphasize that the content domain is NOT irrelevant to the meaning of adversative conjunctions. Epistemic views presented in usages of adversative conjunctions are always based on the observation of real-world events, and so are speech-acts conducted by utterances involving adversative conjunctions. Thus, when Sweetser says adversative conjunctions are epistemic, we should interpret it as meaning that the epistemic domain is especially prominent among others in utterances that include expressions of this category.<sup>5</sup>

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<sup>5</sup> In fact, Sweetser (1991) is somewhat inconsistent in her analysis of adversative connectives. While stating that she cannot find content-domain examples of *but* and *however*, she presents content-domain examples of *although* such as one in (i) below.

- (i) *Although* he could hardly walk, he came and saved my life.

Thus far, we have examined the examples and analysis of Sweetser (1991) regarding the involvement of multiple domains of meaning in modal auxiliary verbs, conditionals, and coordinate conjunctions. What seems to be clear from the above is that the three domains, i.e., the content domain, epistemic domain, and speech-act domain, do not relate solely to specific linguistic phenomena but exist rather universally. After all, these domains are *always* behind an utterance. It is only that these three areas may be foregrounded or backgrounded to different degrees depending on the contextual conditions and the nature of the actual expression used.

### 3.2 Approaches to Domains of Meaning

At the beginning of this chapter, we looked at two different uses of *because* pointed out by Quirk et al. (1985). One is what they call the content disjunctive, and the other is the style disjunctive. These correspond to content-domain usage and epistemic-domain usage, respectively. The relationship between linguistic expressions and multiple domains of meaning has been a topic often discussed in cognitive linguistics, although the terminology used may differ among scholars.

Redeker (1990, 1991) defined the linguistic category of *discourse operators*, which is a broader category than the discourse connective discussed in this study. Discourse operators include such grammatical elements as conjunctions, adverbials, interjections, and various types of idiomatic

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(Sweetser 1991: 79, a typo in the original text corrected)

If (i) is regarded as a content-domain usage of *although*, there seems to be no reason to reject an analysis that categorizes an expression like “He could hardly walk, *but* he came and saved my life” as a content-domain usage of the adversative conjunction.

phrases. Redeker argues that discourse operators have the functionality of attracting the hearer's attention to a particular kind of linkage between propositions (Redeker 1991: 1168). The three levels in which this can occur are listed as follows.

(16) a. **Level of ideational structures**

Two discourse units are *ideationally related* if their utterance in the given context entails the speaker's commitment to the existence of that relation in the world the discourse describes.

b. **Level of rhetorical structures**

Two discourse units are considered to be *rhetorically related* if the strongest relation is not between the propositions expressed in the two units but between the illocutionary intentions they convey.

c. **Level of sequential relations**

When two adjacent discourse units do not have any obvious ideational or rhetorical relation—while still being understood as belonging to the same discourse—their relation is called *sequential*.

(Redeker 1990: 369)

The level of ideational structures in (16a) roughly corresponds to the content domain defined by Sweetser (1991), though not exhaustively. According to Redeker (1991: 1168), among the examples of ideational relations are temporal sequence, elaboration, cause, reason, and consequence. The elements linked in this level could be of the real world, but they are not physical entities per se. They are conceptual by definition. Thus, it is supposed that this level can encompass not only the content domain but also part of the epistemic domain.

The level of rhetorical structures in (16b) partially overlaps both the epistemic and the speech-act domains defined by Sweetser (1991). It is a level on which propositions get connected with the speaker's beliefs/intentions—the original motivation of the speaker's expressing and connecting

the propositions in the first place. Hence it concerns the illocutionary aspect of language as well as the epistemic aspect. Among the examples of the rhetorical relations are concession, evidence, justification, and conclusion (Redeker 1990: 369).

The level of sequential structure in (16c) might look like a wastebasket category from the brief definition therein. It does not have to be so, however. This level concerns the linearity as one aspect of the inherent nature of language. Generally speaking, a speaker of the language is conscious, if partially, of the temporal development of the discourse, and he or she even tries to control it. Discourse operators used in this level capture such awareness and attitude on the part of the speaker about his/her own utterances. Redeker (1990: 369) mentions a wide variety of strategies of this kind. Among them are topic transition, correction, paraphrase, aside, digression, and interruption. Furthermore, Redeker suggests that the level of sequential structure is broad enough to include both interactive and non-interactive (in other words, both dialogic and monologic) discourse phenomena.

Another example of an attempt to stipulate domains or levels of meaning is that of Langacker (2008a). It is even closer to Sweetser's model than Redeker's, though there is still a difference. Langacker's model consists of three levels, as shown in (17).

(17) a. **Effective level**

Level that pertains to occurrences

b. **Epistemic level**

Level that pertains to knowledge of occurrences

c. **Discursive level**

Level where the relevant occurrences are those of the discourse itself

(Langacker 2008a: 484)

The effective level in (17a) corresponds to the content domain in Sweetser’s model. The epistemic level in (17b), not surprisingly, coincides with the epistemic domain. The discursive level in (17c), however, does not have a counterpart in Sweetser’s model. It does partially overlap with the speech-act domain in Sweetser’s model, but this is the case with Langacker’s other two levels, the effective and epistemic levels, as well: After all, every utterance is made to “do something with words” (Austin 1962). The discursive level has more to do with the speaker’s conscious effort to manage the current discourse space and to bring the hearer’s attention to the appropriate part of the knowledge shared between the interlocutors. In this sense, the discursive level resembles the levels of rhetorical structures and sequential structures in Redeker’s model. To see this in actual examples, consider (18), examples of usages of *then* in three levels of meaning.

- (18) a. He finished his beer, *then* he asked for scotch. [Effective]  
 b. If his alibi stands up, *then* he’s clearly innocent. [Epistemic]  
 c. As I was saying, *then*, you need to get more rest. [Discursive]
- (Langacker 2008a: 485)

The discourse connective *then* expresses a temporal relationship in the real world in (18a). The one in (18b) expresses the result of inferential reasoning by the speaker. These instances of *then* bring attention to the relationship between propositions that are placed in some “sequential order,” whether it is temporal or inferential. This is also the case with (18c), an example of *then* in the discursive level; it is only different from the others in that the sequential order resides in the linear development of the discourse in which the interlocutors currently engage.

Interestingly, both Redeker’s model and Langacker’s model set a level for the sequential/linear development of discourse in addition to levels for real-world events and levels for inferential reasoning. They correspond in part to the speech-act domain in Sweetser’s model, though not precisely so. In addition, Redeker’s and Langacker’s models have both similarities and

differences. These do not necessarily mean that any one of these attempts to capture the different domains/levels of meaning is more right or wrong than others. Instead, it seems to be more reasonable to suppose that each of them covers some aspect of meaning that the others do not cover comprehensively.

We suggest, after all, that the divisions in domains/levels of meaning do not come with sharp boundaries in the first place. They may vary, instead, depending on the perspective adopted. Among the three models examined here, we pay special attention to the three domains of meaning in Sweetser's (1991) model in the present study for the depth of its analysis and the broader range of phenomena covered in it.<sup>6</sup> The problem of the latter study, if any, is that it presents the three domains of meaning as if they could be rigidly separated from each other, though they are often ambiguous in reality. This point is discussed in more detail in Chapter 5, where we examine many actual examples of discourse connectives from a corpus.

### **3.3 The Notion of Proposition**

Notwithstanding the caveats mentioned above, the notion of domains/levels of meaning proposed by different researchers of cognitive linguistics points to the essential nature of the linguistic utterance. That is, the same lexical element or construction can accommodate varying types of meaning. Here is a question that we must ask in this connection: how should we describe the mechanism that makes possible those varying types of meaning in the process of encoding/decoding a linguistic utterance containing discourse connectives?

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<sup>6</sup> Furthermore, Sweetser's model of domains of meaning is exceptionally well-known to scholars of both semantics and pragmatics, in and out of the cognitive-linguistic research community. In fact, Redeker (1990, 1991) and Langacker (2008a) cite Sweetser (1991) as the basis of their argumentation.

The present study assumes that the differences in domains of meaning are derived from the dynamic interaction of the linguistic structures and the context. This means that the structure of discourse connectives as grammatical constructions does not internalize specifications or restrictions directly related to domains of meaning. Instead, the discourse connectives specify only the schematic relationship between two propositions and the types of these propositions. In this section, we attempt to provide a definition of the notion of propositions that is more appropriate for the actual analysis of discourse connectives in later chapters.

### 3.3.1 Definition of Proposition

The notion of propositions in the present study is defined somewhat more broadly than it has traditionally been defined in many linguistic and philosophical studies.<sup>7</sup> Here, propositions are not limited to concepts or statements having a truth value. More specifically, the notion of propositions in the present study is defined as follows:

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<sup>7</sup> Murphy and Koskela (2010) explain the term *proposition* in *Key Terms in Semantics* as follows.

A proposition may be defined as the meaning of a SENTENCE that makes a statement about some state of affairs. As such, a proposition has a TRUTH VALUE; it can be either true or false. A proposition is independent of the linguistic structure used to express it, which is to say that the same proposition can be expressed by different sentences (Murphy and Koskela 2010: 131).

The definition of propositions in the present study does not require a proposition to be truth-conditional, however (see also Lewis 1970). Rather it is closer to the use of the term by Langacker in his numerous works. For instance, Langacker (2008a: 441) states that “a finite clause expresses a proposition.” He further explains in the footnote attached to this statement that the term *proposition* is more or less interchangeable with *grounded process*. As a technical term in Cognitive Grammar, a grounded process refers to a relation anchored to some location in a certain kind of mental space, or a *ground*. The mental space/ground is a projection of the conceptual realm of the speaker of the utterance, or various other conceptualizers, including fictitious characters. It is for this reason that (19) states that a proposition could be of varying degrees of schematicity and evidentiality.

(19) **Proposition**

An autonomous unit of conceptualization of a wide range of states and events conceptualized with varying degrees of schematicity and evidentiality.

A proposition is autonomous in the sense that it can exist (or, more accurately, can be conceptualized) without the need to rely on instances of conceptualization other than those already contained within itself. It could be concrete/specific or rather schematic/abstract. Also, it could be a concept of high certainty, as those derived from the speaker's direct perception of reality, or one that is less so, as in the case of concepts derived from someone else's belief or a sheer hypothesis. Hence, the term *proposition* in this study represents various kinds of conceptual objects. States and events in the content domain, the epistemic domain, and the speech-act domain in Sweetser's model are all regarded as propositions.

The above definition of propositions enables us to have an updated look at discourse connectives as grammatical constructions. Consider, once again, the basic structure of discourse connectives in Figure 3.1, which was presented in the previous chapter.

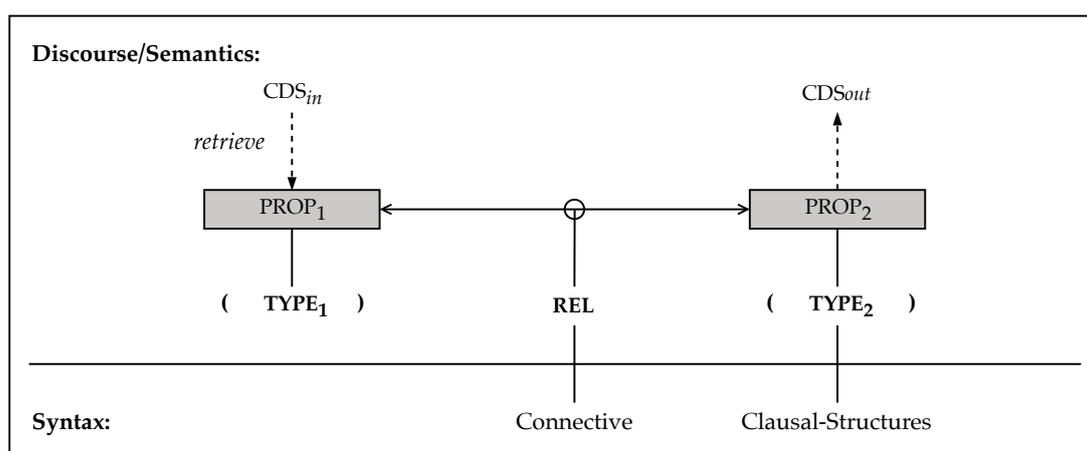


Figure 3.1: Discourse Connective Construction

In Figure 3.1, REL represents the relationship between the two propositions, PROP<sub>1</sub> and PROP<sub>2</sub>, which are respectively required to be of the types specified by the actual discourse connective used with this construction. Notice that the domain of the meaning of the construction is unspecified in this schematic representation of the construction. The construction only provides a base structure on which the domain of meaning will be determined dynamically as the actual utterance occurs in the contextual background. Also notice, concerning Figure 3.1, that PROP<sub>1</sub> is only available via the process of a *retrieval* from the current discourse space (CDS).<sup>8</sup> It is through the process of inference accompanying this proposition retrieval that provides the necessary information for finally determining the domain of meaning.

### 3.3.2 Ambiguity of Domains

The distinction among three domains of meaning—the content domain, epistemic domain, and speech-act domain—is actually more ambiguous than it may seem. The distinction between relations in the real world (content relations) and relationships based on inferential reasoning (epistemic relations) is often subtle, for instance. Sweetser (1991) discusses such ambiguity using examples that can have two possible readings like (20) below.

(20) If he was already gone, *then* they had to leave a message.

(Sweetser 1991: 123)

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<sup>8</sup> The definition of CDS and other details of terms in Figure 3.1 will be presented in Chapter 4. It is primarily based on Langacker's theoretical concept of the same name. However, it is also compatible with Givón's notion of *communicative context*, which he defines as a systematic on-line construction of mental models of the interlocutor's current, rapidly-shifting intentional and epistemic states (Givón 2005: 120-121).

(20) could be interpreted either as an utterance in the content domain or one in the epistemic domain. Paraphrased versions of the utterance based on these two readings are presented as (21a) and (21b), respectively.

(21) a. **Content reading**

Whenever, in the past, he was gone before their arrival, they were obliged to leave a message.

b. **Epistemic reading**

If I know that he was gone before they arrived, then I conclude that they were obliged to leave a message.

(Sweetser 1991: 123–124)

The essential point is that in the content reading in (21a), the second proposition of (20), “they leave a message,” is understood to mean an event that could happen as a result of the first proposition (“he has already gone”), while in the epistemic reading in (21b), the same second proposition is understood to be a basis of inferential reasoning that leads to a conclusion presented by the first proposition.

The distinction between epistemic usages and speech-act usages can also be ambiguous. Consider (22).

(22) He loves me, *because* he wouldn't have proofread my thesis if he didn't.

(Sweetser 1991: 80)

Sweetser argues that an utterance like (22) conveys its meaning in the epistemic domain (Sweetser 1991: 80). She states that it is separable from meaning in the speech-act domain even though some scholars, such as Ross (1970) and Davidson (1973), treat a case like (22) as a speech-act utterance.

Sweetser's rationale is that the statement in (23a) sounds natural as a description of the motivation for saying (22), while (23b) does not.

(23) a. **Epistemic reading**

I conclude that he loves me because I know that he wouldn't otherwise have proofread my thesis.

b. **Speech act reading**

I say to you that he loves me because I am justified by the evidence to that effect.

(Sweetser 1991: 80–81)

It is questionable, however, if we should consider (22) exclusively as an epistemic utterance rather than a speech act one. It is true that (22) does not have an explicit formal property of a speech act such as that of an interrogative or an imperative. However, it is also true that there is nothing that prevents us from considering an ordinary declarative like (22) to be a kind of constative speech-act utterance of "assertion" (Austin 1962; Hooper and Thompson 1973, Yamanashi 2009; Krifka 2014). In other words, not only (23a) but also (23b) might be valid to some extent. The fact that there is no explicit construction indicating a speech act used may influence the judgment about the degree to which each of the interpretations in (23) sounds natural. Still, this cannot entirely exclude the other reading as inaccurate or irrelevant. The same observation applies to the example in (24), which Sweetser would categorize as exclusively epistemic.

(24) I know that I have no money in my bank account, *because* I checked this morning.

(Quirk et al. 1985: 1073)

The usage of *because* in (24) resembles that of (22), in that the speaker gives a conclusion in Proposition 1 reached by inferential reasoning based on the evidence presented in Proposition 2.

It should be noted, however, that (24) has the matrix clause “I know ...” in which the subordinate clause “I have no money in my bank account” is embedded. This extra layer provides (24) with a speech-act connotation since this construction has a structure homological to that of a typical self-referential speech act that often accompanies the form “I say/declare/promise ... .” At the same time, it is also possible to regard (24) as a content-domain usage. In this interpretation, the verb *know* refers to the mental state of the speaker as part of the real-world state of affairs.<sup>9</sup>

Thus, the domains of meaning in linguistic utterances are not always categorically determined; rather, they are often subject to flexible interpretation conducted on the fly as the linear sequence of discourse unfolds. Chapter 5 will deal with the issue of domains of meaning once again, with many actual usages of discourse connectives in which the multiple domains of meaning are involved.<sup>10</sup>

### 3.4 Summary of Chapter 3

This chapter introduced the notion of multiple domains of meaning. First, we examined the differences among the three domains—the content domain, epistemic domain, and speech-act domain—discussed by Sweetser (1991). It became clear that they are involved in a wide range of linguistic phenomena, including modal auxiliaries, conditionals, and coordinate conjunctions.

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<sup>9</sup> Krifka (2014) presents a relevant discussion on the relationship between clause embeddings and illocutionary acts. He argues that illocutionary acts can be embedded under certain circumstances: 1) when a speech act adverbial such as *frankly* modifies the proposition; 2) when the utterance is in the form of a conditional, and 3) when illocutionary acts are expressed as arguments of certain verbs (e.g., *tell*).

<sup>10</sup> Masa-aki Yamanashi (p.c.) criticizes Sweetser’s (1991) distinction between the three domains of meaning. He argues that there is no solid theoretical motivation to stipulate the content domain apart from the epistemic and speech-act domains. His view corresponds to the oft-repeated thesis of Langacker (1985, 1990a, 2008a), which argues that in actual speech situations, propositional content is always presented on some epistemic “ground” and that every utterance has some discursive effect.

Then, we discussed views on domains/levels of meaning presented in the works of researchers other than Sweetser. Redeker (1990, 1991) proposes three levels of meaning—the levels of ideational structures, rhetorical structures, and sequential structures. Langacker (2008a) also proposes three levels of meaning—the effective level, the epistemic level, and the discursive level. The examination of these alternative theories suggests that the divisions in domains/levels of meaning do not come with sharp boundaries; instead, they may vary depending on the perspective adopted.

Also presented in this chapter is a refined definition of the concept a proposition. In the present study, the distinction among domains of meaning is not considered to reside in discourse connectives themselves. The interaction of the discourse-connective construction and the context information dynamically produces the possible interpretations of the utterance.

Finally, we considered the ambiguity of domains of meaning that results from the semantic/discoursal mechanism mentioned above. In some cases, one of the three domains of meaning appears to be exclusively involved in the meaning of an utterance, while at other times, this is not necessarily the case. The present study regards, then, every utterance as involving all the domains, though the degree to which each of the domains is foregrounded or backgrounded differs. This is a novel view that is clearly different from that of Sweetser (1991).



## Chapter 4

# Linearity of Discourse

In this chapter, we further examine the structure of discourse connectives as grammatical constructions, focusing on linearity as an essential property of language.

In 4.1, a brief review of the previous studies is presented, focusing on how they treated the linearity of language. In 4.2, we investigate the process by which contextual information is accessed and updated in an utterance containing a discourse-connective construction. In 4.3, the difference between this construction and its variation, the fronted connective construction, is discussed. Then, in 4.4, it is shown that the discourse-connective construction derives from a more basic mechanism in language—the mechanism for processing two consecutive utterances in discourse. In an attempt to show its general structure, we adopt a descriptive framework called *wrap/unwrap metaphor*, as explicated in 4.5. It is pointed out that this metaphorical framework has much in common with monad computation, a type of design pattern used in the functional paradigm of computer programming. Lastly, 4.6 presents an argument against a claim by a group of researchers regarding the characterization of the meaning of discourse connectives. Blakemore (1996) and Wilson and Sperber (1993) emphasize the difference between conceptual and procedural aspects of meaning, stating that some discourse connectives only have procedural meaning. However, the observations and analysis of the present work suggest that discourse connectives always entail both conceptual and procedural aspects of meaning.

## 4.1 Language's Inherent Linearity

Regardless of their theoretical differences, researchers will admit that the form of language has a linear nature. However, how much importance they place on the linearity of language varies considerably. Traditionally, Generative Grammar focuses on node-branching and hierarchical syntactic structures; however, it disregards linear sequences of linguistic utterances Chomsky (2017) recently stated as follows.

Turning to GEN (= generative computational system), one of its crucial properties, which came to light as soon as the first efforts were undertaken to construct explicit accounts of language (generative grammars), is structure-dependence: the operations of GEN apply to structures, not strings, even ignoring such elementary properties of externalized expressions as linear order (Chomsky 2017: 201).

This tradition has greatly influenced the overall trend of theoretical linguistic research. However, some researchers in cognitive linguistics point out that linearity is an intrinsic property of language and has implications for the meaning of linguistic expressions. For instance, Langacker (2008a) states as follows.

The words of an expression occur in a certain temporal sequence, which linguists (unwittingly using spatial metaphor) refer to as "linear order." This temporal sequencing defines one salient path of access to the conceptions symbolized. Since we necessarily encounter these words sequentially, in either speaking or understanding, linear order always has some effect on meaning—a difference in word order always implies a semantic contrast (though in practical terms it may be slight or even negligible) (Langacker 2008a: 81–82).

Also, Sweetser (1991) mentions language's inherent linearity from a different perspective and suggests that the conjunction/connective *and* has the function of bringing attention to this aspect of the nature of language in the development of discourse.

The order of the clauses parallels the real-world order of the events described in the clauses, so that it becomes unnecessary to add further specification of the temporal ordering of the events being narrated. *And* does not in itself indicate temporal succession (in the way that such meaning may be attributed to the *then* and *and then*); but the order of two *and*-conjuncts may by convention be iconic for the actual sequence of the events described. I would propose that this narrative usage of *and* is in fact only one of many such ways of exploiting the interaction of language's inherent linearity with the general concept of "putting things side by side" (Sweetser 1991: 87).

When considering the structure of discourse connectives, it is essential to understand the linear nature of the language and clarify what implications it has. Of particular importance here is to examine the mechanism of connectives that conjoins two propositions, with one retrieved from the previous discourse and the other newly introduced to the discourse. In short, we must consider how the content expressed by a linguistic expression interacts with information obtained from the context in the real-time processing of the linear structure of discourse.<sup>1</sup>

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<sup>1</sup> There are researchers in the generative community as well who emphasize the linear nature of language. Among the most known is Colin Phillips, who argues that the hierarchical organization of constituents is constructed as each of the linguistic elements is uttered in linear order. That is to say, syntactic structures are built incrementally, in a strict left-to-right order (Phillips 1998). As empirical evidence that supports his claim, Phillips (2003) cites an experiment conducted by Ferreira et al. (2003), who used a "garden-path" sentence in (i).

- (i) While the man hunted the deer ran into the woods.

## 4.2 Interacting with Context

The present study adopts a theoretical concept that corresponds to the notion of current discourse space (CDS) in the framework of Cognitive Grammar of Langacker (1990a). CDS is defined in Cognitive Grammar as follows.

### (1) Current Discourse Space (CDS)

The mental space comprising those elements and relations construed as being shared by the speaker and hearer as a basis for communication at a given moment in the flow of discourse.

(Langacker 1990a: 547)

This chapter will fine-tune this definition of the CDS according to the constructionist framework of the present work. For this purpose, we use examples of the discourse connective *otherwise* collected from the TED Corpus. The following is one of the usages of *otherwise* from the corpus, presented here just as a sample.<sup>2</sup>

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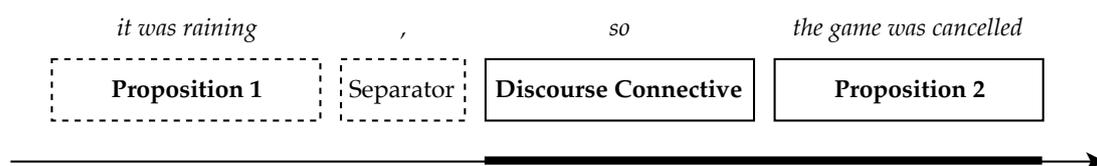
Many participants initially misinterpreted (i): they took the subject NP of the main clause (*the deer*) to be the object of the verb (*hunted*) in the embedded clause. Moreover, even after they succeeded in reading the sentence correctly, many of them continued to believe that *the man hunted the deer*. Phillips states that this presents a motivation to conceive that the grammar and the syntactic parser are separate entities and that it is the latter that constructs the hierarchical structure of constituents in real-time.

<sup>2</sup> *Otherwise* can be considered as the negative form of the conditional (Halliday and Hasan 1976: 259). Thus, naturally, it has usages of different domains of meaning other than the content domain, as exemplified in (2). Huddleston and Pullum (2002) present (i) as one of the examples of the diverse usages of *otherwise*.

- (i) You'd better leave now; *otherwise* you'll get caught up in the rush-hour traffic.

- (2) [The speaker is giving the audience tips to ensure they have “evidence” instead of a “story” made up by someone else.] Tip number three is “pause before sharing anything.” The Hippocratic oath says, “First, do no harm.” What we share is potentially contagious, so be very careful about what we spread. Our goal should not be to get likes or retweets. *Otherwise*, we only share the consensus; we don’t challenge anyone’s thinking [TCSE 26262 | Alex Edmans: What to trust in a “post-truth” world].

Now let us review what has already been discussed so far in the previous chapters about the general structure of discourse connectives as grammatical constructions. Let us consider Figure 4.1, which was first introduced in Chapter 1.



*Figure 4.1: Basic Configuration of Discourse Connective*

A discourse connective introduces a new proposition (Proposition 2) into the discourse. At the same time, a connective invites attention to another proposition (Proposition 1), one already presented in the preceding discourse. In Figure 4.1, Proposition 1 is marked by the dashed lines because it is not part of the formal (syntactic) structure of the discourse-connective construction. Still, it is part of an integral part of the discourse/semantic structure of the construction. The

(Huddleston and Pullum 2002: 1548)

It is interesting to note that (i) can be considered either as an epistemic usage or a speech-act usage. The distinction of different domains of meaning is often difficult, as pointed out at the end of the previous chapter.

discourse connective and the proposition that immediately follows it, on the other hand, are marked with solid lines to indicate that they have both the formal and discourse/semantic structures specified in the construction. The thick line overlaid on the horizontal arrow at the bottom of the figure represents the range where the symbolic structure of the construction unfolds in the linear sequence of discourse.

Chapters 2 and 3 presented a more precise representation of this basic structure, as reprinted in Figure 4.2. The latter representation designates what kind of relation (REL) must be involved in the overall structure, and it also specifies the types of propositions integrated into the relation (TYPE<sub>1</sub> and TYPE<sub>2</sub>).

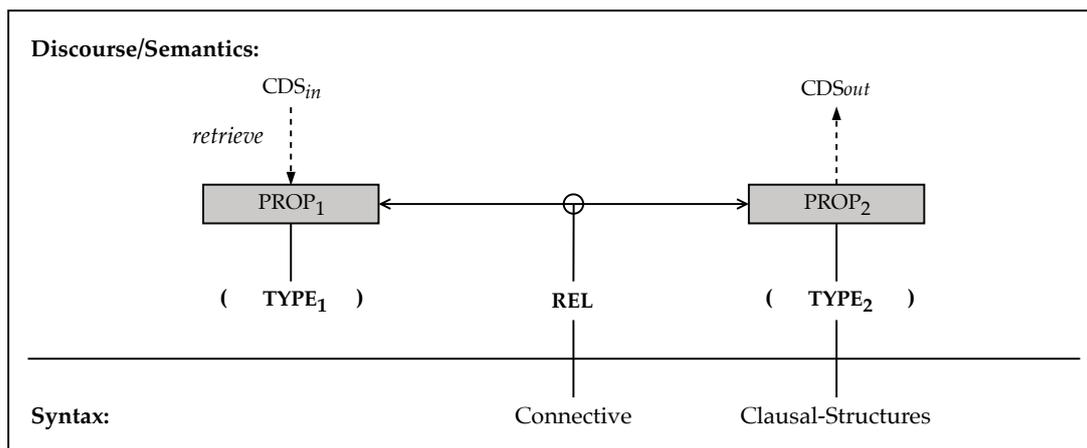


Figure 4.2: Discourse Connective Construction

When this basic structure of the connective construction instantiates, the variable REL is replaced with a concrete relation, and the slots PROP<sub>1</sub> and PROP<sub>2</sub> are elaborated with specific types. In the case of the discourse connective *otherwise* exemplified in (2), for instance, the OTHERWISE relation replaces REL, and PROP<sub>1</sub> and PROP<sub>2</sub> are explicitly typed as "condition" and "consequence," respectively. Figure 4.3 below illustrates this.

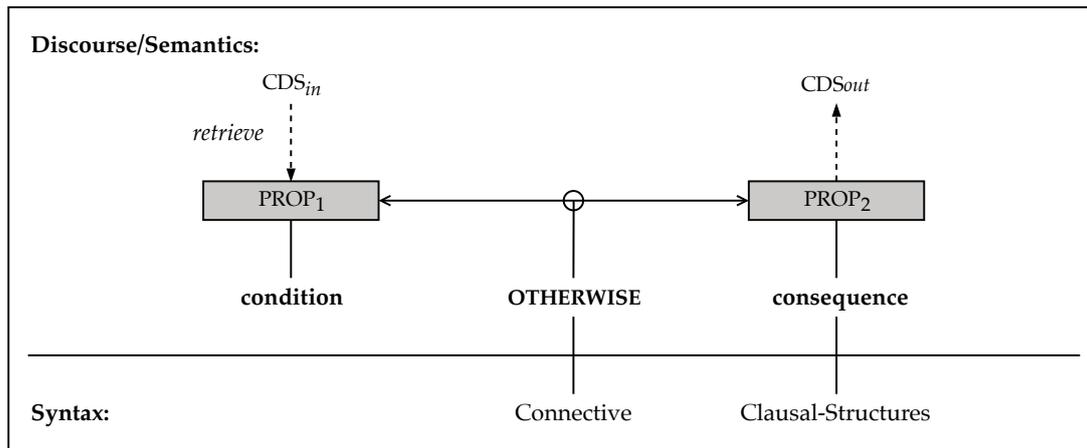


Figure 4.3: OTHERWISE Construction

With the structure in Figure 4.3 in mind, we confirm that the example of *otherwise* in (2) presented earlier in this section meets the type specifications of the OTHERWISE construction: PROP<sub>1</sub> in (2) is of the type “condition” (“our goals should not be to get likes or retweets”), and PROP<sub>2</sub> is of the type “consequence” (“we only share the consensus”).

Now let us examine in more detail the basic structure of the discourse-connective construction in Figure 4.2. First, CDS<sub>in</sub> represents the entire body of contextual information provided dynamically to the construction at the time of the utterance. CDS<sub>out</sub>, on the other hand, represents the CDS updated with the content obtained as a result of using the construction in the utterance. Hence, CDS<sub>in</sub> and CDS<sub>out</sub> refer to essentially the same entity. They only differ in the values stored and in the locations along the linear sequence of the discourse.

Note next that PROP<sub>1</sub> only becomes available through proposition retrieval from CDS<sub>in</sub>. Since PROP<sub>1</sub> has no formal specification in the syntactic structure, the decoding of the utterance containing a connective requires inferential reasoning on the part of the hearer. However, in most cases, it is not a big deal. Since the connective specifies the semantic/discoursal type of the proposition to be retrieved, possible candidates are narrowed down. For instance, in the OTHERWISE construction, PROP<sub>1</sub> is specified to be of the type “condition.” Thus, the hearer can

selectively extract a proposition that can function as a “condition” among all the possibilities that could otherwise be considered as competitors.

Also, note that Figure 4.2 provides a formal (syntactic) specification for PROP<sub>2</sub> that clausal structures must symbolize. This specification contains a plural noun (“clausal structures”) because what follows the connective can be multiple clauses that collectively form a single proposition. In addition, PROP<sub>2</sub> is associated with a particular type that is specified by the connective in the semantic/discourse structure. In the case of the OTHERWISE construction illustrated in Figure 4.3, PROP<sub>2</sub> is of the type “consequence.” Only when both PROP<sub>1</sub> and PROP<sub>2</sub> are appropriately typed can they be integrated into the relation specified by the connective. Once all these conditions are met and the propositions are successfully conjoined, producing new semantic/discoursal content, the updated context CDS<sub>out</sub> is finally obtained to be carried over to the continuing discourse that follows.

Obviously, such a series of processes with the specific input and output can be conceived of as the application of a function, as represented in (3) below. It has three arguments: CDS<sub>in</sub>, REL, and PROP<sub>2</sub>. Note that the list does not include PROP<sub>1</sub> because this can be retrieved from CDS<sub>in</sub>, which is supposed to contain it inside. The return value of the function is CDS<sub>out</sub>, which is passed on, in the continuing discourse, as the input to another function application in a recursive fashion.

$$(3) \quad \textit{Discourse-Function} ( \text{CDS}_{in} , \text{REL} , \text{PROP}_2 ) \Rightarrow \text{CDS}_{out}$$

The expression in (3) shows only the general structure of the discourse function applied to an utterance containing a connective. In an utterance containing a specific connective *otherwise*, for instance, the actual function application looks like the one in (4) below.

$$(4) \quad \textit{Discourse-Function} ( \text{CDS}_{in} , \text{OTHERWISE} , \text{PROP}_2 ) \Rightarrow \text{CDS}_{out}$$

There is an alternative way to represent the same thing in a way that explicitly shows both propositions and their type constraints. The formula in (5) uses the *higher-order function* technique to make this possible.

$$(5) \quad DF_{OTHERWISE} ( CDS_{in} \Rightarrow PROP1::condition , PROP2::consequence ) \Rightarrow CDS_{out}$$

The first argument to the function  $DF_{OTHERWISE}$  is itself a function that takes  $CDS_{in}$  and returns  $PROP1::condition$ . It can be considered a functional representation of the process of proposition retrieval from the context. The second argument to the matrix function is  $PROP2::consequence$ , a proposition with a type constraint. Overall, the representation in (5) creates a “connective-specific” discourse function, hence the function name  $DF_{OTHERWISE}$ . This alternative representation in (5) is more informative than (4). The following discussion, however, will use the simpler notation of (4) rather than (5). This way, it is more apparent that the discourse function at work in an utterance containing a connective is essentially the same as the one applied in utterances without one: in the latter case, the second argument of the discourse function in (3) is interpreted as either omitted or just left unspecified. Additionally, in the following discussion, construction structure diagrams similar to Figures 4.2 and 4.3 will also be used, which provide type constraints and all the other necessary information.

### 4.3 Fronted Connective Construction

As mentioned in Chapter 1, this study does not deal with the so-called *fronted connective construction*. The discourse-connective construction (or simply *connective construction*) and the fronted connective construction are constructions derived from the same super construction and have many similarities. However, while the former extracts Proposition 1 from the CDS, the latter

contains explicitly presented Proposition 1 alongside Proposition 2. Therefore, these two constructions differ in the manner and the degree to which they depend on the CDS. Sentences in (6) are examples of the fronted connective construction.

- (6) a. *Since* the weather has improved, the game will be held as planned.
- b. *Because* we offered to pay him, he will help us.
- c. *Although* Mary wanted it, John gave it away.

Figure 4.4 illustrates the basic structure of this construction.

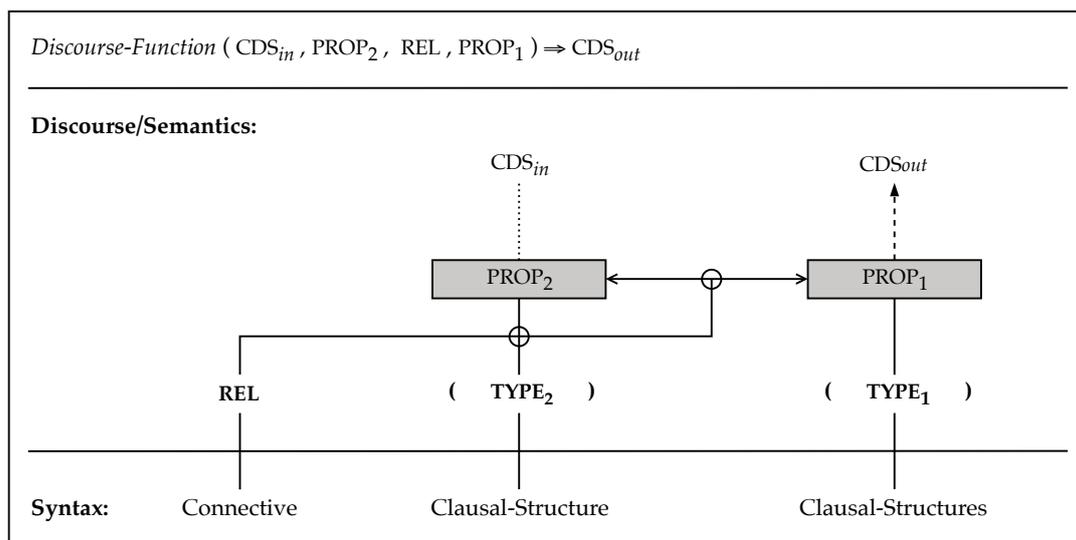


Figure 4.4: Fronted Connective Construction

The differences are as follows. First, the discourse function in 4.4 needs one extra argument for PROP<sub>1</sub> because the formal structure of Proposition 1 must be present in the construction. Notice that CDS<sub>in</sub> still has its place as one of the arguments to the discourse function of the fronted construction. In fact, CDS<sub>in</sub> is supplied to any discourse function as an argument so that the utterance is encoded/decoded with various contextual elements, whether explicit references to

them occur or not. A second difference concerns the linear sequence of the discourse. In the (non-fronted) connective construction, on the one hand, at the moment the connective appears, one proposition has already been introduced into the discourse. In contrast, when the sound/text form of the connective appears in the fronted connective construction, neither proposition is available yet. Finally, the propositions are in the inverted order in the fronted connective construction. In the instance of the fronted SINCE construction in (6a) above, for instance, the proposition that first appears is of the type “cause/base,” and the next one is of the type “result/consequence.” That is, the type specifications occur in reverse order in the case of (non-fronted) connective construction.

Incidentally, in the SINCE construction (whether fronted or non-fronted), the type of PROP<sub>2</sub>, “cause/base,” is further constrained to be “shared/inferable.” The latter constraint means that the contents of the proposition must be part of the knowledge accessible to both the speaker and the hearer, or at least it must be inferable based on what is already known to them. This is not the case with *because*, a discourse connective that is otherwise similar to *since*. This constraint on *since* requires that the relevant information be already available from the preceding discourse, regardless of how Proposition 1 is actually retrieved. In the structure of the fronted SINCE construction in Figure 4.5, a solid line connects CDS<sub>in</sub> and PROP<sub>2</sub> to represent the close relationship between the two.



that takes place virtually whenever the speaker makes two consecutive linguistic utterances.<sup>3</sup> The generalized discourse function behind this commonplace process looks like the one in (7).

(7) *Discourse-Function* (  $CDS_{in}$  ,  $PROP_2$  )  $\Rightarrow$   $CDS_{out}$

The difference from the discourse function for the connective construction in (3) is apparent. The relation between the propositions is unspecified in (7). It depends on the inferential effort of the hearer what relation, if any, should link two propositions, one that is retrievable from the  $CDS_{in}$  and the other that is a newly introduced proposition expressed by the utterance. The following examples from Fraser (2006a) will make this point clear.

- (8)
- a. This flight takes 5 hours. There's a stop-over in Paris.
  - b. This flight takes 5 hours, *and* there's a stop-over in Paris.
  - c. This flight takes 5 hours, *because* there's a stop-over in Paris.
  - d. This flight takes 5 hours. *So*, there's a stop-over in Paris.
  - e. This flight takes 5 hours, *but* there's a stop-over in Paris.
  - f. This flight takes 5 hours. *After all*, there's a stop-over in Paris.

(Fraser 2006a: 195)

The sequence of two sentences in (8a) does not contain a discourse connective. Since the relationship between the two propositions is underdetermined, one could interpret it to have a similar, if not identical, meaning to any of the utterances containing a connective in (8b–f). It would

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<sup>3</sup> It is tempting to call such pairs of consecutive utterances *adjacency pairs*. We refrain from doing so, however, since the latter is well established in the field of conversation analysis as a term to refer exclusively to such pairs as those that are “composed of two turns by different speakers” (Schegloff 2007: 13), whereas what we take up in the present study are mainly pairs of utterances uttered by the same speaker. See also see Yamanashi (2009: Ch. 6).

take a certain amount of effort, however, for the hearer to appropriately infer the type of relation between propositions in an utterance like (8a) since there is no guidance available other than the discursive context in which it is uttered.<sup>4</sup> In a sense, a discourse connective is an effort-saving device that reduces inferential effort on the part of the hearer.

Nevertheless, the two types of discursive processes, one with a discourse connective involved and the other without it, are fundamentally homological. Figure 4.6 schematically illustrates the basic structure of these processes.

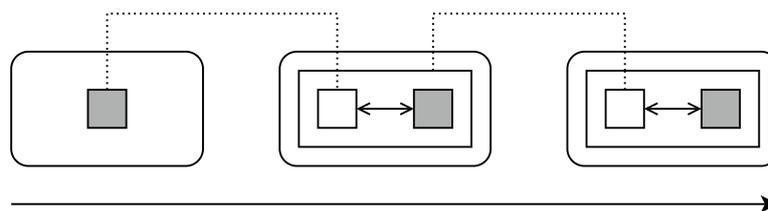


Figure 4.6: Linear Development of Discourse

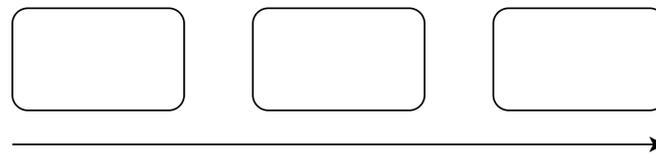
Figure 4.6 depicts the way a proposition in a preceding discourse is retrieved, and it gets related to a new proposition, composing a new proposition that will be, in turn, available for retrieval in the utterances that follow. Let us break down this whole picture into pieces to examine different aspects of it.

First, the rectangles with rounded corners in Figure 4.6 represent the CDS of different times at which each unit of utterance appears in discourse. Figure 4.7 below is an extract from Figure 4.6 that contains only the relevant part. The arrow at the bottom represents the flow of the time. Note

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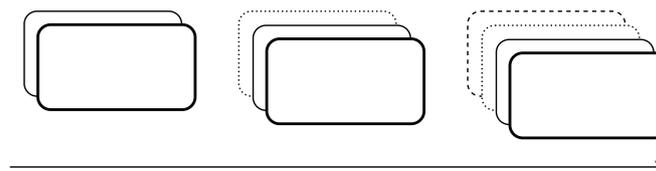
<sup>4</sup> This statement is valid only under the assumption that (8a) is uttered as part of the extended discourse. If there is no contextual information available, the accurate reconstruction of the relation between propositions would be virtually impossible.

that the number of rectangles has no theoretical implication here. Utterances, with or without discourse connectives, could be chained linearly any number of times.<sup>5</sup>



*Figure 4.7: Chain of Discourse State*

The CDS keeps updated as the discourse develops, so the information carried over from one moment to another could contain the history of preceding updates. The accessibility of the body of information that continuously accumulates should change during this process, with the last change being the most accessible and the older information becoming less and less immediately accessible. Thus, a possibly better rendering of what Figure 4.7 tries to represent is something like Figure 4.8 below. Still, the following discussions use the simple rectangles in Figure 4.7 so that the diagrams do not get too complicated.



*Figure 4.8: Stacked Discourse Units*

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<sup>5</sup> A realistic limitation must apply to the maximum number of utterances in a set of discourse. Still, the length of the overall sequence can be reasonably large in certain types of genres. Among these are novels with many volumes and hours of lectures in an academic workshop.

Next, let us examine the propositions and their relationships. In Figure 4.9, which shows another extract from Figure 4.6, a shaded square represents a newly introduced proposition. A new proposition is not *new* anymore when it is referred to later. Squares without shading represent such non-new propositions. The dotted lines between a shaded square and an unshaded square signal that these propositions are essentially identical. Notice that a new proposition becomes old in the next phase of the discourse, and it is related to a newly introduced proposition. In other words, we can conceive that Figure 4.9 depicts a phase in the process of *proposition retrieval*.

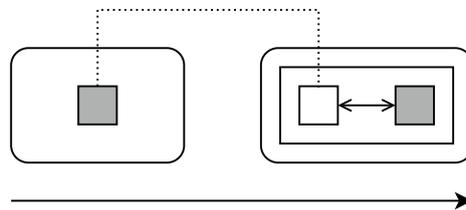


Figure 4.9: Proposition Retrieval

A horizontal line having arrowheads at both ends expresses the relation between a proposition retrieved from the CDS and a newly introduced proposition. Notice that once the discourse saw such a relationship established, with or without the help of a discourse connective, this relationship itself could then be treated as a single proposition available for later retrieval. Figure 4.10 depicts this process, which we tentatively call *folding*.

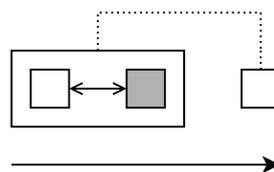


Figure 4.10: Proposition Folding

Folding can be considered part of the fundamental capability of human cognition. It allows one to comprehend something that is internally complex as one whole object that could be utilized,

in turn, to compose a still more complex structure without making the process unnecessarily overwhelming.

The term *context* that we use is, in a sense, the very result of this capability of folding. The context not only includes a number of different elements that exist in the situation at a certain moment of the discursal event; it also accumulates records of appearance, disappearance, and chronological development of these elements up until that moment. We often push this dynamic nature of discourse into the background and refer to the current state as if it were just one single object, using the term *context*. It is worth noting, however, that this conceptual object obtained as a result of folding is not just a simplex, primitive object offering access to its internals. Rather, it is like a container: one can look inside and take out whatever is found in it if the need arises. If the number of levels of embeddings is somewhat large, it would be somewhat difficult to access elements deep inside. Even so, the possibility is still open. The interlocutors engaged in discourse could refer to any topics that have been brought up many conversational turns before, if only as rather inactive elements, as long as they continue to engage in the same discourse. These conceptions of *folding* and *retrieving* give rise to yet another (metaphorical) way to examine the mechanism of discourse. That is the topic we turn to in the next section.

## **4.5 Wrap/Unwrap Metaphor**

### **4.5.1 Metaphorical Explanation of Linguistic Phenomena**

In the analysis of discourse connectives thus far, the theoretical representation of the CDS was conducted in a fashion roughly equivalent to that of Langacker (2008a). This model describes the CDS as if it were a set of global variables that are updated when a new utterance appears. Langacker (2008a) describes this process as follows.

As discourse unfolds, at each step the current expression is constructed and interpreted against the background of those that have gone before. The prior discourse is a major determinant (along with context, background knowledge, etc.) of what I call the current discourse space (CDS). The CDS is a mental space comprising everything presumed to be shared by the speaker and hearer as the basis for discourse at a given moment. Starting from that basis, each successive utterance updates the CDS in some fashion (Langacker 2008a: 59).

In the above quotation, Langacker (2008a) states the CDS is a kind of mental space (Fauconnier 1985, 1997), but the concept of mental space itself is a metaphor. Such metaphoric methods of understanding a concept abound in the study of language and other aspects of human cognition. In this connection, Lakoff and Núñez (2001) state as follows.

One of the principal results in cognitive science is that abstract concepts are typically understood, via metaphor, in terms of more concrete concepts (Lakoff and Núñez 2001: 29).

The question is, then, if there are multiple ways of metaphorically representing a phenomenon, how can we determine which one is better than another? Since this question involves various factors, we cannot expect to obtain a definite answer easily. Besides, if the purpose is as simple as making a good description of a phenomenon, there is no problem in having multiple ways of representing it in the first place. Still, if one approach to description captures more phenomena in related areas than others, it is more valuable in advancing scientific endeavors.

Hence, this section proposes a method based on the wrap/unwrap metaphor as a way to describe and explain the CDS and the process of handling it in discourse. It is an intuitive way to address discursal issues, and, at the same time, it is highly homological to the idea of monad computation in the functional computer programming paradigm. Goldberg (1995) used the concept of inheritance in object-oriented programming as a theoretical device for expressing

networks of constructions. By the same token, the present study proposes to make use of the similarity between the process of linear development of discourse and monad computation in functional programming.

The wrap/unwrap metaphor consists of the four phases shown in Figure 4.11 below. The *base state* in Figure 4.11(a) only contains propositional content in its bare form. Such propositional content gets wrapped in a container in the *wrapping* phase in Figure 4.11(b). This container represents the contextual environment in which the propositional content is conceptually grounded. In other words, it is a “mental space comprising everything presumed to be shared by the speaker and hearer as the basis for discourse at a given moment” (Langacker 2008a: 59). Figure 4.11(c) represents the state of the propositional content *wrapped* in the container. Finally, there is another phase of *unwrapping*, in which the propositional content is taken out of the container so that it can be referred to and modified, as schematized in Figure 4.11(d).<sup>6</sup>

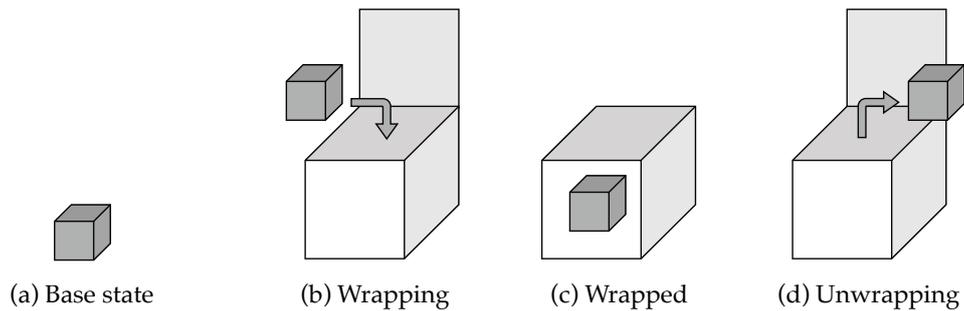
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<sup>6</sup> The wrap/unwrap metaphor can be thought of as a highly generalized version of what Reddy (1979) proposed as the “conduit” metaphor (I thank Kazumi Taniguchi for pointing this out to me). The wrap/unwrap metaphor portrays the analogy of a communicator putting his/her thoughts and ideas into a package and delivering them through a kind of conduit so that the receiver can then open the package and receive the contents. The following are among the examples Reddy (1979) uses to introduce the conduit metaphor:

- (i) a. Whenever you have a good *idea* practice *capturing it in* words.
- b. You have to *put each concept into words* very carefully.
- c. Try to *pack more thoughts into fewer words*.
- d. Insert those *ideas* elsewhere *in the paragraph*.
- e. Don't *force your meanings into* the wrong *words*.

(Reddy 1979: 287)

According to Reddy (1979: 298), at least 70 percent of English utterances about communication use the conduit metaphor, regardless of whether they are speaking of success, difficulty, or failure of communication. The existence



*Figure 4.11: Four Phrases of Wrap/Unwrap Metaphor*

As repeatedly stated thus far, discourse connectives have the functionality of retrieving some proposition from the current discourse space (CDS) and relating it to a newly introduced proposition in a way that is specified by the particular discourse connective used in the utterance. Figures 4.12(a) to (c) below depict this process of establishing a relation between two propositions. That is, the process of 1) taking a proposition out of the container, 2) conjoining it to another newly introduced proposition, and 3) putting the resulting proposition yielded by combining two propositions back into the container.

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of such a conventionalized system of describing communication in English does not automatically support the validity of the wrap/unwrap metaphor as a way to explain the linear nature of language and its mechanisms. However, the conduit metaphor, or variations of it, can also be found in other languages. For example, Nomura (1993) discusses the conduit metaphor in Japanese and its similarities and differences to English.

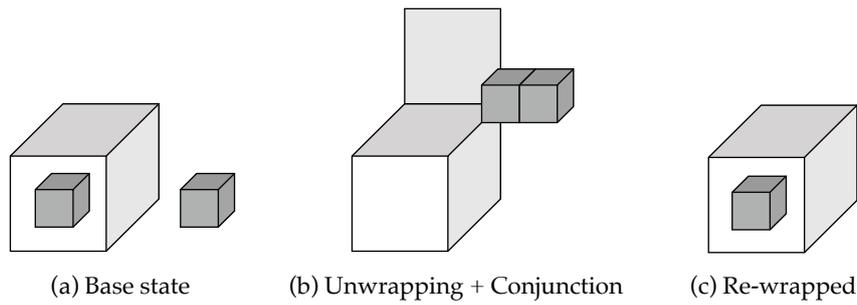


Figure 4.12: Proposition Conjunction

Note that the actual proposition retrieval is not necessarily as straightforward as the process that Figure 4.12 implies. Consider an example in (9).

- (9) If you have debt, you've not completely forgiven your past, so it's our work to forgive ourselves and others so that we can live freely. *Otherwise*, our history will continue to repeat [TCSE 21752 | Tammy Lally: Let's get honest about our money problems].

In the above example including *otherwise*, Proposition 1 of the type "condition" is understood to mean "we forgive ourselves and others" and conjoins to Proposition 2 of the "consequence" type that states "our history will continue to repeat." The establishment of a decent relation between the two cannot be made possible without an inferential effort to extract the former proposition out of its immediate enclosure. In other words, the proposition not only needs to be separated from the outermost layer of the CDS but also the extra layer comprised by the embedding clause "it's our work ... ."

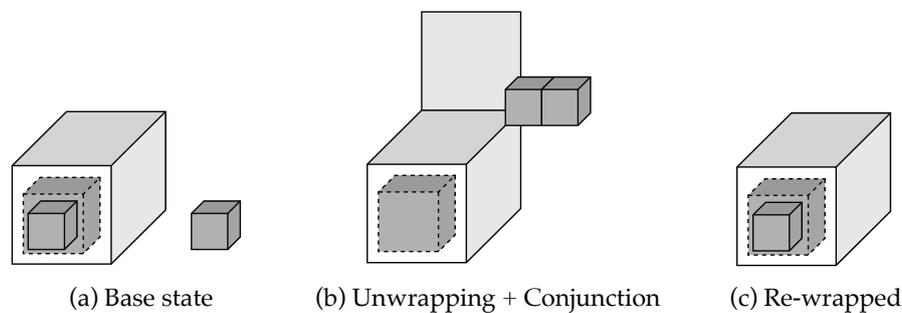
Consider yet another example in (10). Notice that this is an instance of the discourse connective *otherwise* in the domain of speech acts.

- (10) How about we all embrace our inner sloth by slowing down, being more mindful, reducing wasteful convenience, being economical with our energy, recycling creatively and

reconnecting with nature. *Otherwise*, I fear, it will be us humans that turn out to be “the stupidest animals that can be found in the world” [TCSE 40767 | Lucy Cooke: Sloths! The strange life of the world’s slowest mammal].

In (10), again, a rather complex proposition retrieval must be made to separate the proposition “we all embrace our inner sloth” out of its immediate environment of the “proposal/invitation” speech act as well as the outermost layer of the CDS.

Figure 4.13 below schematically represents the processes of proposition retrieval involved in examples like (9) and (10).



*Figure 4.13: Retrieval of a Proposition from Layers of Environments*

In Figure 4.13, the CDS is represented by a container with a lid as is the case with the other figures in this section. However, the propositional content inside has yet another enclosing object drawn with dashed lines. The matrix clause “it’s our work ...” in (9) and the speech act construction “how about ...” in (10) are both such environments from which the proposition has to get extracted. Notice that in Figure 4.13 (c), the propositional content is back inside the immediate environment. This way, the original overall structure is preserved even after all the processes of proposition retrieval and conjugation have been carried out. In other words, folding is accomplished.

The wrap/unwrap metaphor captures such operations of folding and retrieving of propositions in an exceptionally simple fashion. However, the picture that emerges as a result of its application to usages of the discorsal connective (and possibly other discorsal phenomena) has much broader implications than it might seem at first: it constitutes a monadic structure.

#### 4.5.2 Monad Computation

Monad computation is a concept based on category theory, one of the fields of mathematics. In category theory, a monad is defined to be a structural pattern that must satisfy certain strict conditions. This section, however, does not attempt to provide a rigorous mathematical proof of the concept. Instead, we attempt to examine the analogical relationship between the wrap/unwrap metaphor and monad computation in the functional programming paradigm in a rather informal fashion.<sup>7</sup>

Every instance of a monad is subject to a set of conditions conventionally called *monad laws* (Moggi 1991; Wadler 1992, 1995). One of the strategies commonly used to make monadic structures abide by monad laws is implementing three functions, *unit*, *map*, and *join*, that take such structures

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<sup>7</sup> There have been several attempts to apply monad computation to linguistic research. Among the earliest of such attempts is Shan (2002), who suggests that the concept of monads could make a useful theoretical tool to account for various semantic phenomena, such as intentionality, variable binding, quantification, and focus. More recently, Bekki (2008) points out a few shortcomings of Shan (2002) and proposes ideas for improvement. Also, Bozşahin (2012: Chapter 10) states that there are monadic aspects to Combinatory Categorical Grammar, a natural language grammar formalism utilizing the lambda calculus (Steedman 1988, 2000). More recently, Cohn-Gordon (2016) proposes a method of analyzing various linguistic phenomena using different kinds of monads stacked together. However, all of these previous works use monadic computation as part of a mechanism that ensures the logical well-formedness of sentences. The present research instead attempts to point out a monadic aspect of the basic cognitive processes that underlie the processing of discourse connectives and, more generally, the processing of a sequence of propositions having some kind of relationship among one another.

as an argument. In the functional programming language Haskell, for instance, a monad can be defined as follows.

(11) A monad is an operator  $M$  applied on a particular type (e.g.,  $x, y$ ), together with a triple of functions:

- a.  $unit :: x \rightarrow M x$
- b.  $map :: (x \rightarrow y) \rightarrow (M x \rightarrow M y)$
- c.  $join :: M (M x) \rightarrow M x$

(Wadler 1995; Petricek 2018)

Putting aside, for now, the issue of how to interpret each of the functions in (11), let us turn to how monads come in handy and why they are considered so crucial in the functional programming paradigm. In short, the following can be said about them: if a data type satisfies monad laws, it becomes automatically possible for the user to have a common set of assumptions about the behaviors of the data type, even though its superficial appearances and purposes are different from other monadic data types.

(12) a. **List monad**

$M a$  is a list of values, or a container storing values in a list

b. **Maybe monad**

$M a$  either contains a value of type  $a$  or is an empty box

c. **State monad**

$M a$  contains a value of type  $a$  together with a set of a fixed number of other values that comprise a state

(Petricek 2018: 6)

For instance, the data types in (12) above are all implemented as monadic structures, although their practical purposes greatly vary. The list monad in (12a) is used to represent lists of values.

Lists in functional programming offer a means to implement non-deterministic computation. A “bag of words,” for instance, can be implemented using the list monad. A bag of words contains many words, and it has the functionality of returning a word picked out randomly. Figure 4.14 illustrates a complex function involving two monadic functions (i.e., functions that deal with monads) conjoined via an operation called *bind*.<sup>8</sup>

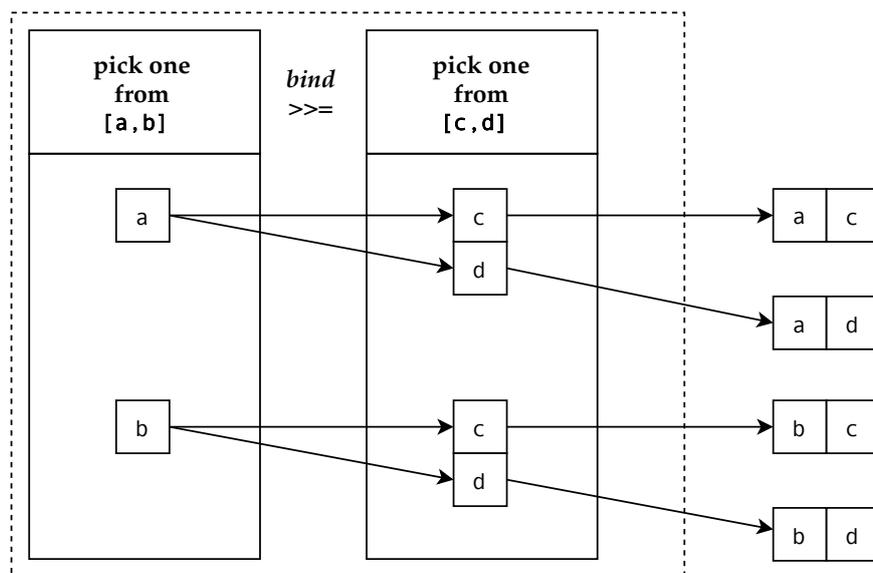


Figure 4.14: List Monad

The first function picks one element from the list [a, b], with possible results being either a or b. The second function picks one element from the list [c, d], with possible results being either c or d. Conjoining these two functions by a monadic operation of *bind* creates a complex function that will yield a list that contains elements, each of which comprises one element from the first list and another element from the second one, namely, (a, c), (a, d), (b, c), and (b, d). Note that the resulting structure of these processes is a list, a monadic data type. Thus, functions similar to

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<sup>8</sup> The operation of *bind*, which conjoins monadic operations, is conventionally represented by  $\gg=$ . This operation is proven to be composed of *map* and *join* defined in (11), though further details are omitted here.

that of the first and second functions could be applied to this resulting structure any number of times. Also, since a complex function created by *bind*-ing monadic functions is a monadic function itself, functions of various degrees of complexity can be sequenced, constituting a yet more complex monadic function. The outermost enclosing box with dashed lines in Figure 4.14 represents that the complex structure consisting of the two component functions can be thought of as a monadic function itself.

Another monadic data type is the maybe monad in (12b). It is a data structure to represent procedures that could “fail.” Suppose there is a set of procedures such that each one of them could independently fail upon its execution. It would be desirable if the failure of one of the procedures could terminate the whole process immediately instead of continuing it until every component process is complete, producing a meaningless value as a result. Figure 4.15 illustrates a complex function involving two component functions that deal with maybe monads.

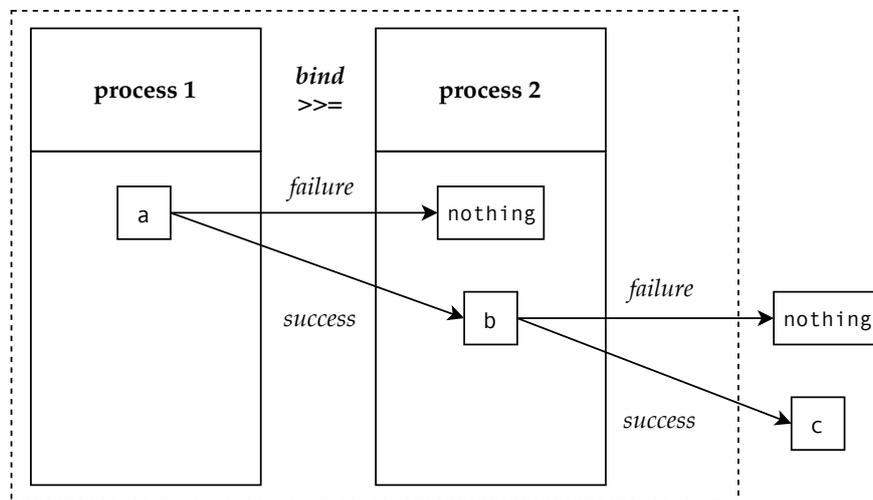


Figure 4.15: Maybe Monad

Execution of process 1 can either succeed or fail, as is the case with process 2 as well. If it were not for the monadic mechanism adopted therein, the conjoining of these two processes would have to be accompanied by an extra layer that checks if the result of process 1 has been completed

successfully or not before the result is fed to process 2. To make matters worse, every time one would like to add such a process to the existing ones, an extra checking layer would also have to be added. A structure utilizing maybe monads is free from such worries. Since every operation to a maybe monad is defined to terminate the entire process if it fails, a sequence of any number of conjoined processes dealing with maybe monads either yields a value of a certain type or fails somewhere, gracefully cutting off the process. Note, again, that component processes such as process 1 and process 2, on the one hand, and the complex structure comprising these (enclosed by the dashed box in Figure 4.15), on the other hand, are homological to each other.

A third instance of the monadic data structure is the state monad in (12c). Understanding the state monad requires an understanding of its theoretical background, which is peculiar to the (purely) functional programming paradigm. In functional programming, an application of a function always produces the same return value as long as the values of the arguments given to the function are the same—a computational trait called *reference transparency*. To ensure reference transparency, variables, including both local ones and global ones, must be made immutable. In other words, all values cannot change throughout the lifespan of a program that is referentially transparent. This trait contributes to the creation of safe and correct programs. However, it also entails a disadvantage. Reuse of the same variables over multiple operations is prohibited, and *states* that can be updated as the processing proceeds are virtually impossible to implement straightforwardly. The state monad comes to the rescue in such a situation. It provides the mechanism with which passing a set of mutable variables over multiple operations becomes possible.<sup>9</sup> Figure 4.16 schematically illustrates how it works.

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<sup>9</sup> Since making a direct modification to values is disallowed in functional programming, replacement of old values with new ones takes place when a state monad is updated. In this connection, Tanaka-Ishii (2010: Chapter 10), in her comparison of various concepts proposed and implemented in digital computers and symbolic computation

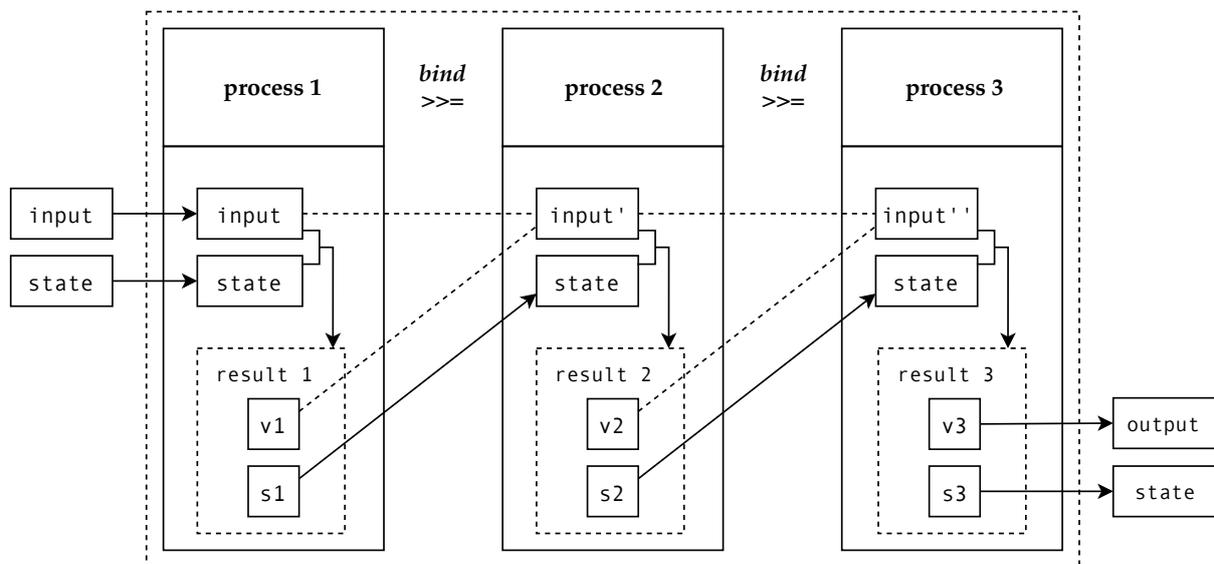


Figure 4.16: State Monad

A process that deals with state monads takes two elements, the input object and the state object. This process yields a result-set comprised of, again, two elements,  $v_n$  and  $s_n$ , with the former being the output value of the process and the latter being the updated state object. Notice that since reference transparency prohibits the original state from getting modified directly, what is obtained here as the updated state is actually a brand-new object that is created independent of the original one. A process conjoined by virtue of *bind* will take this newly created state object as

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in human cognition in general, makes a somewhat negative statement on the practical usefulness of referential transparency as a means to ensure the stability and correctness of a program. She argues that the computation that respects reference transparency tends to be quite inefficient since numerous immutable variables have to be thrown away every time their values are altered. Moreover, Tanaka-Ishii argues, garbage collection is called for to free unnecessarily occupied memory space afterward. However, variables do not always need to be thrown away since, in a system that is reference-transparent, immutable data may be securely reused, again and again, every time there arises a necessity. In other words, a state change does not necessarily entail both the creation of a new object and the disposal of the old one. Instead, both old and new objects co-exist as long as the memory space accommodates them. Those “old” objects are kept alive throughout the lifespan of the program, and it is not a waste of space; on the contrary, new objects can be efficiently constructed based on them (cf. Peyton Jones 1987).

its base state. Also note that the original *input* is available throughout the following sequence. The same object is fed to each of the component processes conjoined with *bind*. Since the *input* object is not stateful, it cannot be modified either directly or indirectly. However, *v1* and *v2*, the interim output values, also become available in later processes, respectively as part of the *input*—thus the notation *input'* is used for process 2 and *input''* for process 3. Finally, at the end of the sequence, *v3* is obtained as the output of the overall sequence and *s3* as the resulting state.

Once again, it is interesting to note, regarding the state monad and its illustration in Figure 4.16, that each of the monadic processes (processes 1 through 3) and the more extensive, conjoined process (enclosed by dashed lines) show parallel configurations. Such a homological relationship between single processes, on the one hand, and larger structures that are composites of these components, on the other, is also observed in the linear structure of discourse as one of its most significant traits, as illustrated by the newly introduced term *folding* in 4.4. This seems to strongly motivate the view that discorsal structures, especially those involving connectives, are based on monad computation that is hypothesized as taking part in some fundamental aspect of human cognition.

The above three instances of monadic data structures (list monad, maybe monad, and state monad) all share one general architecture, that is, some “environment” having a particular trait wraps the values of the monadic structure. In the case of the list monad, the environment is the one that gives the value the trait of non-determinacy. In the case of the maybe monad, the environment is the one that makes any operation on the value subject to immediate termination upon failure. In the case of the state monad, the environment is the one with a set of properties that constitute a state that can be passed over with necessary modification. This general architecture presents a remarkable resemblance to the wrap/unwrap mechanism of discorsal processes proposed above in this chapter. In the latter structure, the “values” are propositions, and the “environment” is the container that encloses them.

This structural resemblance between the two different fields of study is even more striking if part of the definition of the monadic data structures in (11) is paraphrased using a visual aid similar to the one used in the wrap/unwrap metaphor, as in (13).<sup>10</sup>

$$(13) \quad \begin{array}{l} \text{a. } \mathit{unit} :: a \rightarrow \boxed{a} \\ \text{b. } \mathit{map} :: (a \rightarrow b) \rightarrow (\boxed{a} \rightarrow \boxed{b}) \\ \text{c. } \mathit{join} :: \boxed{\boxed{a}} \rightarrow \boxed{a} \end{array}$$

(Based on Petricek 2018: 6)

The *unit* function is the most basic one in (13). The definition of this function in (13a), which is a metaphorical translation of (11a), states that *unit* takes a value of type *a* as the argument and returns a value wrapped in an environment. In the wrap/unwrap processes of proposition retrieval diagrammed in Figure 4.11, the *unit* function corresponds to the “wrapping” phase.

The *map* function in (13b) is a little more complicated. It is a higher-order function, that is, a function that takes a function as an argument and returns another function. The left-hand side and the right-hand side of it are both parenthesized. This indicates that these elements are functions themselves. More specifically, *map* takes a “regular” function that takes a value of type *a* and returns a value of type *b* and returns a “monadic” function that takes a monadic value of type *a* ( $\boxed{a}$ ) and returns a monadic value of type *b* ( $\boxed{b}$ ).

In fact, *map* can be understood in either of the following two ways. One can regard it as a unary function that takes only one argument that is a regular function and returns a monadic function. Alternatively, it is also possible to regard it as a binary function that takes two arguments,

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<sup>10</sup> It is interesting to note that many introductory materials for teaching functional programming adopt variations of the wrap/unwrap metaphor for its intuitive understandability when introducing the concept of monads (e.g., Hutton 2016; Lipovača 2011).

a regular function as the first argument and a monadic value of type  $a$  ( $\boxed{a}$ ) as the second argument, returning a monadic value of type  $b$  ( $\boxed{b}$ ).

The *map* function corresponds to the process of “unwrapping and conjunction” in Figure 4.12(b) since what the latter features is not just an operation that takes a value and returns a new value ( $a \rightarrow b$ ), but an operation that extracts a value from its environment ( $\boxed{a}$ ), finally returning a new value re-wrapped with an environment ( $\boxed{b}$ ).

The *join* function in (13c) reduces multi-layered embeddings into a single layer. A linear sequence of monadic operations possibly produces a structure with an enclosure over another enclosure ( $\boxed{\boxed{a}}$ ). But this prevents the regular *map* function from working on it. Now the *join* function comes to the rescue by flattening the multiple embeddings into a structure with a single embedding ( $\boxed{a}$ ). This roughly corresponds to the process of “re-wrapping” depicted in Figure 4.13 (c).

Thus, there is parallelism between the structure of the process of processing two consecutive utterances in discourse and monad computation. This implies that the basic model of discourse proposed in this chapter may have its root in some aspect of a more general cognitive mechanism that figures in a wide range of symbolic operations. Having said that, admittedly, the discussion here is only preliminary and requires more rigorous investigation in future research.<sup>11</sup>

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<sup>11</sup> The origin of the human ability to construct complex hierarchical structures has become a hot topic of discussion since Hauser, Chomsky, and Fitch (2002), who propose that the faculty of language in the narrow sense is only comprised of the recursive application of a single operation called Merge. However, some researchers assume that the ability of Merge itself might be available not only to human beings but also to other primates. For instance, Fujita (2014) suggests a distinction between a simple application of Merge that he calls Pot-Merge after Greenfield (1991) and a more complex process called Sub-Merge, with the latter being a uniquely human capacity. In Pot-Merge, an adjoining element is merged to the head structure that has been assembled from multiple components beforehand (e.g.,  $\text{Merge}(\text{green}, \{\text{tea}, \text{cup}\}) \Rightarrow \{\text{green}, \{\text{tea}, \text{cup}\}\}$ ), whereas in Sub-Merge, an adjoining element is first merged to another element, constituting a sub-assembly, and then the resulting composite structure,

## 4.6 Conceptual and Procedural Meaning

### 4.6.1 Relevance Theoretical View of Discourse Connectives

The present chapter has presented an analysis of the architecture of discourse, with a particular emphasis on linearity as an essential property of language. This section will further suggest that the above analysis can provide a new perspective on a controversial issue discussed by researchers engaging in the study of discourse connectives.

Blakemore (1987, 1992) argues that a linguistic theory can take either of two options in analyzing linguistic phenomena according to their theoretical orientations: one is a conceptual approach, and the other is a procedural approach. Blakemore (1987) states as follows.

On the one hand, there is the essentially conceptual theory that deals with the way in which elements of linguistic structure map onto concepts—that is, onto constituents of propositional representations that undergo computations. On the other hand, there is the essentially procedural theory that deals with the way in which elements of linguistic structure map directly onto computations themselves—that is, onto mental processes (Blakemore 1987: 144).

Based on this assumption, Blakemore (1987, 1992) claims that while the meaning of many discourse connectives (*discourse markers* in Blakemore's terminology) are conceptual by nature,

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in turn, gets merged to the head structure (e.g.,  $\text{Merge}(\{\text{green, tea}\}, \text{cup}) \Rightarrow \{\{\text{green tea}\} \text{cup}\}$ ). Monad computation resembles Sub-Merge in that it assumes the creation of a complex structure that is later conjoined to another structure. The present work does not go any further regarding possible relationships between monad computation in discourse and the concept of Merge. However, it is interesting to note that discourse/pragmatic structures tend to accommodate heavily hierarchical organizations that are too complex to be licensed within the boundaries of clauses and sentences, as discussed and exemplified by Levinson (2014).

there are others with meanings that are not conceptual but are rather procedural. Blakemore (1996) argues that what she calls appositional markers, such as *and*, *but*, and *so*, are procedural by nature and do not have conceptual meanings at all. She suggests that this group of connectives should be treated differently from other connectives that she refers to as discourse markers. For instance, what the apposition marker *so* does in (14) below is not to add or elaborate on the conceptual content of the sentence; instead, it just “signals that the discourse segment following the *so* should be processed as an effect or a conclusion following from the preceding segment” (cf. Fraser 2006b: 24).

(14) The movie was over, *so* we didn’t bother going to the theater.

It is important to note that Blakemore’s view rests on the pragmatic framework of Relevance Theory and that other researchers of Relevance Theory share this rigid distinction between the conceptual aspect and the procedural aspect of meaning.<sup>12</sup> Wilson and Sperber (1993) argue that discourse connectives (by which they refer to what Blakemore calls apposition markers) are procedural by nature. They state as follows.

Discourse connectives are notoriously hard to pin down in conceptual terms. ... The procedural account suggests an answer to these questions. Conceptual representations can be brought to consciousness; procedures cannot. We have direct access neither to grammatical computations nor to the inferential computations used in comprehension. A procedural analysis of discourse connectives would explain our lack of direct access to the information they encode (Wilson and Sperber 1993: 15).

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<sup>12</sup> See Sperber and Wilson (1995) and Wilson and Sperber (2012), *inter alia*, for the general ideas and principles of Relevance Theory.

Rouchota (1998) presents an even more drastic stance, arguing that the meaning of discourse markers, including not only apposition markers but also other connectives, is essentially procedural rather than conceptual. Rouchota states that the meaning of discourse connectives does not have a truth value and that, hence, their meaning is difficult to negate using negation constructions.

(15) A: I'm sure Mary is on a diet: she went jogging this morning; *moreover*, she skipped lunch.

B: ? That's not true. That she skipped lunch is not additional evidence that she is on a diet.

(16) A: Mary never came to any of my backups. *Nevertheless*, her essays are excellent.

B: ? That's not true. The good quality of Mary's work does not deny your low expectations from her.

(Rouchota 1998: 115, a typo in the original text corrected)

In (15) and (16), the utterance by speaker B includes an utterance in an attempt to deny the truthfulness of speaker A's statement containing a discourse connective. B's utterance does not sound very natural, however. This phenomenon seems consistent, at least apparently, with the claims by Blakemore (1996) and Wilson and Sperber (1993) that the conceptual aspect and procedural aspect of meaning should be distinguished.

#### 4.6.2 Fraser's View

Fraser (2006b) challenges the relevance-theoretic views presented above. He states that "discourse markers/discourse connectives, some illocutionary markers, and pronouns that have been analyzed by relevance theorists as encoding only procedural meaning should be analyzed as having a conceptual component of meaning" (Fraser 2006b: 25).

Fraser points out that Rouchota's (1998) test to determine if there is a conceptual aspect in the meaning of a given connective will produce different results if the overall expression used is modified. Consider (17) and (18) below.

(17) A: We have two reasons to believe that Mary is on a diet: she went jogging this morning; *moreover*, she skipped lunch.

B: That's not true. You don't have sufficient reasons to reach this conclusion, since neither the fact that she went jogging nor your second, additional reason, that she skipped lunch, are grounds for concluding that she is on a diet.

(18) A: Mary doesn't drink. *However*, she had a little brandy this evening.

B: Not true. Contrary to what you might have expected, she maintained her abstinence quite nicely tonight.

(Fraser 2006b: 25–26)

These two examples show that it is possible to negate a proposition that contains a connective. Based on this observation, Fraser concludes that in the meaning of connectives, there are conceptual aspects as well as procedural aspects. Some connectives may not seem to have a conceptual meaning because the degree of conceptual meaning is minimal in comparison to the procedural meaning. Nevertheless, this does not mean that there is no conceptual meaning in connectives.

The present study, in line with Fraser (2006b), assumes that both types of connectives have a procedural aspect and a conceptual aspect. However, the theoretical ground for this assumption is different from that of Fraser's. The analysis of the present study emphasizes the linearity of language. This view is partially compatible with claims from the perspective of Relevance Theory, such as those made by Blakemore (1996) and Wilson and Sperber (1993). Since discourse connectives are linguistic elements that connect a proposition inside the context (which is only

available at the very moment of the utterance) and a new proposition introduced immediately after it, their structure must have a procedural aspect. This does not tell the whole story, however. The discourse-connective construction designates that Proposition 1 and Proposition 2 participate in a relationship specified by the connective used in the utterance and that the contents of the text segments corresponding to the propositions must match certain types. Because these types themselves are conceptual, the claim that there is no conceptual aspect in discourse connectives is untenable.

Both Blakemore (1996) and Wilson and Sperber (1993) overlook the fact that the use of a discourse connective involves the type specification for propositions that takes place behind the procedural operation in the discourse-connective construction. Thus it can be said that there are not only procedural meanings but also conceptual meanings in discourse connectives, no matter how schematic and seemingly attenuated they may seem.

## **4.7 Summary of Chapter 4**

This chapter discussed the linearity of discourse. Section 4.1 provided a brief review of how previous studies treated the concept. Cognitive linguistics has often pointed out that linearity is an essential property of language, though it has not thoroughly investigated the precise mechanism by which this linearity affects linguistic meaning.

In Section 4.2, how the contextual information is accessed and updated in an utterance containing a discourse connective was examined. A connective presupposes the execution of a discourse function that takes three arguments. The first argument is the CDS, from which one extracts Proposition 1; the second is a relation type of propositions; and the third is Proposition 2, which is a new proposition that participates in the relationship specified by the connective along

with Proposition 1 retrieved from the CDS. A discourse connective specifies the semantic/discoursal types of the two propositions as well as that of the relation connecting them.

Section 4.3 took a brief look at the so-called fronted connective construction, a construction that is closely related to the discourse-connective construction. The fronted connective construction does not require inferential reasoning to retrieve a proposition from the CDS. Thus, the role of the CDS in the fronted connective construction remains low in its degree of immediate necessity compared to that of the non-fronted discourse-connective construction. In other words, the fronted versions are more confined to the sentence-level than their non-fronted counterparts are.

Section 4.4 pointed out that the mechanism by which two propositions conjoin in the discourse-connective construction is essentially the same as the underlying mechanism for processing two consecutive utterances. The latter point explains why it is sometimes the case, though not always, that using or not using a discourse connective seemingly does not make a significant difference to the meaning. Still, using a discourse connective plays the role of explicitly attracting the attention of the hearer to the relation between propositions.

Section 4.5 introduced the wrap/unwrap metaphor, which helps describe the general structure of proposition retrieval and conjugation. This metaphorical device for presenting structures of a sequential nature bears a remarkable resemblance to monad computation, a type of design pattern used in the paradigm of functional computer programming. This analogical relationship between two different fields suggests that the analysis of the present study is tapping into certain aspects of a highly fundamental part of human cognition, although this suggestion is admittedly speculative at the current stage.

Finally, in 4.6, we argued against a claim made by some researchers of Relevance Theory regarding the characteristics of the meaning of discourse connectives. Blakemore (1996) and Wilson and Sperber (1993) present a view that conceptual and procedural aspects of meaning are

exclusive of each other. However, the analysis in this chapter provides the basis for maintaining that discourse connectives always have both conceptual and procedural aspects, a view that is essentially the same as that of Fraser (2006b), though the routes taken to arrive at this conclusion are somewhat different.

## Chapter 5

# Analysis of Discourse-Connective Constructions

In this chapter, we take up three categories of discourse connectives and examine examples of them. The purpose of this chapter is not to create an exhaustive list of categories and types of discourse connectives, nor is it to enumerate the different uses of particular discourse connectives. Instead, the purpose here is to verify the validity of the discussion so far by seeing actual examples. This will clarify why different types of connectives have different characteristics but all have the same basic structure discussed in the previous chapters. The main properties of the discourse-connective construction are as follows: first, its structure includes a relationship between two propositions; second, one of the propositions is retrieved from the CDS while the other is given explicitly; and third, the propositions, as well as the relation between them, have types specified by the connective actually used.

Another purpose of this chapter is to investigate further the relationship between the domains of meaning discussed by Sweetser (1991) and discourse connectives. Sweetser points out that there are three domains of meaning (the content domain, the epistemic domain, and the speech-act domain) for the various linguistic phenomena. However, as pointed out in Chapter 3, there are not always strict boundaries between them, and which particular domain gets foregrounded is determined by an inferential process based on contextual information. The following sections illustrate these points more empirically.

## 5.1 Basic Structure of Discourse Connective

Before going into the examination of actual examples, this section reviews the basic structure of the discourse-connective construction. As repeatedly mentioned in preceding chapters, a discourse connective introduces a proposition, as exemplified in the two examples in (1) below. Notice that it does not matter if the connective appears after the period, as in (1a), or follows a comma, as in (1b). The choice is, in fact, somewhat arbitrary. Thus, the specific choice of the separator is not considered part of the formal conditions of the discourse-connective construction.

- (1) a. We paid him a very large sum. *So* he kept quiet about what he saw.  
b. We paid him immediately, *so* he left contented.

(Quirk et al. 1985: 442, 1108)

On the other hand, usages of a connective like (2) below do not qualify as examples of the discourse-connective construction. This is not because (2) does not have a comma or a period before the connective *so*; rather, it is because Proposition 2 in (2) does not meet the type requirement specified by the connective *so*. That is, the clause “he can impress his mother-in-law” does not instantiate the “result/consequence” type in the same way that “he kept quiet about what he saw” in (1a) and “he left contented” in (1b) do. Instead, (2) is an instance of the usage of *so* as a marker of an adverbial phrase expressing a “purpose.”

- (2) He’s getting a new car *so* (that) he can impress his mother-in-law.

(Quirk et al. 1985: 556)

Also outside the scope of analysis in the present study are instances of fronted connective constructions as in (3).

- (3) a. *Since* the weather has improved, the game will be held as planned.  
b. *Because* we offered to pay him, he will help us.  
c. *Although* Mary wanted it, John gave it away.

Usages of discourse connectives in this construction partly share the same characteristics as those of the (non-fronted) connective construction. As mentioned in 4.3, however, they are excluded from the analysis so that we can put more focus on the traits that are only observed in the discourse-connective construction.

In the next section, we turn to each of the three categories of discourse connectives, namely, causal relations, adversative relations, and elaborative relations.<sup>1</sup> In doing so, we examine many examples of the discourse connectives of these categories.

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<sup>1</sup> The choice of the three types of connectives is, admittedly, somewhat arbitrary. Still, it can be said that these types represent some of the discourse relations that are traditionally considered fundamental in human cognition. Hobbs (1990: 101–102) cites the philosopher David Hume’s following statement concerning the possible types of connections between ideas.

Though it be too obvious to escape observation that different ideas are connected together, I do not find that any philosopher has attempted to enumerate or class all the principles of association—a subject, however, that seems worthy of curiosity. To me there appear to be only three principles of connection among ideas, namely *Resemblance*, *Contiguity* in time or place, and *Cause* or *Effect* (Hume 1748/1955: Section III).

Among the three types dealt with in this chapter, connectives of causal relations, obviously, involve cause and effect. Connectives of adversative relations feature relations opposite to resemblance, but being in an opposite relation may well imply their cognitive proximity (by virtue of *structural priming* in terms of Bock (1986) and Goldberg (2006)). Moreover, that which connectives for elaboration feature roughly corresponds to elements in contiguity with each other.

## 5.2 Case Studies

Listed in (4) below are the three categories of discourse connectives and particular connectives examined in this section.

(4) a. **Connectives of causal relationship**

<i>so</i>	(cause/base ↔ result/consequence)
<i>therefore</i>	(cause/base::discoursal ↔ result/consequence)
<i>because</i>	(result/consequence ↔ cause/base)
<i>since</i>	(result/consequence ↔ cause/base::shared/inferable)

b. **Connectives of adversative relationship**

<i>although</i>	(reference-statement ↔ adversative-statement)
<i>in contrast</i>	(reference-statement ↔ contrastive-statement)
<i>instead</i>	(reference-statement ↔ alternative-statement)

c. **Connectives for elaboration**

<i>in fact</i>	(reference-statement ↔ evidence/support::new)
<i>in other words</i>	(reference -statement ↔ reformulative statement)
<i>that is (to say)</i>	(reference -statement ↔ reformulative statement)

Inside the parentheses next to each of the connectives in (4) are the types of propositions specified by the connective. Through case studies of these connectives of the three categories, it will also be shown, as suggested in the previous chapters, that the proposition retrieval must take place in accordance with these type specifications for propositions.<sup>2</sup>

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<sup>2</sup> The following analysis does not aim to provide a complete and exhaustive list of individual connectives' functions and usages. Nor does it deal with the so-called "fronted connective constructions," which can be used with connectives such as *since*, *because*, and *although*. (See Section 4.3.)

## 5.2.1 Connectives for Causal Relations

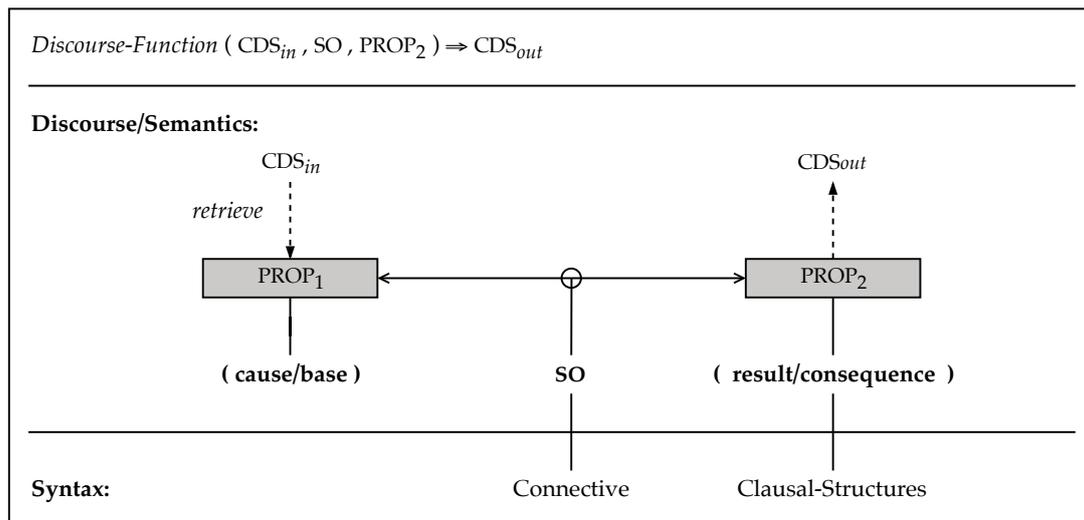
The first category of discourse connectives in this section is one that specifies the “causal relation” between propositions. It is often pointed out that causal relations are essential in linguistic processing and comprehension (Noordman and de Blijzer 2000; Pander Maat and Sanders 2000). In the following, *so*, *therefore*, *because*, and *since* are examined.

### 5.2.1.1 *So*

The connective *so* specifies a subtype of causal relation, which I represent as SO for convenience. This connective requires that Proposition 1 be of the type “cause/base” and Proposition 2 of the type “result/consequence.”<sup>3</sup> Figure 5.1 illustrates the structure of the SO construction.

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<sup>3</sup> The labels for the proposition types used in the present study are primarily based on previous works such as Huddleston and Pullum (2002), among others. However, the actual labels are not necessarily the same as the labels used by those scholars. For instance, Huddleston and Pullum (2002: 1539) analyze that the proposition preceding *so* (Proposition 1) denotes “reason,” and the proposition following it (Proposition 2) denotes “consequence.”



*Figure 5.1: SO Construction*

The type of Proposition 1 is not just “cause” but “cause/base.” This is because not only does the SO construction allow relations that explicitly mention the cause of an event, as in (5a) and (5b) below, but it also allows relations involving a commentary statement made in response to a “base” that does not necessarily express a “cause,” as in (5c) and (5d).

- (5) a. Susan is married. *So*, she is no longer available I guess.  
 b. John was tired. *So*, he left early.  
 c. Attorney: And how long were you part of the crew?  
 Witness: Five years.  
 Attorney: *So*, you were employed by G for roughly 5 years, right?  
 d. Son: My clothes are still wet.  
 Mother: *So* put the driver on for 30 minutes more.

(Fraser 1999: 945)

In (5c), the attorney’s utterance of *so* apparently refers to the preceding statement by the witness. However, the relationship between the two propositions mediated by the connective is not one of

“cause” or “result.” Instead, it is better described as a relationship of two propositions, with one just being motivated by the other. This is essentially the case with (5d) as well.

Sweetser (1991) points out there are usages of *so* in all three domains: the content domain, the epistemic domain, and the speech-act domain. Consider her examples in (6).

- (6) a. He heard me calling, *so* he came.  
b. (You say he’s deaf, but) he came, *so* he heard me calling.  
c. Here we are in Paris, *so* what would you like to do on our first evening here?

(Sweetser 1991: 79)

Sweetser’s (1991) categorization of usages relies on the verbalization of the underlying assumption in interpreting them. (6a), for instance, is an example in the content domain because it invites the understanding that “the hearing caused his coming (in the real world).” (6b) is an example in the epistemic domain because one can paraphrase it as “the knowledge of his arrival caused the conclusion that he heard me calling” based on the natural inference. (6c) is a speech-act usage because it can be assumed that the speaker supposedly had in mind that “our presence in Paris would enable my act of asking what you would like to do.”

Now, let us consider some examples from the corpus. As mentioned in Chapter 1, the present study uses the TED Corpus, a corpus of over 3,000 oral presentations in English from TED conferences. The following example contains *so* in the content domain.

- (7) I’m a numbers person, *so* I rarely win at Scrabble. I made this diagram to remember all the two- and three-letter words in the official Scrabble dictionary [TCSE 23087 | Tommy McCall: The simple genius of a good graphic].

As discussed later in detail, usages in the content domain and those in the epistemic domain are sometimes ambiguous. For (7), however, the judgment of category membership is relatively straightforward. It is almost unthinkable to have such an epistemic assumption as “the fact that I am a numbers person makes me reasonably conclude that I rarely win at Scrabble” for Proposition 2 in this utterance (“I rarely win at Scrabble”), which is just a description of a real-world fact, not a result of inference or interpretation.

The next example, on the other hand, contains *so* in the epistemic domain.

- (8) There’s an economist named Edward Castronova. His work is brilliant. He looks at why people are investing so much time and energy and money in online worlds. And he says, “We’re witnessing what amounts to no less than a mass exodus to virtual worlds and online game environments.” And he’s an economist, *so* he’s rational. And he says ... [TCSE 799 | Jane McGonigal: Gaming can make a better world].

It is interesting to note that the superficial structure of *so* in (8) is similar to that of (7). Both are an expression of a personal trait of a particular person. Proposition 2 in (8), however, rests on inferential reasoning by the speaker. The inference can be verbally expressed as follows: “the fact that he is an economist makes me reasonably conclude that he is rational.”

The next one contains *so* in the speech-act domain.

- (9) Hello, everyone. It’s a bit funny, because I did write that humans will become digital, but I didn’t think it will happen so fast and that it will happen to me. But here I am, as a digital avatar, and here you are, *so* let’s start. And let’s start with a question. How many fascists are there in the audience today? [TCSE 16157 | Yuval Noah Harari: Why fascism is so tempting].

The usage of *so* in this example could be categorized as an interjection, rather than as a connective, but it is possible as well to consider it as a variation of the connective *so*. In (9),

Proposition 1 is easily retrieved from the preceding text “here I am, as a digital avatar, and here you are,” and it matches the type “cause/base” specified by the connective *so*. The expression “*let’s start,*” moreover, offers Proposition 2 of the type “result/consequence.”

Thus, we can find usages of *so* in all three of the domains discussed by Sweetser (1991) in the real-world examples from the corpus. The boundaries of the domains are not always evident in every case, however. For instance, consider (10).

(10) Okay, I’m going to give you a bit of a demonstration. Would you like to see that? I spent all the time setting this up, *so* I guess I should [TCSE 613 | Michael Pritchard: How to make filthy water drinkable].

Presumably, the most prominent domain of meaning involved in (10) is the epistemic domain. A possible underlying assumption is “the fact that I spent all the time setting this up makes me reasonably conclude that I should do my demonstration.” This interpretation gets strengthened when we notice the use of “I guess” in (10), which implies the indeterminacy of the proposition that follows.

However, it is also possible to regard the same utterance as involving the speech-act domain as well. In this interpretation of (10), the phrase “I guess I should” functions as an idiomatic speech-act expression where the speaker declares his/her decision as to what to do next. Note that it contains the modal auxiliary *should*, which is often associated with a speech act because of the high intensity of its deontic meaning (cf. Leech et al. 2009). It is more apparent in expressions such as “You should go to school!” or “We should be there without fail!” for instance.

Thus, the distinction of different domains is by no means always rigid. It is rather flexibly determined according to the context. For this to be possible, it is evident that the context should not be regarded as a part of the static structure of the connective construction. The architecture of

the SO construction in Figure 5.1 conforms to this observation: the CDS is not an integrated part of the construction but a separate entity given to the construction as an argument.

### 5.2.1.2 *Therefore*

The next discourse connective *therefore* resembles *so* in some respects. It specifies a type of “causal relation” between propositions. The connective requires that Proposition 1 be of the type “cause/base” and Proposition 2 of the type “result/consequence.” However, unlike the *so* construction, the type required for Proposition 1 in the *THEREFORE* construction has an additional constraint: it also must be “discoursal,” meaning that it has to be retrievable from explicitly presented discoursal content.<sup>4</sup> In other words, the search domain for the proposition retrieval in this construction is limited to the preceding text; it does not extend to non-linguistic elements

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<sup>4</sup> It should be noted that this type of constraint has been traditionally discussed in terms of the distinction between *syntactic control* and *pragmatic control* (Hankamer and Sag 1976). Pronouns, for instance, can be pragmatically controlled, meaning that they can refer to an element in non-discoursal context. Thus, in (i) below, the pronoun *it* at the end of Sag’s utterance successfully refers to the non-verbal act by Hankamer, which is explicated in the brackets. On the other hand, an utterance with a VP-deletion is not considered entirely acceptable, as in (ii), while an utterance with the identical formal properties is acceptable only if given an explicit antecedent in the discourse, as in (iii).

(i) [Hankamer attempts to stuff a 9-inch ball through a 6-inch hoop]

Sag: It’s not clear that you’ll be able to do *it*.

(ii) [Hankamer attempts to stuff a 9-inch ball through a 6-inch hoop]

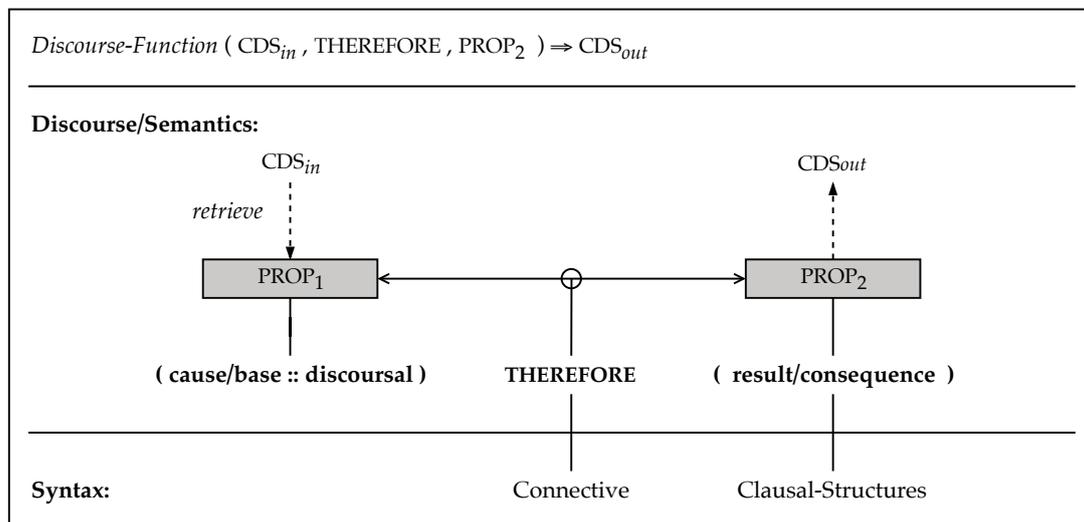
Sag: #It’s not clear that you’ll be able to.

(iii) Hankamer: I’m going to stuff this ball through this hoop.

Sag: It’s not clear that you’ll be able to.

(Hankamer and Sag 1976: 392)

surrounding the discourse event. Figure 5.2 illustrates these specifications and constraints for the THEREFORE construction.



*Figure 5.2: THEREFORE Construction*

Here are examples from Sweetser (1991).

- (11) a. The rules cannot be broken, *therefore* you will have to spend two hours collecting trash.  
 b. The rules cannot be broken, *therefore* the Dean knew some way around them that allowed him to hire John.  
 c. The rules cannot be broken, *therefore* "No."

(Sweetser 1991: 78–79)

Sweetser categorizes (11a) as an example in the content domain because it invites the understanding that "the rules' unbreakability causes your fate in the real world." (11b) is an example in the epistemic domain because the speaker of this utterance is naturally supposed to have made an inference such that "my knowledge of the rules' unbreakability causes my

conclusion that the Dean knew some workaround.” Lastly, (11c) is a usage in the speech-act domain because it can be paraphrased as “the rules’ unbreakability causes my act of saying ‘No.’”

Let us turn to utterances taken from the corpus. The following is an example of *therefore* in the content domain.

(12) Havana is a wonderful area. It’s quite free of commercial clutter: you don’t see our logos and brands and names, and *therefore* you’re alert to things physically [TCSE 613 | Michael Pritchard: How to make filthy water drinkable].

(12) can be paraphrased as “the cityscape of Havana being free of commercial clutter enables people walking in town to be alert to things physically,” thus associating it with the content domain. It also seems possible, however, to regard the same utterance as expressing the speaker’s epistemic view on the relation between propositions since the following paraphrase may not sound unnatural: “Havana being free of commercial clutter causes me to reasonably suppose you are alert to things in this city.”

Consider another example from the corpus.

(13) I’m going to give you an example of three of these tools through which to converse with the body. The first is cellular therapies. Clearly, we heal ourselves in a natural process, using cells to do most of the work. *Therefore*, if we can find the right cells and implant them in the body, they may do the healing [TCSE 142 | Alan Russell: The potential of regenerative medicine].

*Therefore* in (13) may be categorized as usage in the epistemic domain because it is the speaker’s inferential reasoning that leads him to connect Propositions 1 and 2. It is natural to make the supposition that “we heal ourselves in a natural process, using cells to do most of the work; it leads me to conclude that if we find the right cells and implant them in the body, they may do the

healing.” It also seems possible, however, to regard the conditional in Proposition 2 as just a real-world situation that would occur as a natural consequence of Proposition 1. This leads to an alternative reading “we heal ourselves in a natural process, using cells to do most of the work; hence, if we find right cells and implant them in the body, they may do the healing.”<sup>5</sup>

A similar type of ambivalence could often occur when attempting to categorize usages of *therefore* involving modus ponens, as in (14) below.

- (14) The myth that you hear about is, Americans have been told to eat less fat, the percent of calories from fat is down, Americans are fatter than ever, *therefore* fat doesn’t make you fat. It’s a half-truth. Actually, Americans are eating more fat than ever, and even more carbs [TCSE 377 | Dean Ornish: Healing through diet].

By definition, modus ponens must deal with logical relations outside the subjective views of a particular speaker or hearer of the discourse. In this respect, the usages of *therefore* involving modus ponens must not be purely epistemic. It is not quite right, however, to regard such examples as exclusively belonging to the content domain either, as the matters discussed in modus ponens may not be statements of facts in the real world per se. This is, in fact, another piece of supporting evidence for the argument that domains of meaning are not hard-coded in the structure of the discourse-connective construction or its sub-constructions but are determined more dynamically in context.

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<sup>5</sup> This ambiguity may have something to do with the fact that in scientific research, which is the theme of the text in (13), the process of “reasoning” is expected to be presented as “objectively” as possible. Accordingly, either of the two domains of meaning, the epistemic or content domains, can be given more prominence over the other.

The above discussion on modus ponens points to another interesting fact about *therefore*; that is, the propositions expressed along with the discourse connectives are not necessarily consistent with what the speaker himself/herself considers to be true.

(15) The standard creationist argument—there is only one; they’re all reduced to this one—takes off from a statistical improbability. Living creatures are too complex to have come about by chance; *therefore*, they must have had a designer. This argument of course, shoots itself in the foot [TCSE 113 | Richard Dawkins: Militant atheism].

One can reasonably infer that neither Proposition 1 (“living creatures are too complex to have come about by chance”) nor Proposition 2 (“they must have had a designer”) is consistent with the speaker’s belief about the theory of evolution. On the contrary, these propositions are, in fact, to be denied by the speaker, Richard Dawkins, an evolutionary biologist known for his outspoken atheism, in the course of the discourse. Nevertheless, the connective *therefore* is still able to establish a relation between the two propositions.

Speech-act usages of *therefore* are somewhat hard to find. One reason for this might have to do with the constraint on Proposition 1 in the THEREFORE construction that it must be “discoursal.” Though the type requirements and constraints for Propositions 1 and 2 are separate entities, the fact that the two must participate in a single relation inevitably imposes an additional requirement on Proposition 2 as well. As a result, an utterance with Proposition 2 manifested in the speech-act domain is less common because a speech act typically happens in the real world, not in the discoursal world. Presumably, Sweetser’s (1991) example of the usage of *therefore* in the speech-act domain in (11c), presented below as (16a), sounds rather exceptional for this reason. A more grammatically conventional way of conveying the same message as (11c = 16a) would be (16b).

(16) a. The rules cannot be broken, *therefore* “No.”

b. The rules cannot be broken, *therefore* the answer is “No.”

Let us turn to the issue of extraction of a proposition from inside a multi-layered embedding, as discussed in Chapter 4. Consider (17), an example of the usage of *therefore* where Proposition 1 resides in a subordinate clause embedded inside the matrix clause.

(17) I don't think the solutions that I proposed are good enough or smart enough. I think the big problem is that we're not smart enough to understand which of the problems we're facing are good enough. *Therefore*, we have to build super intelligent machines like HAL [TCSE 351 | Marvin Minsky: Health and the human mind].

From a purely logical perspective, there is more than one possibility regarding what to extract as Proposition 1 from the segment immediately preceding *therefore* in (17). One possibility is to retrieve what the matrix clause of (17) (“I think ...”) conveys; another is to retrieve the content of the second-level clause (“the big problem is ...”); and the other available option is to take the content of the innermost clause, (“we're not smart enough ...”). There are no formal requirements regarding from what level the proposition should be retrieved. Thus, the selection relies on inferential reasoning by the hearer. In the case of (17), however, the hearer would never fail to select the content of the innermost clause as Proposition 1 (“we're not smart enough ...”). Otherwise, the relation between the propositions does not make much sense.

Langacker (2008b) suggests that when the matrix clause consists of the first person pronoun and a psychological verb such as *think*, *believe*, or *know*, it is likely that the matrix clause functions as if it were an adverbial phrase modifying what follows, and that the embedded clause, on the other hand, behaves more like the core of the sentence. This phenomenon is relevant to the flexibility of proposition retrieval. The embedding clause composed by a first-person pronoun and

a psychological verb like the one in (17), *think*, tends to be less salient than the embedded clause, and the latter becomes a prominent target of proposition retrieval accordingly.<sup>6</sup>

### 5.2.1.3 *Because*

*Because* is different from *so* and *therefore* in that it introduces a proposition of the type “cause/base” instead of “result/consequence.” Thus, the configuration of the BECAUSE construction presents a mirror image of that of *so* and *therefore*, as shown in Figure 5.3.

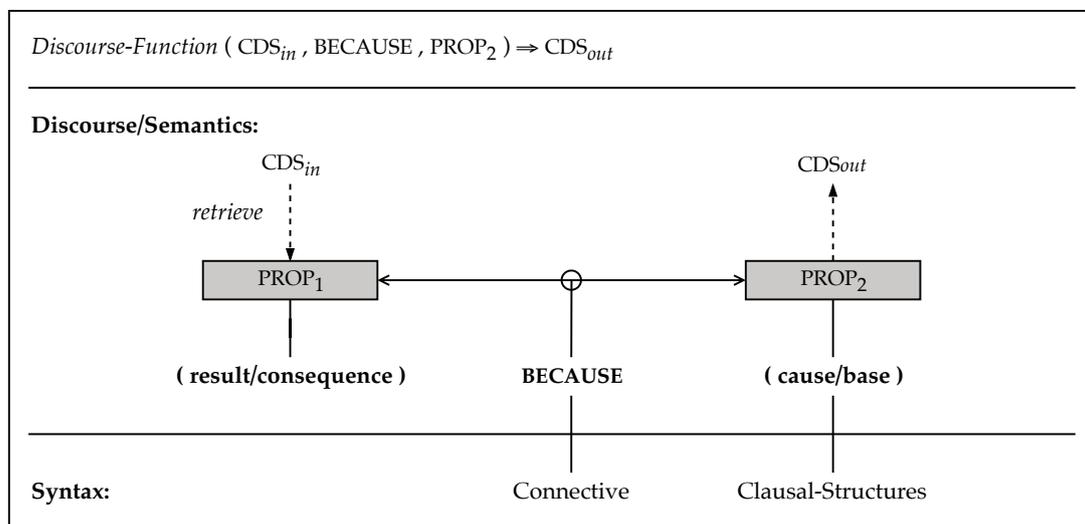


Figure 5.3: *BECAUSE* Construction

As is the case with *so* and *therefore*, Sweetser (1991) distinguishes three types of *because*.

Consider (18).

- (18) a. John came back, *because* he loved her.  
 b. John loved her, *because* he came back.

<sup>6</sup> See Krifka (2014) for a discussion on related issues from the standpoint of formal semantics.

c. What are you doing tonight, *because* there's a good movie on.

(Sweetser 1991: 77)

(18a) is an example in the content domain because it invites an understanding that "his love was the real-world cause of his coming back." (18b) is an example in the epistemic domain because it depends on the hearer making a natural inference that "the speaker's knowledge of John's return caused the conclusion that John loved her." (11c) is a usage in the speech-act domain because its natural interpretation requires an assumption such as "the *because*-clause gives the cause of the speech act conducted by the utterance of the main clause."

The data in the TED Corpus also contains the three usages of *because*. Here is an example in the content domain.

(19) And I get very emotional when I remember him *because* he was killed later in combat and we really miss him, but I wanted you all to see him, *because* he was really, really important. He gave us all the support to put up the first Christmas trees [TCSE 2126 | Jose Miguel Sokoloff: How Christmas lights helped guerrillas put down their guns].

(19) includes two instances of *because*. Both of them are usages in the content domain; Proposition 1 states an event/state that occurred as a real-world consequence of the event/state in Proposition 2. Notice that the concept of the domain of meaning discussed here refers to the region to which the causal relation is attributed, not the region to which the sense of the predicate verb belongs. Thus, even though the first instance of *because* in (19) accompanies the psychological verb *know*, that does not automatically mean the primary domain of meaning of this instance is epistemic.

The following is another example of *because* in the content domain.

(20) When the woman at the fundraising gala said "I'm so proud of you. It must be so hard teaching those poor, unintelligent kids," I bit my lip, *because* apparently we needed her

money more than my students needed their dignity [TCSE 2059 | Clint Smith: The danger of silence].

This example also contains an element reporting a mental state, “bit my lip,” though in a somewhat metaphorical fashion. Again, this does not automatically make the expression an instance of usage in the epistemic domain. Mental states are part of real-world phenomena, so they can be treated in the same fashion as many other events and states that tend not to be associated with one’s perception, feelings, or sentiment. Thus, the causal relation of the BECAUSE construction in (20) is regarded as rather belonging to the content domain.

The next example in (21), on the other hand, is one in the epistemic domain.

(21) This satellite covers the whole of Africa and goes back as far as 1984, and that’s important, *because* if you know how many times a place has had a drought in the last 30 years, you can make a pretty good estimate what the chances are of drought in the future, and that means that you can put a price tag on the risk of drought [TCSE 2065 | Rose Goslinga: Crop insurance, an idea worth seeding].

The reasoning of this categorization should be obvious. The two propositions take part in a relationship in which one proposition provides a sufficient amount of supporting evidence for the speaker to believe the content of the other. That is, the underlying assumption for (21) is something like this: “If you know how many times a place has had a drought in the last 30 years, you can make a reasonable estimate what the chances are of drought in the future, and this causes one to conclude that the satellite in operation since 1984 is important.”

Next, let us consider instances of *because* in the speech-act domain.

- (22) No movement, no growth. Claim your experience. Don't let it claim you, *because* if you do, I believe you will become trapped, you will not grow, you will not evolve [TCSE 2120 | Debra Jarvis: Yes, I survived cancer. But that doesn't define me].
- (23) Raise your hands if you've read *Don Quixote*. There we go. Smart audience. Who's read *Don Quixote*? Get them up. Okay, good, *because* I need somebody smart here because now I'm going to demonstrate with the help of one of you just how deeply rooted your urge to solve is, just how wired to solve all of you really are, so I'm going to come into the audience and find somebody to help me [TCSE 2027 | David Kwong: Two nerdy obsessions meet—and it's magic].

In both examples, Proposition 1 refers to an event that the speaker wishes to realize for a reason described in Proposition 2. In (22), the speaker gives a piece of advice, motivated by her belief about things that could happen to the hearers if they remain ignorant of it. In (23), Proposition 2 gives the motivation of the speaker's speech act of asking his audience to raise their hands.

Now, let us turn to examples of the types that are somewhat difficult to categorize unambiguously into one of the three domains. Consider (24) below.

- (24) I'd like to introduce you to an organism: a slime mold, *Physarum polycephalum*. It's a mold with an identity crisis, *because* it's not a mold, so let's get that straight to start with [TCSE 2048 | Heather Barnett: What humans can learn from semi-intelligent slime].

The usage of *because* in (24) is not a very typical one as it obviously contains a contradictory statement. The speaker refers to an organism and says, "it's a mold with an identity crisis," but then he continues, "because it's not a mold." The speaker uses a rhetorical strategy here in this utterance. A paraphrase of (24) would be "the fact that it is not technically a mold causes me to

say that the mold-like organism is a mold with an identity crisis.” The relation between the two propositions seems to involve both the epistemic and the content domain at the same time.

The next example in (25) is somewhat similar to the previous one.

(25) Now, I’m not boasting, because all of you have famous people and historical figures in your tree, *because* we are all connected, and 75 million may seem like a lot, but in a few years, it’s quite likely we will have a family tree with all, almost all, seven billion people on Earth [TCSE 2021 | AJ Jacobs: The world’s largest family reunion ... we’re all invited!].

Here, *because* introduces Proposition 2 to express the motivation for the speaker to have said Proposition 1, namely, that he is not boasting. As is the case for (24), the relationship between propositions in (25) cannot be categorized definitely as epistemic or content. A paraphrase of the relevant portion of (25) would be: “I can say I am not boasting, for there is no reason to boast considering that all of you have famous people and historical figures in your (family) tree as well.” The relationship between the two propositions rests both on a matter of fact and on inferential reasoning at the same time. It would even be possible, moreover, to say that it involves the domain of speech acts as well in that this utterance defines the intended effect of the previous statement. One of the common traits of speech-act expressions is a self-referencing structure with a meta-linguistic perspective whereby the expression itself defines the purpose and function of the utterance, as is often exemplified by performative sentences such as those of the form “I declare ...” or “I promise ...” among others. Proposition 1 of (25) is expressed in a construction of this type.

The above observation provides another piece of evidence for the argument that the domains of meaning are not hard-coded in the structure of the discourse-connective construction or its sub-constructions. Instead, domains of meanings are determined dynamically in the interaction between the context and the linguistic structures occurring as the discourse unfolds in a linear sequence of utterances.



connective construction, as exemplified in (26), than with the (non-fronted) connective construction (Quirk et al. 1985: 1107).<sup>7</sup>

- (26) a. *Since* the weather has improved, the game will be held as planned.  
b. *Since* you seem to know them, why don't you introduce me to them?

(Quirk et al. 1985: 1104)

Still, there are instances of *since* used with the non-fronted connective construction in the TED corpus. Furthermore, as is the case with other discourse connectives of causal relations discussed so far, the boundaries of the domains are not necessarily clear. Consider (27) below.

- (27) So what we wanted to do is look at this brain-wave component of face detection, the N170, and see if it changed at all as a function of where our participants were paying attention—to the scene or the face. And here's what we found. We found that when they paid attention to the face, the N170 was larger. And when they paid attention to the scene, as you can see in red, it was smaller. And that gap you see between the blue and red lines is pretty powerful. What it tells us is that attention, which is really the only thing that changed, *since* the images they viewed were identical in both cases—attention changes perception [TCSE 25837 | Amishi Jha: How to tame your wandering mind].

At first sight, it seems that the meaning of (27) belongs to the epistemic domain. Proposition 1 (“attention is really the only thing that changed”) is a sort of “conclusion” that the speaker has drawn from considering the content of Proposition 2 that must already have been shared with the hearer but is reiterated regardless. Moreover, the use of the phrase “the only thing that changed”

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<sup>7</sup> Similarly, the fronted construction is more frequently used than the non-frequent one with the concessive connective *although* and *though*, as reported in Schourup and Waida (1988: 211).

implies the speaker's perspective toward the event being evaluated and described. At the same time, however, (27) seems to involve the content domain as well. In the experiment mentioned in (27), an event actually took place in which subjects viewed the identical images multiple times, and then their levels of attention were detected and compared. Thus, Proposition 1 (“the result of the experiment tells that attention is the only thing that changed”) is a real-world consequence of what is expressed in Proposition 2 (“they viewed identical images in both cases”).

The above example, again, suggests that identifying the domain of meaning is not a matter of exclusively selecting one from many. Instead, multiple domains could co-exist simultaneously in an utterance. Only the relative prominence of respective domains varies dynamically according to the context.

Consider another example in (28).

(28) We will be forced to think in completely new ways. We’ll have to go back to our assumptions, and determine if there was a flaw somewhere. And we’ll need to encourage more people to join us in studying science *since* we need fresh eyes on these century-old problems [TCSE 2654 | James Beacham: How we explore unanswered questions in physics].

There are multiple ways to interpret the usage of *since* here. The text segment immediately preceding the connective, “we’ll need to encourage more people to join us in studying science,” could be read as meaning a real-world consequence of the fact presented in Proposition 2, “we need fresh eyes on these century-old problems.” There is a causal relation between them, regardless of the perspective or attitude taken, since it is always true that if we need something, then we will need to make efforts to obtain it. Having stated that, it also seems possible to regard (28) as an instance of the epistemic usage of *since*. Besides the intention to attract attention to the real-world relationship, the meaning of this utterance involves an intention to express the

speaker's own determination to do something about the situation stated in Proposition 2. The use of the modal auxiliary *will* increases the degree of prominence of this epistemic reading.

Here is an example in which meaning in the speech-act domain comes into play.

- (29) Why do we need rules on competition at all? Why not just let businesses compete? Isn't that also the best for us if they compete freely, *since* more competition drives more quality, lower prices, more innovation? Well, mostly it is. But the problem is that sometimes, for businesses, competition can be inconvenient, because competition means that the race is never over, the game is never won [TCSE 3367 | Margrethe Vestager: The new age of corporate monopolies].

Proposition 1 here is presented in the interrogative construction "isn't that also the best for us if they compete freely", and Proposition 2 plays the role of providing the reasoning for the speaker to ask this question. It might look like a typical example of a discourse connective in the speech-act domain. However, the question asked in (29) may not be a pure speech act of interrogation; rather, it could be regarded as a rhetorical question by which the speaker indirectly expresses her message. In that sense, *since* in (29) could be categorized as usage in the epistemic domain.

Thus, the discourse connectives of causal relation we have looked at here (*so, therefore, because, and since*) have usages that span the multiple domains of meaning discussed by Sweetser (1991). The boundaries of the domains, however, are not necessarily as clear as they first appear. This is consistent with what is suggested by the analysis of the structure of discourse connectives in the previous chapters.

### 5.2.2 Adversative Connectives

The second group of discourse connectives examined in this chapter is comprised of those that specify adversative relations. This category broadly includes not only antithetic relations but

also contrastive relations as well. This section focuses on the connectives of adversative relations *although, instead, and in contrast*.

### 5.2.2.1 *Although*

It is considered that adversative relations almost always retain an epistemic aspect of meaning (Sweetser 1991: Chapter 4). The rationale is as follows: when one compares or contrasts two elements, it is virtually unavoidable to make a somewhat subjective choice in picking one element over the other.<sup>8</sup> We can observe this trait of the adversative construction in a pair of examples of *although* in (30), where Proposition 1 and Proposition 2 are somewhat arbitrarily interchangeable.

- (30) a. No goals were scored, *although* it was an exciting game.  
b. It was an exciting game, *although* no goals were scored.

(Quirk et al. 1985: 1098)

Regarding this interchangeability, Quirk et al. (1985) state as follows.

Concessive clauses indicate that the situation in the matrix clause is contrary to expectation in the light of what is said in the concessive clause. In consequence of the mutuality, it is often purely a matter of choice which clause is made subordinate (Quirk et al. 1985: 1098).

The type specifications in the ALTHOUGH construction reflect the fact that the selection of one proposition over the other does not necessarily rest on absolute necessity. It is based on the

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<sup>8</sup> In Cognitive Grammar, the process of selecting a focal element in a linguistically described event has been traditionally discussed in terms of the distinction between *trajector* and *landmark*. See Langacker (1987a, 1990b).

speaker's immediate perception of the event in context. Figure 5.5 below presents the types of the two propositions: Proposition 1 is of the type "reference-relation," which is virtually equivalent to specifying nothing at all, while Proposition 2 is of the type "adversative-relation," which requires that the latter proposition be (metaphorically) located in a position opposed to that of Proposition 1.

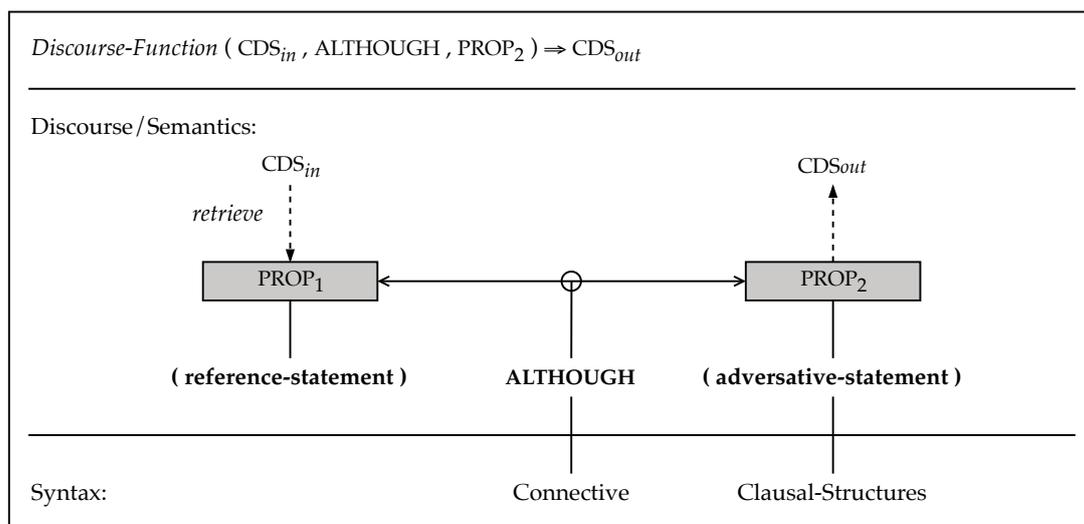


Figure 5.5: ALTHOUGH Construction

Although the epistemicity is almost always present in this construction, it does not mean that the adversative construction is quite exceptional in this regard. The present study assumes that different domains of meaning are immanent in every utterance and that categorization of usages only shows what particular domain is perceived as more prominent in an utterance. This is the case with adversative constructions as well as other connective constructions. The only difference is that adversative constructions tend to involve epistemicity to a higher degree compared to other constructions.

For the sake of convenience in the discussion that follows, let us summarize the underlying meaning of the usages in the three domains in (31) below.

(31) PROP<sub>1</sub>, *although* PROP<sub>2</sub>

a. **Content domain**

PROP<sub>1</sub> occurs/happens in spite of PROP<sub>2</sub>

b. **Epistemic domain**

I conclude PROP<sub>1</sub> is true in spite of the knowledge of the fact PROP<sub>2</sub>

c. **Speech-act domain**

I conduct a speech act of PROP<sub>1</sub> in spite of PROP<sub>2</sub>

Regardless of the difference of domains of meaning, *although* imposes some kind of limitation stated in Proposition 2 on the preceding proposition, Proposition 1. The following is an example of *although* in the content domain.

(32) The atmosphere on Mars is really thin—100 times thinner than on Earth—and it's not breathable, it's 96 percent carbon dioxide. It's really cold there. The average temperature is minus 81 degrees, *although* there is quite a range of temperature [TCSE 2476 | Stephen Petranek: Your kids might live on Mars. Here's how they'll survive].

The two propositions mediated by the connective are both facts in the real world. The epistemic aspect of the meaning of the construction is neither salient nor highly relevant here, even if it is not entirely backgrounded.

The next one is an example of the usage of *although* in the epistemic domain. It presents the fundamental nature of the connective more conspicuously.

(33) And just in case any of you still had that profit idea in your mind about how much those burial plots cost and how much money you might be able to make, they also warn that it might cause the value of your house to drop by 20 percent. *Although*, actually, it's more likely

that no one will want to buy your house at all after that [TCSE 2393 | Alison Killing: What happens when a city runs out of room for its dead].

Proposition 1 in (33) states what will supposedly happen if one creates a burial plot in his/her backyard—a sizeable decrease in the value of the property. Proposition 2 provides an additional comment regarding this point, telling the hearer that worrying about the value of the property is useless since people will not want to buy it in the first place. This message is considered to be a result of inferential reasoning based on commonsensical knowledge about the world, thus making the utterance highly epistemic.

Let us turn to another example involving the usage of *although* in the speech-act domain.

(34) So here are the consequences that are really quite intriguing: we're not always what seem to be, and that takes me to my next point. I should say, before getting to this, something about sexual intercourse, *although* I may not have time. And so, if you would like me to—yes, you would? OK [TCSE 2530 | Brian Little: Who are you, really? The puzzle of personality].

Proposition 1 in (34) is wrapped in the “I should” construction, which functions as a means to conduct an indirect sort of discursual speech-act of declaring what he/she does next. Proposition 2, on the other hand, presents a limitation to be kept in mind about what has just been declared in Proposition 1. Thus, the category of this instance of *although* in (34) is considered to be that of the speech-act domain. Notice, however, that it may also be possible to regard it as an instance of usage in the epistemic domain.

#### 5.2.2.2 *Instead*

*Although* specifies Proposition 1 to be the focus of the primary attention with Proposition 2 being an additional commentary on it. Conversely, *instead* has its focus on Proposition 2, which

provides an alternative proposition to that of Proposition 1.<sup>9</sup> As it is eventually overridden by Proposition 2, Proposition 1 is not only typed as a “reference-relation”; it is given an additional constraint that it must be “negatable.” Figure 5.6 shows the basic structure of the INSTEAD construction.

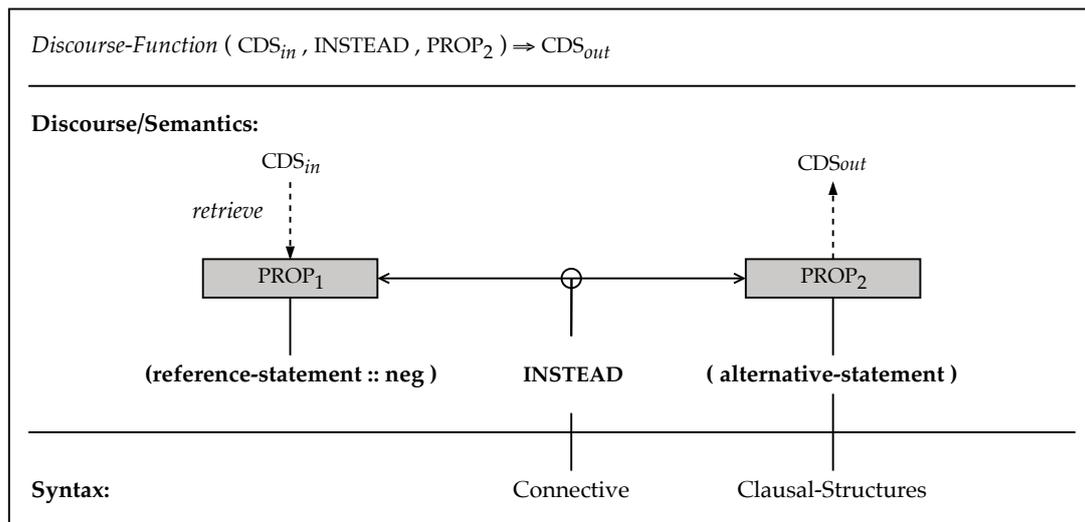


Figure 5.6: INSTEAD Construction

We can summarize the basic meaning of the usages of *instead* in the three domains as in (35). Notice, as is the case with *although*, that a certain amount of epistemicity underlies the INSTEAD construction, regardless of the prominent domain of meaning.

(35) PROP<sub>1</sub>, *instead* PROP<sub>2</sub>

a. **Content domain**

It is PROP<sub>2</sub> that occurs/happens, not PROP<sub>1</sub>

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<sup>9</sup> *In fact* originates from a prepositional phrase. We are not concerned with its historical development in the present study, however. See Himmelmann (2004) and Lewis (2011) for attempts to explicate the process of the emergence of *in fact* as a discourse connective.

**b. Epistemic domain**

PROP<sub>2</sub> is considered to be the case, while PROP<sub>1</sub> is not

**c. Speech-act domain**

I conduct a speech act of PROP<sub>2</sub>, not PROP<sub>1</sub>

For Proposition 2 to be an alternative to Proposition 1, the two must share a common—or at least comparable—set of semantic properties. However, the formal properties of the two propositions do not necessarily match. For instance, the two propositions have parallel formal properties in (36), whereas this is not the case in (37).

(36) So if you're attempting to multitask, you know, doing four or five things at once, you're not actually doing four or five things at once, because the brain doesn't work that way. *Instead*, you're rapidly shifting from one thing to the next, depleting neural resources as you go [TCSE 2834 | Manoush Zomorodi: How boredom can lead to your most brilliant ideas].

(37) The technology world cannot change the world of things. *Instead*, we need to create technology which changes makers of things, people who make your chairs and clothes and everything else, into makers of smart things, enable them to do that [TCSE 40637 | Ivan Poupyrev: Everything around you can become a computer].

In (36), Proposition 1 is represented by the phrase “you're not actually doing four or five things at once,” which is a belief to be negated afterward. Proposition 2, represented by the phrase “you're rapidly shifting from one thing to the next,” is the alternative. The two expressions are essentially isomorphic in terms of their formal properties. In (37), on the other hand, while Proposition 1 is expressed using *change* as an intransitive verb and the subject nominal *technology*, Proposition 2 is expressed using the predicate “need to change” along with the agent of the act, *we*, which is the subject nominal. Thus, the structures of Propositions 1 and 2 are not in parallel in terms of their formal properties. This pair of examples show that in the encoding and decoding of the discourse-

connective construction, the process of proposition retrieval plays a vital role: it extracts a proposition of the specified type from the preceding segment of text, no matter what formal structure it would take.<sup>10</sup>

Let us now turn to the usages of *instead* in the three domains of meaning. The following is an example of usage in the content domain.

- (38) Getting a college education is a 20-year investment. When you're growing up poor, you're not accustomed to thinking that far ahead. *Instead*, you're thinking about where you're going to get your next meal and how your family is going to pay rent that month [TCSE 2775 | Karim Abouelnaga: A summer school kids actually want to attend].

In (38), Proposition 2 is the result of neither inferential reasoning nor consideration; rather, it presents a matter of fact in the real world, though it inevitably retains an epistemic aspect of meaning to some extent due to the inherent nature of the construction.

The next example in (39) is a usage in the epistemic domain.

- (39) But we shouldn't expect this to happen automatically. Spending money helping others doesn't necessarily promote happiness. *Instead*, it matters how we do it. And if we want people to give more, we need to subvert the way we think about charitable giving. We need to create opportunities to give that enable us to appreciate our shared humanity [TCSE 39981 | Elizabeth Dunn: Helping others makes us happier—but it matters how we do it].

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<sup>10</sup> This does not mean formal parallelism does not matter in discourse involving *instead*. Rather, it is desirable for efficient and accurate interpretation of propositions connected with *instead* or any other discourse connectives for that matter. See Gutwinski (1976) for discussion on the role that structurally parallel expressions play in achieving cohesion in text consisting of multiple sentences.

In (39), the adversative relationship between Proposition 1 and Proposition 2 rests on the process of reasoning based on the information provided by the context. Note that the statement in Proposition 1 (“spending money helping others doesn’t necessarily promote happiness”) does not automatically ascertain the truth of the other statements in Proposition 2 (“it matters how we do it”). The degree to which the process of reasoning contributes to the overall meaning of this usage is high enough to justify our categorizing it as epistemic.

The following is an example of *instead* in the speech-act domain.

(40) Now, I can’t promise you’re going to end up with house plants. But the point of this story is that online dating doesn’t have to suck. Don’t treat it like a game, and don’t treat it like a resume review. *Instead*, use it to source and qualify leads and then get offline as quickly as possible with the zero date. Because the point of this isn’t swiping. It’s finding your person [TCSE 20083 | Christina Wallace: How to stop swiping and find your person on dating apps].

Propositions 1 and 2 are both expressed in the imperative constructions in (40). It is evident that this usage of *instead* involves the speech-act domain of meaning. Note also that Proposition 1 is expressed with negative imperatives, thus fulfilling the type requirement of the INSTEAD construction (“reference-relation::neg”).

Next, let us turn to yet another point of interest regarding the use of *instead*. The type of Proposition 1 in the INSTEAD construction is specified as “reference-relation::neg,” with the extra constraint “neg” at the end, but this does not mean that the expression corresponding to Proposition 1 necessarily includes a negation particle such as *not* and *no*. The relevant text segment meets this type-requirement even if it only invites a construal containing some kind of negation in the semantic/discoursal level. For example, consider (41).

(41) So in just a few years, we’ve gone from 20 seconds per image to 20 milliseconds per image, a thousand times faster. How did we get there? Well, in the past, object detection systems

would take an image like this and split it into a bunch of regions and then run a classifier on each of these regions, and high scores for that classifier would be considered detections in the image. But this involved running a classifier thousands of times over an image, thousands of neural network evaluations to produce detection. *Instead*, we trained a single network to do all of detection for us. It produces all of the bounding boxes and class probabilities simultaneously [TCSE 2829 | Joseph Redmon: How computers learn to recognize objects instantly].

The usage of *instead* in (41) requires a process of proposition retrieval that is accompanied by a certain amount of inferential effort. Since the text segment expressing Proposition 1 (“this involved running a classifier thousands of times over an image, thousands of neural network evaluations to produce detection”) does not contain any negation particles, proposition retrieval must be conducted with necessary adjustments in a way that it successfully fulfills the type requirement for Proposition 1 (“reference-relation: neg”). Only then is Proposition 2 (“we trained a single network to do all of detection for us”) appropriately understood to mean roughly as follows: Since the method mentioned above would involve too many detection procedures, we did not adopt it. *Instead*, we trained a single network to do all of detection for us.

As mentioned earlier, a multi-layered structure with embeddings does not block proposition retrieval. Nor does the level in which negation takes place matter too much. For instance, consider (42).

(42) Most people think that new technology or advanced technology can never start in Africa. *Instead*, they think that the best way to help the continent advance is by providing aid or services that the continent can’t provide for itself [TCSE 3694 | Keller Rinaudo: How we’re using drones to deliver blood and save lives].

In (42), the sentence immediately before the connective “most people think ...” cannot be understood as Proposition 1 as it stands. For the relation that *instead* specifies in (42) to be appropriately understood, proposition retrieval is imperative, extracting the content that can be expressed as “most people do not think new technology or advanced technology can start in Africa.”

The following example in (43) has a similar structure.

(43) With its small brain and flared pelvis, we would not have been surprised if the fossils turned out to be two million years old. *Instead*, the fossils dated to 235 to 336 thousand years, an incredibly young date for such a small-brained individual [TCSE 35353 | Juliet Brophy: How a new species of ancestors is changing our theory of human evolution].

Here, the proposition retrieval must be conducted from inside an embedded structure of the *if*-conditional. Then, it is understood such that Proposition 1 (“the fossils turned out to be two million years”) is negated and overridden by Proposition 2 (“the fossils dated to 235 to 336 thousand years”).

As discussed in Chapter 4, the mechanism of proposition retrieval is part of the fundamental architecture of the discourse-connective construction. The last two examples of *instead* provide another piece of evidence that this mechanism is operated in a highly flexible fashion, regardless of the formal properties of the relevant portion of the preceding discourse.

### 5.2.2.3 *In Contrast*

The discourse-connective construction itself does not entail any specification as to what domains of meaning are involved. Instances of the adversative connective construction, however, are almost always associated with the epistemic domain of meaning. This is due to the fact that the act of contrasting two elements relies on the mental process of (often metaphorically) viewing

objects. Such a viewing process presupposes a “perspective,” and the existence of a perspective inevitably implies epistemicity. The relation expressed by *in contrast* is among those that display this tendency to a high degree. Figure 5.7 presents the basic structure of the IN-CONTRAST construction.

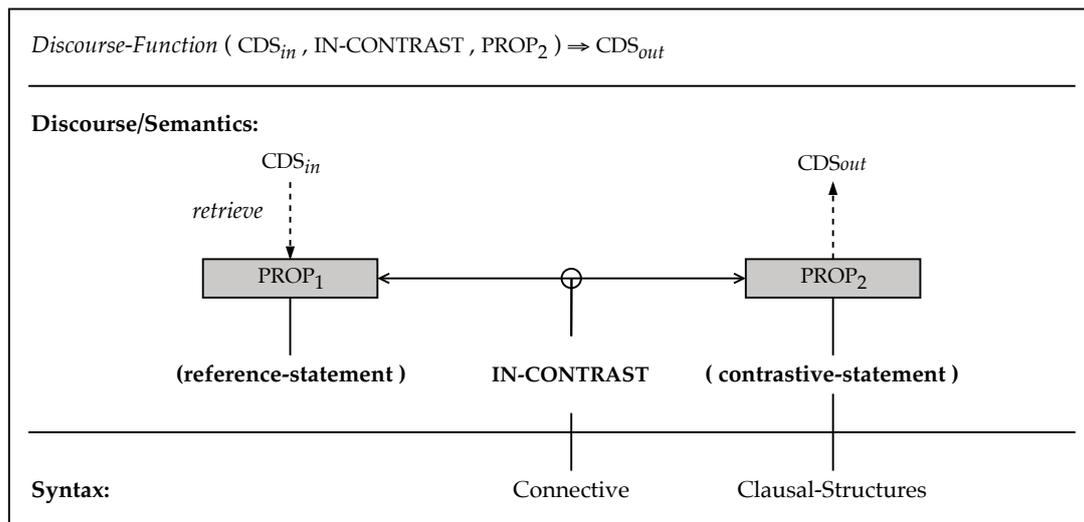


Figure 5.7: IN-CONTRAST Construction

Propositions 1 and 2 of the IN-CONTRAST construction are often presented with formal structures that are somewhat parallel to each other. The type of Proposition 1 (“reference-relation”) and that of Proposition 2 (“contrastive-type”) are interdependent, so the parallel structures help make the type-checking of the propositions easier. In (44) and (45) below, the two propositions are comparable not only semantically but also syntactically.

- (44) In the US, the average American spends three percent of their income on energy. *In contrast*, low-income and rural populations can spend 20, even 30 percent of their income on energy [TCSE 23129 | DeAndrea Salvador: How we can make energy more affordable for low-income families].

(45) Humans evolve slowly, with time to correct for issues in the interaction of humans and their environment. *In contrast*, artificial intelligence is evolving at an incredibly fast rate [TCSE 10360 | Margaret Mitchell: How we can build AI to help humans, not hurt us].

In (44), the syntactic constructions used for the two propositions are almost the same. In (45), though the verbal aspects are different, the choice of the verb is identical, and the overall formal realizations of the two propositions are basically homological.

Such formal correspondence is optional, however. *In contrast* does not necessarily require the propositions to be structured in a formally parallel fashion. Even if the formal properties are somewhat different between the two propositions, the contrastive relation holds as long as the semantic/discoursal types of the propositions match the ones specified. Consider (46) and (47) below.

(46) But I think UNICEF is just such a big, broad charity that it can be a little hard to envision how your own small donation will make a difference. *In contrast*, Spread the Net offers donors a concrete promise: for every 10 dollars donated, they provide one bed net to protect a child from malaria [TCSE 39981 | Elizabeth Dunn: Helping others makes us happier—but it matters how we do it].

(47) The first experiment—I walked around MIT and I distributed six-packs of Cokes in the refrigerators—these were common refrigerators for the undergrads. And I came back to measure what we technically call the half-lifetime of Coke—how long does it last in the refrigerators? As you can expect it doesn't last very long; people take it. *In contrast*, I took a plate with six one-dollar bills, and I left those plates in the same refrigerators. No bill ever disappeared [TCSE 487 | Dan Ariely: Our buggy moral code].

In (46), contrasted are the degrees of ease of envisioning how small donations to two organizations make a difference. The syntactic properties of the two propositions are different, but they are still

interpreted as taking part in a contrastive relationship. In (47), two experiments in a socio-psychological project differing in the value of a variable are contrasted. The procedure and the results of the first experiment are presented in detail, while the description of the second experiment is given very concisely. Still, the inferential reasoning that accompanies proposition retrieval finds the parallel structures in the two segments of the text.

There is another characteristic typically observed in many instances of the IN-CONTRAST construction. Proposition 1 and Proposition 2 in the construction tend to be in a relationship involving a positive/negative polarity. This is not surprising at all, considering the nature of the type requirements that a connective of adversative relations imposes on its propositions. Let us examine (48) and (49) below.

(48) As it turns out, there is a strong relationship between mind-wandering now and being unhappy a short time later, consistent with the idea that mind-wandering is causing people to be unhappy. *In contrast*, there's no relationship between being unhappy now and mind-wandering a short time later [TCSE 1607 | Matt Killingsworth: Want to be happier? Stay in the moment].

(49) What this means is that, if the police seize an iPhone and it has a password, they'll have a difficult time getting any data off of it, if they can do it at all. *In contrast*, the security of Android just really isn't as good [TCSE 2614 | Christopher Soghoian: Your smartphone is a civil rights issue].

These examples include negation particles: *no* in (48) and *not* in (49). The use of a particle of this kind makes a proposition automatically conform to a contrastive relationship. However, as some of the preceding examples of *in contrast* have already shown, such an explicit marking of polarity is not obligatory. The relation can be regarded as contrastive even if there is only a relative

difference that is large enough according to some standard shared between the speaker and the hearer. This is the case in (50) and (51) below.

(50) And if you now try to cram 100,000 chimpanzees into Oxford Street, or into Wembley Stadium, or Tienanmen Square or the Vatican, you will get chaos, complete chaos. Just imagine Wembley Stadium with 100,000 chimpanzees. Complete madness. *In contrast*, humans normally gather there in tens of thousands, and what we get is not chaos, usually [TCSE 2307 | Yuval Noah Harari: What explains the rise of humans?].

(51) If we look at the DNA variation among humans of different races from different continents, the actual DNA difference is only 0.1 percent. If we look at the genetic difference between humans, great apes, and rhesus macaques, that number is seven percent. *In contrast*, the genetic difference between HIV subtypes from different patients may be as much as 35 percent [TCSE 8786 | Edsel Salvaña: The dangerous evolution of HIV].

As mentioned repeatedly, the semantics of adversative connectives has much to do with perspectives. In this connection, it is worth noting that the use of the phrase “look at” in (51) reflects the speaker’s (supposedly semi-conscious) awareness of the nature of adversative relations. When comparing and contrasting multiple elements, we are not only just listing those elements but also virtually “viewing” them, shifting our attention from one to the other.<sup>11</sup> The mechanism of proposition retrieval proposed in the present study is consistent with this general fact.

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<sup>11</sup> Mental activities of this kind are considered to have much to do with linguistic phenomena often associated with theoretical concepts in cognitive linguistics such as *mental scanning* and *fictive motion*. See Langacker (1987a), Matsumoto (1996), and Matlock (2004) for descriptions and discussions on these concepts.

### 5.2.3 Connectives for Elaboration

The third category of discourse connectives discussed in this section is those that specify “elaborative relations” between propositions. The following examines the three connectives *in fact*, *in other words*, and *that is (to say)*.

#### 5.2.3.1 *In Fact*

Elaboration is one of the key aspects of discourse connectives. The connective *in fact* introduces a description that elaborates on a preceding proposition.<sup>12</sup> Proposition 1 of the IN-FACT construction is of the “reference-statement” type, and Proposition 2 has to be of the “evidence/support” type. In addition, the latter type is modified with the additional constraint “new,” specifying that the proposition presented as evidence or support for the referential element is the one newly introduced to the discourse, often producing a rather strong effect comparable to that of an adversative connective (cf. Oh 2000; Aijmer 2013).<sup>13</sup> Figure 5.8 illustrates the basic structure of the construction.

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<sup>12</sup> In the present study, we do not differentiate between connectives consisting of a single word and those consisting of multiple words. See Schwenter and Traugott (2000) and Traugott and Dasher (2002) for the historical development of *in fact* as a modal adverb as well as a discourse marker.

<sup>13</sup> Schourup and Waida (1988) argue that the central function of *in fact* is to “strengthen” what has just been said. They state that what *in fact* indicates is not emphasis itself but rather the existence of the “relationship of strengthening” between two propositions. Their argument rests on the observation of usages like (i) and (ii) below.

(i) I don’t plan to marry Sam. *In fact*, I dislike him intensely.

(ii) No more cake for me, please. *In fact*, I’ll be lucky if I can finish this piece.

(Schourup and Waida 1988: 65)

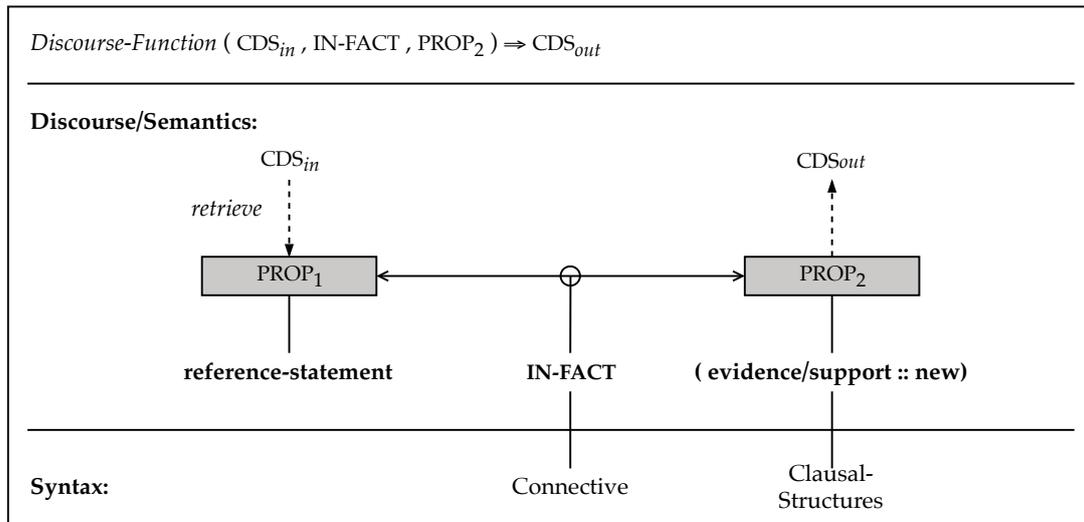


Figure 5.8: *IN-FACT Construction*

(52) and (53) below are typical examples of *in fact* from the corpus. In both examples, the elaborative information provided in Proposition 2 is new to the discourse.

(52) From North America to Europe to China to Japan, there's actually been a consistent decline in birth rates. *In fact*, over the past 50 years, the global fertility rate has halved [TCSE 40635 | Wajahat Ali: The case for having kids].

(53) And insufficient resilience in the face of a significant enough stressor, can result in a psychiatric disorder, such as depression. *In fact*, most cases of major depressive disorder are

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The analysis of Schourup and Waida (1988) makes sense considering that not only does Proposition 2 in (i) and (ii) emphasize what has been said in Proposition 1, it also introduces a fact that refers to a point higher in a certain scale that Proposition 1 implies. The analysis of the present study is basically consistent with that of Schourup and Waida (1988), though the term “strengthening” is not adopted here due to the lack of a theoretical definition of what it actually means.

initially triggered by stress [TCSE 19831 | Rebecca Brachman: A new class of drug that could prevent depression and PTSD].

As a result of this requirement regarding the newness of the elaborative information, Proposition 2 of the IN-FACT construction often comes as a kind of surprise to the hearer (Fraser and Malamud-Makowski 1996, Schwenter and Traugott 2000). This “surprising” factor is sometimes rather explicit, as in the following example.

(54) An interesting one: birds also love and date just like us humans. *In fact*, you’ll be surprised to know that males dress to impress the women, and I’ll show you how. So here we have a long-tailed widowbird, and this is how they would normally look. But when it comes to the breeding season, everything changes, and this is how he looks [TCSE 3590 | Washington Wachira: For the love of birds].

In (54), “you’ll be surprised to know” does not add much to the semantic content of Proposition 2, but since *in fact* itself contains an aspect of meaning to the same effect, adding this phrase enhances this aspect of the meaning in what follows in Proposition 2.

The next example is also interesting in that the “surprising” aspect of Proposition 2 goes hand-in-hand with an intentional effort to extend imagination motivated by Proposition 1.

(55) So there’s an obvious idea (= combining direct democracy with software agents) that maybe we want to consider. But I understand that in this day and age, this idea might be quite scary. *In fact*, thinking of a robot coming from the future to help us run our governments sounds terrifying [TCSE 32267 | César Hidalgo: A bold idea to replace politicians].

In (55), Proposition 2 not only introduces a new fact to the discourse but also makes that very fact come into being by provoking the imagination in association with what has been just said as Proposition 1. A similar type of usage of *in fact* appears in (56) as well.

(56) You know, software engineers and real estate developers think differently—really differently: different values, different time frames—time frames is a big one—and different jargon, different language. And so they don't always see eye to eye. I think this is a bigger problem than most of us realize. *In fact*, I think professional culture clash is a major barrier to building the future that we aspire to build [TCSE 13517 | Amy Edmondson: How to turn a group of strangers into a team].

In (56), Proposition 1 states that the discrepancy between the cultures of software engineers and real estate developers is a real problem. Proposition 2, then, further emphasizes this point by referring to it as a “culture clash” and calling it a “major barrier” to building the aspired-to future. Here, both propositions are based on the speaker's construal. The newness of Proposition 2 is brought about by describing the problem currently discussed using words implying an even higher degree of seriousness.

More typical than these examples, though, are instances of *in fact* that rely on external facts known already to both interlocutors. There is a subtype of *in fact* that includes a report-like expression referring to a fact that provides evidence for the message conveyed by Proposition 1.<sup>14</sup> Consider (57).

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<sup>14</sup> Meinunger (2006) suggests that a proposition embedded in a report-like matrix structure can be considered to be part of the speaker's belief and, accordingly, the whole structure functions as an assertion of the embedded proposition. Following this observation by Meinunger, Krifka (2014) argues that if the subject of the sentence is a trusted source, the speaker can make a speech-act of assertion, acting the role “as a proxy for that other source” (Krifka 2014: 81).

(57) Well, let me put it to you this way: the year *Jaws* came out, Americans suddenly started listing “sharks” among their top 10 major fears. In 1995, BMW paid the James Bond franchise three million dollars to have James Bond switch from driving an Aston Martin to a BMW Z3. That one move caused so many people to go out and buy that car, that BMW made 240 million dollars in pre-sales alone. The year that *Brave* and *Hunger Games* came out, female participation in archery went up 105 percent. *In fact*, studies show that the movies you watch don’t just affect your hobbies, they affect your career choices, your emotions, your sense of identity, your relationships, your mental health—even your marital status [TCSE 2890 | Naomi McDougall Jones: What it’s like to be a woman in Hollywood].

The formal properties of Proposition 1 in (57) are somewhat complicated, and the propositional content needs to be extracted from a fairly wide range of text segments preceding the connective. The point, however, can be roughly summarized as this: movies could change people’s thoughts and behaviors. Then, the speaker of (57) tries to reinforce her argument by referring to *studies* in Proposition 2, introducing a piece of new supporting evidence for Proposition 1.

The actual ways in which Proposition 2 can be presented in this reporting style may vary widely. In (58), for instance, a rather periphrastic way of referring to external evidence is used.

(58) In libraries across the country that charge fines, the poorest neighborhoods have the most number of people blocked from use. *In fact*, the Colorado State Library was so worried about this, they published a white paper and they stated unequivocally that it’s the fear of fines that keeps poor families out of libraries [TCSE 27750 | Dawn Wacek: A librarian’s case against overdue book fines].

Proposition 1 of (58) mentions a nationwide problem that many libraries in the United States are confronting. The credibility of this problem is endorsed by Proposition 2, which newly introduces relevant research on the problem conducted by the Colorado State Library.

There is another notable variation of *in fact*. In the following examples, a supporting fact in Proposition 2 happens to be a process or situation in which the speaker himself/herself is directly involved. Consider (59) and (60) below.

(59) I'm a first-generation American. Both of my parents are immigrants. *In fact*, my father, Gabriel, came to the US almost 50 years ago [TCSE 15284 | Michael Rain: What it's like to be the child of immigrants].

(60) And some of those cells have to divide thousands of times. *In fact*, even as I stand here before you, all throughout my body, cells are furiously replenishing to, well, keep me standing here before you. So every time a cell divides, all of its DNA has to be copied, all of the coding DNA inside of those chromosomes, because that carries the vital operating instructions that keep our cells in good working order, so my heart cells can keep a steady beat, which I assure you they're not doing right now, and my immune cells can fight off bacteria and viruses, and our brain cells can save the memory of our first kiss and keep on learning throughout life [TCSE 2868 | Elizabeth Blackburn: The science of cells that never get old].

Such immediacy of the process or situation presented in Proposition 2 to the speaker of the utterance is consistent with the semantic requirements of the IN-FACT construction. The "newness" of the proposition will be somewhat emphasized, all the more for the reason that it has been kept untold to the hearer until it is revealed in the utterance. It must be so because, after all, the very person relevant to the topic discussed has been right there from the beginning.

Lastly, it can be pointed out that the discourse-connective construction of elaboration resembles that of adversative relations (discussed in 5.2.2) in that the relation between propositions almost always retains the epistemic aspect of meaning. This stands perfectly to reason, considering that an elaboration is an intentional act of making what has already been said even more precise or more transparent to the hearer: it requires the speaker to be consciously aware of

the CDS and his or her perspectives to it. Thus, even though many of the examples of *in fact* observed so far may seem to be usages in the content domain, some degree of epistemicity is immanent. It is even possible for this epistemicity to be somewhat explicitly expressed. For instance, consider (61) and (62).

(61) Skilled or unskilled, all are welcome. *In fact*, part of the charm and the innovation of the work here is that so many makers aren't artists at all, but scientists or engineers or welders or garbage collectors, and their works cross disciplinary boundaries, from a grove of origami mushrooms that developed out of the design for a yurt to a tree that responds to the voices and biorhythms of all those around it through 175,000 LEDs embedded in its leaves [TCSE 20757 | Nora Atkinson: Why art thrives at Burning Man].

(62) So it is beginning to occur to me that waiting for Hollywood to grow a conscience may not actually be a winning strategy. *In fact*, it seems to me that whenever there is a small, ruling class of people who have all of the money and power and resources, they're not actually that excited about giving it up [TCSE 2890 | Naomi McDougall Jones: What it's like to be a woman in Hollywood].

Notice that in both examples (61) and (62), Proposition 1 is embedded in the matrix clause presenting a specific perspective toward it. In (61), Proposition 2 states the idea that "so many makers aren't artists at all." This proposition is embedded inside the speaker's somewhat subjective evaluation expressed by the phrase "part of the charm and the innovation of the work here is." In (62), Proposition 2 states that "people having money, power, and resources do not give them up easily." This is embedded in the matrix clause "it seems to me that." These examples illustrate the immanent epistemicity in the relationship between propositions mediated by *in fact*. Embedding the proposition in an expression showing the speaker's perspective to it fits this characteristic of the connective *and*, thus, makes it more revealing as a result.



The connective *in other words* is used to guide the interpretation of the preceding proposition in relation to the purpose of the current discourse. It often functions as a means to provide a summary of that which the previous discourse has expounded, as is the case in (63) and (64) below.

(63) There's a part of our brain that would like to know our mistakes and like to look at our weaknesses so we could do better. I'm told that that's the prefrontal cortex. And then there's a part of our brain which views all of this as attacks. I'm told that that's the amygdala. *In other words*, there are two you's inside you: there's an emotional you and there's an intellectual you, and often they're at odds, and often they work against you [TCSE 2859 | Ray Dalio: How to build a company where the best ideas win].

(64) But by 2050, it will affect 150 million people—which, by the way, will include many of you. If you're hoping to live to be 85 or older, your chance of getting Alzheimer's will be almost one in two. *In other words*, odds are you'll spend your golden years either suffering from Alzheimer's or helping to look after a friend or loved one with Alzheimer's [TCSE 2340 | Samuel Cohen: Alzheimer's is not normal aging—and we can cure it].

The reformulation provided by Proposition 2 in this construction may introduce an epistemic ground for what has already been given in Proposition 1. The following example in (65) explicitly presents the epistemicity of Proposition 2 with the phrase "it seems that."

(65) We discovered that averaging the answers of the groups after they reached consensus was much more accurate than averaging all the individual opinions before debate. *In other words*, based on this experiment, it seems that after talking with others in small groups, crowds collectively come up with better judgments [TCSE 4669 | Mariano Sigman and Dan Ariely: How can groups make good decisions?].

Note also that usages of *in other words*, or connectives of reformulation in general, are necessarily “discursive,” since using a connective of this kind is an effort on the side of the speaker to convey a message as accurately as possible in the linear development of the discourse. For the same reason, utterances involving *in other words* could take on some speech-act nature, though of varying degrees. Consider (66) and (67) below.

(66) But what about those more dynamic and unpredictable situations that we now increasingly face? I think in addition to the mechanical thinking, we now need to master the art of biological thinking, as embodied by our six principles. *In other words*, we need to think more modestly and subtly about when and how we can shape, rather than control, unpredictable and complex situations [TCSE 2549 | Martin Reeves: How to build a business that lasts 100 years].

(67) So when people talk about saving bees, my interpretation of that is we need to save our relationship to bees, and in order to design new solutions, we have to understand the basic biology of bees and understand the effects of stressors that we sometimes cannot see. *In other words*, we have to understand bees up close [TCSE 2249 | Anand Varma: The first 21 days of a bee’s life].

Proposition 2 in (66) and (67) contains an expression that implies an obligation to conduct a particular act (“we need to” and “we have to,” respectively). Thus, *in other words* here not only suggests a paraphrase of what Proposition 1 already stated but also provides a way to translate it into a suggestion for a concrete act. (68) below contains an example of *in other words* in the speech-act domain, presented in an even more straightforward fashion.

(68) There’s a quote that I keep coming back to, by Saint-Exupéry. He’s the author of *The Little Prince*. He said, “If you want to build a ship, don’t drum up your men to collect wood and give orders and distribute the work. Instead, teach them to yearn for the vast and endless

sea." *In other words*, I claim, if we really want to improve our judgment as individuals and as societies, what we need most is not more instruction in logic or rhetoric or probability or economics, even though those things are quite valuable [TCSE 2537 | Julia Galef: Why you think you're right—even if you're wrong].

Proposition 2 in (68) is embedded in the matrix clause "I claim." It is a typical expression of a speech act of argumentation. Thus, it can be said that as is the case with the discourse connectives of causal relations discussed in 5.2.1, the usages of the IN-OTHER-WORDS construction span the three different domains of meaning: the content domain, epistemic domain, and speech-act domain.

The above is also the case with the other connective of reformulation, *that is (to say)*. The following is an example of *that is (to say)* in the content domain.

(69) First, almost all of us today get a high school diploma. *That is*, we've gone from four to eight years of education to 12 years of formal education, and 52 percent of Americans have actually experienced some type of tertiary education [TCSE 1828 | James Flynn: Why our IQ levels are higher than our grandparents'].

The relation between the two propositions in (69) does not include much of a trace of epistemic reasoning; Rather, Proposition 2 states the real-world entailment of the fact presented in Proposition 1. In the next example, on the other hand, the epistemic domain of meaning plays a more prominent role.

(70) Steve Sillett, when he was a 19-year-old college student at Reed College, had heard that the Redwood forest canopy is considered to be a so-called Redwood desert. *That is to say*, at that time it was believed that there was nothing up there except the branches of Redwood trees [TCSE 409 | Richard Preston: The mysterious lives of giant trees].

Proposition 1 in (70) states a real-world fact regarding people's belief about the flora of the region in question ("the Redwood forest canopy is considered to be a so-called Redwood desert"). However, the motivation for the wording used in the segment in question is not clear enough to the hearer, so the speaker provides follow-up information using the reformulative construction with the intention to provide background information for Proposition 1. Thus, Proposition 2 here is not just a straightforward paraphrase of Proposition 1; rather, it is a rhetorical device meticulously prepared for the hearer to be able to find the same inferential path that the speaker has taken before the utterance of Proposition 1.

Lastly, the following example in (71) contains *that is to say* in the speech-act domain.

(71) And so I'm going to tell you the answer to that question. First, good news: you don't have to become a triathlete to get these effects. The rule of thumb is you want to get three to four times a week exercise minimum 30 minutes an exercise session, and you want to get aerobic exercise in. *That is*, get your heart rate up [TCSE 10362 | Wendy Suzuki: The brain-changing benefits of exercise].

The text in (71) is a segment of a talk about the positive effects of exercise on the brain. In this text, Proposition 1 states what it is recommended to practice in order to benefit from those effects. Proposition 2 does not just restate this using a different set of expressions. Instead, it translates the statement in Proposition 1 into a speech act of a simple command or invitation. Note, however, that the relationship between the two propositions here cannot be categorized exclusively into one domain of meaning. Proposition 2 ("get your heart rate up") does several things all at once. Other than making a direct suggestion, it summarizes what has been said already and also indicates the reason why such-and-such activities are recommended by relating the desired effect of doing them.

Thus, although the connective of reformulation *that is to say* has usages in all three domains of meaning discussed by Sweetser (1991), the boundaries between the domains are not necessarily

clear, just as many examples in this chapter have already revealed. The distinction among domains of meaning is often a matter of degree, suggesting that it is not hard-coded either in the discourse-connective construction or its subtypes. Instead, each of the domains of meaning is immanent in every usage of a discourse connective. Only as a result of interaction between the context and the details of a particular construction does the distinction appear more or less prominently. This is precisely what was pointed out in the discussions on the structure of discourse connectives presented in the preceding chapters.

### **5.3 Summary of Chapter 5**

In this chapter, we verified the validity of the analysis of the discourse connective construction in the previous chapters by examining actual examples from the TED corpus, a corpus of spoken English in presentations of TED Talks. Although different types of connectives have distinct meanings, all of them share the same basic structure characterized by the following three properties. First, each includes a relationship between two propositions. Second, one of the propositions resides in the CDS. Third, the propositions are of particular types that are specified by the connective used in the utterance.

This chapter has also shown that the three domains of meaning proposed by Sweetser (1991) elucidate a wide range of meanings of discourse connectives. The content domain, the epistemic domain, and the speech-act domain are all relevant to the usages of discourse connectives examined here. It should be kept in mind, however, that there are no strict boundaries between the domains. The three domains are, in fact, immanent in every usage of a discourse connective. The apparent distinction among different domains is due to the relatively high degree of prominence that one of these domains happens to attain. These degrees of prominence are not

hard-coded in either the discourse-connective construction or its subtypes. Instead, they are determined dynamically in the interaction between constructions and the context.<sup>16</sup>

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<sup>16</sup> The thesis that the relative prominence of domains of meaning can change dynamically must have strong relevance to Traugott's (1989) unidirectional theory, which describes general tendencies in historical changes of meaning:

(i) Tendency I: Meanings based in the external described situation > meanings based in the internal (evaluative/perceptual/cognitive) described situation.

Tendency II: Meanings based in the external or internal described situation > meanings based in the textual and metalinguistic situation.

Tendency III: Meanings tend to become increasingly based in the speaker's subjective belief state/attitude toward the proposition.

(Traugott 1989: 34–35)

Further exploration of this association is undoubtedly promising. However, the present study limits itself to a rather synchronous perspective.

## Chapter 6

# Inference and Discourse Connectives

This chapter investigates the inferential processes involved in the usages of discourse connectives. It shows that the encoding and decoding of discourse connectives more or less require inferential reasoning that is similar to that needed in the processes called *type coercion* (Pustejovsky 1995; De Swart 1998; Michaelis 2004; Boas 2011; Croft 2012). When two elements co-occur in an utterance, one of the elements may constrain the type of the other element. Failure to observe such type constraints, however, does not always result in type errors. There are cases in which utterances are still adequately understood thanks to type coercion, which shifts the type of the element into the desired one. Though the concept of coercion has been treated as if it were a phenomenon existing only at the sentence level in previous studies, this chapter shows that it occurs at the level of discourse as well.

In the first half of this chapter, we look at different approaches to coercion. First, the concept of coercion in Generative Lexicon (Pustejovsky 1995, 2005, 2011), a semantic framework based on Generative Grammar, is introduced. Generative Lexicon has an affinity with cognitive linguistics in that it focuses on linguistic phenomena that are often considered somewhat peripheral, such as nominal expressions involving metaphor and metonymy. According to Generative Lexicon, the meaning of utterances is not given simply as a composition of individual items; rather, it is dynamically generated in the process of making gradually larger linguistic units. This is partly consistent with the basic idea of the present study. However, Generative Lexicon assumes that discourse-level phenomena should be rigidly distinguished from semantic phenomena. This conflicts with the fundamental assumption of the present study. Thus, we adopt, instead, the

constructionist approach to coercion in an attempt to clarify the inferential processes involved in utterances with discourse connectives.

The second half of this chapter proposes a general principle regarding the inferential processes that underlie the use of discourse connectives, using the Override Principle proposed by Michaelis (2004, 2005) as the theoretical basis. We also examine actual examples of the usages of discourse connectives involving various types of coercion. Then, at the end of this chapter, a conclusion is presented regarding the central functions of discourse connectives. Discourse connectives provide partial guidance as to the way two propositions in the discourse should be related. It is “partial” because there is no guarantee of a perfect match between the propositions and the types specified by the actual connective used in the utterance. The propositions may have to be “coerced” by inferential reasoning so that the overall structure conforms to such specifications.

## 6.1 Approaches to Coercion

### 6.1.1 Generative Approach

Coercion is triggered when the semantic type of a lexical item conflicts with the requirements for it imposed by some other element in the context. One of the most typical examples of coercion involves a shift of the aspectual type of the predicate verb. Consider (1) below.

- (1) a. My program *ran* for a few minutes.  
b. My program *ran* in less than four minutes (this morning).

(De Swart 1998: 360)

The type of the verb *ran* in (1) is originally atelic, i.e., the meaning of the verb does not have in itself the concept regarding a point of time when the event ends. However, in (1a), the duration of

the event is specified by the prepositional phrase “for a few minutes,” and the sentence as a whole implies the concept regarding the end of the event as a result. In (1b), the amount of time that elapsed before the event begins is specified by prepositional phrase “in less than four minutes.” As a result, the verb *run* in (1b) acquires an inchoative aspect, meaning that the sentence implies the concept of the very beginning of the event, which is not included in the inherent part of the verb’s semantics. In both examples, the semantic type of the verb shifts from one to another in response to the cue provided by the co-occurring oblique element representing a particular time concept.

The following examples in (2) involve similar phenomena.

- (2) a. Suddenly, I *knew* the answer.  
b. I *read* a book for a few minutes.  
c. John *played* the sonata for about eight hours.  
d. For months, the train *arrived* late.

(De Swart 1998: 360)

In (2a), due to the indirect specification of the starting point by the adverb *suddenly*, the state verb *know* is coerced into an inchoative verb, a verb representing the concept of an event implying a particular time of beginning. In (2b), the verb *read* is coerced into an ongoing process, i.e., a limited part of the whole process of reading the book. In (2c), on the contrary, the event represented by *play* is coerced from an act into a state. As a result, the sentence is interpreted to mean a particular pattern of action repeated again and again. Lastly, in (2d), the event represented by *arrive*, a telic action verb, imposes a habitual reading due to its co-occurrence with “for months,” indicating the duration of time.

In his theory of Generative Lexicon, Pustejovsky (1995) defines the concept of type coercion as follows.

(3) **Type coercion**

A semantic operation that converts an argument to the type which is expected by a function, where it would otherwise result in a type error.

(Pustejovsky 1995: 59)

Pustejovsky (1995) employs a method of describing the composition of linguistic elements as a function application. The concept of a function here refers to an element that takes any number of arguments while imposing constraints on them. Among other syntactic categories, verbs are the most typical examples of functions, as exemplified by the examples in (4).

- (4) a. Mary *began* to read the novel.  
b. Mary *began* reading the novel.  
c. Mary *began* the novel.

(Pustejovsky 1995: 32)

The transitive verb *begin* is a function taking two arguments: one for the subject and the other for the object (in a broader sense). The verb imposes type requirements for these arguments. The subject argument must be an agentive entity that can initiate an event—thus, it typically turns out to be an animate entity. The object argument, on the other hand, is required to be an event initiated by the subject element. Now, the first two examples in (4) contain an expression that explicitly refers to an event of *reading*. However, in (4c), the argument given to the verb *begin* is “the novel,” which does not refer to an event, at least by itself. The element “the novel” is coerced into an element of the event type. Only then is (4c) read as having more or less the same meaning as (4a) and (4b).

Pustejovsky argues that a semantic theory must be able to answer the question of how such coercion takes place in the process of composing phrasal structures out of lexical items while criticizing the approach that has enjoyed popularity regarding this question (Pustejovsky 1995: Chapter 3). This approach, which Pustejovsky calls *sense enumeration lexicon* (SEL), attempts to account for different usages of a lexical item by assuming that there are as many different senses of the lexical item. It cannot explain, however, all the innumerable numbers of meanings of the lexical item that are slightly different from each other. Nor does it explain the cognitive mechanism behind all those usages of a lexical item.

Instead, Pustejovsky regards lexical items as building blocks from which intended meaning is “generated” as they combine in a higher-order organization of linguistic structures. In his discussion regarding the actual mechanism of his non-SEL theory of word composition, Pustejovsky stipulates that there are four levels in lexical information, as listed in (5) below.

(5) Four Levels of Lexical Information

a. **Lexical typing structure**

giving an explicit type for a word positioned within a type system for the language

b. **Argument structure**

specifying the number and nature of the arguments to a predicate

c. **Event structure**

defining the event type of the expression and any subeventual structure it may have with subevents

d. **Qualia structure**

a structural differentiation of the predicative force for a lexical item

(Pustejovsky 2005: 1)

Lexical typing structure in (5a) is a level in which the type of an individual lexical item is determined vis-a-vis the network of types of other lexical items. The network includes the hierarchical structure based on inheritance between elements. In other words, the lexical typing structure specifies paradigmatic relationships of a word (Saussure 1916). Argument structure in (5b) is somewhat self-explanatory. In a word, it specifies the syntagmatic structures of a lexical item. Event structure in (5c) concerns broad types of events that are represented by the lexical item. Among the types of this sort include STATE, PROCESS, and TRANSITION (Pustejovsky 1995: 61). The fourth level in (5), qualia structure, is one of the most prominent features of Generative Lexicon. It is the level in which the intensional (instead of extensional) definition of an element is determined. A qualia structure consists of the four qualia roles listed in (6).

(6) Qualia structure

a. **FORMAL**

the basic category which distinguishes the meaning of a word within a larger domain

b. **CONSTITUTIVE**

the relation between an object and its constituent parts

c. **TELIC**

the purpose or function of the object, if there is one

d. **AGENTIVE**

the factors involved in the object's origins or "coming into being"

(Pustejovsky 2005: 2)

In plain terms, the definitions of qualia roles in (6) can be paraphrased as follows: if a lexical item  $\alpha$  is to be explained, a FORMAL role states "what  $\alpha$  is"; a CONSTITUTIVE (or CONST for short) role states "what  $\alpha$  is made of"; a TELIC role states the "function of  $\alpha$ "; and an AGENTIVE role states "how  $\alpha$  came into being."

Now, let us apply these concepts to the analysis of actual expressions. Consider (7) below, which is structurally identical to (4c) above.

(7) She began *the book*.

The nominal *the book* here is understood to refer to a process rather than an object. Pustejovsky (2005) states that the encoding and decoding of such a sentence are conducted successfully without causing a type error due to coercion that shifts the type of the nominal appropriately. Coercion does not occur freely, however. For coercion to happen, there must be a particular set of properties in the semantic structure of the element getting coerced. In the case of *the book* in (7), coercion is possible because the noun *book* has a feature structure with its intrinsic properties shown in Figure 6.1.<sup>1</sup>

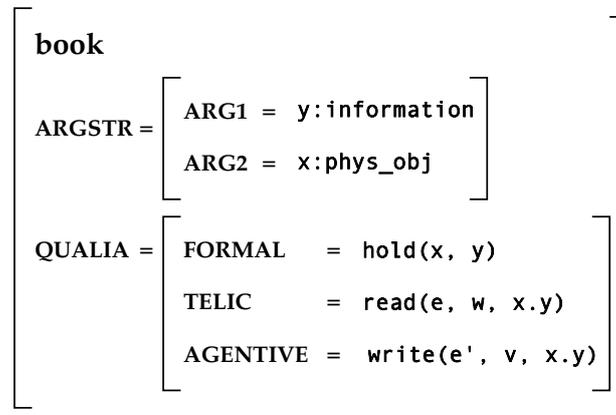


Figure 6.1: Feature Structure of book

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<sup>1</sup> Only the portion of the feature structure that is relevant for the discussion here is included in Figure 6.1. The lexical typing structure, the event structure, and the constitutive qualia role are omitted for simplification.

The feature structure in (7) specifies the argument structure and the qualia structure of *book*. The argument structure consists of two arguments: semantic argument *y* of the “information” type and semantic argument *x* of the “physical object” type.<sup>2</sup> The qualia structure consists of three qualia roles. The FORMAL role *hold(x, y)* designates that *x* holds *y*, that is, a “physical object” holds “information.” The TELIC role *read(e, w, x.y)* designates that event relation *e* holds between *w* and *x.y*, with *w* being the “reader” and *x.y* a “physical object” containing “information.”<sup>3</sup> Lastly, the AGENTIVE role *write(e', v, x.y)* designates that another event relation *e'* holds between *v*, the “writer,” and *x.y*, the “information contained in a physical object.”

In Generative Lexicon, coercion is explained in terms of the inferential extension of lexical information. If there is a type mismatch in the semantic structure of a phrase, the qualia structure of the elements involved will be checked to see if such extension is possible. As to the coercion of *the book* in (7), there are two options available to make a “process” reading of the nominal possible—profiling the TELIC role or the AGENTIVE role in the QUALIA structure. Profiling the TELIC role allows the semantic aspect of “a process of using (i.e., reading) the object” to be foregrounded in the meaning of the overall sentence, while profiling the AGENTIVE role will allow a “process of creating (i.e., writing) the object” to be foregrounded instead.

The above example alone might not be enough for arguing against the SEL because if one can register the process senses of *book* (“reading a book” or “writing a book”) in addition to more basic senses of the word, there is no need to abandon the SEL. However, it is realistically impossible to assume all the different senses of a word in advance since each of them only comes into being in a

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<sup>2</sup> Notice that these are “semantic” arguments, which should not be confused with “syntactic” arguments. That the variables *x* and *y* are components of the semantic structure of *book* entails that they do not necessarily have corresponding formal manifestations.

<sup>3</sup> In Generative Lexicon, after the convention in computational linguistics in general, the dot symbol (.) represents a composition of two elements. The notation *x.y*, for instance, means a composite structure of *x* and *y*.

specific contextual environment, which could vary widely from one utterance to another. For instance, let us consider the senses of the adjective *fast*. One may be able to list its various senses as in (8).

- (8) a. *fast*<sub>1</sub>: to move quickly  
b. *fast*<sub>2</sub>: to perform some act quickly  
c. *fast*<sub>3</sub>: to do something that takes little time

This list of possible senses for *fast*, however, does not fully explain the meaning of utterances such as those in (9) below.

- (9) a. The Autobahn is the *fastest* motorway in Germany.  
b. I need a *fast* garage for my car, since we leave on Saturday.  
c. The *fastest* road to school this time of day would be Lexington Street.

(Pustejovsky 1995: 46)

In (9a), *fast* characterizes the legal maximum speed on the German highway, which is higher than that of many other roads. In (9b), it indicates that the store in question is “quick” at doing work. In (9c), it means that the estimated arrival time to the destination will be shorter on a certain route. In fact, these three usages of *fast* can be regarded as variations of the three senses in (8a) to (8c), respectively. However, notice that *fast* in (9a-c) has semantic features that are slightly different from those in (8a-c): *The Autobahn* in (9a) is not something that moves; *a garage* in (9b) does not perform the act of repair (instead, people there do); and *Lexington Street* in (9c) is just there sitting still to be used by the motorists.

Generative Lexicon assumes that coercion is at work in a wide range of linguistic phenomena. Among them are those discussed widely as classic examples in past semantic research, including

not only in the generative tradition but also in cognitive linguistics. (10) to (13) below are examples that Pustejovsky (1995) uses to illustrate variations of nominal coercion (container/contained alternation, place/people alternation, process/result alternation, and product/producer alternation). From a cognitive-linguistic point of view, these are mostly instances involving metaphorical/metonymical extensions of meaning (cf. Lakoff and Johnson 1980; Lakoff 1987; Gibbs 1994; Kövecses 2010).

(10) **Container/Contained alternation**

- a. Mary broke the *bottle*.
- b. The baby finished the *bottle*.

(11) **Place/People alternation**

- a. The John traveled to *New York*.
- b. *New York* kicked the mayor out of office.

(12) **Process/Result alternation**

- a. The company's *merger* with Honda will begin next fall.
- b. The *merger* will produce cars.

(13) **Product/Producer alternation**

- a. John spilled coffee on the *newspaper*.
- b. The *newspaper* fired its editor.

(Pustejovsky 1995: 31–34, with minor modifications)

Linguistic phenomena that Cognitive Grammar (Langacker 1987a, 1990a, 1990b, 2008a) has long dealt with using the concept of *construal* are also analyzed in Generative Lexicon (count/mass

alternation, plant/food alternation, and figure/ground alternation). (14)–(16) are among the sentences that exemplify such phenomena.<sup>4</sup>

(14) **Count/Mass alternation**

- a. The *lamb* is running in the field.
- b. John ate *lamb* for breakfast.

(15) **Plant/Food alternations**

- a. Mary watered the *figs* in the garden.
- b. Mary ate a *fig* for lunch.

(16) **Figure/Ground alternations**

- a. The *window* is rotting.
- b. Mary crawled through the *window*.

(Pustejovsky 1995: 31–34, with minor modifications)

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<sup>4</sup> Nunberg (1995) also deals with phenomena similar to (14)–(16), where “transfers of meaning” occur. His approach is, however, somewhat different from Pustejovsky’s. Pustejovsky (1995) regards the process of coercion as taking place lexically. Thus *lamb* in (14b), for instance, can offer the “mass” reading thanks to the qualia structure that it contains as an independent lexical item. Nunberg (1995: 120) points out that the transfer of meaning should be considered as “a phrasal process that works to a large degree in concert with the process of semantic composition,” referring to an example like (i).

- (i) The south side of Cambridge voted Conservative.

The lexical approach, Nunberg argues, cannot explain the fact that the subject NP of (i) refers to a group of people (instead of the region of the city of Cambridge). The present study does not adopt Pustejovsky’s framework to deal with coercion phenomena partially due to this problem. See also Wechsler (2015: Chapter 2) for related issues on polysemy and sense extension of lexical items.

The fact that two different frameworks share these areas of interest does not automatically mean they are both well-grounded or compatible, of course. Still, the explanation of coercion offered in Generative Lexicon has much in common with the analysis of discourse connectives in the present study. It is especially apparent when Pustejovsky (1995) states that the SEL does not do well in explicating the semantic process of constructing the meaning of lexical items in context and that inferential reasoning and commonsensical world-knowledge are the key factors (Pustejovsky 1995: Chapter 4).

However, there are theoretical obstacles to adopting the methods of Generative Lexicon in the present study. The first of them concerns the modular view of language held in Generative Lexicon. As part of the generative tradition that originates in the works of Noam Chomsky, it rigidly distinguishes semantics and syntax as independent regions of study (cf. Chomsky 1957, 1986, 1994, 1995). The second obstacle is related to the first one. Generative Lexicon also makes a clear distinction between semantics and discourse. Pustejovsky (1995) suggests the following.

A clear notion of semantic well-formedness will be necessary in order to characterize a theory of possible word meaning. This may entail abstracting the notion of lexical meaning away from other semantic influences. For instance, this might suggest that discourse and pragmatic factors should be handled differently or separately from the semantic contributions of lexical items in composition (Pustejovsky 1995: 6).

In the above citation, Pustejovsky draws a clear boundary between semantics and discourse, though somewhat tentatively. The present research, which aims at the elucidation of the structure of discourse connectives, however, presupposes that semantics and discourse are inseparable. This is not just an arbitrary choice but is due to logical necessity. If the meaning of language depends on inference, it is inevitable to take into consideration broader contextual factors since the knowledge base on which inferences can be made updates continuously as the discourse unfolds.

For this reason, we now turn to the approach to the concept of coercion from a perspective of Construction Grammar instead.

### 6.1.2 Constructionist Approach

In Construction Grammar, the concept of coercion is addressed in a series of studies by Michaelis (2002, 2004, 2005), who proposes the Override Principle as a condition for coercion to occur in the encoding/decoding of lexical items. Also, Boas (2011) deals with coercion in connection with a phenomenon that he calls *leakage*. In what follows, we examine these two concepts, the Override Principle and *leakage*, to establish a theoretical foundation for an analysis of discourse connectives based on Construction Grammar.

#### 6.1.2.1 Override Principle

Michaelis (2002, 2004, 2005) argues that coercion plays a vital role in the use of grammatical constructions. As discussed in Chapter 2, a construction is a structure consisting of a symbolic relationship between its meaning and its form. Also, a construction can be considered a function that takes arguments, performs some processing on them, and returns the results. However, unlike function applications in mathematics and computer science, in the case of natural language, an application of a construction as a function is highly flexible. When a given set of arguments satisfies the formal requirements, but the semantic type does not match the ones specified by the construction, coercion can take place so that a kind of semantic extension can occur utilizing commonsensical world-knowledge and inferential reasoning (cf. Sanford 2006). Michaelis (2005) presents examples of coercion occurring in nominal and aspectual morphosyntax. In the sentences in (17) and (18) below, the successful application of a construction as a function relies on coercing the types of the elements printed in italics.

(17) **Nominal morphosyntax**

- a. Give me some *pillow*.
- b. They sampled some *wines*.
- c. She had a *beer*.

(18) **Aspectual morphosyntax**

- a. She *liked* him in a minute.
- b. I'm feeding him a line and he's *believing* every word.
- c. She *washes* the car.

(Michaelis 2005: 46)

Michaelis (2005) points out that coercion occurs not only in nominal morphosyntax and aspectual morphosyntax but also in argument structures of verbs, though she refers to this type of phenomenon as “coercion in semantic frames,” using examples presented in (19).

(19) **Semantic frames**

- a. Down at the harbor there is a teal-green clubhouse for socializing and parties. Beside it *sparkles* the community pool (*Vanity Fair* 08/2001).
- b. When a visitor passes through the village, young lamas stop picking up trash to mug for the camera. A gruff ‘police monk’ *barks* them back to work (*Newsweek* 10/13/1997).

(Michaelis 2005: 46)

The verb *sparkle* used in (19a) is prototypically associated with a monovalent frame. Namely, it is originally expected to be realized in a clause that comprises a theme, something that “sparkles.” Thus, *sparkle* in (19a) is considered somewhat “marked” in that it is embedded in a bivalent frame comprising not only a theme but also a location of the event. This is also the case with (19b), where a monovalent verb *bark* is embedded in a bivalent frame. In these examples, the verb’s semantic

type does not match the semantic type required by the construction cooccurring with the verb. To remedy this, coercion must take place, shifting the verb's semantic type accordingly.

Michaelis (2002, 2004, 2005) stipulates the conditions in which such type-shifting must occur as follows.

(20) **Override Principle**

If a lexical item is semantically incompatible with its syntactic context, the meaning of the lexical item conforms to the meaning of the structure in which it is embedded.

(Michaelis 2004: 25)

The present study adopts the above as a guiding principle for coercion in the application of the discourse-connective construction in actual utterances. Later in this chapter, we examine actual examples of discourse connectives where coercion is at work. Before that, however, let us look at one theoretical distinction pointed out by Michaelis (2005) that is relevant to coercion.

According to Michaelis (2005), there are two types of type-shifting: explicit type-shifting and implicit type-shifting. The first one, explicit type-shifting, is defined as follows.

(21) **Explicit type-shifting**

A shift in the designation of a lexical item (or its projection) by a grammatical construction with which that lexical expression is conventionally combined.

(Michaelis 2005: 55)

A typical example of explicit type-shifting is the application of the progressive construction to an activity verb such as one in (22) below. It is "explicit" in the sense that the shift from "activity" to "state" is indicated by the progressive morpheme *-ing*.

(22) She was *winning* the race when she got tripped.

(Michaelis 2004: 17)

Implicit type-shifting, on the other hand, is defined as follows.

(23) **Implicit type-shifting**

A shift in the designation of a lexical item (or its projection) in order to reconcile semantic conflict between word and construction, as per the Override Principle.

(Michaelis 2005: 55)

It is worth noting that implicit type-shifting often co-occurs with explicit type-shifting. Example (24) below is such an example.

(24) Growers are *preferring* it because it takes less work to harvest than the white varieties.

(Michaelis 2004: 17)

It is “implicit” in the sense that the semantic type of the verb *prefer* must be coerced from “state” to “act” without having a specific formal marker before it is then explicitly type-shifted by virtue of the progressive morpheme *-ing*. Such an implicit type-shift, which coerces the type of the verb into something different just in order to change it back again later (“stative” to “active” and then to “stative”), may look useless at first sight. However, the process of the implicit type-shift from “stative” to “active” has its own semantic effect. Since it gives the semantic trait of “activeness” to *prefer*, the explicit type-shift accompanying the application of the progressive morpheme *-ing* not only turns the resulting type back into that of a “state” category but also turns it into a type that has a rather complex internal, where only a part of the ongoing process of “preferring” is focused. This structure is identical neither to the semantic structure of the original state verb nor to that of the same verb implicitly coerced into an active verb. The overall effects are only attained

by the sequence of the above procedures involving both an implicit type-shifting and an explicit type-shifting.<sup>5</sup>

The distinction of explicit and implicit type-shifting has implications for usages of discourse connectives as well. In the analysis presented later in this chapter, the following statement by Michaelis about explicit and implicit type-shifting bears a special significance.

While the use of an explicit type-shifting device can be viewed as a hearer-based accommodation, arising from the drive toward maximal transparency, the use of an implicit type-shifting device can be seen as a speaker-based optimization strategy, involving economy of effort (Michaelis 2005: 83, a typo in the original text corrected).

Before turning to actual examples of discourse connectives, however, we examine another theoretical notion that has much to do with coercion, that is, *leakage*, discussed by Boas (2011).

### 6.1.2.2 Leakage

According to Boas (2011), leakage is a phenomenon that causes “otherwise unacceptable non-conventionalized utterances to be judged acceptable by means of coercion” (Boas 2011: 1295). The term *leakage* is attributed to Edward Sapir, who states as follows.

[W]ere a language ever completely “grammatical,” it would be a perfect engine of conceptual expression. Unfortunately, or luckily, no language is tyrannically consistent. All grammars leak (Sapir 1921: 38).

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<sup>5</sup> Michaelis (2005) states that the term *coercion* may be better reserved to implicit type-shifting (Michaelis 2005: 47), though the two types of type-shifting may be intertwined and often difficult to discern. The present study uses the term rather more broadly than Michaelis (2005) does.

Boas (2011) suggests that a comparison of the two sentences in (25) provides a good foundation on which to discuss the concept of leakage.

- (25) a. Ed hammered the metal *flat*.  
b. ?? Ed hammered the metal *safe*.

(Boas 2011: 1271)

While (25a), a typical example of the resultative construction, presents no problems, the acceptability of (25b) is somewhat reduced even though the only difference is the choice of the adjective that expresses the resulting state. Since the formal properties of (25a) and (25b) are equivalent, the difference in acceptability is attributed to other properties. Boas (2011) points out that the resulting state in (25b) expressed by the adjective *safe*, “cannot be construed as being directly caused by the energy emitted by the agent” and thus it cannot be regarded as an example of the resultative construction as natural as (25a) is.

The acceptability of the latter sentence, however, is much improved if given an appropriate context that provides enough motivation for the choice of the adjective. The text presented in (26) is such an example, where the otherwise nearly unacceptable sentence in (25b) is contextualized and thus accepted more easily.

- (26) The door of Ed’s old Dodge had a piece of metal sticking out. When getting out of the car, Ed had cut himself on the metal and had to go to the hospital to get stitches. The next day, *Ed hammered the metal safe*.

(Boas 2011: 1272)

The evaluation of (26), in fact, could vary from speaker to speaker. Boas conducted a survey of 40 native speakers of English to check the acceptability of this example, with the results that 23

informants found it acceptable, nine judged it marginally acceptable, and eight found it unacceptable—not a totally unanimous evaluation. It is nevertheless undeniable that an appropriate context could improve the overall acceptability of this otherwise problematic sentence. Why, then, does this happen? To address this, Boas proposes the following explanation.<sup>6</sup>

Leakage phenomena are best accounted for in terms of analogical association of one of the verb's conventionalized argument structure specifications (represented by an event frame, or mini-construction) with two other important sources of information (Boas 2011: 1295).

In Boas's analysis, (26) is not just an instance of the resultative construction; it is also associated with another construction by the analogical similarity of the event frames evoked by it. The additional construction is of the form "make ... safe" here. In (26), thanks to the rich contextual support, the information for both of the two event frames is available at the same time. This phenomenon, which Boas calls *leakage*, increases the interpretability and the acceptability of the sentence as a result.

There is one condition, however, for such an analogical association between the event structures of the primary construction  $E_1$  and the secondary construction  $E_2$  to be established. That is, the latter construction must be entrenched to some extent in the language. This condition is met in the case of (26). A corpora study attests that the *make ... safe* construction has a reasonably high

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<sup>6</sup> Boas (2011) only mentions that the experiment participants were 40 native English speakers; however, he does not mention their prior experience with linguistic literature. Furthermore, it is possible that different contexts may produce somewhat different results in either direction. According to Yamanashi (2009), constructions are subject to schematization, instantiation, and extension, as is the case with many other linguistic units (Yamanashi 2009: Ch. 5). Thus, there are practically no restrictions on the "creative" use of constructions, as long as they are embedded in the appropriate context. From these perspectives, the survey and argument of Boas (2011) are insightful; however, there are limitations to consider.

degree of entrenchment in English. Boas (2011) gives sample utterances of this construction collected from the British National Corpus, presented in (27).

- (27) a. Good food handling and thorough cooking should *make* all food *safe*.  
b. What is done to *make* tap water *safe* to drink?  
c. How soon do they *make* sexual intercourse *safe*?  
d. Baker also claimed the Government had done all it could to *make* cars *safe*.  
e. This demonstrates the need for us to continue to stop and search people, if we are to *make* the streets *safe*.

(Boas 2011: 1288)

From these observations, Boas generalizes the process of leakage in which the specifications of a construction leak because of its analogical relation with another construction also used in the utterance. (28) below explicates the condition more formally.

(28) **Conditions on leakage**

The conventionalized specifications of an event frame  $E_1$  may leak to yield a new non-conventionalized utterance ( $U_N$ ) iff.

- a. There exists another conventionalized event frame  $E_2$
- i) that licenses conventionalized utterances ( $U_C$ ) expressing part of the form-meaning pairing of  $U_N$ , and
  - ii) that is more abstract at some level than  $E_1$ .
- b. By means of analogical association, those parts of the event-frame specifications of  $E_1$  are overridden or augmented by the event-frame specifications of  $E_2$ , which are necessary to license  $U_N$ . Association of  $E_1$  with  $E_2$ , in order to license  $U_N$ , is only possible if
- i) there is a semantic overlap between  $E_1$  and  $E_2$  such that those specifications of  $E_1$  which are not overridden or augmented by  $E_2$  can be construed as an instance of  $E_2$ , and

- ii) each form-meaning specification associated with  $E_2$  that overrides or augments any of  $E_1$ 's specifications is construed the same way in  $U_N$  as it is according to its specifications encoded (expressed) by  $E_2$  as a result of the information provided by  $E_1$ ,  $E_2$ , and contextual background information.

(Boas 2011: 1291)

With the above fundamental mechanism, the process by which the non-conventional sentence in (26) gets licensed thanks to leakage can be schematically illustrated as in Figure 6.2.<sup>7</sup>

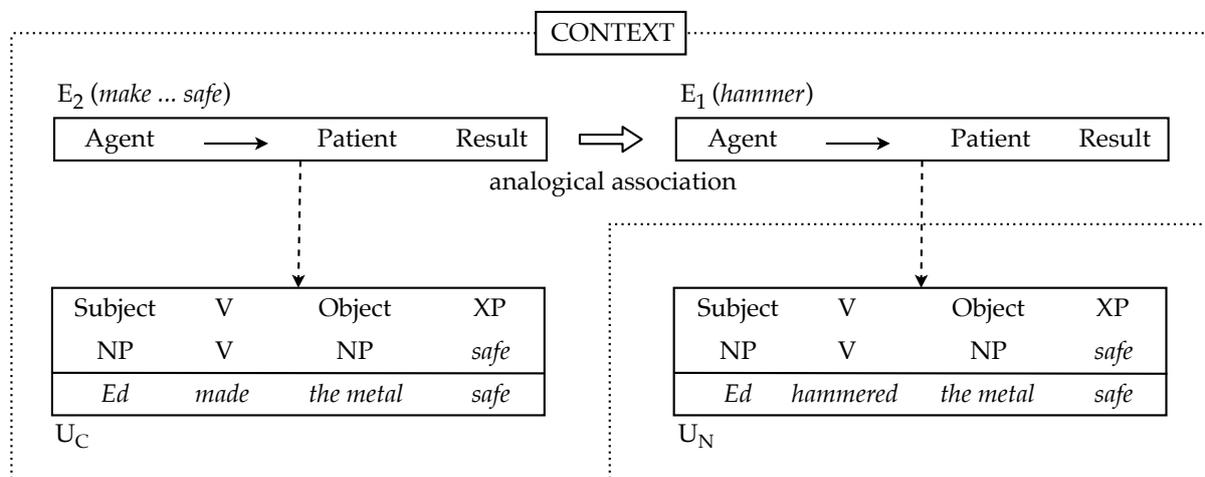


Figure 6.2: Licensing of Non-conventionalized Utterance

Typically, the resultative construction containing the verb *hammer* is not able to take the oblique element *safe* (=XP in Figure 6.2) because of the semantic restriction on the final state in the resultative construction. Boas points out regarding this constraint on the final state as follows: “it cannot be construed as being directly caused by the energy emitted by the agent.” However, due to the analogical association between  $E_1$ , the event frame of the resultative, and  $E_2$ , that of the *make ... safe* construction, which is frequent enough (or “entrenched”), an unconventional

<sup>7</sup> Figure 6.2 is created based on Boas (2011: 1292) with some minor modifications.

expression (“Ed hammered the metal safe”)  $U_N$  comes into being as a result. It may carry some semantic awkwardness in isolation. Nonetheless, the acceptability significantly improves if uttered in context, thanks to the leakage as well as supportive information available in the ongoing discourse.

This phenomenon Boas (2011) calls *leakage* shows the potential significance of inference in the encoding and decoding of linguistic expressions in the level of discourse that goes beyond the boundaries of sentences and clauses.

### 6.1.3 Interim Summary

Thus far, this chapter examined approaches to coercion in two different frameworks. First, we saw that the methodology of Generative Lexicon has something in common with that of the present research. Both adopt the “functional” approach in describing the process of encoding and decoding utterances. Moreover, both place importance on inferential reasoning. Pustejovsky (1995) defines coercion as an operation of converting the type of an element so that the requirements imposed on it are semi-forcibly fulfilled. This kind of operation is not freely available, however. It depends on the qualia structure, the commonsensical world-knowledge that is stored along with the other kinds of knowledge composing individual lexical items. Nonetheless, the theoretical presupposition of Generative Lexicon that syntax, semantics, and discourse are all separate regions of research keeps the present research from adopting the latter framework.

Thus, we turned to constructionist approaches to coercion instead and examined two theoretical notions proposed therein. Michaelis (2004) describes the conditions under which coercions occur to the meaning of lexical items as the Override Principle. She also distinguishes two types of type-shifting, implicit type-shifting and explicit type-shifting, with only the former defined as identical to the process of coercion in her terminology. Boas’s (2011) notion of leakage suggests that non-conventional usage of a construction could become more acceptable if the

following two conditions are met: 1) there exists a construction that is well entrenched in the language and analogically associated with the primary construction; and 2) enough contextual data is available that motivates and accommodates the event structures of both constructions at the same time.

Coercion expands the language without introducing brand-new or ad hoc devices specially designed to meet the needs that arise in encoding and decoding utterances. It allows the utilization of existing linguistic devices, whether lexical elements or constructions, to convey messages that go beyond the boundaries of their prototypical meanings by making use of inference and world-knowledge. The next section is intended to present how coercion occurs not only at the sentence level but also at the discourse level, with particular attention to discourse connectives as an example of grammatical categories that heavily rely on this mechanism.

## **6.2 Discourse Connectives as Inference Inducers**

### **6.2.1 Override Principle for Connectives**

Michaelis's (2004) Override Principle stipulates that the type of a lexical item shifts to conform to the specifications of the construction in which it is embedded. The principle is presented again in (29) below.

#### **(29) Override Principle**

If a lexical item is semantically incompatible with its syntactic context, the meaning of the lexical item conforms to the meaning of the structure in which it is embedded.

(Michaelis 2004: 25)

(29) only refers to the type of lexical items, but we need to deal with propositions expressed in a wide variety of forms. Thus, the principle must be modified so that coercion in utterances involving discourse connectives can be similarly designated.<sup>8</sup>

(30) **Override Principle for Connectives**

If the type of a proposition is incompatible with the type specified by the connective construction it is embedded in, the type of the proposition conforms to that of the construction if the inferential operation of type-shifting is available based on the shared contextual information and commonsensical world-knowledge.

To see how this principle works, let us consider the examples in (31) below.

- (31) a. This flight takes 5 hours. There's a stop-over in Paris.  
b. This flight takes 5 hours, *and* there's a stop-over in Paris.  
c. This flight takes 5 hours, *because* there's a stop-over in Paris.  
d. This flight takes 5 hours. *So*, there's a stop-over in Paris.  
e. This flight takes 5 hours, *but* there's a stop-over in Paris.  
f. This flight takes 5 hours. *After all*, there's a stop-over in Paris.

(Fraser 2006a: 195)

(31a) is an utterance without a discourse connective. Since the relationship between the proposition conveyed in the first sentence and the proposition of the next sentence is not explicitly

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<sup>8</sup> The Override Principle for Connectives presented in (30) differs from Michaelis' (2004) original principle in (29), in that it does not use "syntax" and "semantics" as opposing concepts. While acknowledging the basic validity of Michaelis' principle, I would like to emphasize the importance of the basic tenet of cognitive linguistics that syntax and semantics are inextricably linked and can hardly be separated.



information. For Proposition 2, though there is a formal designation, it is only designated as clausal-structures. Therefore, it may also be necessary to appropriately type-shift the proposition.

## 6.2.2 Type-Shifting in the Discourse-Connective Construction

In the following, we examine actual examples in which implicit type-shifting, or coercion, occurs in addition to explicit type-shifting in the discourse-connective construction. As mentioned shortly before, since the discourse-connective construction does not have detailed formal specifications for propositional elements, expressions of various forms could appear with it. As a result, the construction involves countless different types of type-shifting. It is virtually impossible to enumerate all the possible kinds. The purpose here is, instead, to show notable examples from the corpus where the process of coercion comes into play at the discourse level.<sup>9</sup>

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<sup>9</sup> Another, more implicit purpose of this section is to elucidate how certain types of sentence-level phenomena that have been often discussed in Generative Grammar may have discourse-level counterparts, and they can be analyzed in the present framework. One such phenomenon is the construction mismatch in VP-ellipsis discussed by Merchant (2001, 2008), exemplified in (i) below.

- (i) a. The system can be *used* by anyone who wants to (*use it*).
- b. The janitor must *remove* the trash whenever it is apparent that it should be (*removed*).

(Merchant 2008: 169)

In (i), the elements in parentheses represent parts of sentences that do not have surface forms, that is, deleted VPs. Note that in each of the sentences in (i), the construction of the antecedent VP and that of the deleted VP are different in their voices: one is in the active voice while the other is in the passive voice. We consider that VP-ellipsis in (i) above involves a mechanism of proposition retrieval that is fundamentally identical to the one underlying discourse-level phenomena such as those observed in the previous and present chapters.

### 6.2.2.1 Implicit Type-Shifting in Discourse

As discussed in Section 5.2, there are connectives for elaboration that specify Proposition 1 to be of the type “reference-statement” and Proposition 2 to be “reformulative-statement.” Since reformulation is an act of expressing the same thing once again in a different way, the two propositions are expected to include virtually the same content. However, there could be cases where a connective of this type is used to relate two propositions having apparently distinct properties, both formally and semantically. Consider (32).

- (32) So we may be able to go beyond that when thinking about this system that I’m showing you, and *that is to say* we need to think in terms of the water, the fresh water, which is also going to be an issue in the future, and we’re working on methods now for recovering the waste water [TCSE 1561 | Jonathan Trent: Energy from floating algae pods].

The text preceding the connective *in other words* in (32) makes a statement about “ability,” while the text following the connective makes one about “necessity.” Strictly speaking, these two refer to different things. This does not conform to the requirement by the construction that the propositions participate in an elaborative/reformulative relation. Thus, implicit type-shifting is in order. The contextual information and commonsensical world-knowledge allow one to make inferential reasoning and relate the two notions of “ability” and “necessity.” The logic is rooted in everyday experience. We know the necessity of an act is more likely to arise when it is possible, rather than vice versa. In fact, it is not worth discussing the necessity of doing something when there is no way to make it happen in the first place. Equating “ability” and “necessity” is pragmatically natural even though it may not be semantically so. Thus, the usage involving *that is to say* in (32) is made possible by implicitly type-shifting the content types of two propositions into two that are compatible with each other, with the help of inference based on the commonsensical world-knowledge shared by both interlocutors.

### 6.2.2.2 Declarative/Interrogative Conversion

In instances of discourse connectives for elaborative/reformulative relations, a proposition expressed by a declarative statement can be matched or compared to a proposition expressed by quite a different type of construction, such as the imperative construction or the interrogative construction (cf. Yamanashi 2009).<sup>10</sup> (33) below shows such an example.

- (33) So the FDA has a very specific protocol. In the first phase of this testing, which is called testing for toxicity, it's called Phase I. In the first phase, you give the drug to healthy people and you see if it actually makes them sick. *In other words*, are the side effects just so severe that no matter how much good it does, it's not going to be worth it? Does it cause heart attacks, kill people, liver failure? And it turns out, that's a pretty high hurdle [TCSE 1901 | Roger Stein: A bold new way to fund drug research].

Proposition 1 in (33) is in a declarative sentence with an *if*-clause embedded in it, while Proposition 2 is in a sequence of interrogative clauses. The effect of reformulation here is attained

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<sup>10</sup> Yamanashi (2009) discusses the interesting phenomena of two distinct clauses coordinated in a single sentence notwithstanding the incoherency of their formal constructions. The following are examples of such sentences with different combinations:

- (i) [Imperative & Declarative]  
Wash the toilet and the car is still dirty.
- (ii) [Interrogative & Imperative]  
Hey, where is your knife and hold your fork tight.
- (iii) [Declarative & Interrogative]  
The sleeves are a bit tight and isn't the waist too tight?
- (iv) [Imperative & Declarative]  
Please buy some sugar and we need soy source, too.

(Yamanashi 2009: 249)

by virtue of the implicit type-shifting. The interrogative construction originally expresses the intention of exerting the illocutionary force of “asking.” Thus, if the text right after *in other words* in (33) appeared in a different context, it would be likely that the utterance would be interpreted more literally as a question asking something to the hearer. Apparently, this is not the case here. The expression in the form of a question in (33) only offers an alternative way of saying basically the same thing as the preceding text just to help the hearer grasp the meaning as accurately as possible. In other words, no question is actually asked here. This implicit type-shifting, or coercion, may occur without being consciously noticed by the interlocutors. Still, it plays an essential role in the overall meaning construction for the utterance.

### 6.2.2.3 Semantic/Pragmatic Repair

Typically, a connective of adversative/contrastive relations conjoins two text segments having parallel structures. If their structures are regarded as imbalanced, implicit type-shifting/coercion must take place. It can “repair” the semantic/pragmatic structures of two text segments that are structurally inconsistent with each other. Consider (34) below.

- (34) It turns out that human drivers make mistakes that lead to traffic accidents about once every 100,000 miles in America. *In contrast*, a self-driving system is probably making decisions about 10 times per second, so order of magnitude, that’s about 1,000 times per mile [TCSE 2291 | Chris Urmson: How a driverless car sees the road].

The text segment to the left of the connective *in contrast* in (34) relates the rate of *mistakes* that could happen for human drivers. The text to the right of it, on the other hand, makes a statement about *decisions* made by the computer system of a self-driving car. Thus the two structures are inconsistent with each other—hence, coercion is called for. The information about the frequent occurrence of human mistakes makes the hearer draw an inference that humans make too few

decisions while driving. Moreover, it will also be implied that those decisions are neither as stable nor correct as those of machines in the first place. The self-driving car makes far more decisions than humans and does so more accurately. Notice that such inferencing requires natural reasoning based not only on the information in the text itself but also on commonsensical world-knowledge of relevant issues such as the nature of human decisions and the stability and accuracy of computer systems. A semantic/pragmatic repair like this is consistent with what the present research suggests about the fundamental mechanism of discourse connectives.

#### 6.2.2.4 Discourse Connective as a Cue to Build a Proposition

The basic structure of discourse connectives includes two propositions, with one extracted from the CDS and the other newly introduced by the connective. The new proposition, Proposition 2, is often provided by a single clause, but it can also be provided in a sequence of clausal structures that collectively compose a single proposition. Consider (35).

(35) There's a new field in brain science, social neuroscience. This studies the circuitry in two people's brains that activates while they interact. And the new thinking about compassion from social neuroscience is that our default wiring is to help. *That is to say*, if we attend to the other person, we automatically empathize, we automatically feel with them [TCSE 200 | Daniel Goleman: Why aren't we more compassionate?].

Proposition 1 retrieved from the text preceding the connective *that is to say* in (35) states that "our default wiring is to help." It is abstract enough to be naturally followed by elaborative statements. However, it is unknown to the hearer if it is what happens, for there could be diverse possibilities as to the type of relation between propositions when there were no guiding signs. It is even possible that the relationship is unnoticed, especially when the formal properties of the two propositions are as different as those in (35). The insertion of *that is to say* in (35) alleviates

such concern. It plays a role in declaring that what follows reformulates the preceding proposition. In other words, it provides a cue for the hearer to build a proposition out of a sequence of text following the connective. This process is similar to proposition retrieval, by which a proposition is extracted from the text preceding the connective. What happens in an utterance like (35) only differs from regular proposition retrieval in that the proposition is delivered in real-time as the discourse unfolds rather than as a result of a retrospective reference.

#### 6.2.2.5 Leaking Construction

Lastly, let us examine discourse connective usages involving leakage. As discussed in 6.1, When leakage occurs, a grammatical construction appears in a somewhat non-conventional way, but the resulting utterance is considered reasonably acceptable thanks to the support of an extra construction analogically associated with the primary construction. In a word, the leakage creates a hybrid construction conflating two constructions based on a partial overlap of their structures. The following is an example of such a leaking construction.

(36) And let me ask you, when was the last time that you kissed a mirror? Ultimately, we need to work together as communities, as governments and as businesses to really change this culture of ours so that our kids grow up valuing their whole selves, valuing individuality, diversity, inclusion. We need to put the people that are making a real difference on our pedestals, making a difference in the real world. Giving them the airtime, *because* only then will we create a different world [TCSE 2102 | Meaghan Ramsey: Why thinking you're ugly is bad for you].

In (36), Proposition 1 is expressed in a gerundive construction (“giving them the airtime”) that does not use a more straightforward way of conveying the same message, such as “we should give them the airtime.” Though the exact reason why this gerundive expression is used here instead of a clausal form is not apparent, one conceivable motivation must be as follows. The

gerundive expression is a fragment of what is originally intended to be a full sentence, such as “giving them the airtime is an imperative,” for instance. If this is the case, then the leaking construction in (36) is a conflation of the gerundive subject construction and the BECAUSE construction. Alternatively, the gerundive subject may be a fragment of a caused-event construction in a form such as “giving them the airtime will cause the future where we create a different world.” The result part of this construction may have been somehow replaced by the BECAUSE construction and ended up having the formal structure it does.

Either way, the conflated expression makes sense without any significant problem since the analogical relation between the constructions as well as the contextual information provide enough support for the hearer to determine the intended meaning of the utterance. Additionally, all the component constructions that possibly compose the hybrid construction in (36)—the gerundive subject construction, the BECAUSE construction, and caused-event construction—are considered well entrenched in the language. Thus, the overall picture seems to be in parallel with what Boas (2011) points out in his analysis of the process of leakage.

### **6.3 General Function of Discourse Connectives**

In this section, we conclude the chapter by considering the general function of discourse connectives based on the observations of the examples thus far. The examples in this chapter made it clear that the propositions to be conjoined by the connective do not necessarily find themselves entirely ready for that to happen: it is often the case that the propositions must be coerced into types that match the specifications imposed by the particular connective used in the utterance. In fact, coercion is not a special operation applied only to limited cases of usages of discourse connectives. In a sense, every usage of a discourse connective involves some kind of coercion even though the degree of inferential reasoning required may vary widely.

This view leads to an understanding that discourse connectives provide partial guidance as to how the hearer should interpret two propositions presented sequentially. It is “partial” for the following reason. Though a discourse connective specifies broad types of propositions, the matching between the actual propositions and the specified types is not guaranteed; it always relies on the inferential effort on the part of the hearer. The distinction between explicit and implicit type-shifting suggested by Michaelis (2005) has a significant implication here. Michaelis’s comment as to the characteristics of explicit and implicit type-shifting mentioned in Section 6.1 is recapitulated below.

While the use of an explicit type-shifting device can be viewed as a hearer-based accommodation, arising from the drive toward maximal transparency, the use of an implicit type-shifting device can be seen as a speaker-based optimization strategy, involving economy of effort (Michaelis 2005: 83, a typo in the original text corrected).

Discourse is an interactive activity between the speaker and the hearer. Even if the ongoing discourse is in a rather unidirectional style of a presentation or a lecture, the speaker needs to pay much attention to the CDS—the body of knowledge built and updated from what he or she has stated and shared with the hearer. When presenting a new proposition, the speaker considers how the hearer determines its place in the CDS relative to the existing contents therein. Thus, to use Michaelis’s words, connectives are considered devices for hearer-based discourse optimization.

However, not only the speaker but also the hearer needs to make efforts to optimize the communication. Though there are only a limited number of discourse connectives in the language, there are virtually no restrictions on the formal and semantic properties of the expressions actually used in the discourse-connective construction. Therefore, the hearer is always required to be alert and make efforts to appropriately retrieve and flexibly adjust propositions in a way that conforms to the type specification given by the connective used in the utterance.

It can be said that, on the one hand, that discourse connectives are a hearer-oriented optimization device. On the other hand, however, they are also devices for reducing the cognitive burden on the part of the speaker since they exempt the speaker from taking the trouble of guiding the hearer to the definitive interpretation of the propositions in an utterly unambiguous fashion. In a sense, discourse connectives just urge the hearer to infer the appropriate interpretation of given propositions in a way that matches the types they specify. Thus, they are different from many other linguistic elements in that they have these two aspects that may seem to conflict at first sight.<sup>11</sup>

## 6.4 Summary of Chapter 6

In this chapter, we examined inferences involved in utterances containing discourse connectives. It was shown that inferential processes similar to those in coercion phenomena (Pustejovsky 1995; De Swart 1998; Michaelis 2004; Boas 2011; Croft 2012) are at work in encoding and decoding utterances involving discourse connectives.<sup>12</sup> Although many previous studies have discussed coercion as a sentence-level phenomenon, this chapter exemplified that it also occurs at the discourse level, a level beyond the boundaries of clauses and sentences.

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<sup>11</sup> Some connectives can be used just for the sake of pausing until the next word is ready to be uttered (I thank Koji Fujita for pointing this out to me). Such usage is interesting for further examining discourse linearity; however, I will leave this discussion for future research.

<sup>12</sup> Coercion analysis is not free from criticism, however. Traugott (2007) suggests that some instances that are considered to include nominal coercion from countable to mass, as in the case of *a pudding*, may well be analyzed as phenomena of polysemy. Ziegeler (2007) points out that the coercion analysis of verbal aspects should be reconsidered since the early occurrences of the English progressive are supposed to be less limited and are allowed to be used with stative verbs as well as with active verbs. Their arguments based on historical facts are valid in their own light. We suppose, however, that coercion phenomena exist, and they are better investigated as real-time processes of type-shifting, considering their productivity and universality in various aspects of language use.

In Section 6.1, we looked at different approaches to coercion. Generative Lexicon (Pustejovsky 1995) adopts the “function” metaphor to describe the process of encoding and decoding utterances. It denies the prevalent view called *sense enumeration lexicon* and proposes an alternative, that is, the meaning of a linguistic construct is dynamically generated as lexical components combine into larger units of organization. Coercion, which Pustejovsky defines as an operation of converting the type of an element so that the requirements of another element can be met, accommodates an otherwise incongruent pair of elements and makes sense of it. Even in a situation where a lexical mismatch between two elements occurs, as long as the qualia structure of one element contains properties that conform to the requirements imposed by the other, coercion takes place and saves the resulting expression from getting discarded as infelicitous.

The approach of Generative Lexicon and that of the present research have some similarities. Generative Lexicon, however, takes a highly modular view of language, which agrees with neither the present study nor the framework of cognitive linguistics in general. Thus, the approach to coercion from the perspective of Construction Grammar was introduced, with particular attention paid to two of its essential notions. The Override Principle, proposed by Michaelis (2002, 2004, 2005), designates the conditions in which coercion occurs in the application of a construction in an utterance. Boas’s (2011) notion of leaking deals with phenomena where the apparently non-conventional use of a construction is allowed, though marginally, thanks to an extra construction conflated with the primary construction by an analogical link found between the two.

Then Section 6.2 expanded the Override Principle so that it accommodates coercion that occurs in utterances involving discourse connectives. The Override Principle for Connectives states that if the type of a proposition is incompatible with the type specified by the construction it is embedded in, an inferential operation of type-shifting will occur. Then, we examined examples from the corpus to confirm that this principle properly explains them.

Finally, in Section 6.3, an analysis was presented regarding the central functions of discourse connectives based on the above examination of actual data. Discourse connectives provide partial guidance as to how two propositions presented linearly in the discourse should be interpreted. It is only “partial,” in that even though a discourse connective specifies the types of the propositions, the successful matching of the actual expressions and the types specified is not guaranteed. The propositions must be more or less “coerced” by inferential reasoning so that the overall structure conforms to the specifications of the connective used in the utterance. Thus, we can regard a discourse connective as a device having the following two features that are complementary to each other. On the one hand, it is a hearer-oriented optimization device; on the other hand, it is also a device for reducing the cognitive burden on the part of the speaker by exempting him or her from having to make an unambiguous explication as to how the relevant text segments should be interpreted in context.

# Chapter 7

## Final Remarks

The purpose of this study was to analyze discourse connectives from the perspective of Construction Grammar using actual examples from a corpus and to reveal their structures as grammatical constructions as comprehensively as possible. This chapter concludes the present work. The first section presents a summary of each of the chapters. Then, the second section introduces related issues that were not touched upon thus far as prospective research topics for future investigation.

### 7.1 Summary of the Present Work

Chapter 2 examined the basic methodology of Construction Grammar and what is currently lacking in this theoretical framework for dealing with discourse-level phenomena involving discourse connectives. It was pointed out that first and foremost, Construction Grammar at present is a framework primarily centered on sentence-level analyses.

This does not mean the basic tenets of Construction Grammar should be doubted. For sentence-level constructions, including argument structure constructions, Construction Grammar provides a solid analytical foundation. Constructions are connected by inheritance relationships to compose a network. In fact, the idea that language elements form a network configuration is widely held in cognitive linguistics in general and has been proven valid by many studies within and without of the linguistic communities (Hudson 2007; Dehmer and Emmert-Streib 2009; Nielsen 2013; Diessel 2019). The network view of constructions thus suggests that constructions

are not idiomatic patterns that have been devised in an ad hoc manner for practical purposes but instead are subject to core principles of linguistic knowledge.

However, the network view of language does not reveal much about how constructions work in discourse, that is, a continuum of utterances that unfolds linearly. In order to explain the primary function and structure of discourse connectives, it is necessary to take into consideration the nature of cognitive processes such as those that obtain relevant information from the context as the interlocutors encode/decode the relations between propositions.

Chapter 3 examined the relationship between discourse markers and domains of meaning, with special attention to the discussion by Sweetser (1991). Sweetser points out that linguistic utterances involve three different domains of meaning. These three domains are the content domain, the epistemic domain, and the speech-act domain. Usage in the content domain describes the relationships that occur in the real world. Usage in the epistemic domain concerns a proposition obtained as a result of the speaker's inferential reasoning. In usage in the speech-act domain, a speech act is conducted by virtue of that very utterance.

Sweetser (1991) treats these three domains as if they were mutually exclusive. She mentions that it is sometimes difficult to determine the domain of meaning for a given utterance and that there could be occasions where the hearer must make a somewhat arbitrary decision as to which domain to take as the intended one. However, she basically assumes one and only one domain of meaning is associated with each given utterance: one at a time, that is. Though the concept of domains of meaning is useful in analyzing discourse connectives, the present study does not assume domains of meaning are mutually exclusive. Instead, they are all taken to be immanent in every linguistic utterance. Only the degrees of prominence with which these domains of meaning are involved in individual usage events differ.

Attempts to define multiple domains of meaning similar to that of Sweetser (1991) have also been made by researchers such as Redeker (1990, 1991) and Langacker (2008a). Though the criteria

for their classifications are overlapping, there are differences as well. Assuming that they are basically on the same track, this overlapping suggests that the notion of domains of meaning is valuable in explaining linguistic usages, but they may not always be unambiguously distinguishable. Instead, the domains of meaning are determined dynamically as the discourse unfolds in the discourse rather than being hard-coded statically in individual linguistic elements.

Chapter 4 provided details of the process by which discourse connectives relate propositions using the contextual information. One of the main arguments is that the use of a discourse-connective construction is an application of a discourse function that has three arguments: the CDS, the relation type, and the new proposition. This discourse function yields the updated CDS as a return value to be carried over to yet another discourse process that follows.

The CDS is a collection of information shared between the speaker and the hearer that can be referenced in an utterance. Regardless of the presence or absence of a discourse connective, linguistic utterances can refer to the CDS and update the values of the CDS. The basic structure of the discourse-connective construction is characterized by the following points: 1) one of the propositions is extracted from the CDS while the other proposition is introduced by the connective, 2) both propositions take part in a relationship of the type specified by the connective, and 3) the CDS is updated with the result.

The above characterization of the nature of discourse connectives relies on a “discourse process as a function” metaphor, as it were. Since it is just a way of describing the way the discourse is structured, other means of representation could be devised as well. One such means is the “wrap/unwrap” metaphor. It not only illustrates the linear nature of the discourse in a visually tangible fashion but also reveals its striking resemblance to monad computation in the functional paradigm of computer programming. This resemblance between two structures across

research domains that are seemingly quite remote implies the significance of the notion of linearity to human symbol processing and human cognition in general.<sup>1</sup>

Thus, the present study argues that the description of grammatical constructions should include the dynamic and linear nature of discourse. In fact, this is not a view widely held among researchers. Much research in Construction Grammar has been primarily concerned with the network features of constructions. These features are unquestionably vital to the science of language, but they only shed light on one side of it. Linguistic structures are both hierarchical and linear at the same time. In this connection, the present study also pointed out that the binary distinction that separates procedural meaning and conceptual meaning as mutually exclusive categories is untenable. Blakemore (1996) and Wilson and Sperber (1993) argue that the meaning of some discourse connectives is entirely procedural. On the other hand, Fraser (2006b) argues that even those connectives could be viewed as having a trace of conceptual meaning. The present study agrees with Fraser. Procedural meaning and conceptual meaning are both inherent in all discourse connectives. Only the degree to which these aspects are likely to be foregrounded is different from one discourse connective to another.

Chapter 5 examined three categories of discourse connectives collected from the TED Corpus, an English presentation transcript corpus. The three categories covered were connectives of causal

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<sup>1</sup> Since computer programming languages are created by humans who have the ability to manipulate natural languages, the various features of natural languages are inevitably reflected in them. For this reason, one may have doubt as to whether comparing the features of computer programming languages with those of natural languages leads to further clarification of human cognition. In this connection, it should be noted that many aspects of a natural language are “given” to its speakers, whereas computer programming languages are designed and improved intentionally and purposefully. In the course of these artificial languages being used to solve real-world problems, the worldviews reflected in them are tested for soundness and effectiveness, often driving new lines of thought that capture different aspects of the human-world interaction (Hasebe 2005). Thus, I argue that examining the implementation of computer programming languages and the ideas behind them can be a medium for understanding the nature of human thought and possibly its limitations.

relations, connectives of adversative/contrastive relations, and connectives of elaboration. It became clear from the analysis in this chapter that these distinct types of discourse connectives have the common structure discussed in Chapter 4, though they have different specifications as to the types of propositions and relationships connecting them.

With regard to many of the discourse connectives examined, the three domains of meaning discussed by Sweetser (1991) were found deeply relevant to their meaning. This suggests that the stipulation of the three categories, the content domain, the epistemic domain, and the speech-act domain, is valid. However, it is often difficult to associate these usages exclusively to a single domain of meaning. The previous literature does not emphasize this enough. The real-world usages from the corpus show that the distinction among domains of meaning depends heavily on the context, and thus, it is virtually impossible to provide a definitive categorization of an utterance independent of the contextual information.

This analysis is consistent with the basic structure of discourse connectives suggested in the preceding chapters. The discourse-connective construction takes the CDS as an argument and builds a relationship between the proposition extracted from the CDS (Proposition 1) and the proposition that is newly introduced (Proposition 2). Thus, the actual meaning of the utterance only becomes available as a result of the interaction between the construction and the contextual information given in the CDS at the time of utterance.

The data used in the analyses of Chapter 5 were collected from the TED Corpus Search Engine (TCSE), a corpus system containing transcripts of over 3,000 TED Talks developed by the author of the present research. It allowed us to examine the usages of discourse connectives in context. Since discourse connectives deal with textual data beyond the boundaries of sentences and clauses, fragmented snippets of text, such as sentences isolated from context, would not make a dataset fully suited for comprehensive research. Though there are several caveats mentioned in Chapter 1, the TCSE offers examples of usages of discourse connectives with all the relevant contextual

information readily available. This enabled the present research to be based more on actual linguistic data rather than relying on contrived examples.<sup>2</sup>

In Chapter 6, we considered the role of inference in the discourse-connective construction. This chapter introduced the concept of coercion. It is a process in which type-matching is semi-forcibly achieved with the help of inferential reasoning and commonsensical world-knowledge in the case when the type of one grammatical element does not match the specifications of a co-occurring element.

We reviewed two approaches to coercion, one from the perspective of Generative Lexicon (Pustejovsky 1995, 2005, 2011) and the other from that of Construction Grammar. The former is partially compatible with the present work at the analytical level. However, the highly modular view of Generative Lexicon does not agree with the theoretical foundation of the present study. On the other hand, the approach based on the framework of Construction Grammar (Michaelis 2004, 2005; Boas 2011) is free from such a modular view, and two of its theoretical notions, the Override Principle and leakage, have significant implications for the present study. Usages collected from the corpus demonstrate a variety of ways in which coercion takes place in utterances involving discourse connectives.

Based on the above investigation in Chapter 6, we reached the following conclusion: the discourse-connective construction has two aspects. In one of these aspects, discourse connectives reduce the cognitive burden of the hearer by explicitly showing the relationship between

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<sup>2</sup> This is not to say we should be justified in making light of examples that linguists have created themselves. In fact, it is data of the latter type that have made possible advances in various aspects of modern linguistic research. However, it is very challenging to investigate discursal phenomena that go beyond the boundary of sentences solely with contrived examples since the discursal context develops dynamically. We need to have at least a snapshot-like grasp of the context in which a linguistic phenomenon occurs in order to make sense of even the most trivial instance of a discourse phenomenon adequately. Such a grasp of context becomes relatively easy when data is adopted that originates from actual utterance events.

propositions. In the other aspect, it is the speaker that receives the benefit; discourse connectives exempt the speaker from taking the trouble of defining the possible interpretation of each of the propositions in an entirely unambiguous fashion. Meanwhile, the hearer is required to make efforts to appropriately interpret the propositions in a way that conforms to the specifications by the connective used in the utterance. This seemingly self-contradictory nature of discourse connectives, in fact, allows them to complement each other.

## 7.2 Prospects

This study aimed to develop a method to describe the usages of discourse connectives in the framework of Construction Grammar. In this attempt, it became clear that we must take into account the contextual information in the descriptive system of Construction Grammar so that discourse phenomena that go beyond the boundaries of sentences can be systemically handled. Thus, we adopted the concept of CDS and integrated it into the model of the basic structure of the discourse-connective construction. It was expected that this method would be useful not as an ad hoc means of description but as a rather versatile way of analyzing many linguistic phenomena at the discourse-level.

Still, the validity of the method has not been conclusively proven yet; it is necessary to apply it to phenomena other than discourse-connective constructions. Among the prospective areas of research are constructions involving pronouns and other anaphora. Another would be linguistic phenomena reflecting the shift of viewpoints. Constructions involving voice and aspect are examples of such phenomena. These are often regarded as sentence-level matters, but the choice of voice and aspect heavily relies on discursal factors. In addition, there are many discourse connectives that the present study did not deal with. More systematic and comprehensive work

on discourse connectives must be conducted to complement the present work, which is an admittedly preliminary attempt that is limited in range and depth.

Another critical research area that this study did not cover is the acquisition process of discursal constructions. In Construction Grammar, research has been conducted not only on the syntactic and semantic features of grammatical constructions but also on the detailed processes by which children acquire them. These studies, often accompanied by psychological experiments, have gradually revealed the way linguistic knowledge develops as a network of constructions of varying sizes and degrees of schematization. As is widely recognized, sentence-level constructions play an important role in forming grammatical knowledge from the earliest stages of acquisition (Tomasello 2003; Taniguchi 2014; Goldberg 2019). However, discursal constructions, such as connective constructions, may be acquired later than sentence-level constructions, as they require more conscious awareness to enable speakers to keep track of ongoing discourse. A careful and systematic research design is needed to elucidate this aspect of language.

There is also room for further development in the methodology to represent discursal constructions, particularly the detailed mechanisms of proposition retrieval. We must investigate what information can be extracted as propositions and what conditions may be imposed therein. Also, the psychological reality of such analytical devices needs to be further explored. Traditionally, cognitive linguistics has made it an informal rule that its theoretical concepts reflect some aspects of human cognitive abilities. Cognitive-linguistic concepts such as categorization, figure and ground, gestalt perception, and image schema are among such concepts supposedly relying on the basic cognitive abilities. Many of those basic cognitive abilities have their empirical bases in bodily experiences, but I do not believe it must necessarily be so. For example, the concept of mapping used in analyses of conceptual metaphors (Lakoff and Johnson 1980; Lakoff 1987; Gibbs 1994; Kövecses 2010) and that of mental spaces (Fauconnier 1985, 1997; van Hoek 1997; Coulson and Oakley 2000) rest on rather mathematical backgrounds.

The resemblance between the linear nature of discourse and monad computation discussed in Chapter 4 in the present work may be considered an instance of a similar type of phenomenon. Monad computation in computer programming has category theory as its theoretical background. This subcategory of mathematics discusses various types of relations in terms of two concepts, morphisms (or arrows) and domains, and examines the nature and the degrees of sameness, or homology, of seemingly distinct relations. In fact, conceptual metaphor theory and mental space theory in cognitive linguistics are both describable in terms of morphisms and domains (cf. Eppe et al. 2018). Having said that, the discussion presented in the present work about the resemblance of the linear nature of discourse and monad computation is only preliminary and tentative. Further exploration is needed to elucidate the real nature of the relationship.

Throughout the present work, we have discussed the “multifacetedness” of natural language. As has been emphasized in cognitive linguistics and Construction Grammar, language has a hierarchical structure, but we should not ignore the linear nature of language. Also, there are two sides to meaning in language—the conceptual aspect and the procedural aspect. These are both equally significant. Furthermore, while communication in language has many structural restrictions that seem to limit what one can do with language, it is this collection of linguistic restrictions that makes it possible for us to verbalize the most abstract of thoughts and highly accurately convey them to other brains.

The last point has many implications, I believe. In the past, the creative aspects of sentence-level phenomena have been repeatedly emphasized (e.g., Chomsky 1966; Pustejovsky 1995; Asoulin 2013). Turning to discourse-level phenomena, however, the situation is somewhat different. While creative aspects of discursal phenomena have been studied in connection to stylistics and pragmatics, less effort has been expended to investigate the “structural” properties

of the discourse.<sup>3</sup> This imbalance must be corrected. As the linear sequence of utterances is virtually the only way of conveying ideas having a certain degree of complexity, systematic research on its nature is by no means frivolous. It requires observations from multiple angles and multiple theoretical backgrounds. The present work has proposed just one approach to such an enterprise from the perspective of Construction Grammar and cognitive linguistics to pave the way for more comprehensive research in the future.

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<sup>3</sup> In fact, there have been several attempts to construct a framework to represent discursal structures in a more or less formal way. Among them are Rhetorical Structure Theory by Mann and Thompson (1988) and Segmented Discourse Representation Theory by Asher and Lascarides (2003).

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