

## Connectives and Discourse Relations

Illustrated with examples from a rich range of languages and genres, this book provides a state-of-the-art introduction to the meanings and functions of connectives, and the discourse relations they communicate. It begins with theoretical chapters that illustrate the many interfaces present in the study of connectives and discourse relations, using diachronic data to illustrate how connectives incorporate such a wide range of functions in synchronic language use. The second half of the book presents the rapidly growing body of studies that have used empirical data to assess theories of connectives and discourse relations, spanning fields as diverse as discourse processing, first and second language acquisition, and cross-linguistic studies. End-of-chapter discussion questions and lists of further reading are included, along with a comprehensive glossary of key terms. Wide-ranging yet accessible, this is a much-needed resource for both scholars and students interested in discourse, linguistic interfaces, and the relation between languages and minds.

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PROOF

# Connectives and Discourse Relations

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PROOF

# 1 Defining Connectives and Discourse Relations

## 1.1 INTRODUCTION

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When people use language to communicate, their sentences don't follow each other randomly: there is usually a logical link between them that is easily identifiable and that makes the content they try to convey coherent. As Hovy and Maier (1994: 1) note, "One of the first observations that one makes in analyzing discourse is that it exhibits internal structure." Discourse relations and connectives each contribute in their own way to structure discourse and make it a coherent whole. In this first chapter, we will start by defining and illustrating the notions of discourse relations and connectives, showing their connections but also insisting on their differences. We will see that even though the role of discourse connectives is to make discourse relations explicit in discourse, their use is not always needed for a discourse relation to be communicated. Conversely, connectives are not always associated with a specific discourse relation: many of them can convey various relations depending on the context. Another goal of this chapter is to situate discourse relations and connectives within the more general concepts of discourse cohesion and coherence. We will see that connectives represent one type of cohesive tie and that discourse relations are crucial elements ensuring local coherence within a discourse. In the last part of the chapter, we will present some important underlying methodological and theoretical choices that were made when selecting the topics covered in this book and the data presented in each chapter. We will also emphasize that the study of discourse connectives and relations has many interfaces with other domains of linguistic analysis such as semantics, pragmatics and syntax, and will explain how and where these interfaces will be integrated in the book.

## 1.2 DEFINING THE MAIN CONSTRUCTS

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### 1.2.1 Discourse Relations

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The term ‘discourse relations’ designates the logical links that hold between discourse segments, and make the succession of discourse segments appear coherent. As a first illustration of their role in discourse, let’s consider a short excerpt from a real book review (1) written by an anonymous reader from the United States.

- (1) Usually after I finish a book, I write my review immediately while everything is still fresh in my head. This one, I had to stew about overnight while I decided how I wanted to rate it. I won’t go into the premise of the book since this novel has been out for quite a while now and there are plenty of other reviews that do.  
[Amazon.com]

In this short text, every clause – defined as a grammatical unit containing a subject and a predicate – is logically linked to at least one other clause. For example, the events of finishing a book and writing a review are presented as temporally sequential, whereas the act of stewing overnight is presented as simultaneous to the act of deciding how to rate the book. These two temporal relations describing either synchronous or asynchronous events each represent a specific type of discourse relation that can hold between discourse segments. Another example of discourse relation is causality. This relation is illustrated in the text by the link between the fact that the book has been out for quite a while, which is presented by the author as a reason for not going into its premise in the review. A last example of relation found in this short text is the relation of addition. The two clauses: ‘the book has been out for a while’ and ‘many other reviews already present its content’ are listed as two congruent facts that add up and lead to the same conclusion: the premise of the book does not need to be presented again.

This first example illustrates the fact that discourse relations cover different types of meanings such as addition, causality and temporality. This list is, however, far from exhaustive. Other discourse relations include concession, contrast, condition, restatement, exemplification and many others. Even though the notion of discourse relations is quite intuitive, as we observed from our analysis of example (1), there isn’t a unanimously accepted list of all possible discourse relations to be found in the literature. In fact, the number of relations varies from 16 in some models (Mann & Thompson, 1988) to over 70 in others

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(Hovy & Maier, 1994). The reason for these wide discrepancies is that the way discourse relations are defined depends a lot on researchers' more general view of what is discourse and how to analyze its structure. Some models take a lexically grounded approach (Prasad et al., 2008) and therefore focus on relations that are conveyed by connectives such as *after* and *while*. Others take a more holistic approach to discourse structure and decide that every discourse segment must be linked to another by a discourse relation, regardless of whether it is explicitly marked by a connective or not (Carlson & Marcu, 2001). Others still take a cognitive approach to discourse relations and focus on the underlying features that make them easier or more complex to read, understand and remember (Sanders, Spooren & Noordman, 1992). In Chapter 2, we will present the lists of discourse relations that are used in major frameworks of discourse coherence such as Segmented Discourse Representation Theory (Asher & Lascarides, 2003), Rhetorical Structure Theory (Mann & Thompson, 1988), the Penn Discourse Tree Bank corpus (Prasad et al., 2008) and the Cognitive Coherence Relations model (Sanders et al., 2018). We will also explain the underlying assumptions that each of these models makes about discourse and analyze the impact of these assumptions on their definition of discourse relations and connectives.

But first of all, we need to explain what exactly we mean by the word 'discourse', a term that we have already used repeatedly without defining it. The important point to emphasize is that this term is used more broadly in linguistics compared to its meaning in everyday conversation, where it tends to focus on spoken and often monological productions. In linguistics, the term 'discourse' is often used to describe any form of linguistic production that goes beyond the level of the sentence, be it spoken or written, monologic or dialogic. Some authors use the term 'text' with a similarly broad meaning. For example, Halliday and Hasan (1976: 1) define a text in the following way: "the word text is used in linguistics to refer to any passage, spoken or written of whatever length, that does form a unified whole." In this book, we will use the word 'discourse' over 'text' for this broad category because it has become more widespread in recent literature, but it is important to bear in mind that it covers the same productions that other authors describe as texts.

Another important element for the analysis of discourse compared to other levels of linguistic analysis is that it focuses on language in use rather than on linguistic forms (Brown & Yule, 1983), even though we will see below that connectives can also be analyzed as linguistic forms that contribute to making a discourse cohesive and therefore form an

integral part of its analysis. Yet, a discourse should not be defined solely based on its structure. In fact, the fundamental defining feature of a discourse is that it forms a coherent whole. Coherence is a cognitive rather than a linguistic notion, denoting readers' and hearers' ability to interpret it based on linguistic content and inferences linked to context, rather than on its linguistic features alone (see 2.4).

Finally, the linguistic structure and meaning conveyed by a piece of discourse are obviously quite varied depending on whether it is a spoken informal chat between friends, a spoken political address, an email to work colleagues, or a written literary work. This variation is often characterized in terms of the notions of 'genre' and 'register.' Stukker, Spooren and Steen (2016: 9) define the notion of genre as "a conventional way to perform linguistic activities through language" and list novels, speeches, debates, conversations and chats as examples of genres. Additionally, the notion of genre is often linked with the notion of register. In this book, we define register as the degree of formality of the language used in a given genre. For example, the genre of political speeches typically includes language from a high register, whereas the genre of chats involves a low register (but see Conrad & Biber, 2019 for an alternative definition of these notions). We will discuss the use of discourse relations and connectives across various genres and registers in Chapter 7.

Going back to the short excerpt in (1), you may have noticed that the examples we gave of discourse relations were systematically linked to the use of a specific connective: the relation of temporal sequence was indicated by *after*, the relation of temporal simultaneity by *while*, the causal relation by *since*, and the additive relation by *and*. Discourse relations are indeed very often signaled by a connective, and this is the reason why this book includes an analysis of both discourse relations and connectives, as these two concepts are very closely intertwined. In fact, the short excerpt of sixty-six words presented in example (1) contains as many as five occurrences of connectives (*after*, *while*, *while*, *since*, *and*), which illustrates both the importance of connectives as indicators of discourse relations and their high frequency in discourse. As we will see in Chapter 6, the frequent use of connectives in discourse can be explained by the fact that they play an important role in the way discourse is understood and remembered. They also facilitate the online processing of discourse by speeding up reading.

Yet, despite the importance and prevalence of connectives for the communication of discourse relations, they are not compulsory for a discourse relation to be conveyed between two discourse segments.

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In fact, discourse relations can also be left implicit and recovered by inference. For instance, in excerpt (1), there is a relation of contrast between the usual process described by the author for reviewing a book in the first sentence – “Usually after I finish a book, I write my review immediately while everything is still fresh in my head” – and the second sentence describing how this particular review was performed – “This one, I had to stew about overnight while I decided how I wanted to rate it.” Yet, this relation of contrast is not marked by any connective, even though a contrastive connective such as *whereas* could have been inserted between the two sentences, as illustrated in (2).

- (2) Usually after I finish a book, I write my review immediately while everything is still fresh in my head, **whereas** this one, I had to stew about overnight while I decided how I wanted to rate it.

[adapted from: Amazon.com]

However, the author of (1) chose not to use a contrastive connective, trusting her audience to recover the intended relation by inference. This example illustrates the fact that connectives are not compulsory for discourse relations to be communicated. We will discuss in Chapter 6 the cognitive differences between relations that are conveyed explicitly with a connective or implicitly. We will see that connectives facilitate the processing of a discourse relation but at the same time add an additional word to the sentence that needs to be decoded and processed. For this reason, speakers usually (unconsciously) decide to use a connective or not by striking a balance between the burden of uttering an additional word and the benefit of a connective facilitating the processing and comprehension of the intended discourse relation.

Finally, let's note that when conveying a discourse relation, the speaker is not faced with a binary choice between using and not using a connective. Depending on the relations, there are an array of alternative signals that they may use to indicate the intended discourse relation (e.g., Das & Taboada, 2018; Hoek, Zufferey, Evers-Vermeul & Sanders, 2019; Crible, 2022). For example, a relation of causality can be conveyed by using a relative clause (3) or even a punctuation mark such as a colon (4).

- (3) I won't go into the premise of this book that has been out for quite a while now.
- (4) I won't go into the premise of this book: it has been out for quite a while now.

[adapted from: Amazon.com]

Similarly, a relation of contrast can be conveyed by a lexical contrast between the words used in the two discourse segments. For example, in (2), a contrast could be established thanks to the use of “a book” in the first sentence and “this one” in the second. Usually, discourse relations that can be expressed by various alternative signals are also those that are less frequently conveyed by means of a connective (Das & Taboada, 2013). The availability of such signals is not, however, the only relevant factor. Discourse relations that are cognitively easy to infer because they are highly expected in discourse such as causality and addition (Murray, 1997; Sanders, 2005) are also conveyed implicitly much more frequently compared to relations that are more unexpected and therefore difficult to infer (Hoek, Zufferey, Evers-Vermeul & Sanders, 2017). Crible (2022), on the other hand, found that rather than relational complexity, it is the ambiguity of the connective that influences the use of alternative signals: signals co-occur more with ambiguous connectives than with more informative ones.

In sum, discourse relations are the links that hold sentences together within a discourse and contribute to making it coherent. These links rely both on linguistic elements such as connectives to indicate them, and also on the cognitive ability of the addressees to derive appropriate inferences based on context.

### 1.2.2 Connectives

Connectives form a functional category of lexical items used to explicitly mark discourse relations between discourse segments. It includes words like *after*, *while* and *since*, as illustrated in example (1), but also many others like *if*, *when*, *in addition*, *however*, *but*, etc. In fact, most Indo-European languages possess a vast repertoire of connectives including several hundred different lexical items.<sup>1</sup> For example, the German dictionary of connectives DiMLex contains 275 entries (Stede, Scheffler & Mendes, 2019) and the French database of connectives Lexconn contains 328 entries (Roze, Danlos & Muller, 2012).

The definition of connectives that we just gave is the one we will use in this book. However, this is not the only definition that can be found in the literature, nor is it a unanimously accepted one, as we will see in Chapter 3. As we observed in the case of discourse relations, the definition of connectives can vary depending on the goal of the research and its domain. This variability is first noticeable in the

<sup>1</sup> Lexicons of connectives in many different languages can be found at: <http://connective-lex.info/>.



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various names given to the same lexical items, for example, discourse markers (Schiffrin, 1987), pragmatic markers (Fraser, 1996) and, somewhat less frequently, cue phrases (Knott & Dale, 1994) and discourse relational devices (Stede, Scheffler & Mendes, 2019). Even though the element of connectivity, mentioned in our definition, is quite widely accepted in most definitions (Crible, 2018), there are important differences in the type of links envisioned across various frameworks. While we focus exclusively on discourse relations such as cause and condition in our definition, other frameworks extend these connections to what Schiffrin (1987) calls other “planes of discourse.” For example, the word *so* in (5) links the new utterance to previous ones by introducing a topic shift and acts as a turn-taking device. This example is taken from a real telephone exchange recorded for the Switchboard corpus<sup>2</sup> (Godfrey, Holliman & McDaniel, 1992).

- (5) A: I would think so, um seems like these all they all went to uh to leaf and it wasn't until late in the summer they started making fruit so I don't know if my mom would say you planted them in the wrong sign of the moon “you know but I don't”.
- B: So, a lot of times I'd help her with that. I haven't had much opportunity to work on any other craft stuff lately we've been trying to start up a business and then trying to get my garden going.

[sw2093B-ms98-a-0008]

In her work, Schiffrin is interested in the role of discourse markers across these various planes of discourse. For this reason, the lexical items she considered in her analysis are only partly convergent with the items that we include in the category of connectives: elements like *since* and *but* that can signal discourse relations, but also elements like *well*, *I mean*, *uh* and *you know* that typically play different roles in discourse. For example, the uses of *um* and *uh* in (5) are linked to discourse planning. Other markers like *you know* and *I mean* are often used for the management of interpersonal relations, as in (6) taken from another excerpt of the same exchange in Switchboard:

- (6) No, no, no like that Joe, Jose Canseco [laughter] **you know, I mean**, oh.

[sw2105A-ms98-a-0048]

<sup>2</sup> <https://catalog ldc.upenn.edu/LDC97S62>.

For this reason, we will consider in this book that the notion of discourse markers covers a broader category of items from which connectives – defined as markers of discourse relations – represent only one particular subtype.

It is important to note that while the categories of discourse connectives and markers are partially divergent, they cannot be treated as two entirely separate categories. In many cases, the same lexical item can have both connective and marker uses. For example, in addition to its function as a turn-taking device illustrated in (5), *so* can also be used to convey a discourse relation, namely a relation of consequence, as illustrated in another occurrence of this word from the same exchange in (7).

- (7) It wasn't until late in the summer they started making fruit so I don't know if my mom would say you planted them in the wrong sign of the moon.

[sw2093A-ms98-a-0058]

We will come back to the complex relations existing between the categories of connectives and discourse markers in Chapter 3. In addition to the ambiguity between connective and marker usages, many connectives can also be used in contexts in which they do not play a role in linking discourse segments at any level but rather act as semantic components of the sentence. For example, such non discursive uses are found in yet another occurrence of the word *so* from the Switchboard dialogue (8) and is also illustrated by the use of *while* from the book review presented above (9).

- (8) I would think so.

[sw2093A-ms98-a-0058]

- (9) This novel has been out for quite a **while** now.

[Amazon.com]

We will discuss this kind of ambiguity in more detail in Chapter 4, where we will show how different syntactic distributions may distinguish between connective uses and non-connective uses. Let's note for the time being that the polyfunctionality of words used as connectives and markers is no accident. Historically, connectives evolved through a process of grammaticalization (Hopper & Traugott, 2003) by which lexical words progressively lose their semantic meaning and start incorporating other non-lexical functions. Similarly, connectives that act as linking devices between semantic contents, for example, relating

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facts or events in discourse, progressively take on more pragmatic functions, for example, acting as turn-taking devices or indicators of interpersonal relations through a process sometimes called “pragmaticalization” (Degand & Evers-Vermeul, 2015). We will discuss the grammaticalization and pragmaticalization processes underlying various connective uses across languages in Chapter 5.

At the beginning of this section, we defined connectives as a functional category of words. Indeed, connectives do not form a grammatical class in the same way as adjectives or verbs do. In fact, connectives come from a series of different grammatical categories, comprising mostly coordinating conjunctions (*and, but, so*), subordinating conjunctions (*although, because, if, since, when, while*) and adverbs (*even though, however, nevertheless, therefore*) but also prepositions (*before, after*). In other words, connectives are grouped into a single category not because of their common grammatical features but because they have the same function in discourse: indicating discourse relations. It would thus be tempting to conclude that grammar plays little role in the study of connectives. We will argue in Chapter 4 that this is not the case. The grammatical category to which a connective belongs limits the positions that it can take in the sentence. For example, coordinating conjunctions are not used in sentence final position (or when they are, their function changes, see Chapter 5). Yet, some discourse functions seem to be preferentially communicated in specific syntactic positions within the sentence (Dupont, 2021). For example, interpersonal functions of discourse markers seem to be associated with turn-final positions (Degand, 2014; Degand & Crible, 2021). We will address the syntactic aspects of connectives and, more generally, the interface between syntax and discourse in Chapter 4.

To conclude, it is important to stress that even though connectives and discourse relations are two closely related notions, there are generally no one-to-one mappings that can be established between them. On the one side, most discourse relations can be conveyed by more than one connective. For example, in the Penn Discourse Treebank annotated corpus, the relation of concession is alternatively conveyed by the connectives *although, but, even if, even though, however, still, though* and *while*. On the other side, the connective *although* is used to convey, in addition to a relation of concession, relations of comparison, contrast, and juxtaposition, among others. The connective *but* receives as many as twenty-nine different sense tags (PDTB Research Group, 2008). Thus, the study of connectives as indicators of discourse relations raises many important issues related to the complex form–function mappings that they involve. Throughout this book, we will discuss the

differences of meanings between several uses of the same connective depending on context, and the subtle meaning and usage differences that exist between different connectives that can be used to express the same discourse relation across various genres and in different languages. We will also discuss the impact of the multifunctionality of some connectives for the way children, learners and adults process, use and understand them.

### 1.2.3 Cohesion and Cohesive Ties

The related notions of cohesion and coherence play important roles for the analysis of discourse structure. In this section and the next one, we will briefly present them in order to explain what roles connectives and discourse relations play in discourse cohesion and coherence.

The notion of cohesion has been analyzed in some depth in Halliday and Hasan's (1976) seminal book *Cohesion in English*. Halliday and Hasan observe that what makes discourses coherent wholes is that they exhibit "texture", or in other words, the fact that they are made of elements that bind sentences together. For example, in the excerpt of the book review presented in (1), the first sentence mentions "a book". In the second sentence, the author references the book she wants to review by using the expression "this one" and at the end of the sentence simply by "it". These uses of different referential expressions at various points in the discourse are examples of texture. Starting the review with a referent other than "a book" in the first sentence would have made it impossible for the audience to identify which referent was intended. Conversely, later on in the discourse, repeating the first referential expression "a book" or even "this book" would produce an impression of incoherence, as illustrated in (10).

- (10) This book, I had to stew about overnight while I decided how I wanted to rate this book.

[adapted from: Amazon.com]

Thus, referential expressions are what Halliday and Hasan call cohesive ties that contribute to giving texture to a discourse. More generally, cohesive ties designate all pairs of elements in a discourse that are cohesively related. We will briefly discuss the different types of cohesive ties in this section. But before that, we still need to provide a more detailed definition for the notion of cohesion.

According to Halliday and Hasan (1976: 4), the notion of cohesion is a semantic one that characterizes the relation of meaning between two elements within a discourse that are linked by a cohesive tie. In other words, there is a cohesive relation between two elements when the

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interpretation of one of them in the discourse presupposes a reference to another element. For example, the interpretation of the pronoun “it” in the example above presupposes access to a full-fledged referential expression earlier in the discourse. In the absence of such a reference, “it” can potentially be used to designate any inanimate object. Thus, cohesion forms an integral part of the system of language, as it is realized by linguistic elements found in the discourse. As we will see in the next section, this is a major difference between cohesion and coherence.

A first category of cohesive ties discussed by Halliday and Hassan is precisely referential expressions, such as the use of “it” in the example above. In this case, the antecedent of the pronoun, the noun phrase “this book” is also part of the discourse. This is a typical case of anaphora. In other cases, the referential expression that needs to be understood in relation to another one can also be placed before the noun phrase in the discourse, forming a cataphora, as in (11), where the reference of the pronoun “it” is linked to the noun phrase “the book” in the second sentence.

(11) I loved it. This book is really well-written.

[constructed example]

In other cases still, the referent to which a referential expression must be linked is not found in the discourse itself but must be retrieved from the context. This is the case for (12), in which the reference of the temporal adverb *today* is not provided in the discourse.

(12) Today, we are going to discuss cohesive ties.

[constructed example]

The common point between these three cases is that there is a second element to which the referential expression must be tied in order to be interpretable. For this reason, this category of referential expressions is also sometimes called non-autonomous expressions, in contrast to autonomous expressions such as “a book” that do not need to be tied to another element in the discourse in order to be interpreted (Milner, 1992).

In addition to reference, a relation of cohesion can also involve a process of substitution. As its name indicates, the relation of substitution involves the replacement of a word or group of words by another one that is equivalent in the discourse. Contrary to reference, the equivalence produced by a substitution is not at the abstract level of meaning but at the level of the words that are used. For this reason, Halliday and Hasan situate the relation of substitution at the lexicogrammatical level rather than at the semantic level. An example of substitution was found in example (1), with the relation between “a

book” and “this one”. Here the use of “one” replaces the word “book” in the second occurrence. A similar case to substitution is an ellipsis, in which a word is substituted by nothing, or in other words not repeated, in the second occurrence. Ellipses are often found in question–answer pairs, as illustrated in (13). Here the subject and the verb are not repeated in the answer. Yet, such omissions give texture to the discourse and make it more cohesive compared to a fully explicit version in which all elements are repeated, as illustrated in (14).

(13) Alice: What do you like to eat?

Barbara: Lasagna.

(14) Alice: What do you like to eat?

Barbara: I like to eat Lasagna.

[constructed examples]

Connectives also represent an important type of cohesive tie in discourse. Contrary to references, ellipses and substitutions, connectives do not rely on an anaphoric relation between two elements in discourse. Their role is to give instructions on how to interpret the intended relation between two discourse segments. As such, they also presuppose the existence of other elements in the discourse. Just like references, they can in some cases be used to anchor a discourse segment to a non-linguistic context. The consequence relation expressed by *so* in (15) represents one such case.

(15) [Context: Anne, who claims to be on a diet, brings herself a plate with a big burger and fries.]

Sascha: So, you think this will help you lose weight?

[constructed example]

Another important difference between connectives and other cohesive ties is that many of the coherence relations they convey are independent of the order in which the two related segments occur in discourse. For example, the causal relation conveyed by *since* remains unchanged when S1 precedes S2, as it was used in the original version of the book review repeated in (16) or when the order is reversed, as in (17).

(16) [I won’t go into the premise of the book  $s_1$ ] since [this novel has been out for quite a while now  $s_2$ ].

[Amazon.com]

(17) Since [this novel has been out for quite a while now  $s_2$ ], [I won’t go into the premise of the book  $s_1$ ].

[adapted from: Amazon.com]

## 1.2 Defining the Main Constructs

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Finally, connectives also differ from other types of cohesive ties in that the segments they relate to are not always close to them and clearly circumscribed. For example, in (18), the additive relation holds between the bracketed elements rather than those immediately preceding and following the connective *also* in this discourse from a debate at the European Parliament and collected as part of the Europarl Corpus (Koehn, 2005).

- (18) [We are concerned, therefore, as others have said, at the number of amendments which seek to exclude even further some of society's most excluded, by aiming for a very narrow definition of "refugee". <sub>s1</sub>] My group will not be supporting those amendments. [We are **also** concerned at the number of amendments which, in seeking to introduce greater flexibility, run the risk perhaps of obscuring responsibility for the management of the EQUAL initiative. <sub>s2</sub>]

[ep-00-02-14]

Another example of *also* used in the European Parliament illustrates the fact that a segment connected by a connective can go beyond the scope of a given sentence, often spanning several sentences as in (19) where the first segment is made of seven rather long sentences.

- (19) [Could I thank Commissioner Patten for coming here at short notice to respond to our wish to debate this very critical issue and as others have said, the television pictures that we have seen of the stricken Limpopo valley in Mozambique are absolutely heartbreaking. Children have lost parents, families are bereft, hopeless, helpless and they have lost absolutely everything. But of course, as others have said, this whole thing was predicted and predictable and the slow and very inadequate, woefully slow and woefully inadequate response is something that should dictate now that we actually do invest seriously in disaster preparedness. There is a case as the Commissioner mentioned for the implementation of a rapid response facility and rapid response force in situations like this to deal with crises such as we have there because we simply did not have the strategies or the logistical preparations in place. This morning there were seven helicopters and of course those helicopters were only working in the Gaza region. The Save river has huge flooding problems as well but no one has even been there yet. 85% of the work is within an hour of Maputo so we really have no idea what

the extent of the problem is.  $s_1$ ] Also [I would like to say  
Commissioner that European citizens want to know exactly  
what ECHO is doing.  $s_2$ ]

[ep-00-03-01]

Taken together, these examples illustrate the fact that identifying the segments related by a connective is not always an easy task and forms an integral part of the analysis of discourse relations, as we will see in Chapter 2.

In sum, we have argued in this section that connectives belong to the category of cohesive ties, and therefore contribute to giving texture to a discourse. We will see in the next section that the impression of texture linked to cohesive ties, even though important, is not always enough to make a discourse appear coherent.

#### 1.2.4 Discourse Coherence

While the notion of cohesion is strongly dependent on the linguistic elements contained in a discourse, that of coherence is a cognitive one linked to people's ability to interpret a discourse. Cohesion and coherence are to some extent related, as a discourse that doesn't contain any cohesive tie can hardly be coherent, when it is made of more than a couple of sentences. Compare, for example, the short discourse we presented in the introduction to this chapter with a modified version in which cohesive ties have been removed in (20).

- (20) Usually I finish a book, I write a review immediately, everything is still fresh in my head. This book review, I had to stew about overnight, I decided how I wanted to rate the book. I won't go into the premise of the book, this novel has been out for quite a while now, there are plenty of other reviews that go into the premise of the book.

[adapted from: Amazon.com]

Yet, even though they are important in giving texture to a discourse, the use of cohesive ties does not guarantee that a discourse will be perceived as coherent. The mini-discourse in (21) contains as many as five cohesive ties, indicated in bold, yet it does not appear to be highly coherent.

- (21) Alex is happy **because** **his** cloud is green **so** **he** got a gift  
from **his** parents.

[constructed example]



## 1.2 Defining the Main Constructs

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The reason for this apparent lack of coherence is that it is difficult to access a context in which there is a plausible causal relation between having a green cloud and a state of happiness. But imagine now that (21) was uttered by Alex's teacher to the school principal, in order to inform him that one of her students, Alex, is happy because the evaluation that he received, in the form of a cloud that can take several colors (green for very good behavior, yellow when some improvements are needed, etc.) is very good. Alex's parents promised their son a gift if his behavior in school was impeccable and will therefore offer him the model train set that he dreams of. With this context in mind, the logical links between sentences in (21) become perfectly coherent.

In short, this example illustrates that coherence is in the mind of the person interpreting a discourse rather than in the use of specific linguistic devices. Building a coherent discourse thus requires the ability to supply appropriate context in order to form a mental model based on linguistic elements that are always to some extent underspecified.

The ability to infer the appropriate discourse relation is a crucial element of discourse coherence, as these relations represent the logical links uniting discourse segments. For this reason, discourse relations are also called 'coherence relations' in some models of discourse structure. Discourse relations create coherence at a local level: they usually unite only two discourse segments. This is however not enough to ensure that a discourse will be perceived as globally coherent. Consider, for example, the discourse from a patient with schizophrenia in (22) that does not seem to make sense globally, yet a discourse relation can clearly be identified between each discourse segment. The second sentence is an elaboration of an element presented in the first sentence (geography), the third sentence elaborates on another element of sentence two (Prof. August A.) and so on for all other subsequent sentences.

(22) Then, I always liked geography. My last teacher in the subject was Professor August A. He was a man with black eyes. I also like black eyes. There are also blue and grey eyes, and other sorts, too. I have heard it said that snakes have green eyes. All people have eyes. There are some, too, who are blind. These blind people are led by a boy. It must be terrible not to be able to see. There are people who can't see, and, in addition, can't hear. I know some who hear too much. There are many sick people in Burgholzli, they are called patients.

[example from Bleuler, 1913, quoted by Frith, 1992: 95]

What this short discourse lacks is global coherence, a general topic that holds all the sentences together. The importance of having a general topic accessible when reading a discourse in order to make sense of it was illustrated in a famous experiment by Bransford and Johnson (1972). In this experiment, the authors gave short discourses like (23) to their participants and then asked them to recall them as precisely as possible, and to rate their comprehension.

- (23) The procedure is actually quite simple. First you arrange things into different groups. . . Of course, one pile may be sufficient depending on how much there is to do. If you have to go somewhere else due to lack of facilities that is the next step, otherwise you are pretty well set. It is important not to overdo any particular endeavor. That is, it is better to do too few things at once than too many. In the short run this may not seem important, but complications from doing too many can easily arise. A mistake can be expensive as well. . . At first the whole procedure will seem complicated. Soon, however, it will become just another facet of life. It is difficult to foresee any end to the necessity for this task in the immediate future, but then one never can tell. After the procedure is completed one arranges the materials into different groups again. Then they can be put into their appropriate places. Eventually they will be used once more and the whole cycle will have to be repeated. However, that is part of life.

[from Bransford & Johnson, 1972: 722]

The important manipulation performed in this experiment is that participants were divided into several groups. One group of participants heard the discourse without any additional information. A second group was given a topic for the discourse they were about to hear, and a third group was given a topic after they had heard it. Results indicated that the group who did have an indication of topic before hearing the discourse gave higher comprehension ratings and had a better recall score compared to the group that heard the discourse without any indication of topic. The group who had an indication of topic after hearing the discourse gave ratings and received recall scores that were similar to those of the group who did not get any information. This experiment thus demonstrated quite clearly the importance of processing a discourse with a topic in mind, ensuring global coherence. In the case of (23), the topic of the discourse was “washing clothes”. If you found this discourse hard to follow when you read it, reading it again with the title in mind is likely to give you a very different evaluation of its coherence.

Having a topic in mind likely made such a big difference for participants' evaluation of their comprehension because it enabled them to activate all their background knowledge about the topic, which in turn enriched the mental representations they had built while hearing the discourse. For example, the mention of "things" that have to be arranged into different groups becomes much more precise with the topic of washing clothes in mind, as it is reduced to clothing items. Even though the passages used in this experiment were kept deliberately vague in order to assess the role of prior knowledge, even discourses that are not as vague contain implicit elements that have to be enriched by inference in order to build mental representations of their meaning. In fact, the role of background knowledge is so important that it even seems to matter more than the level of reading skill as a factor accounting for reading comprehension in young readers. In an experiment, Schneider, Körkkel and Weinert (1989) found that 10-year-old children who possessed good prior knowledge about the topic of a text before reading it (in this case soccer) had higher scores on comprehension questions after reading the text compared to 14-year-olds who did not have a similar background knowledge on the topic, even though the second group had four more years of reading practice.

To summarize, we have argued in this section that coherence is a cognitive notion linked to readers' ability to interpret a discourse. Discourse relations are important elements contributing to building a coherent mental model of a discourse. However, their role is limited to linking elements locally, and such local coherence is not sufficient to ensure that the discourse as a whole will be perceived as coherent. Global coherence rests on the identification of the topic of a discourse, and the latter is linked to the ability to reconstruct the speaker's global informative intention (Reboul & Moeschler, 1998).

### **1.3 KEY CONSIDERATIONS FOR THE STUDY OF DISCOURSE RELATIONS AND CONNECTIVES**

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The analyses of discourse relations and connectives that we will present throughout this book rely on studies that were performed on empirical data, be it in the form of corpora or controlled experiments. Even though in some research trends, these notions were traditionally analyzed based on invented examples, for example in the context of argumentative discourse as in Anscombe and Ducrot (1977) and within Relevance Theory, for example in Blakemore (1987) and many others, a lot of recent research has demonstrated that such models

often fall short when confronted with real data. For this reason, we will limit ourselves to briefly discussing the import of these theoretical models in Chapter 3. Conversely, we will discuss at some length the many insights gained from the analysis of corpora in different languages and genres and stress the complementarity of findings coming from corpus studies with those of experiments assessing language processing, comprehension and acquisition. The studies discussed in this book do for the most part rely on a quantitative analysis of data. This is a major difference with other research domains such as conversation analysis that use real data to perform detailed qualitative analyses of interactions (e.g., Sidnell & Stivers, 2012). Even though these analyses are interesting and valuable, they lack the potential for generalization that comes with quantitative analyses and that we strive to give in this book. Such quantitative analyses will enable us to answer many crucial questions about the relations between discourse relations and connectives. Examples of such questions are: How often are connectives used to convey discourse relations? What are the other frequently used strategies to convey discourse relations in the absence of connectives? Does the communication of some discourse relations require the use of a connective more than others?

We will also place great emphasis throughout the book on cognitive issues related to the processing, memorization and understanding of the information conveyed by discourse relations and connectives. These issues are indeed central to better understand why and how they are used in various communicative situations. For example: Are discourse relations processed in the same way whether they contain a connective or not? Can we observe processing differences when the same relation is conveyed by different connectives? Do people better understand the content of a discourse when the relations are explicitly indicated with connectives? These questions will form an essential part of Chapters 6–9 of the book. Studies that have assessed these cognitive issues rely on various experimental protocols that go from simple pen and paper tasks – for example, asking people to fill in blanks with the appropriate connective from a list – to complex eye-tracking experiments and brain studies in the form of event-related potentials and fMRIs. We will strive to present these studies in as simple a way as possible, while enabling readers to understand the key methodological aspects of these methods. We will argue that investigating the same questions through offline methods measuring the product of comprehension, such as fill-in the blank tasks or comprehension tasks and online methods tracking processing as it unfolds – like self-paced reading and eye-tracking – provide complementary results that shed greater

### 1.3 *Study of Discourse Relations and Connectives*

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light on these issues. We will therefore systematically seek to compare results from various types of experiments when they are available and underline the advantages and limitations of each of them.

Another main goal of the book is to compare the use and processing of connectives and discourse relations across different groups of speakers and addressees. We will present data from adults who are native speakers in Chapters 6 and 7, before moving on to data from children and teenagers in Chapter 8 and finally learners in Chapter 9. Considering data from children will provide answers to many important questions, such as: When do children start using connectives in the course of first-language acquisition? Do they first start producing implicit relations before mastering connectives? What is the order of acquisition between different discourse relations and connectives? Are children able to process and understand discourse relations and connectives already when they start reading? How does the ability to master connectives continue to develop during teenage years? Similarly, the integration of data from learners also contributes to giving many important answers to questions such as: Are learners able to use and understand connectives in their second language? Do they use the information conveyed by connectives while processing discourse relations in a similar way as native speakers? Do learners' difficulties with connectives come from negative transfer effects related to their first language, or to more general limitations in proficiency?

Throughout these chapters, we will provide results from studies that have assessed the ability to use, process and understand connectives and discourse relations in different discourse genres and registers. Chapter 7 is more specifically dedicated to investigating the impact of genres and registers on the use of various discourse relations and connectives. This chapter will address questions, such as: Are some connectives specific to some discourse genres or registers? Does the type of discourse relations that people typically use also vary across genres? Another important issue dealt with in Chapter 7 is the variations that exist between languages in the uses of discourse relations and connectives. Taking a cross-linguistic perspective will enable us to address questions like: What differences are there between connectives that are used to convey the same discourse relation in different languages? Are discourse relations typically conveyed differently across languages? Can connectives be easily translated from one language to another? The attention to cross-linguistic matters will not be restricted to Chapter 7. Throughout the book we will strive at illustrating models, descriptions, approaches and findings in a wide variety of languages from different language families. We thus aim to demonstrate that

discourse connectives and relations and their complex interrelations are at work in any natural language and that their theoretical and methodological accounts should be cross-linguistically valid.

Finally, the study of discourse relations and connectives has many important interfaces with other domains of language, and we will explore them throughout the book. Chapter 3 will explore the interface between semantics and pragmatics in order to analyze the type of meaning conveyed by connectives. This interface will be tackled again from the perspective of language change in Chapter 5, by analyzing the process of grammaticalization involved in the emergence of new meanings and functions for discourse connectives, for example the evolution from temporal to contrastive meaning of the connective *while*, or the use of *so* as an indicator of consequence to its use as a turn-taking device. This analysis of semantic and pragmatic aspects of connectives' meanings will lead to the discussion of several important issues: What is the type of meaning encoded in connectives? How can we account for semantic ambiguity in connectives? How does the meaning of connectives evolve?

The analysis of connectives will not be limited to their meanings and functions. In Chapter 4, we will address the interface between syntax and discourse in order to investigate the role of syntax in the use of connectives, more specifically: Does the grammatical category of a connective have an influence on its meanings and uses? What are the links between syntactic position in the sentence and the type of functions that are typically expressed by connectives? What is the role of syntax in the identification of the discourse segments related by a connective? Can syntactic structures replace the use of connectives for the communication of some discourse relations? In the case of spoken data, this interface extends to the domain of phonology and the analysis of prosodic contours that are associated with various uses of connectives. We will discuss these aspects when comparing the functions of connectives across the spoken and written registers in Chapter 7.

## **1.4 SUMMARY**

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The primary goal of this chapter was to introduce the main concepts that will be discussed throughout this book, namely the notions of discourse relations, connectives, cohesion and coherence. We have started by defining the notion of discourse relations, emphasizing their strong links with connectives but also stressing that they can also be conveyed in the absence of them. They should therefore be studied in

their own right as a cognitive rather than a lexical phenomenon. We have seen that discourse relations are numerous and varied, covering many different types of logical links that can hold between discourse segments, such as causality, temporality and contrast. We have also defined the notion of connectives as linguistic items that are used to make discourse relations explicit in discourse. We have argued that connectives represent a subset of the more generic category of discourse markers that also encompasses non-relational devices involving the management of interpersonal relations and discourse planning. We have seen that drawing a line between connectives and markers is however a difficult task, as the same lexical items can often take the two types of functions depending on context. We have also insisted on the fact that the form–function mappings between connectives and discourse relations are complex and manifold. We have then moved on to defining the related notions of discourse cohesion and coherence. We have defined cohesion as a semantic relation between linguistic elements found in a discourse, such as referential expressions or lexical chains. We have seen that connectives are a specific subtype of cohesive device that are not themselves linked to other elements but rather serve to indicate the link between two external elements in discourse. Moving on to coherence, we have seen that discourse relations are crucial elements to ensure local coherence between discourse segments. We have, however, also argued that such local coherence only represents one aspect of discourse coherence, as a discourse must also be globally coherent. The second aim of this chapter was to introduce the main theoretical and empirical choices made in this book and present the research questions that will be addressed. These choices involve a focus on studies relying on quantitative analyses of empirical data in the form of corpus research or experiments. These studies will encompass various discourse genres, registers and languages. They will also include data from adult native speakers, learners, children and teenagers, and serve to explore the many interfaces between discourse and other domains of linguistic analysis such as semantics, pragmatics and syntax.

### ***DISCUSSION POINTS***

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- Can you summarize the main arguments justifying that the notions of cohesion and coherence should be kept separate?
- What other elements in addition to connectives ensure the cohesion of discourse?

- Why do many authors argue that coherence is a psychological rather than a linguistic notion? (See especially the chapter by Zwaan and Rapp for a cognitive perspective on coherence.)

### ***FURTHER READING***

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The first chapter of Schiffrin's (1987) book on discourse markers, entitled "What is discourse?" provides a very good introduction to the main elements involved in the definition of discourse and its analysis. Similarly, the first chapter of de Beaugrande and Dressler's (1981) book on text linguistics entitled "Basic notions" can be useful to get a grasp on the notions of cohesion and coherence. The subsequent chapters respectively dedicated to cohesion and coherence provide a more in-depth introduction to these notions. The main reference on cohesion and cohesive devices remains Halliday and Hassan's (1976) book entitled *Cohesion in English*. A more recent and concise introduction to cohesion can be found in Martin's (2001) chapter. An accessible introduction to discourse from a psycholinguistic perspective is Zwaan and Rapp's (2006) chapter.



## 2 Theoretical Models of Discourse Relations

### 2.1 INTRODUCTION

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During the last decades, having an explicit representation of discourse structure has become a pressing need for many applications in computational linguistics, such as automatic summarization and human-computer interactions. During the same period, the development of new theories and methodologies in psycholinguistics has also meant that the study of language processing could go beyond the level of isolated sentences. This evolution also implied the need for a cognitively motivated representation of discourse structure, accounting for discourse coherence. In this context, theoretical models of discourse structure have started to emerge since the 1980s in order to provide such explicit representations. We will present a selection of the most prominent ones in this chapter, starting with Rhetorical Structure Theory (2.2) and Segmented Discourse Representation Theory (2.3), two models that share the goal of providing a global representation of discourse structure encompassing every segment of a text, thus going beyond the level of local discourse relations. We will then present lexically grounded approaches to discourse structure that anchor the study of discourse relations in the use of connectives, in particular the Penn Discourse Treebank project (2.4). We will finally present the Cognitive Approach to Coherence Relations, a model emphasizing the need to provide a cognitively plausible account of discourse relations, in the form of a set of cognitively motivated primitives into which all of them can be decomposed (2.5).

In this chapter, our main objective is to provide a succinct description of each model, emphasizing their main goals, and discussing their advantages and limitations. We will also list their specificities compared to other models, and analyze the main differences between them. We will focus more specifically on the aspects of these models that have to do with the description of discourse

relations, and leave aside other components linked to global discourse structure such as schemas, as well as the question of discourse segmentation. We refer interested readers to relevant publications about these aspects of discourse structure at the end of the chapter. For each model, we will present the type of research to which it has been applied, and the data that have been produced in the form of annotated corpora. As we will see, all these models have been used to annotate large corpora with discourse relations. An important issue is therefore to establish mappings between the relations annotated in each of them, in order to compare data from one corpus to the others. We discuss various options for comparing annotations across models in the last section (2.6). A specific model developed for the annotation of discourse markers (and connectives) in spoken discourse focusing on their polyfunctionality and polysemy will be presented in Chapter 3.

## **2.2 RHETORICAL STRUCTURE THEORY**

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Rhetorical Structure Theory (RST) was one of the first models developed in the 1980s (Mann & Thompson, 1988) as an attempt to provide a global theory of discourse structure. The initial goal was to provide a tool that could be used in computer-based text generation. Since then, the theory has also become a valuable descriptive tool in itself, with many different applications.

The starting point for RST comes from the intuitive observation that texts are not made of arbitrary collections of sentences, but rather exhibit internal structure that make them appear coherent to a reader. Thus, in this model, coherence can be defined as an absence of non-sequiturs, in other words clauses following each other without obvious logical links between them. Even though there is no formal obligation that every part of the text is included in an RST analysis, well-formed texts do not usually require not having any elements left out. When performing an RST analysis of a text, the analyst starts by segmenting the text into spans, and then determining the relations between them, called rhetorical relations, a notion similar to the term of discourse relation that we use in this book. Additionally, relations are hierarchical, depending on the lengths of the text spans that they unite. In other words, local relations can be embedded into more global ones within a text.

The list of relations included in RST varies somewhat from author to author, a fact that Mann and Thompson (1988) had already anticipated,

Table 2.1 List of relations in Mann and Thompson (1988)

|                                  |                                      |
|----------------------------------|--------------------------------------|
| <b>Circumstance</b>              | <b>Antithesis and concession</b>     |
| <b>Solutionhood</b>              | Antithesis                           |
| <b>Elaboration</b>               | Concession                           |
| <b>Background</b>                | <b>Condition and otherwise</b>       |
| <b>Enablement and motivation</b> | Condition                            |
| Enablement                       | Otherwise                            |
| Motivation                       | <b>Interpretation and evaluation</b> |
| <b>Evidence and justify</b>      | Interpretation                       |
| Evidence                         | Evaluation                           |
| Justify                          | <b>Restatement and summary</b>       |
| <b>Relations of cause</b>        | Restatement                          |
| Volitional cause                 | Summary                              |
| Non-volitional cause             | <b>Other relations</b>               |
| Volitional result                | Sequence                             |
| Non-volitional result            | Contrast                             |
| Purpose                          |                                      |

as they foresaw that different relations might be needed for different languages or text types (see also Taboada & Mann, 2006a). One of the most widely accepted versions (sometimes called “classical RST”) of the list comes from their 1988 paper, and includes 23 relations, summarized in Table 2.1.

Later on, other relations such as *list*, *means*, *preparation*, *unconditional* and *unless* were added to the list (Mann, 2005). Even though there is no upper limit to the number of relations that can be included in RST, many authors warn against adding a great variety of relations that could not be identified reliably by analysts.

The list of relations proposed by Mann and Thompson (1988) is not really organized as a taxonomy with different families of relations. The authors explain that in their view, there isn’t one single taxonomy that would be entirely appropriate, as different groupings could be made depending on the research question. Still, a division that has often been suggested within RST concerns the opposition between relations that deal with the subject matter of the text, such as elaboration, solutionhood, all types of causal relations, etc. Their function is to be recognized and understood by the reader. The other category includes relations that deal with presentational aspects of the text. In other words, their role is to produce an effect on the reader. For instance, relations of justification are inferred when one segment increases the likelihood that the reader will accept the claim presented in the other segment.

A specificity of RST compared to other frameworks comes from the identification of two different parts for most relations, called the nucleus and the satellite. Nuclei represent the most important part of the relation, whereas satellites are more secondary. If all nuclei are removed from a text, its content is not interpretable anymore. But if satellites are removed, the text, even though incomplete and agrammatical, can still be understood. For example, in a relation of evidence as in (1), the two related text spans include a claim ('nobody is at home') and the evidence backing it up ('the lights are out'). In this case, the claim is the most important span, hence the nucleus, and the evidence is the satellite. To take another example, in a relation of elaboration as in (2), the nucleus contains the basic or main information ('Paul had a great holiday') and the satellite the additional information ('He went swimming...').

- (1) The lights are out, so nobody is at home.
- (2) Paul had a great holiday. He went swimming, ate good food and partied every night.

[constructed examples]

While there is no fixed order for nuclei and satellites within a text, preferential patterns have been observed for some relations. For example, in relations of elaboration, restatement or enablement, the nucleus usually comes first in the text, followed by a satellite. In contrast, for relations of concession, condition or background, the satellite typically comes first and the nucleus second. Other relations do not display a preferential order. Other relations still don't have a segment that is more important than the other, as for example the relation of contrast in (3). The two parts are simply the two sides of the contrast. These relations are called multinuclear. Other examples of multinuclear relations include lists and sequences.

- (3) Helen is blond but Sandra is a brunette.

[constructed example]

Both types of relations can apply either at the sub-sentential level, as in (4) for multinuclear relations and (5) for nuclear relations, or between sentences, as in (6) for multinuclear relations or (7) for nuclear ones.

- (4) Peel the carrots, and slice them into thin slices.
- (5) Good as it may look, I won't eat dessert.
- (6) Peel the carrots, slice them into thin slices. Cook them briefly in the pan, and serve hot.

## 2.2 Rhetorical Structure Theory

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- (7) I could say a lot more about this topic. But time is up, and  
I will stop there.

[constructed examples]

In RST, each relation comes with four types of constraints: a constraint on the nucleus; a constraint on the satellite; a constraint on the combination of the nucleus and the satellite; a constraint on the effect produced. For instance, the relation of evidence poses a constraint on the nucleus that the reader may not believe the content of the nucleus to a degree that is satisfactory to the writer. The constraint on the satellite is that the reader either believes it or will find it credible. The constraint on the relation between the nucleus and satellite states that the reader's comprehension of the satellite will increase their belief in the nucleus. The intended effect is that the reader's belief in the nucleus is increased. A label of evidence can be used only if the analyst is convinced that the writer wanted the effect to be inferred.

The constraints vary greatly from relation to relation. To take another example, the relation of justification does not pose any constraint on the nucleus or the satellite, only on their combination: the fact that the reader comprehends the satellite will increase their willingness to accept the writer's right to present the nucleus. The effect is therefore to increase the reader's willingness to accept the writer's right to present the nucleus.

A big corpus of texts in English, comprising 385 documents from the Penn Treebank made of articles from the Wall Street Journal, has been annotated with RST relations (Carlson & Marcu, 2001). This corpus was built in order to help the development of computer-based applications such as text summarization, machine translation and document retrieval (Taboada & Mann, 2006b). It has also been very useful for answering important questions about the description of discourse relations, as well as their signaling. As the examples above illustrate, RST is focused on defining the way text spans are connected by different types of relations. Since all text spans are included in the annotation, it becomes possible to compare the ways in which various relations are signaled.

Das and Taboada (2018) annotated all the signaling devices used to convey relations in the RST corpus, including connectives but also other lexical, syntactic, semantic, graphical and genre features, and found that 90 percent of relations in their data were signaled, sometimes even with multiple signals. However, connectives represented a small portion of the signaling devices, as only 11 percent of the relations were signaled exclusively by connectives, against 75 percent of

the relations that were signaled by other means. This explains why connectives are somewhat marginal for RST, a theory mostly interested in the segmentation of texts into discourse relations. On the one side, connectives are not needed to convey a relation, and when they are used, they do not unambiguously convey a relation because many of them are polyfunctional (see Chapter 3). Yet, they also found important differences between relations that were very rarely marked, such as background and restatement, and relations that were very often explicitly marked like concession and condition. These observations have in turn been quite useful to study the role of connectives and other signaling devices for the processing and acquisition of discourse relations (see Chapters 6 and 8).

Since its conception, RST has been applied for analyses in many different domains (Taboada & Mann, 2006b), in addition to the computer applications mentioned above. Even though it was originally designed with English in mind, RST has been used to compare the communication of discourse relations between different languages (see Chapter 7). It has also been used beyond the analysis of monologic texts, and applied to dialogues (e.g., Daradoumis, 1996), and even to studying the links between speech and gestures in communication (de Carolis et al., 2000). RST has also been used to compare the communication of relations across various genres such as academic (Benwell, 1999) and argumentative (Azar, 1999) discourse. Finally, RST has been used to evaluate text writing in L1 (Bouwer, 1998) and L2 (Kong, 1998).

To summarize, RST provides a way to analyze the structure of texts by decomposing them into discourse relations. For this reason, this theory is centered on the notion of discourse coherence and offers a limited place for the study of connectives.

## **2.3 SEGMENTED DISCOURSE REPRESENTATION THEORY**

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Segmented Discourse Representation Theory (SDRT) was developed in the 1990s (Asher, 1993; Lascarides & Asher, 1993) based on two different trends of research from the 1980s, encompassing both formal semantics and theories of discourse. It is first based on Discourse Representation Theory (Kamp & Reyle, 1993), a formal semantics model developed in order to account for discourse phenomena going beyond the level of individual sentences such as anaphoric relations, and second on theories of discourse structure with applications to computational linguistics, such as Rhetorical Structure Theory (see Section 2.1) and Centering Theory (Grosz & Sidner, 1986). SDRT aims at keeping the

### 2.3 *Segmented Discourse Representation Theory*

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formal rigor of DRT while using the notion of discourse relation in order to resolve problems arising from this framework.

One such problem is related to the temporal interpretation of discourse, as illustrated with the following pair of examples:

- (8) Max opened the door. The room was pitch dark.
- (9) Max switched off the light. The room was pitch dark.

[from Lascarides & Asher, 1993: 437]

In both examples, sentences contain verbs in the past tense, and have a similar grammatical structure. In addition, the first sentence describes a punctual event whereas the second one describes a stable state of affairs. Yet, there is a major difference between them in terms of process. While in (8) the state of darkness covers the whole event of opening the door, in (9) this same state of darkness happens only after Max has switched off the light. Yet, DRT does not provide any means to differentiate between these two situations, because it does not take into account the type of discourse relation holding the two sentences together. In (8), the relation is one of background, but in (9) it is a relation of result. With the information from the discourse relation, the distinction between the two examples becomes clear. SDRT was precisely developed to provide means to incorporate discourse relations into a logical representation of discourse, thus accounting for these differences.

A specificity of SDRT compared to other discourse models is its integration of two types of analyses of discourse structures. First, a bottom-up approach starting from minimal discourse units and linking them with discourse relations in a recursive fashion (relations can be embedded in one another). Second, a top-down construction starting from a full or partial discourse structure and identifying signals of global text organization. While Asher et al. (2017) emphasize that both types of structures can lead to similar results, they also note that analyses taking one or the other approach typically focus on different aspects of discourse structure: local relations on the one side, and more global structures on the other. These two analyses also involve a different focus from a cognitive perspective. Conducting a top-down analysis means that readers are believed to look for global textual coherence before assigning local links between sentences, and to focus first on global structures such as thematic continuity or discontinuity rather than more local discourse relations. Within the SDRT framework, both types of structures are deemed important and complementary, and both have been annotated in corpus data (see below).

Table 2.2 *Discourse relations from SDRT (Reese et al., 2007: 8)*

| Coordinating relations |              | Subordinating relations |              |
|------------------------|--------------|-------------------------|--------------|
| Veridical              | Nonveridical | Veridical               | Nonveridical |
| Continuation           | Consequence  | Background              | Attribution  |
| Narration              | Alternation  | Elaboration             |              |
| Result                 |              | Explanation             |              |
| Contrast               |              | Commentary              |              |
| Parallel               |              | Source                  |              |
| Precondition           |              |                         |              |

At the level of discourse relations, SDRT takes a medial position between theories that make use of a high number of relations (such as RST and PDTB), and more minimalist models like the two relations used by Grosz and Sidner (1986). In total, 14 relations have been selected to account for written texts, which was the original objective. These relations are listed in Table 2.2. They are classified first based on a grammatical criterion: whether they introduce horizontal relations between coordinated segments, or whether they introduce a hierarchic relation with a subordinate clause. It also distinguishes between veridical relations that entail the content of their arguments, and nonveridical relations that do not entail the content of at least one of the arguments.

In SDRT, discourse relations are characterized semantically. With this precise semantic description, it can be verified whether two relations are the same, if one of them entails the other or if they are incompatible. An example of such a definition is given below for the relation of explanation, taken from Reese et al. (2007: 12):

When  $\alpha$  and  $\beta$  introduce eventualities in the dynamic sense (i.e. existential quantification over eventualities occurs with wide scope over modal operators, negation or non-existential quantifiers),  $\text{Explanation}(\alpha, \beta)$  holds when the main eventuality of  $\beta$  is understood as the cause of the eventuality in  $\alpha$ . *Explanation* has temporal consequences, viz. that the eventuality described in  $\beta$  precedes (or overlaps) the eventuality described by  $\alpha$ . *Because* is a monotonic cue for *Explanation* [...] ‘After’ and ‘when’ sometimes signal *Explanation*.

This example illustrates several important points. First, relations are described in relation to one another, as for example the link between temporality and explanation. Second, relations are defined independently of discourse connectives and other markers that are deemed to be



### 2.3 Segmented Discourse Representation Theory

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too ambiguous, but they are still listed as potential indicators of a relation, such as *because*, *after* and *when* in the case of explanation relations. The strength of each signal is also indicated. In that sense, SDRT is similar to RST, a theory also focusing on relations rather than the signals conveying them. Another similarity between these two models is that all textual segments are included in the analysis, as all of them except for the first segment in the text are hypothesized to be linked to at least another with a discourse relation in coherent texts.

There are also a couple of important differences between RST and SDRT, in addition to the different number of relations included in each model, and the way they are labelled. Contrary to RST, in SDRT several relations can be presented simultaneously between two discourse segments, as for example in (10). In this example, the two segments are linked both by a relation of contrast and of narration, as the presence of the two connectives *but* and *then* indicates. If only one relation were allowed between these segments as in RST, analysts would have to choose between them, and thus lose part of the information conveyed.

(10) John gave Mary a book, but then he took it back.

[translated from Busquets, Vieu & Asher, 2001: 82]

There is also another difference in the representation of discourse relations between the two models. In SDRT, the structure of discourse takes the form of graphs rather than trees. This implies the possibility of having attachments between parts of texts that are not contiguous, as in (11) from Asher et al. (2017: 1245) where the two discourse segments 31 and 33 are linked by a relation of contrast, even though they are not contiguous.

(11) [In 1988, Kidder eked out a \$ 46 million profit,]<sub>31</sub> [mainly because of severe cost cutting,]<sub>32</sub> [Its 1,400-member brokerage operation reported an estimated \$ 5 million loss last year,]<sub>33</sub> [although Kidder expects to turn a profit this year]<sub>34</sub>.

[RST Treebank, wsj\_0604]

Similarly to RST, in the PDTB framework, implicit relations are annotated only between adjacent segments (see Section 2.4). As a result, these long-distance attachments cannot be represented in these models. This means that part of the existing relations within a text are missed.

Ten years after the initial version of SDRT, Asher and Lascarides (2003) proposed an extension of the model to clarify or simplify some issues, and to make it more suitable for a broader range of linguistic phenomena. One of the extensions was to include relations for the

annotation of dialogues, as the original SDRT version was conceived for written genres. In order to account for the specificities of dialogues, relations linked to questions and requests were added to the general relation of elaboration. Another addition was the relation of adjacency pairs, in order to account for cases when the first segment is a question and the next one is an answer. Another typical aspect of dialogues is that speakers often correct each other. A relation of correction was thus added to account for this phenomenon.

Another novelty was to make the theory modular, in order to separate various aspects of discourse interpretation. In this view, the inference of discourse relations is a specific module that takes as input underspecified semantic representations, world knowledge and lexical information. This module is deemed to be the one gluing all the other aspects of discourse interpretation together, hence the importance of discourse relations for coherence.

SDRT analyses have been implemented in a large corpus of French written texts: the ANNODIS corpus<sup>1</sup> (Reese et al., 2007; Afantenos et al., 2012). This corpus is multi-genre, as it includes texts from news and encyclopedia articles, linguistics research papers, and international relations reports. It therefore encompasses narrative, expository and argumentative genres (see Chapter 7). The ANNODIS corpus includes two types of annotations. A bottom-up annotation of elementary and complex discourse units linked by discourse relations, and a top-down annotation of high-level structures such as enumerative structures and topical chains, in line with the two types of discourse structures identified in SDRT. As both types of annotations required texts of different length (short for bottom-up annotations and longer for top-down ones), they were performed on distinct subparts of the corpus. The annotation of discourse relations was performed in three phases. In a first phase, two naïve annotators annotated 50 documents, and their input was used to create an annotation manual (Reese et al., 2007) describing the relations and giving information about discourse segmentation. In a second phase, three students double-annotated 86 documents after receiving training. In a last phase, an expert annotator adjudicated and corrected the naïve annotations in order to reach a final version of the corpus.

Thanks to these annotations, ANNODIS is a useful resource to compare the frequency of different relations across genres, and to link the occurrence of discourse relations with other discourse phenomena such as the use of pronouns. Since it uses an onomasiological approach

<sup>1</sup> <http://redac.univ-tlse2.fr/corpus/annodis/>.

to discourse structure, focusing on discourse relations and linking all textual segments with at least one other, this corpus has been useful in showing how relations are realized in discourse and in identifying all the different linguistic forms that can be used to signal each relation, contrary to models that start from markers as a way to identify relations. From its inception, SDRT has been of interest for natural language processing applications, and the ANNODIS corpus has been used as training for systems dealing with discourse structure prediction, discourse parsing, relation labeling and sentiment analysis. The inclusion of dialogic data into SDRT has been tested in another project (STAC) involving the annotation of on-line chat dialogues (Asher & Paul, 2018).

In sum, SDRT is a formal model of discourse structure that includes, but is not limited to, the annotation of discourse relations. Like RST, the focus is placed on discourse relations whereas connectives play a rather marginal role due to their ambiguities (see Chapter 3).

## 2.4 THE PENN DISCOURSE TREEBANK FRAMEWORK

The Penn Discourse Treebank (PDTB) is a project that started in the first decade of the twenty-first century to annotate the million words corpus from the Wall Street Journal with discourse information<sup>2</sup> (Webber et al., 2006). More specifically, the idea behind this project is to annotate explicit and implicit discourse connectives throughout the corpus. Implicit connectives correspond to cases where no connective was used in the text, but the annotator judged that there was still a discourse relation that could be inferred between two adjoining text segments, and that this link could be adequately expressed by a connective. In such cases, they inserted this connective, and it counted as an implicit connective. A major difference between the PDTB framework and the other models we discussed so far is that it is not tied to any theory, and does not aim at building global discourse structures beyond the linking of arguments by connectives.

The PDTB can be considered as a lexically grounded approach to discourse (Prasad, Webber & Joshi, 2014), as relations are intrinsically linked to connectives and other signals that can be used to express them. Indeed, annotators are always guided by connectives first (explicit or implicit) before attempting to label the discourse relation that it communicates. One of the main advantages of the PDTB is that it

<sup>2</sup> <https://catalog.ldc.upenn.edu/LDC2019T05>.

provides the most extensive resource of annotated connectives available. In the 2.0 version of the corpus, released in 2008 (PDTB Research Group, 2008; Prasad et al., 2008), there were 18 thousand explicitly and 16 thousand implicitly signaled relations. In the PDTB-3 version released in 2019, 17 thousand new relations were added. These correspond mostly to intra-sentential relations, for example, between conjoined verb phrases with segments containing free adjuncts or to-infinitives that had not been annotated in the previous version. In addition to explicit and implicit relations, the PDTB also contains an annotation of alternative lexicalizations or AltLex. These annotations were used when a relation was not conveyed by an explicit connective but the addition of a connective between the two segments would still be inappropriate because it would lead to redundancy, as other information in the sentence also signaled the relation, as in (12):

- (12) But a strong level of investor withdrawal is much more unlikely this time around, fund managers said. A **major reason** is that investors have already sharply scaled back their purchases of stock funds since Black Monday.

[from Prasad, Webber & Joshi, 2017: 1201]

In this example, the relation of causality cannot be made explicit by adding the connective *because*, as it would be redundant with the information conveyed by the expression “a major reason”. This expression corresponds to a case of AltLex in the PDTB. Given that the identification of alternative lexicalizations was limited to the annotation of implicit relations in which a connective could not be inserted, it is clear that this annotation does not cover all cases in which relations are conveyed by other means than connectives, contrary to corpora annotated within the RST and SDRT frameworks, which include all relations of a given type, independently of its marking.

Two other types of annotations for discourse relations were included. First, the tag EntRel was used when the coherence was entity based, in other words, when the second segment was an extension giving more information about an entity described in the first segment, as in (13) where the second segment provides further information about Hale Milgrim:

- (13) Hale Milgrim, 41 years old, senior vice president, marketing at Elektra Entertainment Inc., was named president of Capitol Records Inc., a unit of this entertainment concern. Mr. Milgrim succeeds David Berman, who resigned last month.

[from Prasad, Webber & Joshi, 2017: 1201]

Finally, when no relation could be perceived between the segments, the tag NoRel was used. When all annotations are put together, the PDTB-3 now contains over 53 thousand tokens of annotated discourse relations (Prasad, Webber & Lee, 2018).

Given the importance of discourse connectives in this framework, a crucial aspect of the project was to define them in such a way as to label as many different relations as possible, while separating them clearly from neighboring classes. In the PDTB-2, connectives were restricted to four well-defined syntactic classes: subordinating conjunctions (*because, when, if, etc.*); coordinating conjunctions (*and, but, or, etc.*); prepositional phrases (*as a result, in comparison, etc.*); and adverbs (*then, instead, yet, etc.*). This list excluded two neighboring classes of lexical markers: cue phrases like *well* and *so* in the sentence initial position that are used for functions like topic shifts rather than for the communication of discourse relations, and discourse markers like *actually* that do not take scope over two arguments. In the PDTB-3 version, the list of connectives has been enlarged to include prepositional subordinators like *for, with, instead of, etc.* that can also complementize for clauses.

The list of discourse relations included in the PDTB takes the form of a hierarchy encompassing three different levels. This list has evolved between the PDTB-2 and PDTB-3 releases. We focus here on the more recent list of relations included in the PDTB-3 in Table 2.3. The list of senses from the PDTB-2 version is described in the annotation manual (PDTB Research Group, 2008) and early experiments with sense annotation are reported in Miltsakaki et al. (2008).

In this list, Level-3 is used only for relations that can have a different directionality. In other words, one or the other argument linked by the connective can take on a specific role, for example, conveying the goal or the cause segment. This is new compared to Version 2 that used this level to make more fine-grained distinctions between sub-types of relations. In the current version, all relation types can be found at Level-2, whereas Level-1 merely categorizes these relations into four main families. A few fine-grained distinctions that could not be annotated reliably or that occurred very rarely were removed from the list (for example, the various subtypes of conditional relations), while a few relations missing from the previous version were added (for example, a relation of *similarity* in the comparison group).

The annotations of connectives were performed using pre-established lists of connectives from the literature, with which annotators proceeded one connective at a time throughout the entire corpus, so that they could benefit from their increasing expertise. A specific tool was developed to perform the annotation in the corpus (Lee et al.,

Table 2.3 *List of relations from the PDTB-3 (Webber et al., 2019)*

| Level-1            | Level-2                      | Level-3                                |
|--------------------|------------------------------|----------------------------------------|
| <b>Temporal</b>    | Synchronous                  | –                                      |
|                    | Asynchronous                 | Precedence<br>Succession               |
| <b>Contingency</b> | Cause                        | Reason<br>Result<br>Neg-Result         |
|                    | Cause+Belief                 | Reason+Belief<br>Result+Belief         |
|                    | Cause+SpeechAct              | Reason+SpeechAct<br>Result+SpeechAct   |
|                    | Condition                    | Arg-1-as-Cond<br>Arg-2-as-Cond         |
|                    | Condition+SpeechAct          | –                                      |
|                    | Negative Condition           | Arg-1-as-NegCond<br>Arg-2-as-NegCond   |
|                    | Negative Condition+SpeechAct | –                                      |
|                    | Purpose                      | Arg-1-as-Goal<br>Arg-2-as-Goal         |
|                    | Concession                   | Arg-1-as-Denier<br>Arg-2-as-Denier     |
|                    | Concession+SpeechAct         | Arg-2-as-Denier<br>+SpeechAct          |
| <b>Comparison</b>  | Contrast                     | –                                      |
|                    | Similarity                   | –                                      |
|                    | Conjunction                  | –                                      |
|                    | Disjunction                  | –                                      |
|                    | Equivalence                  | –                                      |
|                    | Exception                    | Arg-1-as-Excpt<br>Arg-2-as-Excpt       |
|                    | Instantiation                | Arg-1-as-Instance<br>Arg-2-as-Instance |
|                    | Level-of-detail              | Arg-1-as-Detail<br>Arg-2-as-Detail     |
|                    | Manner                       | Arg-1-as-Manner<br>Arg-2-as-Manner     |
|                    | Substitution                 | Arg-1-as-Subst<br>Arg-2-as-Subst       |

2016). This tool was also used to compare two annotations and to adjudicate cases of disagreements. When the disagreement concerned a Level-1 tag, the adjudication was done by a group of expert annotators. When the disagreements concerned Level-2 or Level-3, the

relation was automatically labelled at the higher level, for which there was an agreement between annotators.

In the PDTB, the same two discourse segments could be annotated with more than one discourse relation, for example, when the connective had multiple senses (see Chapter 3), or when the relation was implicit and the annotators inferred more than one relation between them. This enabled the authors to identify the most recurrent cases of double relations. In addition to the annotation of connectives, the PDTB corpus also contains an annotation of the arguments related by connectives, and an indication of attribution of the content of the segments, which can be ascribed to beliefs or assertions performed by the writer or by a person that is being talked about in the text. This led the authors to observe that some connectives can involve a use of different attributions between the two segments. In PDTB-3, another type of annotation has been added, to account for cases when argument 1 involves a question and argument 2 provides an answer to that question. Since questions are treated as dialogue acts in the literature (e.g., Bunt et al., 2020) and these sequences cannot be instantiated by a connective, they are not considered as a new discourse relation, but rather as a complementary phenomenon (Prasad, Webber & Lee, 2018).

A similar approach to the PDTB has been adopted to annotate corpora in other languages such as Arabic (Al-Saif & Markert, 2011), Chinese (Zhou & Xue, 2012), Hindi (Kolachina et al., 2012), Turkish (Zeyrek, Demir, & Sevdik Çallı, 2013) and Czech (Zikánová et al., 2010). The relations from PDTB-3 have also been used in an ongoing effort to put together lexicons of connectives from different languages (Stede, Scheffler & Mendes, 2019; see Chapter 4).

Since its release in 2008, the PDTB corpus has been used for various language technology applications, such as the automatic annotation of discourse relations (Pitler et al., 2008), and the prelabeling of connectives to improve the output of machine translation systems (Meyer & Popescu-Belis, 2012). The PDTB has also been used to assess cognitive theories about discourse, such as the continuity hypothesis (see Chapter 6) according to which some discourse relations should be conveyed implicitly more often than others. Thanks to the annotation of explicit and implicit connectives in the PDTB, Asr and Demberg (2012b) were able to compare the ratio of implicitness across relations, and to confirm the existence of a continuity constraint empirically.

To summarize, the PDTB takes a radically different approach from previous models, because it is theory neutral and discourse relations are annotated only in relation to connectives, without searching for a more global discourse structure. This lexical view of discourse relations

has enabled researchers to apply a similar method to typologically diverse languages, and to compare their results (Prasad, Webber & Joshi, 2014).

## **2.5 A COGNITIVE APPROACH TO COHERENCE RELATIONS**

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The Cognitive Approach to Coherence Relations (CCR) originated in the 1990s (Sanders, Spooren & Noordman, 1992) as an attempt to provide a cognitively motivated set of primitives to account for the basic features of discourse relations. The idea was to go beyond a simple list of discourse relations, and to characterize each of them in terms of four different primitives. This decomposition was meant to account for all possible cases in terms of basic cognitive principles such as causality. It was also meant to account for the polyfunctionality of some connectives, and showing that their various senses shared some elements in their primitives. For example, the fact that a connective like *and* can be used to convey additive or causal relations but never concessive ones can be accounted for by the basic difference of polarity between positive and negative relations (see below). Thus, a major aim of CCR is not to have a list of relations to annotate cases encountered in corpus data, but to provide a framework of coherence relations explaining differences and similarities between them in cognitive terms. In other words, cognitive validity is one of the main tenets of this model. For this reason, it has been first and foremost used in psycholinguistic studies to explain the way readers process discourse relations (see Chapter 6), and the order in which children acquire them (see Chapter 8). It has also been used to annotate corpus data, for example, the DiscAn corpus<sup>3</sup> (Sanders, Vis & Broeder, 2012).

The four primitives suggested by Sanders, Spooren and Noordman (1992) all correspond to a relational criterion. This criterion emerged from the observation that a discourse relation provides more information than the two related segments in isolation, what the authors call their informational surplus. This supplementary information can be categorized into four dimensions that, when put together, constitute the meaning conveyed by each discourse relation.

The first dimension is called polarity, and it separates positive from negative relations. A positive relation functions between the content of the two related segments. For example, in (14), the link is established

<sup>3</sup> <https://dev.clarin.nl/node/4198>.



## 2.5 A Cognitive Approach to Coherence Relations

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between the fact of winning the competition and the state of happiness. Typically, such relations are conveyed by connectives like *and* or *because*. A relation is negative if it holds between a negated version of one of the segments, as in (15). In this example, Ann's happiness leads to an expectation that something positive happened to her, but this expectation is denied in the second segment. The dimension of polarity separates adversative, concessive and contrastive relations that are all negative from all the other relations that take a positive polarity.

(14) Ann is happy because she won the competition.

(15) Ann is happy but she lost the competition.

[constructed examples]

The second dimension, called basic operation, separates causal from additive relations. On the one hand, causal relations have an implicational order between the segments, as in (14) where the fact of winning the competition implies the state of happiness. In addition to causal relations, conditional relations also have an implicational order, but the difference between them is the status of the cause (hypothetical or real). On the other hand, additive relations do not have an implicational order, but are simply linked by a logical conjunction, as in (16). In this example, the two facts about Elsa only add up and lead to a same conclusion, for example, that Elsa is a gifted person, but there is no implicational order between them.

(16) Elsa is very good at math and she won a swimming competition.

[constructed example]

In addition to additive relations, temporal relations of sequence (conveyed by connectives like *and then*) or temporal overlaps (conveyed by connectives like *meanwhile*) are also linked by a conjunction rather than an implication. But contrary to additive relations, they are also temporally ordered (see below). The criterion of causal vs. additive link also applies to negative relations. For example, the relation of concession in (15) implies the negation of a causal link, whereas the relation of contrast in (17) does not.

(17) Elsa is very good at math but her sister is not.

[constructed example]

The third dimension corresponds to the source of coherence, and separates the objective from subjective relations (originally called "semantic" and "pragmatic" relations in Sanders, Spooren and Noordman (1992) and later relabeled in the psycholinguistic literature

and in the more recent versions of the model). Objective relations are connected at the level of their propositional content, or in other words they concern real-world events not actively constructed by the speaker, as in (18).

(18) The door slammed because there was strong wind outside.

[constructed example]

In subjective relations, the speaker is actively involved, as it presents a reasoning or speech act that they perform in one or both segments, as in (19). In this example, the fact that the lights are always out does not cause the neighbors' holiday but merely the speakers' conclusion that they are away. This dimension separates subjective relations such as evidence and justification from objective ones such as temporal sequence or cause-consequence.

(19) The neighbors must be on holiday, because their lights are always out.

[constructed example]

The last dimension applies only to causal relations. It was originally called basic versus nonbasic relations, but has more recently been renamed implicational order (Sanders et al., 2021). In relations that involve an implicational link between the segments, this link can be conveyed in basic order as in (20) or in nonbasic order as in (21).

(20) Peter was tired so he went home early.

(21) Peter went home early because he was tired.

[constructed examples]

Relations with a basic order present the information in the text following the order of the implication, for example, with the antecedent in the first segment and the consequent in the second segment, as in (20). The order is reversed in nonbasic relations like (21), where the consequent is presented first and the antecedent second in the text.

A summary of all four dimensions and the corresponding relations is reproduced in Table 2.4.

A fifth dimension was added later on to the model in order to account for temporality; in other words the fact that the two segments are ordered in time or not (Evers-Vermeul, Hoek & Scholman, 2017; Sanders et al., 2021). For some relations like additive relations, there is no such order. These are therefore called nontemporal relations. When there is a temporal order, it can either be chronological when the first event chronologically is presented before the second one as in (22) or

## 2.5 A Cognitive Approach to Coherence Relations

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Table 2.4 Taxonomy of relations from Sanders, Spooren and Noordman (1992: 11)

| Basic operation | Source of coherence | Order    | Polarity | Class          | Relation                                                   |
|-----------------|---------------------|----------|----------|----------------|------------------------------------------------------------|
| Causal          | Semantic            | Basic    | Positive | 1              | Cause-consequence                                          |
| Causal          | Semantic            | Basic    | Negative | 2              | Contrastive cause-consequence                              |
| Causal          | Semantic            | Nonbasic | Positive | 3              | Consequence-cause                                          |
| Causal          | Semantic            | Nonbasic | Negative | 4              | Contrastive consequence-cause                              |
| Causal          | Pragmatic           | Basic    | Positive | 5a<br>5b<br>5c | Argument-claim<br>Instrument-goal<br>Condition-consequence |
| Causal          | Pragmatic           | Basic    | Negative | 6              | Contrastive argument-claim                                 |
| Causal          | Pragmatic           | Nonbasic | Positive | 7a<br>7b<br>7c | Claim-argument<br>Goal-instrument<br>Consequence-condition |
| Causal          | Pragmatic           | Nonbasic | Negative | 8              | Contrastive claim-argument                                 |
| Additive        | Semantic            | –        | Positive | 9              | List                                                       |
| Additive        | Semantic            | –        | Negative | 10a<br>10b     | Exception<br>Opposition                                    |
| Additive        | Pragmatic           | –        | Positive | 11             | Enumeration                                                |
| Additive        | Pragmatic           | –        | Negative | 12             | Concession                                                 |

anti-chronological when the second event is presented before the first one as in (23).

(22) Sam had his breakfast and then he left for work.

(23) Sam left for work after taking his breakfast.

[constructed examples]

One of the key aspects of this framework from a cognitive perspective is that for each dimension, one of the two possible values is deemed to

be cognitively more complex than the other. For example, constructing a causal relation is a more complex cognitive procedure than merely conjoining segments, as it implies constructing an implicational order, often based on world knowledge. Similarly, inferring a subjective relation is more complex than an objective one, because it requires the ability to infer the mental states of the speaker (Zufferey, 2010), an ability known in cognitive psychology as having a theory of mind. Similarly, having to infer a nonbasic order relation is more complex than a basic-order one, and a nonchronological temporal relation is more complex than a chronological one, because in such cases, the chronological or implicational order of the relation reverses the order of presentation in the text.

As mentioned above, the CCR framework places a lot of weight on cognitive validity. Many studies involving language processing and acquisition have found evidence in favor of this model. First, in the domain of language processing, cognitively simpler relations are processed more quickly compared to more complex ones. For instance, causal relations are processed more quickly compared to concessive relations (Köhne & Demberg, 2013), objective causal relations are processed more quickly than subjective ones (Canestrelli, Mak & Sanders, 2013), and causal relations with a basic order are processed more quickly than those with a nonbasic order (Noordman & de Blijzer, 2000). In the field of language acquisition, children start producing cognitively simpler relations like additive and causal relations before more complex ones such as concessive and adversative relations (Evers-Vermeul & Sanders, 2009), master objective relations before subjective ones (Zufferey, 2010; Evers-Vermeul & Sanders, 2011), and understand temporal relations in chronological order better than in antichronological order (Pyykkönen and Järvikivi, 2012).

The CCR framework has also been applied to annotate a range of different corpus data in different languages like Dutch (Sanders, Vis & Broeder, 2012), Spanish (Santana et al., 2018), and Mandarin Chinese (Li, Evers-Vermeul & Sanders, 2013). It has also been used successfully to help nontrained and nonexpert annotators annotate coherence relations using a stepwise approach corresponding to the different dimensions of this model (Scholman, Evers-Vermeul & Sanders, 2016). Finally, it has also been used to annotate corpora with children's productions (e.g., Van Veen, 2011) and parallel corpora (Hoek et al., 2017).

In a nutshell, CCR provides a radically different framework compared to the ones presented so far, in that it does not provide a list of

discourse relations but a decomposition into a set of primitives with the aim of providing a cognitively grounded model of discourse coherence.

## 2.6 CAN DIFFERENT FRAMEWORKS COMMUNICATE?

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All the frameworks for the annotation of discourse relations that we have discussed in this chapter have been used for the annotation of large portions of corpus data. This represents a valuable source of information for researchers working on discourse-related issues. However, one of the limitations of these resources is that they have been annotated with the different labels used in each model, and it is not clear how these labels can be compared across frameworks. Yet, putting these resources together would represent a major step forward for research on discourse-related issues. For this reason, in recent years, there have been some attempts to provide ways to make frameworks more compatible in the future, and to find ways to translate existing annotations from one framework to another. We discuss them in this section.

As Benamara Zitoune and Taboada (2015: 148) observe, there are several problems involved in the comparison of discourse relations across frameworks, such as differences in segmentation, different labels used for discourse relations, and differences in the type of discourse structures that have been annotated. In this section, we will leave aside issues related to segmentation, and focus on the differences of granularity between different models. Several proposals have been made to circumvent it. On the one hand, minimal lists of core relations that are absolutely necessary to annotate discourse relations, and that are robust across languages and genres, have been proposed. For instance, Benamara Zitoune and Taboada propose a hierarchy with three different levels of granularity inspired from the RST, SDRT and PDTB frameworks, leading to a total of 26 relations. They test the validity of their proposal by mapping an RST corpus and two SDRT corpora with this new taxonomy. They report that most mappings were quite straightforward, but there were also problems of granularity that could not be resolved, for example, when a relation was missing in one of the taxonomies or was too fine-grained to have an exact equivalent in the new taxonomy. Another similar attempt at providing a unified taxonomy was conducted as part of the ISO standard for semantic annotation (Bunt & Rashmi, 2016). This proposal contains a set of 20 core discourse relations that are not ordered into

Table 2.5 *Comparison between frameworks using the CCR dimensions*  
(Sanders et al., 2021)

| Framework Label          | Basic Polarity | Implicational operation | order             | Source of coherence    | Temporality           |
|--------------------------|----------------|-------------------------|-------------------|------------------------|-----------------------|
| PDTB <i>cause result</i> | positive       | causal                  | basic             | objective              | chrono.               |
| SDRT <i>consequence</i>  | positive       | causal                  | basic / non-basic | objective / subjective | chrono. / antichrono. |

a hierarchy in order to avoid problems of divergent groupings between the frameworks. In both cases, the effort goes in the direction of simplification, but it is not clear yet whether these new taxonomies can really account for all the cases of discourse relations and genres, as is their objective, and whether they will be used for future large-scale annotation projects. It is indeed doubtful that data will be reannotated with the risk of not answering the initial research question anymore.

Instead of providing a new set of coherence relations, Sanders et al. (2021) suggested using the dimensions from the CCR framework as an interlingua to make other annotation frameworks communicate. They therefore decomposed all relations from the RST, SDRT and PDTB frameworks in terms of the five dimensions listed above (see Section 2.5). Thus, each relation receives values in all dimensions, and this makes them comparable independently of the label used in various frameworks. Table 2.5 illustrates how this comparison applies to the relation of contingency–cause–result from the PDTB and the relation of consequence from SDRT:

Given their labels, both relations might appear to cover similar cases, but the decomposition into dimensions shows that this is not the case, as they differ in three out of five dimensions: implicational order, source of coherence and temporality. It appears that the SDRT relation of consequence is more general than the PDTB result relation, as it also encompasses what in the PDTB would correspond to two additional relations: the relation of cause–reason to account for the nonbasic order of the segments, and the relation of justification to account for subjective causal relations.

Thanks to this decomposition, it becomes immediately clear which aspects of the relations vary between frameworks, something that is rather opaque based on their labeling alone. However, the five dimensions do not contain enough characteristics to specify all the features of some relations such as list or condition. For this reason, a limited set of

additional features has been added to the model for comparison purposes. One such feature is conditionality, a feature that applies to the consequence relation in SDRT but not to the causal relations in PDTB.

Finally, in another more limited comparison between the CCR framework and the PDTB-3 taxonomy, Rehbein, Scholman and Sanders (2016) found that the comparability between them was very good, as the modifications made to PDTB-3 compared to PDTB-2 resolved many problems to compare it to other frameworks. They applied both frameworks to a corpus of spoken data consisting of telephone conversations and broadcast interviews, and found that both could adequately account for many relations found in this mode as well.

To summarize, comparing annotations performed between frameworks remains an important challenge that will need to be addressed in the future so that the many available resources can be reused across projects. In this respect, the decomposition of relations into dimensions that can be compared across frameworks seems to be a promising step forward, because of the possibility it offers of abstracting away from relations' labels and listing their core characteristics.

## **2.7 SUMMARY**

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The goal of this chapter was to present the main characteristics of four leading models for discourse annotation. We have seen that a major difference between them lies in their scope. While the Rhetorical Structure Theory (RST) and the Segmented Discourse Representation Theory (SDRT) models aim at providing a full-fledged representation of text structures, the Penn Discourse Treebank (PDTB) framework is lexically grounded and theory neutral. The Cognitive Approach to Coherence Relations model (CCR) takes yet another perspective, as it does not aim at listing all the possible relations, but rather at characterizing them by using a set of basic dimensions that are cognitively motivated. Contrary to the other frameworks, it thus favors cognitive plausibility over descriptive adequacy.

The role played by connectives is also quite different across models. While it is quite peripheral in RST, SDRT and CCR, which aim most of all at representing the coherence created by discourse relations, it is central in the PDTB model. The advantage of models like RST and SDRT is that they provide a very comprehensive view of all the other linguistic means that are used to convey discourse relations in addition to connectives. The main advantage of the PDTB is that it provides

thousands of occurrences of connectives annotated with a sense tag. It is therefore the most comprehensive resource available to date to study this class of lexical items. The main advantage of CCR is its psychological grounding that makes it particularly well suited in psycholinguistic studies.

In short, each model has its own advantages and limitations, but each one has been used to annotate data from various languages and genres, as we have illustrated throughout this chapter. The choice of one model over another therefore depends on the goals of the annotation, and more generally on the research questions addressed in a project. An important step ahead in future years will be to find ways to make data annotated with discourse relations more comparable across corpora, either by agreeing on a standardized set of discourse relations, or by finding ways to make different frameworks communicate, for example, by comparing the different dimensions involved in each relation, as proposed by the CCR framework.

### **DISCUSSION POINTS**

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- What are the main differences between the RST and SDRT frameworks?
- What are the main advantages of decomposing relations into different dimensions rather than simply listing them in a taxonomy according to the CCR framework?
- Imagine that you plan to annotate the acquisition of discourse relations in a spoken corpus of bilingual children speaking English and Spanish in order to assess whether the order of acquisition is the same in both languages. Which framework would you choose to perform your annotation and why?

### **FURTHER READING**

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The definite reference for Rhetorical Structure Theory is Mann and Thompson (1988). For SDRT, the most complete reference is Asher and Lascarides (2003). An introduction to the PDTB framework can be found in Prasad, Webber and Joshi (2017), and an introduction to the novelties of the PDTB-3 annotation is Prasad et al. (2018). A description of the technical aspects of annotation for all these frameworks and many more can be found in the book edited by Ide and Pustejovsky



(2017). The CCR framework and its usefulness for comparing annotations from various sources is presented in Sanders et al. (2021). The original CCR paper that launched this framework is Sanders, Spooren and Noordman (1992). The issue of discourse segmentation is discussed by Hoek, Evers-Vermeul and Sanders (2018) for written discourse and by Degand and Simon (2009) for spoken discourse.

PROOF

## 3 Connectives: Meanings and Functions

### 3.1 INTRODUCTION

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In this chapter, we dig into the semantics of discourse connectives. In other words, we aim to give an overview of how the meaning of discourse connectives has been described. Before turning to specific studies, we need first to give a more precise definition of what we mean by discourse connectives. What lexical items are included in the category we aim to describe from a semantic point of view? In Section 3.2, we will tackle this question reviewing how discourse connectives and discourse markers relate to one another and what differentiates them. We then turn to several accounts of the notorious ambiguity of discourse connectives. While there is general consensus that in (most) discourse connectives one form can receive different meanings or readings, there is much more discussion on how to account for this polyfunctionality. Proponents of the polysemous view consider that the different related meanings of the connective are encoded as part of their conceptual meaning (see below). In contrast, the monosemy approach considers that a connective basically conveys a single invariant meaning, and that the individual interpretations of this invariant meaning are retrieved in context. These different views are developed in Section 3.3. The semantics of connectives, be it from a monosemy or polysemy perspective, has been studied mainly following a semasiological, bottom-up approach in which one or more specific connectives are analyzed in context to uncover their semantic and syntactic distribution. Several case studies in a variety of languages are presented in Section 3.4.1. Finally, we turn to onomasiological studies, where the point of departure is a given (relational) meaning and how this is expressed through connectives in a given language. This approach is then extended to a categorial perspective in which the functional distribution of discourse connectives as a category is developed (Section 3.4.2).

### **3.2 DISCOURSE CONNECTIVES AS A SUBCATEGORY OF DISCOURSE MARKERS**

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In Chapter 1, we described connectives as a “functional category of lexical items used to explicitly mark discourse relations holding between discourse segments”. This is a categorial definition demanding that in order to be a member of the discourse connective class, the item in question should encode the notion of “connectivity” as belonging to their core meaning. In other words, a necessary condition to be a discourse connective is to have a relational meaning. Yet, this is not a sufficient condition as other lexical items do also encode this notion. Strikingly, Schourup (1999: 230) considers connectivity as a necessary characteristic of discourse *markers*, a class of linguistic expressions that is notoriously difficult to describe in a consensual way (Fischer, 2014; Maschler & Schiffrin, 2015). Pons Bordería (2001: 226–27) rightly observed that connectives are generally viewed as a subclass of the discourse marker category and at the same time they “are the best studied subset (. . .) Therefore, the specific properties of connectives are mixed up with those of discourse markers. It is sometimes hard to know if a given characterization of discourse markers is valid for all discourse markers or if it is only applicable just for the subclass of connectives.” A number of authors share this idea that discourse connectives should be subsumed under the wider umbrella of discourse markers (Degand, Cornillie & Pietrandrea, 2013; Crible, 2018) or pragmatic markers (Aijmer & Simon-Vandenberg, 2011). Yet, others explicitly posit two distinct categories, with connectives on the one hand, and discourse markers or particles, on the other (for an overview, see Maschler & Schiffrin, 2015). Here, we will consider discourse connectives as a (well-studied) subcategory of discourse markers. We base this position on the observation that connectives and discourse markers share many (key) features. To make our point, we will review Schourup’s (1999) list of “characteristics of discourse markers” and evaluate to what extent they apply to the subset of discourse connectives. These characteristic features are:

- i. connectivity
- ii. optionality
- iii. non-truth-conditionality
- iv. weak-clause association
- v. initiality
- vi. orality
- vii. multi-categoriality

According to Schourup, connectivity is the most characteristic feature of discourse markers and is considered by most authors as a necessary feature. It is also the defining characteristic of discourse connectives, whose primary function is to signal a relationship between a host unit and the previous or following discourse. Yet, the relational function of discourse connectives is defined more strictly as establishing a relation between two textual units. Thus, Mauri and van der Auwera (2012: 377) simply define a connective as “a linking device establishing a given relation *between two clauses or phrases*” (our emphasis). Discourse markers are not restricted to strictly relating two segments of texts. They may also link the host utterance to “the context in a wider sense” (Hansen 1997: 1260, cited in Schourup, 1999: 231), thus including their bracketing function referred to in Schiffrin’s seminal definition of discourse markers “as sequentially dependent elements which bracket units of talk” (1987: 31), that is, occurring at the boundaries of units. These “units of talk” are (deliberately) vaguely defined “because this is where [the markers] occur – at the boundaries of units as different as tone groups, sentences, actions, verses, and so on” (Schiffrin, 1987: 36). Discourse connectives differ from discourse markers in that the bracketing function is strongly determined by their grammatical function. Thus, Schiffrin observes that markers such as *and*, *but*, *so*, in other words discourse connectives, behave differently from other discourse markers such as *oh* and *well*, because the former “have a role in the grammatical system” (Schiffrin, 1987: 128). It follows that “in addition to characterizing the discourse slot(s) in which they occur, we need to consider the possibility that grammatical properties of the items themselves contribute to their discourse function” (p. 128). The strictly relational status of discourse connectives as well as the syntactic constraints that, at least partially, influence their use, both at the local and the global level (see below) distinguish discourse connectives from discourse markers and seem to justify their status as subcategory.

The second discourse marker characteristic is optionality, which is described from two perspectives: (i) syntactic optionality refers to the fact that the removal of the marker “does not alter the grammaticality of its host utterance (Schourup, 1999: 231), (ii) semantic optionality refers to the observation that the (discourse) relation remains accessible even if the marker is left out. In other words, omitting the marker “renders the text neither ungrammatical nor unintelligible” (Brinton, 1996: 267, cited in Schourup, 1999: 231). The syntactic optionality has, to our knowledge, not been investigated *per se*, while the semantic optionality of discourse connectives has been studied extensively. Very briefly, it seems that the possibility of syntactically leaving out a

### 3.2 Discourse Connectives as Subcategory of Discourse Markers

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discourse connective is strongly restricted by the grammatical category of the connective at hand (see Chapter 4). For instance, coordinating conjunctions that work as connectives can often be left out syntactically, even if semantically some specific meanings might get lost (see below). In example (1), leaving out the coordinating conjunctions ‘and’ or ‘but’ does not hinder the grammaticality of the complex sentence, even if the semantic relation is less clear without than with one or the other connective. In contrast, leaving out the subordinating conjunctions ‘if’ in example (2) or ‘although’ in example (3) not only blurs the intended relational meaning, it also renders the complex sentence syntactically awkward or incorrect, because the syntactic dependency is lost in the absence of the subordinating conjunctions. Discourse markers being syntactically independent from their host clause, they are in all cases syntactically optional.

- (1) The whole family joined the dance floor after dinner (and/but) the kids seemed to have more fun than the adults.
- (2) We would not brag about it, (if) we were rich.
- (3) (Although) his father was very rich, Jimmy never bragged about it.

[constructed examples]

Semantic optionality has been investigated extensively in discourse connectives studies, where a contrast has been made between so-called explicit relations, signalled by a connective, and implicit ones, where the connective is missing (see Chapter 1). Two strands of research have investigated this topic more in particular: natural language processing and experimental pragmatics.

In natural language processing, many efforts have been made to meet the challenge of automatically identifying implicit relations in corpus data (see, e.g. Braud & Denis, 2014; Bai & Zhao, 2018). Most of this work is based on (manually) annotated corpora, most notably the Penn Discourse Treebank (PDTB) (see Chapter 2), where implicit discourse relations have been annotated when the relation was ‘signalled’ by an ‘implicit connective’, that is, a connective that is compatible with a given non-signalled discourse relation. More precisely, a relation is said to be implicit when a ‘missing connective’ can be identified (Miltsakaki et al., 2004). On the basis of the PDTB discourse annotations, Asr and Demberg (2012a) found that some discourse relations are “more strongly” marked than others and that some cues are more strongly associated with specific discourse relations. For instance, it appeared that conditional relations are nearly always explicitly marked

(mostly with the connective *if*), while the relations of list, instantiation or restatement are more often left implicit. In addition, some connectives appear to be “stronger” cues for a given relation, than others. For instance, *though* and *although* are highly reliable cues for the counter-expectation relation, *so* for the result relation and *for example* for the instantiation relation. On the other hand, the frequent connectives *and* and *but* are less strongly associated with specific relations.

In further work, Asr and Demberg (2012b) did find that marking of relations is strongly linked with the expectedness of the underlying semantic relation. More precisely, corpus evidence was found that causal and continuous relations are more often left implicit, which has received a cognitive (processing) explanation: readers tend to expect a continuous or a causal relation between non-cued contiguous sentences, making the linguistic marking superfluous. This is in line with both the Continuity Hypothesis (Murray, 1997; Levinson, 2000) “that comprehension difficulty ensues when a text event is discontinuous without this discontinuity having been explicitly marked” (Asr & Demberg, 2012b: 2672) and with the Causality-by-default Hypothesis according to which “experienced readers aim at building the most informative representation, [therefore] they start out assuming the relation between two consecutive sentences is a causal relation” (Sanders, 2005: 9; see also Mak & Sanders, 2013). Experimental pragmatic research has further confirmed that the presence of a connective helps the reader establish the underlying discourse relation, with faster reading times and better recall (see, e.g. Degand, Lefèvre & Bestgen, 1999; Sanders & Noordman, 2000); even if the type of underlying discourse relation and the adequacy of the discourse connective play a major role in the way they are processed. These studies are reviewed in more detail in Chapter 6.

Regarding the contrast between implicit and explicit relations and the underlying idea that (some) discourse connectives or discourse markers would be semantically optional, Taboada (2009) points out that there are many alternative signalling mechanisms beside discourse markers or connectives, like tense, mood, embedding, verb semantics or implicatures that may (help) establish discourse relations. In Taboada’s view, “[i]t may be the case that all relations are indeed signalled, that is, that they are all explicit. The challenge lies in finding what the particular signal is in each case” (p. 128). She pursued this line of research in later corpus work, showing that a vast majority of the discourse relations are marked by more than one explicit signal, most often a discourse marker/connective and some other referential, lexical, syntactic or graphical cues (Das & Taboada, 2019), in particular

### 3.2 Discourse Connectives as Subcategory of Discourse Markers

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when the discourse marker used is ambiguous or generic on its own (Das & Taboada, 2018; see also Crible, 2020). Furthermore, Crible and Demberg (2020) in an offline crowdsourcing experiment showed that “non-connective cues” such as lexical verbs or antonyms do have a positive disambiguating role on inferring implicit relations of consequence or contrast, respectively. In other words, “a coherence relation is less ambiguous and more easily disambiguated when the S2 [second segment] contains clear linguistic features associated with the conceptual meaning of the relation” (Crible & Demberg, 2020: 328).

It appears that the feature “optionality”, in particular semantic optionality, has been studied much more extensively for the particular category of discourse connectives than for discourse markers, overall. Much fewer studies have focused on the impact of the presence of specific discourse markers on discourse processing (but see Fox Tree & Schrock, 1999; Bosker, Badaya & Corley, 2021). On the other hand, studies investigating positive or negative attitudes towards discourse marker use do not seem to exist for the subcategory of discourse connectives, while they do for specific markers such as *like* (Daily-O’Cain, 2000; Hesson & Shellgren, 2015) or for discourse markers overall (Blanchard, 2021). This difference in the types of studies regarding the optionality of connectives or discourse markers seems (again) to confirm that discourse connectives form a distinct subset with proper syntactic and semantic constraints.

Non-truth-conditionality is the third in Schourup’s (1999) list of characteristic discourse markers features. It refers to the fact that discourse markers “are generally thought to contribute nothing to the truth-conditions of the proposition expressed by an utterance” (Schourup, 1999: 232). It is a feature that distinguishes them from so-called content words, which do affect truth conditions.

The concept has been developed within the relevance-theoretic framework establishing a dichotomy between conceptual meaning and procedural meaning (Sperber & Wilson, 1986; Blakemore, 2002). Discourse connectives are generally seen “as encoding procedural meaning which contributes to the computational rather than the representational side of comprehension” (Wilson, 2011: 5). A number of scholars defend the idea that (potentially all) linguistic expressions, including discourse connectives, may encode conceptual and procedural meaning at the same time (Lee, 2002; Moeschler, 2005, 2016; Fraser, 2006; Pons Bordería, 2008), while others defend the dichotomous view (Hall, 2007; Saussure, 2011). Starting with Wilson and Sperber (1993), discourse connectives have been described as “notoriously hard to pin down in conceptual terms”, which leads them to plead that

“a procedural analysis of discourse connectives would explain our lack of direct access to the information they encode” (p. 14). In other words, discourse connectives are better accounted for in procedural terms than in conceptual terms. It is noteworthy mentioning here that Wilson and Sperber use the generic term ‘discourse connectives’ to refer to expressions like ‘so’, ‘now’, ‘well’, ‘moreover’, ‘however’, and so on, even if later studies have focused mainly on discourse connectives in the more restricted, relational sense.

Since then, many scholars have tried to disentangle what makes discourse connectives more procedural than conceptual or a combination of both. Moeschler (2005, 2016), for instance, puts forward the hypothesis that there is “a correlation between the strength of the encoded meanings and their range (i.e. their possible values): a connective C encodes a weak meaning if it is not restricted to one interpretation, whereas it is strong if its meaning is restricted to one specific one (like the CAUSE relation for *because*)” (Moeschler, 2016: 126). He furthermore proposes that this distinction between strong and weak meaning applies to conceptual meaning, not to procedural meaning. In other words, connectives have a relational conceptual meaning, while their procedural meaning instructs the hearer/reader on the interpretation to be given in context. Hall (2007), on the other hand, working out Blakemore’s (2002) analysis of the connective *but* pleads for a strong procedural account, which in her view “can cope better with the variety of uses that it [*but*] can have” (p. 172). In particular, she argues that a procedural analysis of the so-called ambiguity of *but* between contrastive and concessive meanings “offers a better explanation of the meaning and interpretation of discourse connectives than accounts on which they map directly onto conceptual representations” (p. 172).

Lee (2002), then, seems to take an in-between position proposing a cline from conceptual to procedural meaning that allows to account for both conceptual aspects of sentential (logical) connectives and procedural aspects of more inferential connectives. In his words, “rather than assuming that connectives are either conceptual or procedural, I claim that all connectives occupy places on a scale which ranges from logical connection to inferential connection. There is no clear-cut boundary between the conceptual part and the procedural part (...). Instead, there are two directions: towards the conceptual end on the one hand, and towards the inferential end on the other” (Lee, 2002: 852). This proposal is worked out for both English and Korean connectives. In contrast, de Saussure (2011) claims that no linguistic expression is expected to bear both conceptual and procedural information. Rather,



### 3.2 Discourse Connectives as Subcategory of Discourse Markers

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in his view, linguistic expressions, including connectives, are conceptual by default. Only under specific circumstances can an expression be categorized as procedural, namely “when it triggers inferences that cannot be predicted on the basis of an identifiable conceptual core to which general pragmatic inferential principles are applied” (p. 67). Thus, the connective *parce que* (‘because’) is conceptual (and not procedural) in that it encodes a loose concept of causality which it serves “as a solid basis to predict all possible inferences obtained on the basis of *parce que*” (p. 68), including so-called meta-textual or epistemic uses based on abductive reasoning (Sweetser, 1990; see Section 3.4.1 and Chapter 6). The connective is also “easy to translate, to spell out and paraphrase, and is truth-evaluable” (de Saussure, 2011: 68), criteria that belong to conceptual expressions according to Wilson and Sperber (1993).

After having listed the three first characteristics above (connectivity, optionality, truth-conditionality), Schourup concludes that they “are all frequently taken together to be necessary attributes of DMs [Discourse Markers]”, the remaining features being “less consistently regarded as criterial for DM status” (p. 232). We would rather defend the position that the above features are typical of the subcategory of discourse connectives, while the remaining four of his list (weak clause association, initiality, orality and multicategoriality) are actually typical of the discourse marker class overall, not of the specific subcategory of discourse connectives.

Briefly, weak clause association refers to the observation that discourse markers are “either outside the syntactic structure or loosely attached to it” (Brinton, 1996: 34). In Chapter 5, we will see that this syntactic detachment generally results from a diachronic development from sentence-internal to sentence-initial position. It seems that this feature applies to so-called adverbial connectives, like *after all*, *moreover*, *however*, that are syntactically more loosely integrated with broader positional freedom, than ‘conjunctive connectives’ that are most often restricted to initial position and are syntactically more constrained (see Chapter 4). Initiality, then, is indeed strongly associated with most discourse connectives, even if other syntagmatic positions are possible too. According to Schourup, this tendency “to appear initially is probably related to their ‘superordinate’ use to restrict the contextual interpretation of an utterance: in general it will make communicative sense to restrict contexts early before interpretation can run astray” (p. 233). This is a property both discourse connectives and discourse markers seem to share.

Finally, orality as a defining feature of the discourse marker class is probably the characteristic that applies less to discourse connectives.

Although discourse connectives do of course occur in speech, it is not the case that they occur *primarily* in speech. It has however been shown that discourse connective types are different in speech and in writing, with higher-register, lower-frequency connectives in (planned) written language or written-to-be-spoken discourse than in spontaneous spoken interaction (see Chapter 7). The final feature discussed by Schourup (1999) is multicategoriality, that is, the fact that discourse markers/connectives form a heterogeneous category with respect to the syntactic class. While this is specifically true for the overall discourse marker category, with source syntactic forms that may be as diverse as nouns, prepositional phrases, conjunctions, interjections, adverbs or verbal phrases (see, e.g. Bolly, Crible, Degand & Uygur-Distexhe, 2017), the connective subset itself is also syntactically multicategorial, be it in a more restricted sense drawing primarily on (coordinating and subordinating) conjunctions and adverbs. This is a matter that we will develop in more detail in Chapters 4 (synchronic perspective) and 5 (diachronic perspective).

Summing up the overview in this section, we would like to conclude that connectives are best described as a subset of the category of discourse markers. Thus, a connective is a discourse marker, but not every discourse marker is a connective. More precisely, a connective is a type of discourse marker that signals a discourse relation between two spans of discourse. Syntagmatically, a connective follows the syntactic constraints of its source category, with a strong tendency to occur in initial position of its host clause. Semantically, a connective encodes both conceptual and procedural meaning. The conceptual meaning is relational, while the procedural meaning encodes instructions on the interpretation to be given in context. In the following section, we will dig deeper into these semantic descriptions.

### **3.3 POLYSEMY AND POLYFUNCTIONALITY OF DISCOURSE CONNECTIVES**

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Regarding the meaning of discourse connectives, a notorious characteristic missing from Schourup's overview in the previous paragraph, shared by discourse markers and discourse connectives alike, is their polyfunctionality and polysemy, where polyfunctionality refers to the fact that discourse connectives can fulfil different functions (derived from the particular context in which they occur) and polysemy refers to their different encoded senses or meanings. Thus, one form can receive different meanings or readings.

### 3.3 Polysemy and Polyfunctionality of Discourse Connectives

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In lexical semantics, such one-form-to-many-meanings cases have been treated generally as cases of homonymy or polysemy. Homonymy refers to lexical ambiguity in which two (or more) linguistic expressions have the same form instantiating different, unrelated meanings. Typical examples are *rock* to refer to a *genre of music* vs. a *stone*; *bat* for a *tool to hit a ball* vs. a *nocturnal flying mammal* or to *lie* meaning either to *recline* or to *tell a falsehood*. Polysemy, on the other hand, refers to a single lexical item with different, related senses. Lexical examples include *dish* as a *a kind of plate* or a *meal*; *wing* to refer to *part of a bird for flying* or to *part of a building*.

To our knowledge, in the area of discourse connectives, there are hardly any proposals for treating such one-to-many relations in terms of homonymy (see also Fischer, 2006a). An exception is Freywald (2016), who argues on distributional grounds that adverbial subordinators used with “deviant” V2-order in German (such as *obwohl* ‘although’, *wobei* ‘whereby’, *weil* ‘because’, *während* ‘while’) should be considered as paratactic homonyms belonging to a separate class within the German inventory of clause linkers. To our knowledge, this is however a minority position in the literature. On the other hand, polysemy accounts are many. In particular, numerous studies aim to explain today’s polysemy as the outcome of general meaning extension mechanisms, such as metaphorical or metonymic relations, or pragmatic inferences through implicatures, especially in diachronic accounts, but not only (see Chapter 5).

In contrast to the polysemy approach where the different related meanings of the lexical item are viewed as encoded, the monosemy approach considers that a single form is associated with a single invariant meaning. “This invariant meaning may describe the common core of the occurrences of the item under consideration, its prototype, or an instruction. Individual interpretations arise from general pragmatic processes and are not attributed to the item itself.” (Fischer, 2006a: 13). In this view, the discourse connective is not polysemous *per se*, it does not encode several (related) meanings. Rather, individual interpretations of an invariant meaning are retrieved in context. More strongly, the apparent differences in meaning would simply be an artefact of the different contexts in which the expression appears (see Fodor, 1998, as cited in Falkum & Vicente, 2015). The latter approach has been advocated mainly in the framework of Relevance Theory.

Hansen (2006: 24) acknowledges that such a monosemic approach offers the advantage of simplifying the semantic description, “leaving the burden of interpretation to pragmatics.” Yet, descriptively, she sees

two main problems. “Firstly, because the descriptions offered may, depending on the multiplicity of concrete uses of the marker in question, end up being so abstract and general that they neither exclude nonexistent uses nor distinguish adequately between different markers. Secondly, postulating monosemy leaves the researcher at a loss to explain how the range of uses of a given item can vary systematically, both diachronically and in language acquisition” (Hansen, 2006: 24). The same view is shared by Waltereit (2006: 71), according to whom “[o]nly with a polysemy approach are we able to account for the rise of the various functions in terms of discrete historical steps.” In the same volume, Pons Bordería (2006: 82) holds that in the area of discourse connectives “monosemy is the exception and polysemy is the rule.”

Describing the meaning of discourse connectives in terms of polysemy (or monosemy) entails that we are able to describe the core meaning of a given discourse connective (in context), *viz.* that we are able to describe the core meaning of such items as *because*, *nevertheless*, *until*, *in addition* or *yet*. Following Hansen (2006: 21), such an approach would consider as its “most fundamental guiding hypothesis (...) that any item capable of functioning as a discourse marker [or a discourse connective] will be endowed with inherent, specifiable meaning, which restricts the possible interpretations of utterances in which that item appears.” Like other lexical items, discourse connectives’ meanings should be discrete, identifiable and limited in number of interpretations in order to follow general “principles of learnability, interpretability, and plausibility (...). The criterion of identifiability includes that the conditions for a given particle to receive a particular interpretation should be clear” (Fischer, 2006a: 3). In other words, semantic (and pragmatic) information regarding the meaningful use of a given connective, its adequacy in a given context, including the discourse relations it is compatible with, are part of our linguistic knowledge. Knowing the meaning of *nevertheless* entails that we know that it is used correctly in example (4), because it is compatible with an underlying concessive relation, while *therefore* or *because* would not be compatible in this context.

- (4) The number of people who died in terrorist attacks around the world had dropped 15.2% in 2018. **Nevertheless**, the number of countries that are under risk of terrorist attacks has only increased since then, as reported by the Institute for Economics and Peace on Tuesday, 20 November.

[SketchEngine, English Web 2020]

### 3.3 Polysemy and Polyfunctionality of Discourse Connectives

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This approach is however explicitly rejected by Rossari (2006: 300), according to whom

the lexical semantics we are dealing with consists in sorting out the factors determining the compatibility of a marker with specific linguistic structures. It does not consist, as one might think, in seeking the coded meaning of an item by analysing the possible interpretations of the utterances in which it may occur.

In other words, we do not derive the concessive meaning of *nevertheless* in example (4) from all contexts it occurs in, rather it is the connective that “imposes restrictions on the formulation of the right and left linguistic context” (Rossari, 2006: 302), that is, it is the connective that determines which textual segments it can conjoin. Evidence for this claim comes from the observation that marked and unmarked discourse relations do not impose the same constraints on the segments they connect, that is, a connective is not a mere explicit signal of an underlying discourse relation. Moreover, the constraints on these segments are specific to the connective at hand. For instance, in (5) the inferential relation may be signalled both by *alors* and *donc*, while in (6) *donc* is not acceptable because the left segment is an accommodated proposition, that is, an *if*-clause which is incompatible with *donc*, but natural for *alors*. In other words, *donc* and *alors* impose different constraints on their left context.

- (5) a. J’ai été voir Marie. J’ai compris ce qui s’est passé.  
b. J’ai été voir Marie. ~~Donc~~/Alors j’ai compris ce qui s’est passé.  
‘I went to see Mary. ~~Donc~~/Alors I understood what happened.’
- (6) a. Tu dois aller voir Marie. Tu sauras ce qui s’est passé.  
b. Tu dois aller voir Marie. ??~~Donc~~/Alors tu sauras ce qui s’est passé.  
‘You have to go and see Mary. ??~~Donc~~/Alors you will find out what happened.’

[Adapted from Rossari, 2006]

Finding out which of the above accounts is theoretically more plausible or descriptively more adequate requires confrontation with actual language use. From a methodological point of view, the study of the (polysemous) meaning of connectives has often been either semasiological, focusing on specific connectives, or onomasiological, aiming at more generic descriptions applying to the whole connective category or a semantic subset. These studies will be presented in the following section.

### **3.4 SEMASIOLOGICAL AND ONOMASIOLOGICAL APPROACHES TO DISCOURSE CONNECTIVES**

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In the area of discourse connectives, the semasiological and onomasiological approaches coexist, be it with different purposes. Semasiological studies typically identify a number of uses for one or more particular connectives and illustrate them with corpus examples. The aim may be to account for the relationship between the various senses, to describe their diachronic evolution through semantic paths and/or grammaticalization (see Chapter 5), or to define contextual clues that may help disentangling the different uses. As Pons Bordería (2008: 1412) observes, such “particular descriptions of single markers can be used not only to describe isolated elements, but also to check whether the predictions made by a theoretical approach may be falsified or not.” In other words, the semasiological approach very often combines a case study with theory building. More precisely, the detailed study of one or more discourse connectives serves to illustrate more general linguistic phenomena, such as grammaticalization, argumentation, syntactic scope, discourse segmentation, subjectivity, etc. Several of these case studies are crosslinguistic, striving to map the meaning potential of a connective in one language to that of its counterpart in another (see Chapter 7). Onomasiological studies, then, aim at uncovering sometimes subtle meaning distinctions between discourse connectives expressing a given relational meaning, typically causal, adversative or temporal connectives. What these studies have in common is that they focus on a set of connectives that are categorized together on the basis of a shared relational meaning, trying to disentangle their similarities and differences, within and across languages. Some studies take an even broader view trying to describe the semantics underlying the discourse connectives category as a whole. Such categorial approaches are most often related to discourse annotation trying to uncover how discourse connectives are at work in actual contextualized language (see Chapter 2). In the two following sections, we will illustrate the semasiological and onomasiological approaches with studies in different languages.

#### **3.4.1 Semasiological Studies of the Semantics of Discourse Connectives**

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Semasiological studies for the semantic description of discourse connectives are widespread. In a nutshell, the point of departure is to take a specific linguistic form, say *because*, *nevertheless*, *until*, *in addition* or *yet*, already mentioned above, and to study the list of functions these forms

### 3.4 Semasiological and Onomasiological Approaches

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may fulfil. The approach is thus inductive and interpretive (Hansen, 2006: 22), involving fine-grained analyses of the context of occurrence in order to identify the range of specific functions that are typically expressed by a given form. Such an approach has sometimes been described as “bottom-up” in that it takes as its starting point the empirical data, that is, the context from which different readings and functions are derived (see e.g. the contributions in Celle & Huart, 2007). As already mentioned, the aim is mostly broader than the “simple” description of a polysemous connective. Several studies establish a direct link between today’s polysemy of given markers and their diachronic evolution; for example, the evolution of final *though* in English (Barth-Weingarten & Couper-Kuhlen, 2002) and a very similar process for final *kuntey* (‘but’) in Korean (Kim & Sohn, 2015), or the semantic evolution of adversative *anzi* (‘rather’) and *invece* (‘instead’) in Italian (Musi, 2016). Further details concerning the theoretical and methodological underpinnings of such diachronic studies will be presented in Chapter 5.

Other studies aim at uncovering the discourse connective functions from the discourse marker functions of a given marker, thus contributing to the theoretical discussion regarding differences between discourse connectives, discourse markers and other pragmatic expressions (see Section 3.2). An example is Bolly and Degand’s (2009) study of the French connective *donc* (‘so/then/hence’), which they describe as “polyfunctional” distinguishing four additional more discursive functions that derive from its semantic consequential core. They show that this discursive evolution goes at least partially hand in hand with a loss of its syntactic distribution characteristics. Still other studies take a clear cross-linguistic approach combining a semasiological approach with translation to uncover systematic differences in the polysemies of connectives’ equivalents in different languages. For instance, Bazzanella et al. (2007) assess convergences and divergences of Italian *allora* and its French translation equivalent *alors* to show that the connectives, while etymologically going back to the same Latin source form *illa hora*, are used differently in the two languages. In particular, they show that the two connectives have the same meaning potential with temporal, inferential and metatextual uses, but that the temporal use is more central in Italian than in French (referring to different paces of grammaticalization between the two languages). In the same vein, Degand (2009) investigates the same French connective *alors* showing that translation (into Dutch) not only confirms its polysemy with temporal, consequential, conditional and metadiscursive meanings, but can also be used as a heuristic to

disentangle the different related senses. Using translation as a heuristic to disambiguate discourse connectives also underlies the work by Cartoni, Zufferey and Meyer (2013a). Further cross-linguistic studies will be discussed in Chapter 7.

On the basis of the annotations in the PDTB (see Chapter 2), Asr and Demberg (2013: 87) distinguish three types of ambiguities that connectives may encode:

- (i) A connective can express different relations, but not the different relations at the same time. A typical example is *since* (temporal vs. causal, belonging to different relation types in the PDTB taxonomy).
- (ii) A connective expresses one class of relations in the PDTB taxonomy, but is ambiguous in the subclasses. For example, *but* always expresses a relation of COMPARISON but can express any subtype (concession, contrast, similarity).
- (iii) The relation itself is ambiguous and several relations can hold at the same time.

Most semasiological case studies are concerned with the first and second types of ambiguity, which covers both polysemic and monosemic studies of individual markers (see the contributions in Fischer, 2006b). The third type of ambiguity is discussed nearly exclusively in discourse annotation projects (see Section 3.4.2). For purposes of illustration, we will focus here on studies investigating the ambiguity of adversative connectives.

Fraser (2009) is a monosemic study of the English connective *but*, for which he distinguishes more than ten different uses. His study of this connective is presented in support of his claim that discourse connectives<sup>1</sup> are to be treated “as monosemous, since most [connectives] have a single meaning relationship and for those which have more than one, it appears at this point that they can be dealt with by pragmatic interpretation” (Fraser, 2009: 307). According to the author, *but* has a core meaning of contrast, thus signalling “a direct or indirect contrast between [Segment]1 and [Segment]2” (p. 300), where direct contrast involves all the uses of *but* conveying a contrastive comparison between the explicit contents of the related segments and indirect contrast establishes a relation between one or two implied propositions. Based on a literature review, his aim is to show that all uses of *but* can be related to the connective’s core meaning. His study is based on

<sup>1</sup> Fraser (2009) uses the term discourse marker (DM), but for reasons of clarity we will use the term connective, as this is the subclass he is concerned with.



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illustrative examples and focuses explicitly on English only so that (semantic) distinctions made in other languages are not considered in his account. This contrasts with Anscombe and Ducrot's (1977) analysis of the connective *mais* ('but') in which the authors specifically consider evidence from other languages to analyze the semantics of the French connective. In particular, the distinction between contrast and correction relations which in French may both be conveyed by the connective *mais* (7–8) is compared to languages in which two distinct connectives are used, namely *aber* and *sondern* in German (9–10), and *pero* and *sino* in Spanish (11–12), respectively.

- (7) Tu aimerais aller à Paris, mais tes parents ne sont pas d'accord.  
You would like to travel to Paris, mais ('but') your parents do not agree.
- (8) Nous ne partons pas en vacances cette année, mais allons rénover notre maison.  
We're not going on holiday this year, mais ('but') we'll renovate our house.
- (9) Du möchtest nach Paris fahren, aber deine Eltern sind damit nicht einverstanden.
- (10) Wir fahren dieses Jahr nicht in Urlaub, sondern werden unser Haus renovieren.
- (11) Te gustaría ir a París, pero tus padres no están de acuerdo.
- (12) Este año no nos vamos de vacaciones, sino que vamos a reformar nuestra casa.

[constructed examples]

From the comparison of the semantic and syntactic behavior, Anscombe and Ducrot conclude that *mais* has two distinct meanings. "Thus, even though this distinction is not lexicalized in two different connectives in French, it is still observable from the fact that the two uses of the connective *mais* are associated with different syntactic patterns" (Zufferey & Degand, *forthc.*). The theoretical consequences of these semantic and syntactic distinctive patterns are further worked out for adversative markers (in Spanish) by Schwenter (2002).

Very often, two or more connectives of the same semantic domain are involved in the analysis. While one might want to argue that the study of more than one linguistic expression belonging to the same semantic domain belongs to the area of onomasiological studies (Section 3.4.2), the focus on specific connectives, their syntagmatic

distribution and the different senses they convey are in line with the bottom-up approach that is typical of the semasiological method. For instance, Zeyrek (2014) analyzes the similarities and differences between two contrastive-concessive discourse connectives in written Turkish, namely *ama* ('but/yet') and *fakat* ('but'). The connectives are analyzed quantitatively and qualitatively considering the characteristics of their arguments, their position in the sentence, the senses they convey, and how they are distributed across genres. Differences between the two connectives are related to genre distribution and to available pragmatic inferences. Similarly, Wang and Tsai (2007) find that the Chinese contrastive connectives *zhishi*, *danshi*, *buguo*, and *keshi* (corresponding to English 'but/yet/however'), while expressing similar discourse functions of opposition do not distribute equally across different discourse types (narratives, casual conversations, formal lectures and formal interviews), and differ from one another in terms of frequency and contextual effects. Combining frequency distribution and experimental data, Asr and Demberg (2020) conclude that fine-grained meaning distinctions between English *but* and *although* may be predicted from the connectives' relational distribution. In other words, a connective's meaning is probabilistic: it is their typical context of use in production data more than the connectives' alleged core meaning that influences how speakers will evaluate their ambiguity. Next to the semasiological studies just described, a number of studies take an onomasiological approach to the contrastive-adversative domain. We will describe some of them in Section 3.4.2.

Case studies of connectives exist in different languages with the explicit objective of uncovering particular (semantic) aspects of the linguistic system and the role connectives play therein. Among these studies, one particular area stands out, namely the idea that connectives would be markers of objective or subjective discourse relations (see Chapter 2). This strand of research has gained increasing attention in the last decade with studies in diachronic and experimental linguistics (see Chapters 5 and 6, respectively), but also in synchronic (corpus-based) descriptive studies in different languages. It is to the latter studies that we will devote some attention here focusing on causal connectives, which have been at the center of researchers' attention in this context.

In Chapter 2, we defined objective relations as relations at the level of propositional content, in which real-world events are connected as in example (18) in Chapter 2, here repeated as (13) for convenience.

- (13) The door slammed because there was strong wind outside.  
[constructed example]

### 3.4 Semasiological and Onomasiological Approaches

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Subjective relations, then, involve a reasoning speaker, who interprets or reinterprets external states of affairs for purposes of argumentation, as in (14) (example (19) in Chapter 2), where the speaker argues on the basis of the fact that the neighbors' lights are always out, that they must be on holiday.

- (14) The neighbors must be on holiday, because their lights are always out.

[constructed example]

The expression of objective and subjective relations by means of connectives has been worked out most extensively in the area of causal relations. Many of these works go back to Sweetser's (1990) seminal distinction between three different domains of discourse in which (causal) connectives may operate: the content domain, the epistemic domain and the speech-act domain, illustrated with her examples in (15–17), respectively. Thus, the content use is based on the cause-and-effect relationships in the real world; epistemic use introduces the speaker's reason for making a conclusion, and speech act use expresses the motivation for the speaker's performing a particular speech act, for example, asking a question in (17).

- (15) John came back because he loved her.

- (16) John loved her, because he came back.

- (17) Since you are so smart, when was George Washington born?

[from Sweetser, 1990: 77–78]

Many studies demonstrate that the systematically different patterns of meaning and use of connectives like *because* can be brought back to their use in these three different domains. In many works on discourse relations and connectives, Sweetser's distinction between three discourse domains has been brought back to the distinction between objective (content use) and subjective (epistemic and speech-act uses) relations and/or discourse connectives or to a scale from low speaker involvement (objective) to high speaker involvement (subjective) (Pander Maat & Degand, 2001). In the latter approach the interplay between discourse relation and connective are put to the fore, in the sense that a

connective encodes a certain speaker-involvement level, which it contributes to the interpretation of its discourse environment. When this level is too low or too high to be combined with the level allowed for by the discourse environment, the use of the connective is inappropriate. (Pander Maat & Degand, 2001: 230)

In other words, some connectives specialize in more objective uses, others in more subjective uses, while still others may not impose any subjectivity constraints at all. Many studies have shown that these constraints are language-specific. While the English connective *because* can be used to express both subjective and objective causal relations, other languages have specialized connectives to express different types of causal relations.

In Dutch, several corpus-based studies have established a systematic relationship between the different types of causal relations and the connectives used to express these relations. More specifically, the connective *want* ('because') is a typical marker of subjective relations, and the connective *omdat* ('because') typically expresses objective relations. These are strong tendencies which have been confirmed both for spoken, spoken-like and written data (Pit, 2006; Sanders & Spooren, 2009, 2015; Spooren, Sanders, Huiskes & Degand, 2010; Sanders, Sanders & Sweetser, 2012), even if there is no one-to-one relation between the connective and the type of causal relation (see Sanders & Spooren, 2013). A similar division of labor between objective and subjective connectives is found in the consequential domain (or forward causal connectives), with the connective *dus* ('so') specializing in subjective uses and *daarom* (similar to 'therefore/that's why') in objective ones, which explains their distinct distributional behavior (Pander Maat & Sanders, 2001; Pander Maat & Degand, 2005). Compared to other languages, Dutch stands out with this strong division between objective and subjective connectives, to such an extent that the connectives themselves are seen as encoding objective or subjective meaning and could be used as a heuristic to determine the subjectivity of equivalents in other languages, such as the connective *because*, which does not encode this meaning (Levshina & Degand, 2017).

In French, three connectives are predominantly used to express causal relations, namely *parce que* ('because'), *car* ('because/for'), and *puisque* ('since') (see Groupe lambda-L (1975) for their seminal theoretical analysis and Zufferey (2012) for an empirical reinterpretation). Regarding the distinction between *car* and *parce que*, the main argument is that *car* conveys more subjective relations and it is also used in a higher (written) language register, while *parce que* is equally well suited to both types of relations, gaining ground on *car* in contemporary French (Debaisieux, 2002; Simon & Degand, 2007; Degand & Fagard, 2012; Zufferey, 2012; Zufferey et al., 2018). In contrast to the "division of labor" view suggested in Stukker and Sanders (2012), corpus-based and empirical work have shown that the distinction between the two connectives is not clear-cut. For example, Zufferey

(2012) notes that *car* and *parce que* are interchangeable in many objective and subjective contexts in writing, and Véronis and Guimier (2006) find that *car* is used in Internet chat-type conversations. This is confirmed in recent work by Blochowiak, Grisot and Degand (2020), who showed that *car* is actually not confined to subjective uses and can also be used to express objective relations (even more frequently than *parce que*), both in formal and informal writings. The connective *puisque* plays a specific role in the causal connective trio. While it is also described as subjective in most studies, it is different from *car* and *parce que* in that *puisque* introduces a cause presented as being part of the common ground between speaker and hearer, that is, as given information (Ducrot, 1983; Nazarenko-Perrin, 1992; Zufferey, 2014).

Similar (corpus-based) studies investigating the relation between subjectivity and causal connectives exist for Spanish (Santana et al., 2018), Mandarin Chinese (Xiao, Sanders & Spooren, 2021), Turkish (Çokal, Zeyrek & Sanders, 2020), including cross-linguistic studies in Germanic and Romance languages (Degand & Pander Maat, 2003; Pit, 2007; Fagard & Degand, 2010; Stukker & Sanders, 2012; Zufferey & Cartoni, 2012). This different encoding of subjectivity in (causal) connectives leads to differences in processing as will be shown in the studies presented in Chapter 6, but also to different syntagmatic distributions, which will be further developed in Chapter 4.

#### 3.4.2 Onomasiological Studies of the Semantics of Discourse Connectives

In contrast to the bottom-up semasiological approach, the onomasiological one is top-down with a predefined set of discourse functions as a starting point for which one would try to determine how these functions might be expressed linguistically. Staying in the causal domain, an example is the study by Ibáñez et al. (2020), whose aim is to identify the variety of markers used to signal causal relations in Spanish and to describe what (semantic) features distinguish these markers from one another. From the 40 different linguistic devices identified to signal causal relations, it was found that the 8 most frequent are the most polyfunctional, while the others specialize in signalling specific relations. Again, in the contrastive-adversative domain, different studies exist, very often combining different languages. They differ from the semasiological studies presented above in that the focus is more on the meaning potential languages display in expressing a type of discourse relation, rather than on the fine-grained distributional differences between the different connectives of that domain. For instance, Izutsu (2008) proposes a “unifying analysis of opposition relations” (p. 646), aiming to unify all the

semantic categories of opposition. On the basis of linguistic evidence (mainly English, but also Romanian, French, Spanish, German, Swedish and Hebrew), she proposes a classification of opposition relations into three semantic categories (contrast, concessive and corrective) that can be distinguished from one another through explicit semantic features. Thus,

contrast designates a mutually exclusive relation between two or more propositional contents; concessive designates a mutually exclusive relation between an assumption and a propositional content or between two assumptions; and corrective designates a mutually exclusive relation between a rejected semantic content and an asserted semantic content.

[Izutsu, 2008: 673]

In a more explicit cross-linguistic perspective, Cuenca, Postolea and Visconti (2019) classify and compare the main contrastive markers of Spanish, Catalan, Italian and Romanian “with the aim of providing a cross-linguistic description of the way in which this class of discourse relations is signalled in these four different Romance languages”. The approach is top-down starting from two general meanings of contrast (non-exclusive *vs* exclusive, in their terms) which are expressed in divergent connective paradigms in the four languages. Also cross-linguistic is the study by Mortier and Degand (2009), who make use of a “combined corpus approach”, including written and spoken comparable data and translation corpora, to address the polysemy of a set of French and Dutch adversative discourse markers. Focusing on French *en fait* (‘in fact’) and Dutch *eigenlijk* (‘actually’) within this set, they establish semantic profiles for the two markers showing how they fit within the complex semantic network of opposition, reformulation and deviation. Going beyond discourse connectives and discourse markers is the onomasiological study of Andorno, Benazzo and Dimroth (2023) in which the authors aim to uncover how the notion of contrast is expressed in Germanic (Dutch/German) and Romance (Italian/French) languages. Using an experimental elicitation task, it is shown that the two language families differ in the way they express contrastive relations, “both in terms of the preferred information units selected to mark a contrast (...) and their sensitivity to the degree of contrastiveness involved” (p. 15). Linguistic expressions of contrast considered include discourse connectives, but also word order, (contrastive) pronouns, prosodic focus or lexical resources.

Next to the semantically driven onomasiological approaches presented above, there is an alternative top-down approach of discourse connectives that aims to describe the category as a whole. Crible and Degand (2019a, b) propose a model for the identification and

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annotation of the functions of discourse markers in spoken languages. Rather than focusing on a restricted set of markers, the “model targets the whole DM category (as opposed to fine-grained case studies), covers functions that apply to both speech and writing, and aims at high reliability, even though annotation remains a challenging and somewhat subjective task” (Crible & Degand, 2019a: 4). One of the specific outcomes of the model is to describe the semantics of discourse markers as a combination of polyfunctionality (different contexts of use) and polysemy (different senses). The model is different from the discourse relations taxonomies that were presented in Chapter 2, but it shares with PDTB its focus on the lexical expressions. The main innovative feature of the model is to distinguish between two independent layers of semantico-pragmatic information, which, once combined, provide a fine-grained disambiguation of the discourse markers’ polyfunctionality and polysemy. On the one hand, the layer of domains corresponds approximatively to the speaker’s global communicative intentions when using a given discourse marker: ideational (relating real-world events), rhetorical (expressing the speaker’s subjectivity and metadiscursive effects), sequential (structuring local and global units of discourse) and interpersonal (managing the speaker–hearer relationship). These four domains reflect different broad functions language in use can fulfil (see also Schiffrin, 1987; Redeker, 1990; Sweetser, 1990). A marker is polyfunctional when it can be used in more than one domain. The second layer of annotation refers to fifteen “discourse functions”, that is, the specific semantic meaning a marker may convey, such as addition, alternative, cause, concession, condition, etc. A marker is polysemous, when it may express more than one function. The specificity of the model lies in the fact that, in principle, any function can combine with any domain resulting in 60 (4 x 15) potential domain-function combinations (see Table 3.1).

So far, the model has been applied (successfully) to spoken data in French, English, Spanish and Polish, uncovering both similarities and divergences in the way languages put their discourse markers to use

Table 3.1 Two-dimensional domains-functions model of discourse markers (based on Crible & Degand, 2019a)

| Ideational                                                                                                                                                                          | Rhetorical | Sequential | Interpersonal |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|---------------|
| Addition – Agreeing – Alternative – Cause – Concession – Condition –<br>Consequence – Contrast – Disagreeing – Hedging – Monitoring – Quoting –<br>Specification – Temporal – Topic |            |            |               |

for the expression of relational and discursive meanings (Degand et al., 2022). More specifically on the topic of polysemy and polyfunctionality, Degand's (2023) study of discourse marker use in different spoken French discourse types (N=1872 DMs, 103 DM types) reveals that high frequency goes hand in hand with high polyfunctionality (use in all four domains) and high polysemy (more than 7 different senses). It appears that these markers are actually the discourse connectives *et*, *mais* and *alors*. Yet, polyfunctionality and polysemy do not always follow from another. The connective *parce que*, for instance, is highly polyfunctional (occurring in the four discourse domains) and monosemous at the same time, only expressing the causal function. The study furthermore uncovers the situational features that favor or disfavor polyfunctional or polysemous discourse markers. In particular, it is shown that discourse markers are not distributed randomly across discourse genres (see Chapter 7). The most polyfunctional markers are mainly at use in highly prepared and formal monologues, while spontaneous, informal dialogues resort more often to domain-specific expressions. Similarly, high polysemy markers are also overrepresented in formal, highly prepared settings while spontaneous conversation resorts to discourse markers which express fewer different functions. The categorial approach is interesting because it gives a beginning to the question "Why and when do speakers use discourse markers (including discourse connectives)?", yet the approach is too coarse-grained to disentangle fine-grained semantic features that are better accounted for in semasiological case studies.

### 3.5 SUMMARY

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This chapter set off with an overview of semantic features defining discourse connectives and how these are different from discourse markers. On the basis of three central features (connectivity, optionality and truth-conditionality), we concluded that discourse connectives are best considered as a subcategory of discourse markers. We then turned to a major semantic characteristic of discourse connectives, namely their polyfunctionality and polysemy. Polyfunctionality refers to the fact that discourse connectives can fulfil different functions depending on the context in which they are used, while polysemy refers to their different encoded senses or meanings. Whether the connective encodes one specific core meaning from which all others are derived in context (monosemy) or whether it encodes several (related) meanings which it brings to different contexts (polysemy) is



still not clear cut. Methodologically, both the monosemy and polysemy accounts heavily rely on fine-grained analyses of contextual features. As to whether one or the other perspective gets the upper hand seems to be determined mainly by the theoretical framework in which researchers host their work. When it comes to describing the semantics of particular discourse connectives, two approaches are put forward. In the semasiological approach the study is bottom-up, starting from the connective and unravelling its different meanings in context. In the onomasiological approach, the perspective is top-down starting from a given semantic domain or relation to investigate how a given language (or given languages) express this general meaning through specific connectives.

### ***DISCUSSION POINTS***

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- Regarding the semantics of connectives, what kind of arguments could be decisive in the monosemy vs. polysemy debate?
- On the basis of the overview of studies in Section 3.4, what are in your opinion the advantages and disadvantages of semasiological and onomasiological approaches to discourse connectives?
- Are there (semantic) reasons to keep the categories of discourse connectives and discourse markers as separate categories of linguistic expressions?

### ***FURTHER READING***

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Fischer (2006b) presents an overview of works on discourse connectives and discourse markers making explicit whether preference is to be given to a monosemous or polysemous account of their (ambiguous) meaning. Celle and Huart (2007) is a good illustration of the variety of theoretical approaches to the study of discourse connectives. Fedriani and Sansó (2017) present state-of-the-art work regarding the form, meaning and functions of pragmatic markers, including discourse markers, modal particles and discourse connectives from a variety of perspectives. Explicitly tackling the categorial distinction between discourse connectives and discourse markers is Pons Bordería (2001). On the notions of polysemy and ambiguity proper, Tuggy (1993) is a strong position paper. Also going beyond discourse connectives is the special issue edited by Falkum and Vicente (2015) presenting current perspectives and approaches to polysemy.

## 4 Connectives between Syntax and Discourse

### 4.1 INTRODUCTION

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This chapter will address a lesser-studied aspect of discourse connectives, namely their syntactic status. More precisely, an overview will be given of those studies that call on the syntactic features of discourse connectives as a means to disambiguate their function and meaning. These syntactic features cover the morphosyntactic nature of discourse connectives, their “part-of-speech” as it were, as well as their syntagmatic distribution, that is, the position they occupy in the host unit as well as their close syntagmatic dependencies.

In Chapter 1 of this book, we defined connectives as a functional, rather than a syntactic category. The homogeneity of the connectives class lies in the fact that connectives are used by speakers and writers to make explicit discourse relations holding between discourse segments. Morphosyntactically, however, the discourse connectives class is heterogeneous as it includes coordinating and subordinating conjunctions, but also adverbs, prepositions and prepositional phrases, or phrasal verbs. In other words, connectives come with a double categorial affiliation: functional and grammatical. In Pons Bordería’s (2001: 228) words: “When we say that *then* is a connective what we mean is that besides being an adverb, some of its occurrences work as a connective, that is, *then* is polysemous.” While most studies on discourse connectives do mention this diversity of linguistic forms belonging to the connectives class (see e.g., Fraser, 1999; Lewis, 2006), the focus has been mainly on their semantic and functional properties (see Chapter 3). Thus, little attention has been paid to the role of syntactic considerations in the definition and disambiguation of discourse connectives and their hosts. Yet, a few research strands stand out that will be worked out in this chapter.

On the basis of existing lexicons of discourse connectives, we will first give an overview of the morphosyntactic distribution of discourse connectives in several European and non-European languages (Section 4.2).

In Section 4.3, we will address a number of studies that focus on the (semi-automatic) identification and annotation of discourse connectives in context. These include theoretical as well as applied studies, where the morphosyntactic status of discourse connectives is key in distinguishing their discourse use from other uses. This is of particular interest in the field of natural language processing (Section 4.3.1), but also in the field of contrastive linguistics, where it has been shown that syntactic categories, including those underlying the description of discourse connective uses, are not always cross-linguistically valid (Section 4.3.2). The last section of this chapter will be devoted to the relationship between the syntagmatic position of discourse connectives and their meaning, which has given rise to numerous studies at the grammar-discourse interface highlighting the fuzzy boundary between discourse connectives and discourse markers. Exemplary synchronic studies will be discussed in the present chapter, while diachronic approaches will be presented in Chapter 5.

#### **4.2 MORPHOSYNTACTIC DISTRIBUTION OF DISCOURSE CONNECTIVES**

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In recent years, several lexicons of discourse connectives have been compiled in a variety of languages, among which the DiMLex project for (written) German (Stede & Umbach, 1998; Stede, 2002) and the LEXCONN project for (written) French (Roze, Danlos & Muller, 2012) stand out for their pioneering role. In both cases, the discourse connectives are listed with information regarding their orthography, syntactic category and the discourse relations they can express. The main aim of these two projects was to provide declarative knowledge about connectives for purposes of Natural Language Processing (NLP), more specifically automatic discourse analysis tasks. These two lexicons form the basis of the recently developed database Connective-Lex, a web-based multilingual lexical resource for connectives (Stede, Scheffler & Mendes, 2019). This database is a compilation of existing and purposefully built connectives lexicons that have been made compatible in their design for purposes of cross-linguistic comparison.

For the ten languages included so far in the database, the following information is provided: orthography, syntactic category, ambiguity regarding connective and non-connective usage, and coherence relations. Table 4.1 presents for each language the number of coordinating conjunctions (cco), subordinating conjunctions (csu), adverbs (adv) and

Table 4.1 Morphosyntactic categories in the multilingual connective-lex

|       | French | English | Dutch | German | Italian | Portuguese | Czech | Ukrainian | Arabic | Bangla |
|-------|--------|---------|-------|--------|---------|------------|-------|-----------|--------|--------|
| cco   | 11     | 9       | 13    | 38     | 77      | 10         | 29    | 14        | 92     | 23     |
| csu   | 131    | 36      | 49    | 66     | 40      | 68         | 27    | 49        | 145    | 23     |
| adv   | 152    | 95      | 94    | 158    | 33      | 99         | 63    | 41        | 26     | 68     |
| prep  | 32     | 36      | 33    | 25     | 16      | 29         | 10    | 9         | 13     | 17     |
| other | 3      | 29      | 19    | 10     | 8       | 21         | 91    | 18        | 120    | 0      |
| Total | 329    | 205     | 208   | 297    | 174     | 227        | 220   | 131       | 396    | 131    |

## 4.2 Morphosyntactic Distribution of Discourse Connectives

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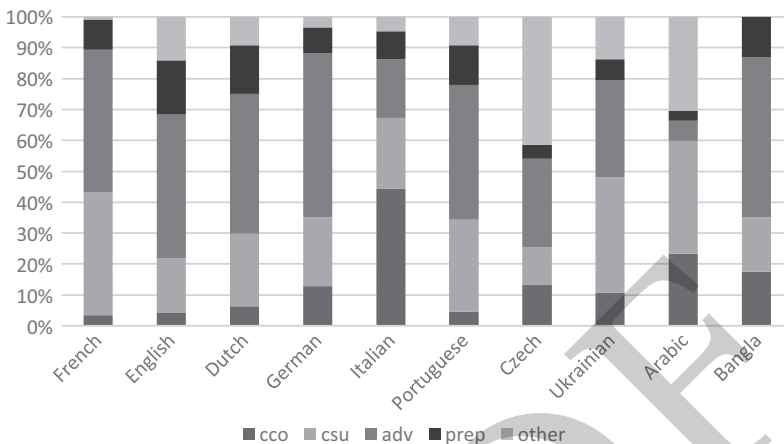


Figure 4.1 Cross-linguistic morphosyntactic distribution of discourse connectives

prepositions or prepositional phrases (prep). The variable “other” covers a variety of morphosyntactic forms, from unknown, to nouns, phrasal verbs or language-specific syntactic categories or expressions.

A closer look at the morphosyntactic distribution of connectives within each language shows that languages make a divergent use of the syntactic stock available for the expression of connectives (Figure 4.1). While Italian discourse connectives most often belong to the coordinating conjunctions category (77/174, or 44.2%), Arabic shows a strong preference for subordinating conjunctions (145/396, 36.6%) and for the category “other” (120/396, 30.3%). Strikingly, the other West-European languages (French, English, Dutch, German, Portuguese) show a similar morphosyntactic distribution, with a majority of connectives being adverbs, followed by subordinating conjunctions, prepositions and coordinating conjunctions. While this cross-linguistic overview hides the subtle idiosyncrasies within each language, the multilingual approach brings to the fore the many challenges that building connectives lexicons include: identifying a robust set of linguistic expressions that count as connectives (for a discussion, see Stede & Umbach, 1998; Pasch et al., 2003; Roze, Danlos & Muller, 2012), defining the syntactic category (see Roze, Danlos & Muller, 2012), establishing the discourse relations that the connectives can mark (in context). The latter endeavor relates to the variety of taxonomies available to describe the senses of discourse relations marked by connectives and was already discussed in Chapters 2 and 3 of this volume.

A closer look at the criteria used to include or exclude given linguistic expressions from the list of connectives for the different lexicons shows that the syntactic criteria may play a crucial role. In other words, it is not enough for a linguistic expression to be used as an explicit marker of an underlying discourse relation to count as a connective, neither is it sufficient for a given connective candidate to belong to one of the above-mentioned syntactic categories to be automatically included in the connective category.<sup>1</sup> A number of additional criteria apply which are syntagmatic in nature. For purposes of illustration, we will give details for French based on Roze, Danlos and Muller (2012), and complement these with additional syntactic criteria and information from the lexicon-building efforts in the other languages.

In the French LEXCONN database, a syntactic category is associated with each connective, “which can differ a little from traditional ones” (Roze, Danlos & Muller, 2012). Strikingly, the position of the connected segments is important in determining the syntactic category of the connective (see Section 4.4). Thus, coordinating conjunctions are always at the beginning of their host clause, and the “mate segment” is always on the left (see example 1); subordinating conjunctions are also always at the beginning of their host clause, but the mate segment can be anteposed (example 2a), postposed (2b), or internal (2c); prepositions correspond to the reduced forms of subordinating conjunctions when the host clause is an infinitive verbal phrase (3), and adverb applies to connectives, which can appear in various positions in their host clause, and whose mate segment is always on the left as in example (4).

- (1) Sophie devait venir aujourd’hui, **mais** elle est encore malade.  
‘Sophie was supposed to come today, mais/but she is still sick’
- (2) a. **Alors que** la chasse est ouverte, ils ont pris le risque d’aller se promener en forêt.  
‘Alors que/While hunting is open, they took the risk to go for a walk in the forest.’

<sup>1</sup> It should be noted that individual languages may introduce more fine-grained syntactic categories such as adpositions taking an abstract nominalized argument or clitics in Arabic, pre- or postpositions with abstract nominal arguments in German or postpositions with nominal phrases in Chinese. On the other hand, the English lexicon based on the Penn Discourse Treebank (PDTB) only includes connectives belonging to the categories conjunction and adverb strictly taking two clausal arguments.

#### 4.2 Morphosyntactic Distribution of Discourse Connectives

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- b. Ils ont pris le risque d'aller se promener en forêt, **alors que** la chasse est ouverte.  
'They took the risk to go for a walk in the forest, **alors que/while** hunting is open.'
  - c. Ils ont, **alors que** la chasse est ouverte, pris le risque d'aller se promener en forêt.  
'They have, **alors que/while** hunting is open, taken the risk to go for a walk in the forest.'
- (3) Elle a consulté le calendrier de la chasse **avant de** partir en promenade.  
'She consulted the hunting calendar before going for a walk.'
- (4) Il fait très beau aujourd'hui. (**Donc**) tout le monde est (**donc**) parti se promener (**donc**).  
'The weather is very nice today. **Donc/Hence** everybody (**donc/hence**) went for a walk (**donc/hence**).'

[constructed examples]

In the German DiMLex, similar positional constraints within the sentence and information regarding linearization of the two connected arguments are mentioned in the lexicon. In addition to categorial and positional criteria, Roze, Danlos and Muller (2012) present three properties of discourse connectives: they are not integrated to propositional content (Cleft Criterion), they cannot be referential expressions (Substitutability Criterion), and their meaning is not compositional (Compositionality Criterion). Only the first one is syntactic in nature. For the authors of the LEXCONN database, connectives do not belong to the predicative structure; therefore, they cannot be focused in a cleft construction. This criterion makes it possible to distinguish a non-discourse usage (example 5) from a discourse usage (example 6) for *à ce moment-là* (at that moment, then/so). The former can be focused in a cleft construction, while the latter cannot.

- (5) Il a commencé à pleuvoir. **A ce moment-là**, Paul est arrivé / C'est à ce moment-là que Paul est arrivé.  
'It started raining. At that moment, Paul arrived / It is at that moment that Paul arrived.'
- (6) Tu as l'air de penser qu'elle n'est pas honnête. **A ce moment-là** ne lui raconte rien / # C'est à ce moment-là que ne lui raconte rien.  
'You seem to think that she's not honest. In that case/So don't tell her anything.'

[adapted from Roze, Danlos & Muller, 2012, examples 2a–3c]

This short overview of the syntactic information stored in connectives lexicons provides us a first glance of the importance to consider the syntactic status of these linguistic expressions, not the least for purposes of (semi-automatic) disambiguation of discourse connectives in natural language processing applications.

### 4.3 USING SYNTACTIC FEATURES TO DISAMBIGUATE DISCOURSE CONNECTIVES

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When it comes to considering the role that syntactic features may play in the disambiguation of discourse connectives, two strands of research stand out: Natural Language Processing applications on the one hand, and (theoretical) case studies, often in a contrastive perspective, on the other.

#### 4.3.1 Disambiguation of Connectives in NLP Applications

NLP applications are concerned with the automatization of language production (natural language generation) and language comprehension (natural language parsing) tasks, among others for purposes of data mining, text summarization and machine translation. Most, if not all of these applications, assume (correctly, we believe) that discourse connectives are the primary source of information for building the discourse structure of a text. It follows that connectives play a crucial role in (automatic) discourse production and comprehension tasks, and NLP researchers have developed algorithms for the automatic identification of connective usage.

According to Pitler and Nenkova (2009), two types of connectives ambiguity need to be resolved during (automatic) discourse processing. First, there is the ambiguity between discourse and non-discourse usage. To illustrate this ambiguity, Pitler and Nenkova mention the adverb *once*, which can be used as a temporal discourse connective, as in (7) or as a temporal adverbial meaning “formerly”, as in (8). There are of course many other ambiguous pairs of this type, in many different languages (see also examples (5–6), above).

- (7) **Once** they had taken the decision, the implementation of the department reorganization went smoothly.
- (8) He **once** was very rich, but these times are over.

[constructed examples]

The second type of ambiguity has received more attention, both within NLP studies and in manual discourse annotation projects. It concerns



### 4.3 Syntactic Features to Disambiguate Discourse Connectives

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the ambiguity of the discourse relation marked by the connectives. For example, *since* can serve as either a temporal or causal connective (examples 9 and 10), *while* as a temporal or contrastive connective (examples 11 and 12), *but* as a contrastive or concessive connective (examples 13 and 14). Actually, the many-to-one relationship between discourse senses and discourse connectives seems to be the rule rather than the exception (see Chapter 3 for an overview in many different languages).

- (9) **Since** I started studying linguistics, I am a lot happier.
- (10) Tell me what to do, **since** you are in charge here.
- (11) The students were very nervous, **while** they were waiting in the corridor to take their oral exam.
- (12) Mary studies engineering, **while** her three brothers have left school early.
- (13) Jimmy can't make it to the meeting, **but** his collaborator can.
- (14) The room was not very comfortable, **but** it was very cheap.

[constructed examples]

Pitler and Nenkova (2009) demonstrate that syntactic features improve performance in the two disambiguation tasks. More precisely, taking into account the morphosyntactic category of the potential discourse connective item, that of its parent, and of its left and right siblings, the authors were able to reach a disambiguation performance close to 95 percent for both the prediction of the discourse vs. nondiscourse use, and for the prediction of the discourse senses. This confirms their assumption that discourse connectives appear in specific syntactic contexts.

Using syntactic features (mainly part-of-speech category, type and linear order of (clausal) arguments) to disambiguate and (semi-automatically) annotate discourse connectives has been applied to a variety of languages. A beacon in this domain of research is the development of the Penn Discourse Treebank (Prasad et al., 2008; see Chapter 2) for English that was manually annotated in various extensions (Webber et al., 2019) and inspired the development of different Discourse Treebanks in as many different languages (see e.g., the Chinese Discourse Treebank (Zhou & Xue, 2015), the Prague Discourse Treebank (Rysová et al., 2016) or the Turkish Discourse Bank (Zeyrek, Demirşahin & Sevdik Çallı, 2013). The principles underlying the identification and annotation of discourse connectives is

similar in most cases: Part of the data is manually annotated following the PDTB guidelines and is then used as a testbed for the development of automatic annotation tools. A case in point is the Leeds Arabic Discourse Treebank (Al-Saif & Markert, 2010, 2011; Alsaif, 2012). For the identification task, the authors show that lexical type features and automatically derived morphological and POS features are highly reliable to distinguish connective from nonconnective use. The method is akin to the one proposed by Pitler and Nenkova (2009) with syntactic features including the position of the potential connective (sentence-initial, medial or final), the surface strings of the three words before and after the connective and the POS-tag of the potential connective and the three preceding and following words (via the ATB/Stanford Tagger), as well as of the potential connective's parent and sibling nodes.

An alternative to annotating (manually or semi-automatically) connectives for their meaning or function is to derive their meaning through clustering techniques making use of syntactic information. Based on the assumption that semantic and functional properties of connectives arise from their distributional characteristics, Laippala, Kyröläinen, Kanerva and Finter (2021) use dependency profiles to reveal similarities and divergences in discourse connectives use. Dependency profiles are based on cooccurrence patterns of the connectives with the dependency syntax relations of the segments in which they are involved. Working with 24 discourse connectives in the Finnish Internet Parsebank of 3.7-billion tokens, the authors demonstrate that applying clustering to these dependency profiles results in linguistically meaningful groupings among the connectives, that is, functionally akin connectives end up in the same cluster. Clustering can furthermore be combined with vector analyses "to obtain generic and stable linguistic characteristics of the discourse connectives" (p. 143). While being less fine-grained than manually annotated data, the large-scale, and fully automatic, analysis may reveal distributional patterns at the interface between syntax and discourse that would remain undetectable in smaller data sets. In addition, dependency treebanks being available for many different languages (de Marneffe et al., 2021), the method can be applied cross-linguistically.

Combining syntactic and lexical information for the semi-automatic identification and characterization of discourse connectives is a promising trend in both monolingual and multilingual studies (Nivre et al., 2020; Zeyrek et al., 2020). The fact that similar surface syntactic features are successful in predicting discourse usage of connectives in several languages highlights the importance of making such syntactic criteria explicit when describing this linguistic category. This being

### 4.3 Syntactic Features to Disambiguate Discourse Connectives

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said, the theoretical case studies presented in the following section invite us to lower some of our expectations regarding the (cross-linguistic) validity of syntactic surface features when describing connectives at the discourse–grammar interface.

#### 4.3.2 Disambiguation of Connectives in Theoretical (Case) Studies

As already mentioned, few studies focus explicitly on the syntactic properties of discourse connectives. Yet, a few case studies stand out in making explicit how syntactic features may impact on the semantics of the connectives under scrutiny. An exemplary study in this respect is Scheffler's (2005) analysis of causal *denn* ('for, because') in German in which she explicitly links *denn*'s syntactic status as a coordinating conjunction to explain "why *denn* can express causation of epistemically judged propositions and speech acts while *weil* [subordinating 'because'] cannot" (p. 219). The crux of her argumentation is that *denn* conjoins two independent assertions (syntactically expressed by main clauses) via a causal conventional implicature. "In other words, *denn* conventionally implicates that the proposition denoted by one clausal argument is caused by the proposition denoted by the other clausal argument" (p. 217). The subordinating conjunction *weil*, on the other hand, does not conventionally implicate the causal relation, rather the causal relationship is part of the embedded assertion (syntactically expressed in a subordinating clause).

A similar line of reasoning is followed by Debaisieux (2016), when she distinguishes two semantic uses of French *parce que* ('because') on syntactic grounds rather than on pragmatic grounds. The starting point of her argumentation is the observation that in many languages, subordinating conjunctions like *parce que* are polyfunctional in that they can introduce both dependent and independent sentences. Her detailed syntactic analysis reveals that these two different uses come with different constraints, the dependent use being a case of a "micro-syntactic construction" and the independent use one of "macro-syntactic configuration" (Debaisieux 2016: 80). Among the syntactic properties at stake, she mentions: (i) the pronominal proportion criterion, that is, the (im)possibility to substitute the causal clause by the interrogative pronoun *pourquoi* (literally 'whatfor'), (ii) the syntagmatic criterion, that is, the (im)possibility to cleft the *parce que*-clause, and (iii) the contrasting option, referring to the possibility of contrasting the *parce que*-clause with a *mais*-clause, as illustrated in examples (15a–c).

- (15) je lui ai proposé **parce qu'**il était au chômage  
'I offered it to him because he was unemployed'

- a. je lui ai proposé pourquoi  
'I offered it to him for what'
- b. c'est **parce qu'**il était au chômage que je lui ai proposé  
'it's because he was unemployed that I offered it to him'
- c. je ne lui ai pas proposé **parce qu'**il était au chômage mais  
parce que j'aime bien travailler avec lui  
'I didn't offer it to him because he was unemployed but  
because I like working with him'

[from Debaisieux, 2016: examples 9a–c]

Given these different syntactic constraints, Debaisieux holds that the different discursive dependencies of subordinating conjunctions should be linked to their syntactic properties, rather than to distinct semantic profiles. This line of reasoning is taken up by Degand (2019) in her contrastive study of *parce que* and its Dutch counterpart *omdat*. In particular, she demonstrates that the syntactic constraints on subordinating embedding (with V-final constraints in Dutch) are lifted when the conjunction is used in a “macro-syntactic configuration” (discourse marker use, in her terms). In other words, different discursive uses come with different syntactic constraints (see also Günthner, 1996; Freywald, 2016).

At a more general level, these studies concern the question whether the distinction between subordination and coordination is parallel in syntax and discourse (Haiman & Thompson, 1989; Fabricius-Hansen & Ramm, 2008; Gast & Diessel, 2012a; Visapää, Kalliokoski & Sorva, 2014). While subordination and coordination are syntactic notions, there is a growing consensus that clause-combining has both syntactic and discursive reflections on a cline expressing different degrees of dependence between the clauses linked. Gast and Diessel (2012b: 4) list three main parameters to describe the semantic and syntactic analysis of clause linkage in a typologically relevant way: (i) the relation of dependency holding between the clause and “the attachment site”, that is, the constituent of any type (noun, clause, verb, ...) to which the dependent clause is attached, (ii) the properties of this attachment site, and (iii) the properties of the attached clause. For the purposes of this chapter, the first parameter is the most relevant one, since it directly involves discourse connectives as potential signals of the type of dependency.

Moving beyond the traditional syntactic division between coordination (or structural and functional independence) and subordination (reflecting structural and functional dependence), Gast and Diessel (2012b: 4) point out that the “term ‘dependency’ can be understood in at least three ways: syntactically, semantically

### 4.3 Syntactic Features to Disambiguate Discourse Connectives

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(or pragmatically) and prosodically”, whereby coordination is conceived of as the absence of any of the above dependencies between the connected clauses, while subordination supposes dependency in at least one of the three properties. Yet, how this dependence is attested, how it can be measured, and how it is expressed cross-linguistically in grammar and in discourse remain questions of debate. In the parametric approach advocated by Gast and Diessel (see also Lehmann (1988) and Bickel (2010)), the distinction is regarded as a gradual one. A number of valuable proposals include fine-grained analyses of distributional features to account for this continuum. Verstraete (2007: 103), for instance, proposes that three parameters of interpersonal grammar, in other words the parameters of modality, speech function and scope “can each take two values in the context of a complex sentence construction (. . .) to set up a basic typology of four construction types”. This typology of clause-combining includes coordination, on the one hand, and three types of subordination, on the other, namely bound subordination, free subordination and modal subordination. Thus, coordination is defined by the parameters [+ speech function], [+ modality] and [- scope]. In other words, coordinated clauses function independently from one another. They have equal status with a speech function and modality of their own and have scope only over their own propositional material, as illustrated in example (16):

- (16) Mattéo was born 7 months ago **and**  
he is the cutest baby in the world.  
he is most probably the cutest baby in the world.  
Isn't he the cutest baby in the world?

[constructed example]

The three types of subordination, then, are characterized by the parameter [- speech function] indicating absence of a speech functional value in the secondary clause. Bound subordination is further marked by the features [- modality] and [+ scope] indicating that the secondary clause falls entirely within the scope of the main clause and cannot have its own epistemic or deontic modal value (example 17).

- (17) a. He cried a lot while you were away.  
b. It is while you were away that he cried a lot.

[constructed example]

Free subordination is also [- speech function] and [- modality], but it is [- scope], indicating that the secondary clause does *not* fall within the scope of the illocutionary force of the main clause, yet it has neither a speech functional nor a modal choice of its own. In (18), the matrix

clause does not have scope over the *when*-clause, rather the two clauses constitute separate intonation units (they are not integrated), the second clause setting the time frame of the question in the matrix clause in a kind of afterthought.

(18) Did he cry? When I was out.

[constructed example]

Finally, modal subordination is [- speech function], [- scope] and [+ modality], which is different from free subordination in that the secondary clause can express independent deontic or epistemic modality, as in example (19).

(19) Whereas it may well be true that Mattéo is a very cute baby, his parents are not very objective.

[constructed example]

Verstraete (2007: chapter 7) convincingly shows that his four-category typology is grammatically motivated in that “the other grammatical criteria that have been used in the analysis of clause combining neatly follow the distinctions defined by the basic parameters of interpersonal grammar” (Verstraete, 2007: 186). Among these, there are, for instance, preposing, clefting and *wh*-questioning, integrated intonation and word order, but also connective selection, which is of interest to us here. Table 4.2 (based on table 32 in Verstraete, 2007: 187) displays a categorization of connectives in terms of the interpersonal typology.

The connectives *and*, *but*, *or*, *for* always introduce clauses associated with the value [+ speech function]. “Another set of conjunctions never allows any speech functional options besides the unmarked declarative, and is therefore invariably associated with the value [- Speech Function]. This category includes *after*, *before*, *when*, *whereas*, *while*, *since*,

Table 4.2 Verstraete’s (2007) clause combining typology and the categorization of connectives

| Construction type   | Connectives                                                                                                                                                     |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Coordination        | <i>and</i> , <i>but</i> , <i>or</i> , <i>for</i> , <i>because</i> , <i>although</i>                                                                             |
| Modal subordination | <i>whereas</i> , <i>when</i> , <i>while</i> , <i>so that</i> , <i>since</i> , <i>as</i> , <i>although</i>                                                       |
| Free subordination  | <i>after</i> , <i>before</i> , <i>if</i> , <i>until</i> , <i>once</i> , <i>as</i> , <i>since</i> , <i>so that</i> , <i>when</i> , <i>while</i> , <i>because</i> |
| Bound subordination |                                                                                                                                                                 |

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*as, so that, until, once, and if* (Verstraete, 2007: 110), which we find in free and bound subordination. A number of connectives are compatible with different clause-combining types. The connectives *because* and *although* “can have both the value [+ Speech Function] and the value [- Speech Function]. *Because*-clauses and *although*-clauses allow non-declarative clause types in final position (...), but they do not allow them in initial position”, as shown in (20) and (21), respectively.

(20) I believe it's time 'Saint' George Galloway was officially canonised preferably using an Iraqi supergun. His intentions must be honourable because who in their right mind would go to Baghdad right after the Gulf War, in which British troops died, and praise the lunatic responsible for starting it?

(21) \*Because who in his right mind would go and praise the lunatic who started the war, Galloway's intentions must be honourable.

[from Verstraete, 2007: 111]

Regarding the parameter of modality, again the values [+ modality] and [- modality] “each define their own sets of conjunctions” (Verstraete, 2007: 114). The set with a positive value for modality includes the connectives *and, or, but* and *for*, compatible with coordination, but also the connectives *although* and *whereas*, compatible with modal subordination (see example 19, above). The set with a negative value for modality, thus not allowing any subjective modal auxiliaries in their host clause, include the connectives *after, before, until* and *once* found in free and bound subordination. Finally, there is a set of connectives that is [+/- modality], namely *as, since, because, so that, when, and while*. According to Verstraete (2007: 117), “[i]t is not a coincidence that all of these conjunctions are ambiguous, either between temporal and contrastive (*when, while*), temporal and justifying (*as, since*), causal and justifying (*because*) and result and purpose (*so that*) meanings.” In other words, the semantic distinctions correlate with the presence or absence of a modal value determining the grammatical clause-combining constructions they may occur in. This aligns with Debaisieux' (2016) findings for *parce que* ('because'), referred to above, albeit in another framework and terminology.

Summarizing the ongoing research on the role of discourse connectives in complex clauses, two research strands stand out, which we will refer to as the clause-combining vs. the discourse relational perspective. The former approach holds that the syntax and semantics of discourse connectives offer little evidence to support the assumption of a structural parallelism between syntax and discourse (for an

interesting synthesis, see e.g., Blühdorn, 2008). Rather, the focus of attention is on the different degrees of dependence between two clauses and whether or not “syntactic dependency” is reflected in “discursive dependency”. The short answer to this question is “no”, the longer question, however, requires a study of clause linkage strategies in a preferably cross-linguistic perspective (see, the studies in e.g., Bril, 2010, Dixon & Aikhenvald, 2011; Gast & Diessel, 2012a) trying to disentangle how coordination and subordination are realized both at the discourse level and the syntactic level, both in syndetic (with a signaling marker) and asyndetic (without explicit marking) combinations. In contrast, the discourse relational approach assigns a crucial role to the discourse connectives as signaling a specific discourse relation, often ignoring their syntactic nature and giving primacy to semantic aspects (Keller, 1995; Gernsbacher, 1997; Stukker & Sanders, 2012; Canestrelli, Mak & Sanders, 2013). Strikingly, in this work, the syntactic status of the linked clauses – including their degree of dependence to one another – is hardly ever accounted for. In other words, as soon as a discourse connective is identified, it is considered as a marker of a discourse relation. Implicitly, a direct mapping is established between clause combining at the grammatical level and discourse relations, focussing on their meaning and/or function but not on their syntagmatic constraints.

Yet, when addressing the question of clause linkage, the syntactic nature of the segments that are linked by a discourse connective cannot be ignored. Most studies suffice with the general statement that discourse connectives make explicit the relation between spans of texts, which by default are defined as “clause-like” (see e.g., Elementary Discourse Units segmentation (EDUs) in computational applications of Rhetorical Structure Theory (Marcu, 2000)). In the connective lexicons (Section 4.2), reference is made to the host clause containing the connective and to the mate segment to which it is related, but what these segments look like from a syntactic point of view is barely touched upon. Dupont (2021) convincingly shows that contrastive research on connectives may fare well from a more systematic syntactic account of the related segments. Focusing on “conjunctive markers of contrast” in French and English, she defined the syntactic features of the connected clauses along two main dimensions: clause types (i.e., finite, non-finite, verbless) and rank status (i.e., main, hypotactic, embedded or minor). From a morpho-syntactic point of view, her analysis demonstrates that the boundaries between coordinators, subordinators and conjunctive adjuncts is actually far from clear-cut, leading her to conceive the boundaries between the three



#### 4.4 Impact of Syntagmatic Position of Connectives on Meaning

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grammatical classes of markers she investigates as different levels on a cline. She also lays bare (slightly) different syntactic distributions of the contrastive connectives and their host clauses in English and French. Regarding the discourse–grammar interface, she shows interestingly that the use of contrastive connectives “in non-default (...) syntactic structures is often motivated by and/or creates a range of effects at the discourse level” (p. 259). For instance, she observes that the use of conjunctive markers of contrast in so-called fragmented syntactic structures (minor clauses, stand-alone hypotactic clauses, sentence-initial coordinators) can serve emphatic discourse functions enhancing the persuasive tone that is central to editorial writing (Dupont, 2021: 263), while the use of discourse connectives in non-finite and verbless clauses (referred to as “syntactic compression”, p. 265) is interpreted as a space-saving strategy in newspaper prose, typical of formal writing. All in all, Dupont’s corpus study convincingly demonstrates “how closely these syntactic patterns are in fact related to discourse-level strategies” (p. 270).

#### **4.4 THE IMPACT OF THE SYNTAGMATIC POSITION OF CONNECTIVES ON THEIR MEANING**

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The final topic addressed in this chapter concerns the influence that the connectives’ syntagmatic position may have on their function. In Section 4.2, we already mentioned that lexicons of connectives do take up the information regarding the connective’s position in the host clause, with coordinating conjunctions being always in initial position of their host clause preceded by the mate segment, and subordinating conjunctions also in initial position, but with their mate segment either before, after or internal to the host clause. Adverbial connective forms, then, can appear in various positions in their host clause.

Regarding the variation in the position of the host clause vs the mate segment in subordinating clause combining, most studies agree that information flow plays a role in the choice between preposing or postposing of the adverbial clause hosting the connective. Renkema (1996), for instance, found that the preposing or postposing of Dutch *omdat*-clauses (‘because’) is related mainly with topicality and local embedding. In other words, it is not the syntactic status of main clause vs subordinate class that is determining in the ordering choice, rather it is the status of the propositional content, and in particular its relatedness to prior information, that is determining (see also Ramsey (1987) for a similar account of English *if*- and *when*-clauses).

Working out this idea further, Degand (2000) confirmed the high sensitivity of such causal constructions to the surrounding discourse, not alone for the choice between preposing and postposing causal conjuncts, but also in the choice between forward and backward causal connectives (see Chapter 3). Thus, she found that writers tend to organize their discourse in function of both prior and upcoming topics of discourse. This was established in a Dutch newspaper corpus analysis based on the forward connectives *dus* ('so'), *daarom* ('therefore'), *daardoor* ('therefore' – objective use, see Chapter 3) and the backward connectives *aangezien* ('since'), *omdat* ('because'), *doordat* ('because' – objective use only). Diessel (2005), on the other hand, using corpus data from spoken and written English, found an impact of relational meaning on the choice between the two orderings. Working on the basis of clauses marked with the connectives *if*, *because*, *when*, *while*, *before*, *after*, *since*, *once*, *until*, *as*, *as soon as*, and *as long as*, Diessel found that conditional clauses tend to precede the main clause, temporal clauses are common in both initial and final position, and causal clauses usually follow the main clause. Furthermore, it is shown that final occurrence of adverbial clauses is motivated by processing, postposing being easier in terms of utterance planning (Wasow, 1997, 2002, cited in Diessel, 2005: 458), while initial occurrence results from semantic and discourse pragmatic forces (in line with the studies by Renkema (1996) and Degand (2000)) that may override the processing motivation. Verstraete (2004), however, in a theoretical constructional study, proposes that the selection of preposed adverbial clauses in English has to do with aspects of the illocutionary status of the conjoined clauses (see Verstraete (2007) presented in Section 4.3.2). More precisely, preposed adverbial clauses (whatever the connective that introduces them) do not constitute a separate speech act (being restricted to the declarative mood) and they do not fall within the illocutionary scope of the main clause. It follows that "initial clauses are interactionally 'deactivated' and backgrounded, whereas (...) their function is not restricted to purely local modification of their immediate main clause" (Verstraete, 2004: 848). This finding is compatible with the discourse pragmatic function of initial clauses found in other studies (*cf. supra*).

Regarding the syntagmatic position of the connective itself in the host clause, there is a strong tendency for initial position, even if there are typological differences with discourse connectives taking the form of sentence-final particles, (e.g., in Japanese; Onodera, 2004; Haugh, 2008; Izutzu & Izutzu, 2014) or conjunctive suffixes (e.g., in Korean; Oh, 2005). Strikingly, when the position of the connective is variable, it may play a role in disambiguating discourse usage from nondiscourse

#### 4.4 Impact of Syntagmatic Position of Connectives on Meaning

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usage (see Section 4.3.1). For instance, Le Draoulec and Bras (2007) showed that depending on its syntactic position in the sentence, the French marker *alors* ('then, so') performs distinct (discourse) functions. When it is used initially, *alors* functions as a conjunctive marker "expressing a dependence link" (p. 88), which may be temporal or consequential, whereas in medial position, *alors* can only function as a temporal adjunct. Similarly, Goutsos (2017) explored the position of discourse markers (functional markers in his terms) in Greek and found that markers occurring in initial position fulfil discursive functions, whereas modal markers occur in medial position. Many other studies have focused on the influence of the connective's syntagmatic position on the discursive meanings themselves, with special attention to the opposition between initial position and final position, often described as left-peripheral vs. right-peripheral uses. For instance, Degand (2014) showed that the connectives *alors* and *donc* ('so, then') express relational meanings of time, consequence and condition in initial position, but also "metadiscursive" meanings of topic management. This is more rarely the case for clause-final position. Degand (2011) finds a similar distribution for Dutch *dus* ('so').

This relation between syntactic position and discourse function was confirmed in Degand and Fagard's (2011) diachronic study of *alors*, where they showed that the marker acquired different discourse functions when moving towards the initial position (see Chapter 5). The idea has been worked out most extensively within the framework that Salameh, Estellés and Pons Bordería (2018) have labelled the *Subjectivity, Intersubjectivity and Peripheries Hypothesis*, introduced extensively in Beeching and Detges (2014), with studies on pragmatic expressions in French, English, Japanese, Italian, Chinese and Korean (see also Onodera & Traugott, 2016). Within this framework, left and right peripheral uses have been associated respectively with subjective and intersubjective meanings, a general trend that goes beyond connectives to include discourse markers and other pragmatic expressions (see also Haselow, 2017). Subjective meanings are linked to the perspective of the speaker/writer, who is drawing contextual inferences, while the intersubjective meanings refer to functions that are more dialogic in nature, concerned with speaker-hearer management (Chapter 3). While this hypothesis has been worked out and at least partially confirmed cross-linguistically in numerous case studies, it has also been challenged or nuanced. In particular, several authors have shown that this functional division of labour does not always hold, with instances of subjective uses in the right periphery, and intersubjective ones in the left

periphery (e.g., Haselow, 2012; Traugott, 2012; Salameh, Estellés & Pons Bordería, 2018; Heim, 2019).

More recently, Degand and Crible (2021) tackled the division of labour between the peripheries by investigating the “functional domains” expressed by discourse markers in peripheral and nonperipheral position. While Degand and Crible’s study concerns not only discourse connectives, but also nonrelational discourse markers like *tu vois* (‘you see/you know’), *bon* (‘well’), or *hein* (‘right’), their results show that initial position is overwhelmingly occupied by discourse connectives (conjunctions and conjunctive adverbials), fulfilling mainly sequential, text-structuring functions, followed closely by rhetorical and ideational uses. While the interpersonal domain is highly infrequent in initial position, it covers more than half of the cases in final position, even if rhetorical and sequential uses are not absent. In the latter case, discourse connectives are almost completely out of the picture. Besides confirming indirectly that the intersubjective meanings are indeed strongly connected to the right periphery (cf. the Subjectivity, Intersubjectivity and Peripheries Hypothesis), the study also indicates that this functional division holds for the peripheries of both clauses and turns, but not for intonation units. Discourse markers appearing overwhelmingly at the boundary of syntactic clauses (more than 90 percent), the authors suggest that “syntax is where DMs act most frequently as boundary markers” (Degand & Crible, 2021: 40) in a functionally motivated way.

## 4.5 SUMMARY

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The starting point of this chapter was the observation that syntactic descriptions of discourse connectives have been rather scarce, even if they are not inexistent. On the one hand, there are a number of efforts aiming to describe the syntactic constraints that come with individual connectives, most notably in connectives lexicons. Such syntactic features have been applied in NLP to disambiguate connective use vs non-connective use, but also to disentangle different connective senses. Most of these works are corpus-based. On the other hand, there have been a number of encompassing theoretical works, in which the aim is to account for clause-combining types, considering coordination and subordination as two extremes on a scale of dependency, with either a gradient cline between these two ends or discrete intermediate categories (Section 4.3.2). Connectives are in this context seen as additional evidence for a given grammatical categorization, but they are not the primary focus of description themselves. Nonetheless, the focus on grammar and syntactic constraints should not

be seen as independent from the semantic meaning expressed. In particular, it was shown that different grammatical configurations go hand in hand with different semantic meanings and categories (as presented in Chapter 3), but also that the syntagmatic distribution of discourse connectives in their host clause influences the meaning they may express. The interplay between grammar and semantics will be worked out further in Chapter 5 from a diachronic perspective.

## DISCUSSION POINTS

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- What is the role of syntactic features in the disambiguation of discourse connectives?
- To what extent should discourse connectives be considered as grammatical expressions?
- Are there any cross-linguistic regularities in the syntactic distribution of discourse connectives?
- What would explain the general tendency for left and right peripheral position to attract different connective meanings?
- To what extent are the functional and cognitive motivations given for preposed adverbial clauses cross-linguistically valid?

## FURTHER READING

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Blühdorn (2008) illustrates how connectives may provide evidence for a model of language in which the organization of subordination and coordination is considered independently in syntax, semantics and discourse. The chapter is part of the volume “*Subordination*” versus “*Coordination*” in *Sentence and Text: A Cross-linguistic Perspective* edited by Fabricius-Hansen and Ramm, of which the introduction presents a clear overview of the challenges in trying to disentangle the different categories of clause-combining and the role connectives may play therein. Gast and Diessel (2012a) pursues a similar objective in a more typological perspective. Focusing on connectives, Stede, Scheffler and Mendes (2019) is an influential contribution on (multilingual) connectives lexicon building that has inspired many authors since, both inside and outside NLP. Regarding the syntagmatic distribution of discourse connectives, in particular how position and meaning of discourse connectives interact, there is the seminal volume by Beeching and Detges (2014) and the more recent volume by Van Olmen and Šinkūnienė (2021) working out similar topics.

## 5 The Evolution of Connectives' Meanings

### 5.1 INTRODUCTION

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“How did connectives emerge in the languages’ grammar?”, is the key question underlying this chapter. Before answering it, we will start with some trivia regarding language evolution and diachronic research. First and foremost, all languages change, they change constantly, but change in progress is extremely difficult to detect. It follows that linguistic change is primarily observed once it has occurred, rarely when it is occurring. The aim of diachronic research is to explain **how** the linguistic system evolves from one stage to the other, going beyond the mere description of successive synchronic stages of language. Linguistic evolution being a largely invisible process that is described and reconstructed on partial data, it remains a largely hypothetical enterprise. In this regard, the uneven availability of historic (written) resources across the languages of the world invites researchers to be aware of the risk of a (strong) Indo-European bias in the development of theories and models of linguistic change.

A strong assumption in diachronic research is that language change is the indirect result of human linguistic interactions to which researchers have an incomplete and restricted access (Marchello-Nizia, 2006). Especially functional approaches to language assume that the locus of language change is primarily within language in use, that is, “une langue change parce qu’elle fonctionne” [a language changes because it works] (Martinet, 1955/2005: xiii, cited in Babiniotis, 2009: 27). In addition to this usage-based perspective, much of diachronic work is based on the premise of uniformitarianism stating that we reconstruct the past on the basis of the present, assuming, for instance, that the cognitive processes underlying language production and comprehension are diachronically stable (Bergs & Hoffmann, 2017). In Labov’s (1972: 101) words: “[T]he linguistic processes taking place around us are the same as those that have operated to produce the historical record” (cited in Traugott, 2017: 290). This premise allows us

## 5.1 Introduction

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to project today's interpretations of linguistic phenomena onto diachronic accounts, paying attention especially to interactional practices. These include findings in the field of sociolinguistics, where seminal work by Weinreich, Labov and Herzog (1968) established that linguistic variation is a fact of life, where extralinguistic factors are key in the explanation of language variation and change. While all types of variation are not necessarily indices of ongoing change, sociolinguistic observations concerning linguistic varieties and variants are indeed an interesting source of diachronic investigations, where language variation is viewed as a potential locus of linguistic change. Next to sociolinguistic variation, semantic variation and syntactic variation are considered as potential indices of (ongoing) diachronic change. Thus, both the well-described polysemy of discourse connectives and their syntactic versatility form the starting point of many diachronic studies (see Section 5.3.3, for an illustrative case study). Many of these studies aim to explain synchronic polysemy in terms of different (successive) stages of the semantic change of the item. Discourse markers, including connectives, have indeed been described as “ideal for observing variation and change: they originate in different grammatical categories, they often compete with many other forms, and they are sensitive to trends regarding language use” (Vincent, 2005: 191).

As far as possible, this chapter will focus on the diachronic description of discourse connectives only. However, the boundary between connectives and discourse markers is a tiny one (see Chapter 1). In addition, the literature on the semantic evolution of discourse markers is greater than that on discourse connectives strictly speaking. It follows that we will occasionally cross this fuzzy boundary when accounting for the principles and methods underlying their evolution in the history of languages.

This chapter is organized as follows. In Section 5.1, we review the discussion about the theoretical framework underlying the diachronic evolution of discourse connectives, that is, in which conceptual terms this linguistic process is best accounted for. In Section 5.2, a general description is given of the evolution from clause-combining strategies to coordinating and subordinating connectives. Section 5.3 reviews a number of case studies in order to illustrate typical and less typical cases of language change in the area of connectives: the semantic evolution from temporal meaning to concessive meaning of French *cependant* ('yet') (5.3.1), the peculiar semantic evolution from cause to contrast of Italian *però* ('but') (5.3.2), and a diachronic account of the synchronic polysemy of French *alors* (5.3.3). Concluding remarks close the chapter with Section 5.4.

## 5.2 HOW DID CONNECTIVES EMERGE IN THE LANGUAGES' GRAMMAR?

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According to Heine et al. (2021: 8), there is “massive evidence and wide agreement to the effect that DMs are as a rule historically derived from sentence grammar units”. In other words, discourse markers, including discourse connectives, derive from lexical and grammatical material expressing propositional meanings at sentence or clause level. While the cline from sentence internal to sentence external uses over time is in itself not really contested, there has been much debate in the DM literature whether this path should be described in terms of grammaticalization, pragmaticalization, cooptation or something else (see, e.g. Heine, 2013; Degand & Evers-Vermeul, 2015; Heine et al., 2021).

In a nutshell, the discussion boils down to considering DMs as belonging to the grammar (grammaticalization) or out of the grammar (pragmaticalization, discoursization, cooptation). Indeed, according to the fairly standard definition, grammaticalization is “the change whereby lexical items and constructions come in certain linguistic contexts to serve grammatical functions, and once grammaticalized, continue to develop new grammatical functions” (Hopper & Traugott, 2003: 18). As Degand and Evers-Vermeul (2015: 60) observe, if DMs are considered to serve such new grammatical functions, that is, to belong to the grammar, the diachronic process by which they develop must be grammaticalization, and there is no need for any other distinct process of pragmaticalization. Yet, the discussion goes beyond the divide between what is to be considered grammatical and what is not (Diewald, 2010). Diachronic change involves a series of linguistic processes of which a number have been described as typical of grammaticalization. A very influential model in this area is that of Lehmann (1995), according to which grammaticalization involves a set of characteristic features or parameters used to determine the degree of grammaticalization of a linguistic item. Examples are: *desemanticization* (loss of semantic substance), *paradigmaticization* (evolution to minor word class), *condensation* (reduction of syntactic scope), *coalescence* (morphological bonding), *fixation* (decrease in syntactic freedom), to name the most prominent ones. In addition, the stage of grammaticalization can be represented on several clines representing the evolution from less grammaticalized to more grammaticalized, where linguistic items move from the left to the right on Hopper and Traugott's (2003: 7) “cline of grammaticality”, represented in Figure 5.1.



content item > grammatical word > clitic > inflectional affix

Figure 5.1 Cline of grammaticality (based on Hopper and Traugott, 2003: 7)

Lass (1997: 267–68, cited in Norde, 2001: 234) exemplifies this cline with more concrete clines, such as the sequence Noun > Postposition > Case ending, but also, Free Morph > Bound Morph, or more generally Lexical Category > Grammatical Category, etc. The discussion of the theoretical and empirical validity of such clines is beyond the scope of this chapter, but see, for example, Fischer, Norde and Perridon (2004), Nørgård-Sørensen, Heltoft and Schøsler (2011), Carlier, De Mulder and Lamiroy (2012).

In her seminal paper, Traugott (1995) advocates that grammaticalization theory would add to its inventories a discourse cline: Clause-Internal Adverbial > Sentence Adverbial > Discourse Particle. This proposal has led to much debate in the “grammaticalization community”, especially because some of the principles frequently associated with grammaticalization, like bonding and reduced scope (*fixation*), appear to be violated. Yet, Traugott (1995: 1) motivates her claim by stating that this cline

illustrates a cluster of other long-attested structural characteristics of early grammaticalization, specifically decategorialization, phonological reduction, and generalization; it also illustrates a number of more recently recognized characteristics, especially pragmatic strengthening and subjectification.

In other words, “lexical material in highly constrained pragmatic and morphosyntactic contexts becomes grammatical” (p. 1) through interactions between syntax and semantics, primarily through local reanalysis. Thus, while it seems clear that the development of DMs is by no means a prototypical case of grammaticalization, many researchers are reluctant to give an alternative, more specific status to their diachronic evolution (Beijering, 2012: 56–57), even if this means to bend the boundaries of what is grammatical and what is not. In other words, although the diachronic evolution of discourse connectives does not check all of the typical boxes of the grammaticalization process, it is similar enough to qualify the process as a type of grammaticalization (see also Degand & Simon-Vandenbergen, 2011).

Yet, according to Heine et al. (2021: 64), another process could be a more suitable candidate to account for the diachronic rise of DMs. The process they refer to is called cooptation.

Cooptation is a fully productive operation whereby a chunk of sentence grammar, such as a word, a phrase, a reduced clause, a full clause, or some other piece of text, is deployed for use on the metatextual level of discourse processing, thereby turning into a thetical. Its functions are determined by the situation of discourse, serving (a) to overcome constraints imposed by linearization in structuring texts, (b) to provide the source of information, (c) to place a text in a wider perspective, e.g. by elaborating, proffering an explanation, a comment or supplementary information, (d) to describe the attitudes of the speaker, and/or (e) to interact with the hearer.

[Heine et al., 2021: 51]

The outcome of the cooptation process strikingly fits the behaviour of many items belonging to the DM class. In particular, it seems that the specific grammatical behavior that DMs exhibit, often viewed as violating some of the basic principles of grammaticalization (such as their variation in position, extension of scope, optionality) do actually align with that of coopted elements. More precisely, when a linguistic expression undergoes cooptation, it changes from a sentence-internal element to an element with syntactic independent status, that is less constrained in terms of position. Heine et al. (2021) observe that this more extended placement freedom, including at the periphery of their host, opens up a range of different contexts of occurrence. "And since new contexts tend to trigger the rise of new functions, DMs are likely to develop distinctly larger sets of grammatical functions than other grammaticalizing expressions" (p. 64). Traugott (2022: 96) agrees that use in pre-clausal position is prone to the emergence of new meanings and structures for text structuring markers. Yet, she insists that such changes from clause-internal to clause-external elements are the result of a continuous process involving structural, phonological as well as semantic factors that occur gradually to the extent that category shift is actually imperceptible. Many authors insist on the gradualness of the diachronic processes leading to the conventionalization of discursive expressions (Traugott & Trousdale, 2010; Giacalone Ramat & Mauri, 2012; Musi, 2016). This contrasts with the view put forward in Kaltenböck et al. (2011: 875) that cooptation is an instantaneous operation. In their more recent work, Heine and colleagues acknowledge that cooptation is only part of the puzzle, referring to cases that cannot be explained in terms of this shift from sentence grammar to discourse. Most importantly, they invite for further research in this area given "that these observations are not based on appropriate empirical evidence" (Heine et al., 2021: 64).

To conclude, it will suffice here to note that the discussion concerning the diachronic processes underlying the emergence of the specific category of discourse connectives is less controversial than that of the broader category of discourse markers. As will become clear in the remainder of this chapter, the evolution of discourse connectives is described most and for all in terms of grammaticalization (see, e.g., König, 1985; Evers-Vermeul et al., 2011; Musi, 2016; Rysová, 2017; Lewis, 2018, and the contributions in Lenker & Meurman-Solin, 2007). This will be illustrated in a number of case studies in Section 5.3, but first we give an overview of the general grammatical and semantic paths that lead towards the emergence of connective devices.

### **5.3 FROM CLAUSE-COMBINING TO DISCOURSE CONNECTIVES**

Clause-combining is considered by many as one of the key building blocks of language in use, and thus a field where a wide range of syntactic, semantic, pragmatic and cognitive phenomena meet (Lenker & Meurman-Solin, 2007: 1). In Chapter 1, we described discourse connectives as clause-linking devices expressing a semantic (discourse) relation. When it comes to combining clauses, two main options are available across the world's languages: (i) *asyndetic juxtaposition* where the relation between the two clauses is left implicit (example 1) and (ii) *syndetic combination* in which the clause-linking device is made explicit (example 2). Thus combined or juxtaposed clauses may express a relation of coordination or subordination. Coordination relations are generally described as relating functionally equivalent states of affairs, expressed in clauses that have some illocutionary force and are cognitively autonomous (Haspelmath, 2007; Mauri, 2008; Mauri & Van der Auwera, 2012, among many others). Subordination relations, then, are characterized by an asymmetric relation of dependency, where one clause is dependent (syntactically, semantically, functionally) on the head clause (Cristofaro, 2003; Haspelmath, 2007; Ohori, 2011; Visapää, Kalliokoski & Sorva, 2012, to name but a few). As already illustrated in Chapter 4, these explicit clause-linking devices may come in different morphosyntactic forms, but as far as their diachronic evolution is concerned, we will focus here on coordinating and subordinating conjunctions only.

- (1) Mary is ill. She needs to rest for a few days.
- (2) Mary got contaminated **but** she shows no symptoms.  
[constructed examples]

Regarding the morphosyntactic emergence of sentence conjunctions, Diessel (1999) observes that they “are frequently formed from a pronominal demonstrative and some other element (e.g., an adverb or adposition) that indicates the semantic relationship between the conjoined propositions” (p. 125). In other words, as already mentioned above, a sentence-internal element evolves to become a sentence-external expression driven by semantic reanalysis. This grammatical path DEMONSTRATIVE > CONJUNCTION is illustrated in Heine and Kuteva’s *World Lexicon of Grammaticalization* (2002: 107) with data from several typologically different languages, where sentence connectives of cause, time, and consequence are cross-linguistically built on this pattern. Grammatical fixation in the form of a conjunction seems to follow from the need to make semantic relations between conjoined parts explicit. This explicitly marked relational meaning is subject to change through speakers’ pragmatic inferential processes. More precisely, in specific contexts, speakers will infer additional, implicit meanings through implicatures or other pragmatic inferences (Breul, 2007). A typical example is the semantic evolution from temporal connective to contrastive and/or concessive connectives, where speakers infer that what is happening simultaneously in time can be or should be interpreted as being in contrast. Thus, in (3), the French connectives *alors que* and *tandis que* (corresponding to English *while*) receive a temporal meaning that is extended to a contrastive/concessive one in the context of (4) (see also Bat-Zeev Shyldkrot, 2008).

- (3) Il est sorti **tandis que/alors qu’il** faisait beau.  
‘He went out **while (when)** the weather was nice’

- (4) Il est sorti **tandis que/alors qu’il** pleuvait.  
‘He went out **while (but, although)** it was raining’

[constructed examples]

König (1985, 1988) makes similar observations regarding the evolution of English concessive connectives. He states that the development of connectives like *nevertheless* or *yet* “from expressions originally asserting remarkable co-occurrence is based on pragmatic principles of interpretative enrichment and the conventionalization of an originally pragmatic inference” (König, 1988: 159, cited in Breul, 2007: 168).

In the two following sections we review how coordinating and subordination conjunctions emerged as discourse connectives across a variety of languages through different linguistic processes involving semantic and syntactic mechanisms.

### 5.3 *Clause-Combining to Discourse Connectives*

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#### 5.3.1 *From Coordination to Coordinating Connectives*

Mithun (1988: 331) sees coordination to be “the most basic and universal” syntactic construction. At the same time, she observes “surprising variety in the types of coordinating constructions exhibited by different languages, and even in the degree to which coordination is grammaticized at all” (p. 331). In other words, not all languages have developed grammaticalized forms of coordination, and when they have, they come with a high degree of both cross-linguistic and intra-linguistic variation, some paths being widely shared, others being specific to some languages or language families (see also Haspelmath, 2007; Mauri & Van der Auwera, 2012). Giacalone Ramat and Mauri (2011: 654–55) focus on the three main types of coordination relations recognized in the literature: conjunction (‘and’), disjunction (‘or’), and adversativity (‘but’). Diachronically, the three groups of coordinating connectives show partially distinct paths of evolution.

According to Giacalone Ramat and Mauri (2011: 661), conjunctive ‘and’-connectives often find their source in spatio-temporal adverbs and prepositions “typically indicating a linear succession in time ‘before, after’ or a linear organization in space ‘in front, beside’.” Thus, through a metaphorical process concrete temporal and spatial notions evolve into more abstract, logical notions. While this metaphorical process is a fairly standard process of meaning extension (Xu, Malt & Srinivasan, 2017), Traugott (1986: 137) already noted that the precise details of exactly which spatial and temporal meanings are selected to express which logical connectives deserve more attention. This grammaticalization path from (spatial or temporal) linearization expression to coordinator can proceed at lower or higher levels of syntax.

Conjunction between nominal phrases typically starts in focal additive particles (‘also, too’) or comitative markers (‘with’) (see Brill (2011) for an illustration of this phenomenon in contemporary Austronesian languages, and Mithun (1988: 339–43) for a detailed illustration of the diachronic processes involved in this grammaticalization path in Sarcee (Athapaskan), Kwa languages (West Africa) and Cayuga (Northern Iroquoian)). Beyond the nominal phrase, paragraph-linking devices, discourse markers, verbs with dislocative meaning (‘go, bring’) or anaphoric pronominal roots may “grammaticalize at the higher levels as connectives between clauses” (Giacalone Ramat & Mauri, 2011: 661). We again refer to Mithun (1988) for detailed descriptions in typologically diverse languages. Of importance here is her observation that for many of these emerging forms, “[t]heir primary function is to provide a semantic or pragmatic link to previous

discourse, not to specify a syntactic one" (Mithun, 1988: 346). This explains that in many languages discourse adverbials and syntactic conjunctions are often difficult to tell apart because of this common functionality. Finally, while there is not a single path leading to coordinating conjunctions, Mithun (1988) points out two additional noteworthy observations: (i) nowadays differences in placement of conjunctions (pre-posed or post-posed) can stem from the different diachronic origins of the markers themselves (p. 351), (ii) coordinating conjunctions grammaticalized fairly recently across languages over the world, with some still in progress, and other clearly relating to borrowing in language contact situations (pp. 351–52).

As for the diachronic sources of disjunctive connectives, Giacalone Ramat and Mauri (2011) present a list comprising distal elements, interrogative particles, free choice verbs, dubitative particles, negative particles and denied conditionals. According to the authors, these elements may acquire a disjunctive meaning

by virtue of the inherent duality and exclusivity that characterizes both the notion of alternative and the notion of 'otherness' (. . .) [or] the irrealis potential status of the two alternatives, which cannot be presented as facts, but need to be overtly indicated as *possibilities*.  
(p. 662)

In other words, disjunctive connectives emerge in a context where an alternative is presented between two possible choices for the hearer.

For adversative connectives, Giacalone Ramat and Mauri first observe that they come with a higher degree of intra-linguistic variation. In other words, in most languages the stock of adversative connectives is more important than that of conjunctive or disjunctive markers. They illustrate this with French "which only shows *et* for conjunction and *ou* (*ou bien*) for disjunction, but a number of different connectives for contrast relations, e.g. *toutefois*, *mais*, *par contre*, *alors que*, *pourtant*" (p. 658). Furthermore, they observe that adversative connectives are more prone to renewal over time and that they are more easily borrowed than conjunctive and disjunctive ones, which may be related to the fact that adversative meaning is strongly intersubjective, with speakers "constantly in search of new and expressive ways of conveying contrast, determining a high synchronic intra-linguistic variation and a quicker renewal" (p. 659). The diachronic sources for adversative connectives are expressions of spatial distance or opposition, expressions of temporal overlap or continuity, causals, comparatives and emphatic expressions. In the case of spatial and temporal source expressions, adversative meaning emerges from the contrast or

opposition of two simultaneous states of affairs that may appear as surprising or unexpected. In her study of Italian adversative connectives *anzi* ('rather', 'on the contrary') and *invece* ('instead'), which both find their source in the spatio-temporal domain of posteriority and anteriority, Musi (2016) shows that the emergent notion of oppositive and counterexpectative contrast encodes the speaker's inferred link between (staged) simultaneity and contrast. Thus, "the contrastive meaning emerges as an invited inference in so-called bridging contexts, where occurrences present a set of recurrent semantic and syntactic features that favor the reanalysis" (p. 27) (see also Section 5.3.1). Causal meanings may also give rise to adversative meanings through denial of expectation, while comparative and emphatic expressions put a contrast between two elements of which one is more in focus (see also Section 5.3.2).

Tracing the evolution of any (coordinating) connective involves analysing its context of occurrence through time, where changing contexts reveal changes of function and meaning. Typically, the grammaticalization of connectives starts in contexts that are semantically and syntactically ambiguous between the original (concrete, propositional) meaning and the emerging (abstract) connective function. In such 'critical' contexts (Diewald, 2002) or 'bridging' contexts (Heine, 2002), speakers will activate pragmatic inferences concerning the presence and/or type of interclausal relation (see also Musi, 2016).

Concerning Lehmann's (1995) grammaticalization criteria (see Section 5.2), Giacalone Ramat and Mauri observe that phonological reduction and coalescence are very often attested in the early stages of the diachronic evolution of coordinating connectives, for example, Old English *be utan* > Engl. *but*. Yet, as already mentioned, other grammaticalization features do not readily apply. The authors mention obligatorification, paradigmaticization, and scope reduction, that seem incompatible with the function and morphosyntactic properties of interclausal connectives as such (p. 664). Scope reduction does not apply because coordinating connectives typically link two clauses, taking wide scope over the two segments. Obligatorification, in the sense of obligatory presence of a linguistic element (e.g. inflectional morphemes), seems inconsistent with coordinating connectives because in many contexts they may be left out (cf. Chapter 1), that is, speakers have the choice between the syndetic and asyndetic options, even in languages with a well-developed connective system. Finally, paradigmaticization is a problematic feature because, while they form a closed set, coordinating connectives do not really form a paradigm in the sense of number or gender inflection paradigms. It follows that

these three features cannot be taken as indicators of the degree of grammaticalization of interclausal connectives.

### 5.3.2 From Subordination to Subordinating Connectives

It is cross-linguistically widely acknowledged that subordinate clauses arise from simple, main clause structures, whereby propositional lexical material grammaticalizes into markers of clause subordination (Hopper & Traugott, 2003: 184–90; Givón, 2009). Grammatically, subordinate clauses come in three main types: (i) a complement clause functions as either subject or object of the main clause; (ii) a relative clause modifies a noun, similarly to an adjective does; and (iii) an adverbial clause occupies an adjunct position modifying the main clause. These three types of subordinate clauses seem to be cross-linguistically and typologically confirmed (Gast & Diessel, 2012a). Ohori (2011: 636) further observes that adverbial subordination is less homogeneous than the other two, both structurally and semantically, and that the border between adverbial subordination and coordination may be viewed as a continuum. Structurally, Ohori summarizes the general tendency that dominates the grammaticalization of subordination as one of “less to more clause integration”, that is, an evolution from syntactically independent, juxtaposed, simple clauses to a syntactically integrated complex clause (see, e.g. Lehmann, 1988; Muller, 1996, but see Combettes, 2013 for a more nuanced view). Here, we will focus on adverbial subordination mainly when reviewing the emergence of subordinating conjunctions used as discourse connectives.

Regarding the historical development of adverbial subordinators, Kortmann (1996: chapter 10) presents an overview study based on exhaustive inventories in Old English (OE: 10th–11th c.), Middle English (ME: 14th–15th c.), Early Modern English (EModE: 16th–17th c.) and Present-Day English (PDE: 20th c.). The study is presented as illustrative of the diachronic path of subordinating connectives in European languages. His focus is on the evolution of the inventories, sketching the major morphological and semantic changes through time. Quantitatively, the “stock” of available subordinators rises between the OE and the EModE periods and then drops in PDE, with markers emerging, changing and disappearing over time. Regarding the markers that “survived”, Kortmann finds that most subordinators go back far in time (OE and mainly ME) and that more recent innovations (last 500 years) are less numerous. In particular, many highly frequent PDE adverbial subordinators find their source in the OE ancestors, among them markers such as *after*, *as*, *as long as*, *as soon as*, *if*, *since*, *so that*, *though* and *while*. This being said, the ME period appears



to be even more important for today's subordinator inventory, with a massive increase in the number of markers, including borrowings (from French) and functional innovations of existing markers, of which more than 50 percent made it to the present time. Among these, we find again highly frequent markers, such as *although*, *because*, *before*, *until*, *when*, *where*. Kortmann links the emergence of markers in this period to the development of a written standard language for which "the development of an inventory of clause-connecting devices specifying interpropositional relations, such as adverbial subordinators, was indispensable" (p. 303).

From a morphological point of view, the evolution of subordinators is characterized by the following features. First, the preferred categorical sources of adverbial subordinators in OE are adverbs and demonstratives. This is a feature OE shares with other old Germanic dialects for the formation of adverbial subordinators. From ME on, the inventory sees a considerable increase in prepositions, nouns, verbs, and complementizers as source categories. The increasing importance of verbs as a source of adverbial subordinators follows from the reanalysis of participles with or without complementizer *that*. Examples are: *considering (that)*, *notwithstanding*, *in case (that)*, *provided (that)*, *seeing (that)*, etc. "In addition, Middle English and Early Modern English employ several subordinators incorporating the base form of the verb *be* (e.g., EModE *be it so (that, as)*, *(if) so be (that, as)*, *if case be (that)*, *albeit (that)*, *howbeit (that)*)" (p. 307). Another "new" source category for subordinators in ME are nouns (often as part of a prepositional phrase) following from direct and indirect borrowings and calques from French. Examples are *by (the) cause (that)*, *to that forward (that)*, *to the end (that)*, *in respect (that)*, not all of which survived. Kortmann further observes that "the inflationary use of phrasal subordinators involving the complementizer *that* in Middle English times, should not be viewed entirely independently of the formation pattern in Old French producing phrasal subordinators with *que* as final element" (p. 309). Furthermore, the often obligatory use of complementizer *that* in OE and ME became optional over time and has now mostly disappeared giving rise to "one-word subordinators", such as *after*, *because*, *before*, *if*, *in case*, *since*, *though*, *till*, *unless*, *until*, *when*, *where*, *while*, *whilst*, *as though* (p. 309).

The second morphological feature that we will present here concerns the syntactic polyfunctionality of adverbial subordinators. It is worthwhile noting that "Old English did not have a single primary adverbial subordinator, i.e. no one-word item serving exclusively as adverbial subordinator" (p. 310). Such "special-purpose" subordinators did not

develop before the ME period and have remained stable with around 14 percent of the inventory of adverbial subordinators until today. Compared to the other West-Germanic languages, this proportion is remarkably low and in contrast with Present-Day Dutch (approx. 38 percent) and German (approx. 40 percent) (p. 311).

Concerning the semantic evolution of adverbial subordinators, there is a clear general tendency towards decreasing polyfunctionality (or increase in semantic precision) throughout the history of English, in the sense that the proportion of polyfunctional subordinators compared to the monofunctional ones decreases, especially (again) between the OE and ME periods. More precisely, comparing the proportion of mono- and polyfunctional subordinators for the whole subordinator inventory, Kortmann finds that “the proportions of polyfunctional items decrease and those of the monofunctional items increase from Old to Early Modern English” (p. 314), especially for the one-word and monomorphemic adverbial subordinators. Yet, this is not to say that polyfunctionality disappears in the individual markers. To the contrary, “there are many instances of polyfunctional subordinators whose meaning range has not become smaller or has, indeed, grown larger over the centuries (Kortmann, 1996: 315). To illustrate this, Kortmann compares the semantic evolution of *so* and *as*, which he describes as the markers “which have undergone the most dramatic changes in their meaning range in the history of English” (p. 315). Whereas both markers have modality as their core meaning in OE, from ME on their semantic paths diverge: the (subordinator) meaning range of *so* decreases, while that of *as* increases. Concretely, *so* lost all of the meanings it had as an adverbial subordinator in OE, among them ‘simultaneity’, ‘condition’, ‘similarity’, ‘place’, and others. In ME, it gained ‘result’ and ‘purpose’ meanings, which are still the only subordinating meanings available today, as illustrated in (5–6):

(5) It was dark, *so* I couldn’t see what was happening.

(6) I packed him a little food *so* he wouldn’t get hungry.

[from Kortmann, 1996: 317]

Other PDE interclausal uses are not subordinating. In this area, we do indeed witness a decrease in semantic polyfunctionality. For a counter-example, namely one of polyfunctionality increase in this area, we refer the reader to Kortmann (1996: 317–18) for “the success story” of *as* in English, “i.e., one that is characterized by an enormous expansion of the range of interclausal relations it came to express in later periods than Old English.”

A second general finding concerning adverbial subordinators is that semantic changes involving ‘cause’, ‘condition’, ‘concession’ (or

“CCC relations”, also including ‘purpose’ and ‘result’) emerge later, and generally derive from locative, temporal or modal senses. In Kortmann’s dataset “there is not a single subordinator which expresses some CCC relation before it (additionally or alternatively) comes to be used as a locative, temporal, or modal marker” (p. 319). These include the development of causal markers from temporal markers of anteriority or simultaneity, as observable for English *since* or *now (that)*, but also German *weil*. In the following Section, we will see that this development seems to be attested cross-linguistically. Noteworthy is also the development of contrastive-concessive *whereas* from a locative marker, and the observation that ‘concession’ is generally the last meaning to emerge (see Section 5.3.1, for a case study in French). About such “CCC markers”, Kortmann finally observes that their proportion steadily expands in the inventory of adverbial subordinators, at the expense of the markers expressing temporal relations.

### 5.3.3 Reconstructing Semantic Paths towards Relational Meanings

Before turning to a number of illustrative case studies, we would like to emphasize the fact that the emergence of subordinating and coordinating conjunctions shares many features. In particular, there is striking evidence across typologically different language families that discourse connectives follow a semantic path that starts off with concrete propositional meanings that give rise to abstract relational meanings through metaphorical extension and pragmatic strengthening. To illustrate this point, we will take as our starting point the “Target-Source List” in Heine and Kuteva’s (2002) famous *World Lexicon of Grammaticalization*. This list gives an overview of present-day (semantic and syntactic) concepts and relates them to possible source forms in over 500 (documented) languages across the world. With an eye on uncovering the semantic paths leading towards nowadays connective use, we retrieved all target concepts related to the diachrony of connectives. We restricted our retrieval to relational meanings also found in the main taxonomies of discourse relations (Chapter 3). These are (in alphabetical order): adversative, cause, concessive, conditional, purpose, and temporal.

When it comes to the (lexical) source of these relational meanings, Heine and Kuteva distinguish the following:

- ADVERSATIVE < TEMPORAL
- CAUSE < BACK, HERE, LOCATIVE, MATTER, PURPOSE, SAY, SINCE (temporal), TEMPORAL

- CONCESSIVE < CONDITIONAL, TEMPORAL
- CONDITIONAL < COPULA, S-QUESTION, SAY, TEMPORAL
- PURPOSE < ALLATIVE, BENEFACTIVE, COME TO, COMPLEMENTIZER, GIVE, GO TO, MATTER, SAY
- TEMPORAL < ALLATIVE, COMITATIVE, HOUR, IN (spatial), INTERIOR, LOCATIVE, TIME

For the sake of illustration, we will review here the evolution towards causal relational meanings only (marked in bold in the list above), that is, those source items that have given rise to causal connectives, very often expressed by means of coordinating and subordinating conjunctions.

The lexical source *BACK* (body part) is a “successful” source for several grammatical forms. According to Heine and Kuteva (2002: 46–50), this process is an instance of a more general process whereby body parts are grammaticalized to spatial concepts and markers, which again are used to express temporal concepts, but also markers for more abstract grammatical relations, such as *CAUSE*. A striking illustration comes from Wolof *ginnaaw*, which synchronically expresses three different grammatical categories: as a noun with the meaning ‘back’ (body part), as a preposition with the meaning ‘behind’ and as a subordinating conjunction meaning (causal) ‘since’. Robert (1997) proposes a unitary semantic analysis according to which *ginnaaw* refers to a location behind a given structured space marked by a landmark. “When *ginnaaw* is in nominal function, no other term in the utterance plays the role of the landmark; the morpheme has an extra-linguistic reference (...) i.e. the human body. In prepositional use, the landmark is the noun governed by *ginnaaw*. In subordinating use, the landmark is the clause introduced by *ginnaaw*” (Robert, 1997: 125). Thus, the causal subordinating use proceeds from the conceptualization of causality in spatial terms, that is, one event behind the other, but also from the metaphorical structuring of “discourse as landscape”, in which argumentative sequences are located behind and following one another, thus creating argumentative inferences (Robert, 1997: 124).

Other “spatial concepts” that give rise to causal conjunctions are *HERE*, and more generally *LOCATIVES*. For *HERE*, Heine and Kuteva (2002: 171) cite examples from Lingala and Albanian, where the locative adverb ‘here’ (respectively *áwa* and *ke*) comes to be used as a causal conjunction corresponding to ‘since’, ‘because’. As for *PURPOSE*, the authors observe that it is often part of “the same polysemy set” as *CAUSE* (Heine & Kuteva, 2002: 247). While there is no conclusive historical evidence to support their hypothesis, the authors nevertheless

argue on the basis of data available to them that diachronically purpose precedes cause in time. Causal subordinating conjunctions may also result from a path that takes SAY as its source item. According to the authors, say-verbs may develop into markers of purpose, cause, and temporal adverbial clauses at later stages of grammaticalization (Heine & Kuteva, 2002: 261–70). They see this as “an instance of a process whereby process verbs, on account of some salient semantic property, give rise to grammatical markers used for clause combining” (p. 269). Examples are given for languages as diverse as Baka or Lezgian. Finally, temporal expressions are an important source for causal conjunctions. “This appears to be an instance of a widespread process whereby spatial and temporal markers are grammaticalized in specific contexts to markers of ‘logical’ grammatical relations, such as adversative, causal, concern, concessive, and conditional relations” (Heine & Kuteva, 2002: 275–76). A well-known example is Latin *posteaquam* ‘after’, ‘ever since’ > French causal subordinator *puisque* ‘since’. Other instances described by Traugott and König (1991: 194–97) include the semantic paths: Old High German *dia wila so* ‘so long as’ > German *weil* ‘because’, English temporal *since* > English causal subordinator *since*. They also mention the regular polysemy of conjunctions with temporal and causal meaning: French temporal subordinator *quand* ‘when’ also used with causal meaning ‘because’, Finnish temporal subordinator *kun* ‘when’, ‘as’ also used with causal meaning ‘since’, ‘because’, Estonian temporal *parast* ‘after’ also used as causal ‘because of’ or temporal *kuna* ‘while’ with causal meaning ‘as’, ‘since’, ‘because’, or Romanian *din moment ce* ‘from the moment’ or ‘because’, and so on.

#### **5.4 THE EMERGENCE OF DISCOURSE CONNECTIVES: SOME ILLUSTRATIVE CASE STUDIES**

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In this section, we present a number of case studies that will develop in more detail how specific discourse connectives may have emerged in the history of different languages.

##### **5.4.1 From Temporal to Concessive in French**

Marchello-Nizia (2009) studies the development of the French concessive connectives *cependant* (‘yet’), *toutefois* (‘however’) and *pourtant* (‘though’). She shows that these linguistic forms first change their syntactic category through a process of grammaticalization (from verbal and nominal expressions to adverbials), in absence of any concessive meaning. Then, through what she calls a process of

pragmaticalization, these adverbials acquire a concessive meaning. Originally, none of these linguistic expressions were neither adverbs, nor connectives, and they did not express a concessive meaning. Rather, stepwise, they changed their grammatical category and their semantic meaning. To illustrate this, we will focus on her analysis of *cependant* ('yet') (see also Marchello-Nizia, 2007).

The origin of *cependant* lies in the anaphoric demonstrative *ce* ('this') followed by the present participle of the verb *pendre* ('to hang'). This corresponds to Diessel's (1999) observation mentioned above that many connectives find their source in the combination of a pronominal demonstrative and some other element expressing a semantic relation. Here, *pendant* ('hanging') is at the origin of the temporal (durative) meaning, that developed with its adjectival use in technical judicial vocabulary at the end of the thirteenth century, for example, *le jugement pendant*, meaning 'while waiting for the judgment'. In the course of the 14th–15th c. durative (adjectival) *pendant* extends to new, non-judicial, contexts. During the fifteenth century, *pendant* starts occurring in prenominal position leading to a reanalysis and recategorization as a preposition (adjective > preposition). In parallel, from the end of the thirteenth century, *pendant* is used in the combination: *en* [preposition] *ce* [anaphoric demonstrative] *pendant* [verb], with durative meaning in judicial contexts. In the course of the fourteenth and fifteenth centuries, the expression *ce pendant* or *cependant* gains a clear temporal (concomitant) meaning ('during that same time') in non-judicial contexts as exemplified in example (7) from the fifteenth century.

- (7) ... il ne feroit que demy guet, c'est assavoir depuis la mynuyt jusques au matin seulement, et [que] si **ce pendant** il vouloit venir parler a elle, elle orroit volontiers ses devises. (*Cent nouvelles nouvelles*, 1460, p. 389)

'He would keep only half a period of watch, namely from midnight to morning only, and if *ce pendant* ('during that time') he wanted to come and talk to her, she would gladly listen to his words.'

[from Marchello-Nizia, 2009: 12]

When this temporal meaning occurs in concessive contexts, either explicitly marked by concessive connectives such as *mais* ('but') or in contexts where the temporal simultaneity receives meaning nuances of opposition or contrast, *cependant* is in a favourable position to add the concessive value to its temporal meaning. These are contexts referred to by Heine (2002) as "bridging contexts", that is, contexts in which the

source meaning is still available, but in which the target meaning is more likely to be inferred. Thus, at this stage, *cependant* has not yet acquired its new concessive meaning. According to Marchello-Nizia, this does not happen before the mid-sixteenth century, when the temporal meaning leaves room to the encoded concessive meaning and *cependant* is used independently as a concessive connective.

Summarizing the grammatical and semantic evolution of *cependant*, we witness a case of polygrammaticalization where *pendant*, on the one hand, evolves from verbal phrase to adjective to preposition, and on the other hand, from verbal phrase to adverb (combined with *ce*). Semantically, the evolution is from spatial (the verb *pendre* ‘to hang’ is originally spatial) to temporal to concessive logical meaning, in line with the semantic path identified by Heine and Kuteva (2002) (cf. Section 5.2.3). A final note is in place here concerning the present-day (restricted) polysemy of *cependant*, which until today may occur with its temporal meaning of simultaneity, but only in formal writing.

Strikingly similar semantic paths have been described for Italian *anzi* and *invece* (Musi, 2016), the Romance markers Fr. *toutefois*, It. *tuttavia*, Sp. *todavía* and Port. *todavía* (Giacalone Ramat & Mauri, 2012), English *nevertheless*, *nonetheless*, *notwithstanding*, *still*, *yet* and counterparts in many languages (König, 1985), English *while* (among others) (Traugott & König, 1991), etc.

#### 5.4.2 From Cause to Contrast: Italian *Però*

In their study, Giacalone Ramat and Mauri (2008) reconstruct the semantic evolution of Italian *però* from causal to adversative marker. They find this evolution “intriguing” because it involves a so-called functional reversal, from cause to *counterexpectative contrast*, or *denial* of an expected causal sequence (Giacalone Ramat & Mauri, 2008: 304), rather than the more classical evolution from temporal to causal and/or concessive/adversative (see Sections 5.3.2 and 5.4.1; Heine & Kuteva, 2002: 291). A present-day example of the adversative *però* is (8). It is a use that is fairly recent in Italian with first unambiguous attestations in the seventeenth century.

- (8) Mario gioca bene **però** perde in continuazione.

‘Mario plays well **però** (but) always loses.’

[from Giacalone Ramat & Mauri, 2008: 303]

Reconstructing the history of *però*, Giacalone Ramat and Mauri indicate that the connective is attested from its earliest occurrences in the twelfth century with a resultative function, thus directly continuing the meaning of its late Latin antecedent *per hoc*. In Old Italian, *però*

expresses both causal ('since') and resultative ('therefore') meanings. It is the occurrence of this latter resultative meaning in specific contexts with negative scope that will give rise to the adversative meaning. The details of this evolution are as follows (Giacalone Ramat & Mauri, 2008: 307–12):

In Old Italian (13th c.–15th c.) *però* occurs with causal meaning in the widespread sequence *però que* ('since, because'). This use becomes rarer in the sixteenth century, almost disappearing from the seventeenth century on, when it gets replaced by the forms *perché* and *poiché*. During this same period of time, *però* is also very frequent in its resultative function, being replaced by *perciò* from the early eighteenth century on. Thus, after the seventeenth century, *però* loses its causal and resultative meanings to give way to its adversative use. The emergence of this new meaning occurs in contexts that are characterized by the presence of some wide scope negation. "In such cases, *però* introduces some consequence that does not take place despite expectations, determining a contrast between the cause and the denial of the expected effect" (Giacalone Ramat & Mauri, 2008: 307). An example is (9).

- (9) Si fu la loro immensa gloria spesso dalla invidiosa fortuna inter-  
rupta, **non però** fu denegata alla virtù (16th c.)  
'If their immense glory was often obstructed by adverse fortune,  
non però (not for that) was it denied to virtue.'  
[from Giacalone Ramat & Mauri, 2008: 303]

While *però* is not contrastive *per se* in such negative contexts, speakers may have reanalyzed it as a marker of a specific type of contrast generated by the denial of an expected causal sequence. In other words, negated causality is reinterpreted as concession (cf. König & Siemund, 2000). Giacalone Ramat and Mauri see an increasing frequency of the form *non però* from the fifteenth and especially sixteenth century onwards. Before the fifteenth century this negated form is rather rare. These negated resultative constructions frequently occur in the environment of other contrastive markers (concessive clauses or the connective *ma* 'but'), thus strengthening the adversative interpretation through an invited inference (see also König, 1988; König & Traugott, 1988). During this long period of time, the adversative interpretation of *però* was strictly connected to the presence of negation. It is not before the early seventeenth century that occurrences are found of adversative *però* without negation. At that point, "the process of reanalysis is complete and *però* has been re-semanticized as a marker of counter-expectative contrast" (Giacalone Ramat & Mauri, 2008: 311). For two additional centuries, *però* is semantically ambiguous between its



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resultative meaning and its adversative one, with the two coexisting. Yet, the syntactic context in which the two meanings are expressed is different, with resultative *però* being restricted to clause-initial position, so that the ambiguity is resolved through the syntactic context. From the second half of the nineteenth century, the resultative meaning of *però* starts to fade, and the syntactic contexts of the item with adversative meaning starts to include the clause-initial position too, which was hitherto reserved to its resultative use.

From the above-sketched evolution, it appears that the grammaticalization of *però* as an adversative coordinating marker (occurring mainly in clause-initial position) has fairly recently come to completion (between the end of the nineteenth and twentieth century). Several factors played a role in this evolution including competition between two forms, specific semantic and pragmatic contexts of use, including syntactic restrictions. In the following section, we will see that similar positional constraints have played a role in the semantic evolution from French temporal *alors* to its causal and discursive uses. Yet, in contrast with *però* where the semantic ambiguity has disappeared with the completion of the grammaticalization process, this is not the case with *alors* which remains polysemous in present-day French.

### 5.4.3 Today's Polysemy Explained: The Case of French *Alors*

Degand and Fagard (2011) take as their starting point the polysemous and polypositional use of the French connective *alors* ('then', 'so', 'now/well', 'right'). They are interested in finding out how this linguistic expression acquired both new grammatical affordances and new meanings. Grammatically, *alors* evolved from a sentence adverbial with temporal meaning, to a (syntactically detached) connective marking temporal, causal or conditional relations, and eventually to a discourse-structuring marker with conversational management uses. The three main uses are illustrated in examples (10), temporal sentence adverbial, (11) causal (consequential) connective, and (12), discourse structuring marker:

- (10) Mais le soir tomba sans que la pluie eût cessé. **Alors**, la Comtesse commit une imprudence ... (20th c.)  
'But the night fell and the rain still hadn't stopped. *Alors*, the countess got careless ...'
- (11) ah il adore ça **alors** ben tu penses bien avec moi euh il était aux aux anges hein  
'oh he loves it *alors* well you'll guess that with me he was in seventh heaven'

- (12) *mais alors* ce qui était marrant c'est que euh / tout à coup il s'arrêtait / et *alors* euh / assez vite *alors* xx se disait maintenant vous vous dirigez vers telle porte // *mais alors*  
'but *alors* the funny thing was that er / suddenly he stopped / and *alors* er / quite quickly *alors* xx was saying now you go towards the door // but *alors*'

[from Degand & Fagard, 2011: 31–35]

The original meaning of *alors* is one of temporal simultaneity. It appeared in twelfth century Old French as a compound of the preposition and prefix *à* 'at' and *lors* 'then', which in turn originates in the Latin ablative form 'illa hora' with the meaning 'at that hour' (see example (13)).

- (13) ... selonc la costyme romaine. Et sachiés que c'estoit une feste qu'il coltivoient *alors* mout hautement. (Tristan en prose, 13th c.)  
'... according to Roman customs. And you should know that this celebration was *alors* held in the highest regards.'

[from Degand and Fagard, 2011: 31]

Grammatically, in its use as a temporal adverbial, *alors* is restricted to a clause-internal position (integrated, syntactically dependent, adjunct). At the end of the thirteenth century, it appeared in contexts where it retained its temporal meaning but could take causal meanings, and occasionally also conditional meanings (from the fourteenth century on). In their corpus-based study, Degand and Fagard show that the frequency of these non-temporal uses rose steadily to 35 percent at the beginning of the fourteenth century, while 65 percent were still clearly temporal. In terms of grammaticalization, there was no recategorization (no shift of word class), yet the marker gained syntactic detachment moving from sentence-internal to sentence-peripheral (initial) position.

From the Middle French period on (15th–16th c.), clause-initial position became the preferred position for *alors*. Strikingly, it is in this new syntactic position that new meanings emerged: first temporal, causal and conditional meanings with a connecting function (from the seventeenth century on), then new discourse structuring meanings (mainly topic shifters and transition markers) from the twentieth century on. Thus, this new syntactic position with extended grammatical scope gave way to new meanings with extended scope over the whole clause. This is in line with Heine et al.'s (2021: 64) observation that new contexts of use raise new functional meanings (see Section 5.1). It is also confirmed by the many studies observing the movement from

sentence-internal to sentence-peripheral position, with a tendency for the expression of subjective meanings in the left periphery (LP) and for intersubjective meanings in the right periphery (RP). This phenomenon was described first in the contributions in Beeching and Detges (2014), and has, since, been labelled the Subjectivity, Intersubjectivity and Peripheries Hypothesis (SIPH; Salameh, Estéllés & Pons Bordería, 2018), giving rise to quite some discussion regarding its generalizability (Pons Bordería, 2018). Notwithstanding this discussion, there is agreement that peripheral position plays an important role in the development of discourse markers and discourse connectives as a locus for the development of new meanings (see, e.g. Onodera & Traugott, 2016; Heine et al., 2021; Van Olmen & Šinkūnienė, 2021) The connective *alors* is but one of the many examples of this phenomenon.

## 5.5 SUMMARY

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In this chapter, we have given an overview of the way discourse connectives emerge in language over time, with a focus on the diachronically well-documented languages French, Italian and English. We first sketched a number of general observations regarding diachronic research and reviewed the main characteristics of grammaticalization theory, which developed as one of the mainstream theoretical frameworks in historical linguistic work, especially in the area of studies on the evolution of discourse connectives.

The core of the chapter concerned the emergence of coordinating and subordinating connectives as resulting from the (grammatical) explicitation of interclausal semantic relations, that is, as markers of clause combining. Syntactically, the general pattern is that of a sentence-internal element that evolves to become a sentence-external expression driven by semantic reanalysis. A typical example is the grammatical path *DEMONSTRATIVE* > *CONJUNCTION* with sentence connectives of cause, time, and consequence cross-linguistically built on this pattern. Semantically, the meaning expressed with the relational marker is subject to change through speakers' pragmatic inferential processes. Thus, in specific contexts, speakers will infer additional, implicit meanings through implicatures or other pragmatic inferences. These general processes are further described and illustrated for coordinating and subordination conjunctions. For coordination, the three main types of relations were reviewed, namely conjunction, disjunction, and adversativity. Diachronically, the three groups of coordinating connectives show partially distinct paths of

evolution. For subordination, the general grammaticalization path was described as the integration of simple, main clause structures, that is, an evolution from syntactically independent, juxtaposed, simple clauses to a syntactically integrated complex clause. Focus was on adverbial subordinators, that is, markers introducing a clause in adjunct position modifying the main clause. Several syntactic and semantic paths leading towards subordinating conjunctions were described on the basis of the exhaustive inventory of English adverbial subordinators over time. We also presented three case studies illustrating typical as well as less typical cases of the evolution of connectives over time: French *cependant* from locative/temporal to concessive; Italian *però* from causal to contrastive, and polysemous French *alors*, retaining temporal, causal, conditional and discourse organizing meanings.

### DISCUSSION POINTS

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- To what extent are the case studies presented in Section 5.4 illustrations of the more general semantic path towards discourse connectives?
- What could explain the striking similarities in the semantic evolution of discourse connectives across languages?
- Based on Kortmann's (1996) study, what would be your prediction regarding the evolution of the inventory of adverbial subordinators in another language? What could be different? What could be the same?
- Can you think of another area in the language where metaphorical extension and pragmatic strengthening have played a role in the diachronic evolution?

### FURTHER READING

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Heine (2002) is a seminal study on the role of context in the evolution of grammatical meanings. He demonstrates that different stages of evolution tend to be reflected in the form of different context clusters. He focuses on one stage in particular, called the switch context, which is characterized by an interaction of context and conceptualization, leading to the rise of new grammatical meanings. This is illustrated in the comparative diachronic study of Giacalone Ramat and Mauri (2012) on the way interclausal adversative connectives may evolve parallelly

in different Romance languages, developing roughly the same function from the same Latin lexical source through similar paths, but at different time rates. The study convincingly shows that regularities in semantic change can indeed be captured through the observation of micro-changes correlated to different types of contexts and to different frequencies of occurrence of the items at issue. Lenker and Meurmann-Solin (2007) present an overview of corpus-based studies on the history of individual connectives in English, drawing on a variety of methodological approaches including grammatical analysis, pragmatics, text linguistics and discourse analysis. The mix of qualitative and quantitative studies offers an insightful view on the importance of clause-combining as the locus where syntactic, semantic, pragmatic and cognitive phenomena meet.

## 6 Processing and Understanding Discourse Relations and Connectives

### 6.1 INTRODUCTION

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In this chapter, we discuss the way people read, remember and understand discourse, depending on the type of relations that link discourse segments together. We also illustrate the role of connectives and other discourse signals as elements guiding readers' interpretation. Throughout the chapter, we review empirical evidence from experiments that involve various methodologies. Some of them are simple enough, as they only consist of asking people to remember elements from a discourse, or to answer targeted comprehension questions about its content. However, other studies involve a more complex methodology, especially those involving online reading. It is important to have a general idea of the way they work in order to be able to critically assess their findings. We therefore present them briefly here.

The simplest method to study online reading is called self-paced reading. In a self-paced reading task, participants read sentences appearing segment by segment on a computer screen. Usually, segments disappear once they have been read, in order to prevent participants from displaying the whole sentence first before actually reading it, as illustrated in Figure 6.1, in which each word would appear one at a time on the same line.

But this also means that reading is not entirely natural, as people cannot go back to reread previous segments once they have moved on, as they usually do. Participants can pace their reading by pressing a computer key (typically the spacebar) to move on to the next segment when they have finished reading the current segment. By comparing the time it takes readers to move on to the next segment in each experimental condition, researchers can infer the processing complexity of a given segment. In these experiments, a discourse can be divided into sentences, groups of words or even single words. The more fine-grained the division, the better it allows researchers to locate the source of an effect, but the less natural the reading becomes. For this

This .. .....  
.... is .....  
.... self-paced .....  
.... .. reading.

Figure 6.1 Illustration of a self-paced reading task

reason, most studies divide sentences into two or three reading segments corresponding to its meaning components, as illustrated in (1) in which the six regions are indicated between slashes, and represent a division between subject, verb and complement.

- (1) Lisa / enjoys being / on her own / and Kurt / enjoys being /  
with other people.

[from Crible & Pickering, 2020: 871]

The rationale behind self-paced reading is that longer processing times reflect greater processing difficulty. An important aspect of these reading studies is that the critical discourse segment, for which reading times are recorded, must be strictly identical across all conditions so that reading times are comparable. The difference between them is therefore created by manipulating the content of the text preceding this critical segment.

Another more sophisticated measure of online reading can be obtained by using eye-tracking. This method consists of making people read sentences on a computer screen while an infrared camera detects their corneal reflection and infers with great precision their gaze direction on the screen. Eye-tracking is more informative than self-paced reading as it enables participants to read sentences in a normal way rather than segment by segment, and regressions to previous portions of a text for rereading are also recorded. Thus, eye-tracking enables researchers to compute the time that people spend on a region when they first read it, but also when they come back to it later on (as well as many other fine-grained processing measures). Other methodological aspects of these experiments are very similar to self-paced reading, as critical segments must also be identical between conditions to make them comparable. An important practical difference between them however is that eye-tracking still mostly requires that participants come to the lab for testing whereas self-paced reading can be conducted remotely. Online recruiting represents a big advantage to reach a larger and more diverse sample of participants.

Finally, we will discuss studies that measure brain activity in the form of Event Related Potentials (ERPs). ERP studies measure neural

processes with a very good temporal resolution. Since this method was developed, several electric waves have been associated with language processing. One of them is the N400 effect, a negative-going deflection that peaks at around 400 milliseconds after the stimulus onset, hence its name. In the literature, its amplitude has often been found to be related with a revision of an expectation, and this signal is often relevant when comparing coherent and incoherent discourse. Another relevant signal is the P600, a late positive component often associated with syntactic reanalysis and repair, but also with semantic or pragmatic violations, and with the updating of mental information in a discourse (Brouwer, Fitz & Hoeks, 2012). Throughout the chapter, we will see how all these methods complement each other and allow us to reach a global picture of discourse processing and comprehension.

To begin this chapter, we will discuss the processing and comprehension of different types of discourse relations, without paying too much attention to the way they are conveyed. In a second part of the chapter, we will address the question of the way these relations are signaled, and underline the many ways in which the presence of connectives influences the processing, recall and understanding of discourse. We will also address the role of alternative cues such as the repetitive argument structure typically found across the two segments of contrastive relations. We will see that most studies testing the role of connectives have focused on the handful of lexical items that are often used in spoken language, but we will mention studies that have specifically focused on connectives bound to the written mode, such as *therefore* and *nevertheless* in English. We will also address the ways in which ambiguous connectives, in other words, connectives that can convey different relations depending on context, are processed during reading. In a third part of the chapter, we will address the question of individual differences between adult native speakers, and argue that even though studies are still scarce on this topic, there is good evidence that these differences exist, and affect the way people use and understand connectives in their native language. A final part of the chapter will be dedicated to reviewing studies that have underlined cross-linguistic similarities and differences in the way discourse relations are processed across languages, depending on the way these relations are marked by connectives. This last part will launch the discussion on crosslinguistic comparisons, that will be dealt with in more detail in Chapter 7.



## 6.2 PROCESSING DISCOURSE RELATIONS

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The notion of discourse relations plays a central role in explaining the local coherence of a discourse across all major theoretical models of discourse representation (see Chapter 2). It has therefore been an important empirical question at least since the 1980s to determine whether this notion is merely an analytic one, useful for the linguistic description of discourse structure, as has been suggested by Grosz and Sidner (1986), or whether it is a cognitive notion that plays a role in the way readers process and understand discourse, as many other authors have argued (e.g., Hobbs, 1983; Mann & Thompson, 1986; Sanders, Spooren & Noordman, 1992). In this respect, among the numerous studies that have assessed the processing of discourse relations, almost all of them have clearly demonstrated that they are of paramount importance for the way adult native speakers process discourse.

To begin with, evidence for the importance of easily inferable discourse relations for text comprehension comes from experiments in which the local coherence of real academic textbooks has been improved by adding links such as causal explanations in short passages, and have compared the ability of readers to understand the content presented in the various versions (e.g., Beck et al., 1991; McNamara et al., 1996). Results consistently indicate that texts with improved local discourse relations were understood better. Conversely, other studies have shown that when discourse relations cannot be inferred because the signal given by a connective is incompatible with the linguistic content of the segments, as in (2), processing is heavily disrupted (Murray, 1997; Ferstl & von Cramon, 2001; Xu et al., 2018). We will come back to these studies in more detail in the next section, when discussing the role of connectives for discourse processing.

- (2) Manny needed to publicize the garage sale. However, he arranged for flyers to be made.

[from Murray, 1997: 231]

The cognitive account of discourse relations also implies that different relations should have a different effect for discourse processing and comprehension, as each of them create different coherence links between discourse segments. For example, in the Cognitive model of Coherence Relations put forward by Sanders et al. (1992), relations vary in their degree of cognitive complexity, and this complexity can be precisely determined by the values that each relation takes on four primitives, namely: basic operation, order of the segments, source of coherence and polarity (see Chapter 2). There is indeed a lot of evidence

in the literature that discourse relations do not all play the same role for discourse processing.

Early studies focused mostly on the relation of causality, and compared its effects to that of other relations, or even to the effect of unrelated segments. For example, Haberlandt and Bingham (1978) found that causally related sentences were read more quickly compared to noncausally related ones. Similarly, Keenen, Baillet and Brown (1984) found that reading times decreased as the level of causality increased between sentences. Other studies have also found that in short narratives, causally related sentences were remembered better (e.g., Trabasso, Secco & van den Broeck, 1984). These early studies therefore underlined the importance of causality for discourse processing and comprehension. They did not, however, systematically compare causal relations to other relation types, as the noncausal relations in these studies often encompassed a variety of different links.

In this respect, Sanders and Noordman (2000) were the first to systematically compare the processing and recall of two types of discourse relations, conveyed with and without connectives. We will focus on the difference between relations in this section. The two relations they analyzed were the problem–solution relation, illustrated in (3), that can be considered as a subtype of causal relations, and the list relation, illustrated in (4), that represents a subtype of additive relations.

- (3) It has been dangerous to cross that street for years. The city council has now decided to build a subway for pedestrians.
- (4) The city council has decided to build a subway for pedestrians. New traffic lights will be installed nearby.

[from Sanders & Noordman, 2000: 38]

These two types of relations differ in the degree of coherence they create in discourse, as causal relations between events typically create a higher degree of coherence by providing an explanation, compared to mere added facts. The authors therefore hypothesized that causal relations could have a higher effect on discourse processing and recall compared to the less informative list relations. However, causal relations are also more cognitively complex than additive relations in Sanders, Spooren and Noordman's taxonomy (1992). It could therefore also be expected that having to deal with this additional complexity might slow down the processing of causal relations compared to list relations.

## 6.2 Processing Discourse Relations

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In order to assess these hypotheses, Sanders and Noordman (2000) designed a reading experiment in the form of a self-paced reading task. Results revealed that problem–solution and list relations were not processed in the same way, as critical segments involving causal relations were read more quickly compared to segments involving a list relation. This result therefore means that cognitively more complex relations like causal relations do not necessarily involve greater processing difficulty. A possible explanation put forward by Sanders and Noordman is that causal relations have a special status in discourse processing, as readers expect to find explanations for the described problems. Taking this observation one step further, Sanders (2005) later suggested a ‘causality-by-default’ hypothesis, stating that causality represents a default interpretation in discourse. This would explain why readers access other interpretations only when a causal meaning cannot be obtained in context, and why causal relations are accessed more quickly than simpler but less informative ones.

In addition to reading time differences, the two relations also differed in terms of recall, as participants remembered elements from causal relations better than elements from list relations. This was apparent both in a task occurring immediately after reading, in which participants had to decide if statements had been presented in what they just read or not, and in a free recall task in which participants had to remember as many elements from the discourse as possible. These results provide further proof of the special status of causal relations in the mental models that readers create after reading a discourse.

More recently, a number of studies have focused on the comparison between causal and concessive relations. This comparison is particularly revealing, as both relations involve a causal link between the segments, but in the case of concessive relations, an expectation created in one of the segments is denied in the other (e.g., Louwerse, 2001) as illustrated in (5). In this sentence, Mary’s state of happiness leads the reader to infer a positive outcome in the competition, but this expectation is explicitly denied in the second segment. For this reason, Sanders, Spooren and Noordman (1992) classify concessions as negative causal relations.

- (5) Mary is very happy although she lost the competition she hoped to win.

[constructed example]

Studies that have compared the way readers process causal and concessive relations have all found important differences between them. First, causal relations are processed more quickly than concessive

relations (Köhne & Demberg, 2013; Xu et al., 2018). Differences were also found between tasks involving offline comprehension and recall. For instance, people found it more difficult to remember sentences that contain the concessive connective *but* compared to the causal connective *because* (Caron, Micko & Thüring, 1988) and have more difficulties filling in blank slots between sentences when a concessive relation is involved (Goldman & Murray, 1992). Note, in addition, that these studies have been conducted in different languages, namely English, German, Dutch and Chinese, which indicates that the observed differences are not due to specific features of the connectives used to convey them in a given language. We will discuss cross-linguistic similarities and differences in the way connectives encode discourse relations in more detail in Chapter 7 and mention cases in which these cross-linguistic differences have an impact on discourse processing in Section 6.6.

Finally, differences between causal and concessive relations have also been underlined in studies that have looked at the processing of incoherent relations, that is, relations for which the signal given by the connective is incompatible with the linguistic content of the segments. While an effect of incoherence is always found for causal relations, this effect is not always apparent for concessive relations in studies relying on reading times, possibly because processing cost is already high for congruent concessive relations and this might obscure differences between conditions in some experimental contexts (see Lyu, Tu & Lin, 2020 for a discussion). The overarching conclusion from all these studies is that the processing cost of concessive relations is higher compared to that of causal relations. We will come back to this issue in the next section, when discussing concessive connectives.

Taken together, all the studies we have discussed so far consistently demonstrate that not all discourse relations are processed in the same way. It seems that causal relations have a privileged status, as they create a high degree of coherence between discourse segments. However, the category of causal relations itself can be decomposed into several subcategories (e.g., Sweetser, 1990). An important difference, which has been tested in several experiments, is the one separating objective causal relations, such as (6), that relate objective facts or events occurring in the world, to subjective causal relations, such as (7), relating claims and conclusions derived in the mind of the speaker (see Chapter 3).

- (6) Heidi was proud and happy, because she won first prize at the art show.

## 6.2 Processing Discourse Relations

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- (7) Heidi could imagine and create things, because she won first prize at the art show.

[from Traxler, Bybee & Pickering, 1997: 485]

Traxler, Bybee and Pickering (1997) have compared the way readers process sentences like (6) and (7) using eye-tracking. In this experiment, the region of interest is the one following the connective ('she won first prize at the art show'). For this reason, the words used in this segment were identical in objective and subjective relations. The different interpretation of the relation comes from the indications given in the first segment. In (6) the fact of winning first prize is the reason for Heidi's objective state of happiness, while in (7) the fact of winning first prize merely leads the speaker to conclude in their mind that she is probably good at imagining and creating things. This experiment uncovered an important processing difference between objective and subjective causality, as readers slowed down when they processed subjective relations compared to objective ones. This effect occurred at the words 'first prize', because it is the point in the sentence when an objective interpretation can be ruled out. The authors therefore conclude that having to infer a subjective meaning is what slowed readers down compared to the default objective interpretation. Further indications that this explanation is on the right track comes from another set of experiments (Traxler et al., 1997) in which the authors inserted a marker of subjectivity already in the first segment, as in (8).

- (8) Eugene thinks that Heidi could imagine and create things because she won first prize at the art show.

[from Traxler et al., 1997: 99]

In this experimental condition, the additional reading time needed to process subjective relations in the second segment disappeared, as readers already had the right relation in mind, thanks to the cue given in the first segment. Canestrelli, Mak and Sanders (2013) found a similar asymmetry in Dutch, both with backward causal connectives like *because* but also with forward causal connectives like *so* in English. Similarly, the addition of a subjectivity marker also removed the extra processing cost in these experiments. We discuss them in more detail in Section 6.6. More recent experiments have shown, however, that adding a subjectivity marker does not always eliminate the extra processing cost of subjective relations (Kleijn, Mak & Sanders, 2021), and more research is still needed to determine why some markers orient readers towards subjectivity while others don't.

The difference between objective and subjective relations does not only involve a processing difference. These relations also play a different role in persuasive texts. Indeed, subjective relations provide readers with indications that the text contains subjective claims rather than objective facts, and this clue forewarns readers, leading them to be more critical towards its content (Kamalski, Sanders & Lentz, 2008). This effect was measured by comparing texts including objective causal connectives, subjective causal connectives and no connectives. Results showed both types of connectives had a reverse effect on persuasion compared to implicit relations. While objective connectives improved the integration of information and therefore increased persuasion, subjective connectives alerted the readers to the persuasive intent of the author, which caused resistance and led to a less persuasive outcome. We can therefore conclude that the use of connectives is not neutral as a way to mark discourse relations, but the effect created by specific connectives should be analyzed separately. We discuss the role of connectives further in the next section.

### **6.3 THE ROLE OF CONNECTIVES FOR DISCOURSE PROCESSING**

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In pragmatics and discourse analysis, connectives are often described as lexical items encoding procedural instructions guiding discourse interpretation (see Chapter 3). Processing studies can shed further light on their role as guides for interpretation. As we will see in this section, connectives do indeed have an immediate effect on discourse processing, by speeding-up the processing of the words immediately following them, but also by reversing expectations. Concessive connectives in particular immediately reverse readers' real-world expectations about the content of the following segment (e.g., Xiang & Kuperberg, 2015). In addition, some connectives that are often used in a pair, like *on the one hand*, raise expectations about a following contrast that readers sustain even with intervening linguistic materials between the two related segments (Scholman, Rohde & Demberg, 2017). Other linguistic signals, for example, the adverb *zwar* in German ('yet, however'), similarly raise expectations about an upcoming concession (Schwab & Liu, 2020). We will review these various effects of connectives in detail in this section, starting with the difference between relations containing and not containing connectives.

#### **6.3.1 Processing Explicit versus Implicit Relations**

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Since the earliest attempts to measure discourse processing, connectives have repeatedly been found to speed up processing of the segment

### 6.3 Role of Connectives for Discourse Processing

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they introduce compared to implicit relations (e.g., Britton et al., 1982; Haberlandt, 1982). In their experiment comparing causal and additive relations, Sanders and Noordman (2000) confirmed that the use of a connective speeded up processing for both problem–solution relations and list relations compared to implicit relations. In that sense, there does not seem to be a processing advantage for causal connectives compared to connectives indicating other relations. An important difference does exist, however, between relations. This difference is linked to the necessity of using a connective to convey the relation. While some relations like causality (9) are easily inferable even when they are conveyed implicitly in the absence of a connective as in (10), others like concession (11) are more difficult to interpret when communicated implicitly (12).

- (9) Mary was very happy because she won the competition.
- (10) Mary was very happy. She won the competition.
- (11) Mary was very happy although she lost the competition.
- (12) Mary was very happy. She lost the competition.

[constructed examples]

This difference between causal and concessive connectives has been tested empirically in a series of experiments. Murray (1995) compared the online processing of concessive relations compared to relations of cause and addition in self-paced reading experiments. All relation types were conveyed both explicitly with a connective in half of the sentences and implicitly in the other half. Overall, Murray found that the implicit version did not trigger longer reading times compared to explicit relations. However, a significant difference was observed specifically in the case of concessive relations, for which the implicit version triggered longer reading times compared to the explicit one. This difference led Murray to conclude that concessive connectives have a greater impact on creating intercausal coherence compared to causal and additive connectives. This interpretation is in line with the continuity hypothesis put forward by Segal, Duchan and Scott (1991). Following this hypothesis, a continuous relation introduces new information that can be integrated in the ongoing construction of the narrative's meaning, whereas a discontinuous relation introduces a rupture in the narration. This rupture must be indicated explicitly with a connective. As observed in his experiment, failure to indicate this rupture disrupts processing, while the removal of a causal or additive connective does not create the same problem.

In another set of experiments, Murray (1997) assessed the impact of an incoherence created by the improper use of a concessive, causal or

additive connective in contexts that were not congruent with their meaning. For example, the use of a concessive connective between two segments that typically indicate a consequence–cause relation as in (9). In this experiment, Murray only compared the inappropriate use of connectives with their absence (i.e., implicit relations). Results indicate that reading times globally increase for sentences conveyed by an inappropriate connective compared to no connective. This effect was however stronger for inappropriately used concessive connectives compared to the other two relations. Murray concludes once again that concessive connectives are more indispensable than causal and additive connectives for discourse processing because they introduce a discontinuous relation that must be explicitly marked to be processed adequately. Conversely, continuous relations such as causality and addition need not be marked explicitly by a connective to be smoothly processed.

Since then, other studies have assessed the role of connectives for causal and concessive relations, using other experimental methods, contexts and in different languages. In one of them, Köhne and Demberg (2013) found that causal relations conveyed by German connectives raise an expectation of congruence with the preceding context in a visual world experiment using eye-tracking in which participants look at images while hearing linguistic stimuli, whereas concessive connectives raise expectations of incongruence leading people to look for alternative referents. This means that causal and concessive connectives are both rapidly integrated during sentence processing but that concessive connectives involve a more complex mental operation, which could explain why they trigger longer reading times in reading experiments. In a study involving Event Related Potentials (ERP), Xiang and Kuperberg (2015) found that reading a connective with a negative polarity like *even so* in English, immediately reversed people's expectation about coherence, as sentences like (13) became more coherent than sentences like (14).

(13) Elizabeth had a history exam on Monday. She took the test and failed it. Even so, she went home and celebrated wildly.

(14) Elizabeth had a history exam on Monday. She took the test and aced it. Even so, she went home and celebrated wildly.

[from Xiang & Kuperberg, 2015: 649]

In this experiment, the N400, a signal often associated with the revision of expectations, was smaller when participants evaluated the coherence or even simply read sentences like (13) than (14), which



### 6.3 Role of Connectives for Discourse Processing

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means that the information provided by the connective quickly overrode world knowledge about the consequences of a failing a test. This experiment also provided further confirmation that the processing of negative relations comes at a cost, as a sustained negativity effect was found even at the end of the sentence. A similar negativity effect (N400) linked to incongruence was also evidenced in another ERP study comparing the roles of causal and concessive connectives in German and English (Drenhaus et al., 2014). In this study, a later positivity effect (P600) was also evidenced for concessive relations. This later effect can be associated with the cost of predicting and revising a causal relation. These brain studies therefore reveal the presence of neural correlates for the added complexity involved in the processing of concessive relations evidenced with behavioral measures such as reading.

In another line of enquiry, Zufferey and Gyga (2016) extended the notion of continuity to include not only temporally and causally continuous relations, but also relations that are continuous or discontinuous with respect to the narrative perspective presented in the first segment. Continuous relations from a narrative perspective involve the same narrative voice across the two segments, as in the relation of elaboration exemplified in (15). By contrast, relations that are discontinuous from a narrative perspective involve a change in narrative voice between the two segments, as in the relation of correction in (16) and confirmation in (17). While the narration always takes the external perspective of Emma in the first segment, the voice changes to that of the narrator in the second segment of (16) and (17), who intervenes to either correct Emma's hypothesis (16) or confirm its veracity (17).

- (15) Emma thought that Bill would marry Ann. She hoped that they would invite her to their wedding.
- (16) Emma thought that Bill would marry Ann, but the marriage did not take place.
- (17) Emma thought that Bill would marry Ann. And indeed, the marriage took place last June.

[from Zufferey & Gyga, 2016: 535]

In a self-paced reading experiment, Zufferey and Gyga (2016) compared the processing of causal and confirmation relations either conveyed explicitly by the polyfunctional French connective *en effet* that can be used in both causal and confirmation contexts, or implicitly. They found that using the connective immediately speeds-up processing at the beginning of the second clause, independently of

the relation involved. They therefore replicated previous findings on the role of connectives to speed-up discourse processing discussed at the beginning of this section. But they also found another effect, located this time at the end of the sentence, which revealed a difference between the two relations during the phase of meaning integration. At this point, removing the connective had an impact on reading times but the effect was much larger for confirmation relations. This effect is therefore in line with Murray's findings, namely that discontinuous relations involve an increase in processing times when conveyed implicitly, but not continuous relations. It also shows that continuity should be thought of as a broad notion including temporal, causal but also narrative continuity.

### 6.3.2 The Role of Alternative Signals

Taken together, the studies summarized so far underline the role of discourse connectives for discourse processing compared to relations that are conveyed implicitly on the basis of the linguistic content of the segments and world-knowledge inferences. However, the explicit communication of discourse relations by means of a connective or its implicit communication do not exhaust the many ways in which a relation can be communicated. In fact, many of them can also be conveyed by the use of alternative signals (e.g., Das & Taboada, 2018; Hoek et al., 2019) such as lexical indications of contrast (18), of enumerations (19), or even for causal relations verb forms (20), and punctuation signs (21).

- (18) Tom is a bit *overweight*; John is really *skinny*.
  - (19) Martha did *several* things to prepare for her holidays. She renewed her passport, went shopping and packed her suitcase.
  - (20) *Feeling* ready to leave, Martha was quite relaxed.
  - (21) Martha was quite relaxed: she was ready to leave.
- [constructed examples]

Across three self-paced reading experiments, Crible and Pickering (2020) assessed the role of structural parallelism, in other words the repetition of the same argument structure across the two segments as in (22) as a cue to help readers process contrastive relations, and pitched the usefulness of this cue against that of a connective by comparing contrastive relations conveyed by the connective *but* to relations conveyed by the semantically underspecified connective *and* (see Spooren, 1997; Blackmore & Carston, 1999; Crible et al., 2019 for analyses of *and* in terms of underspecification).

### 6.3 Role of Connectives for Discourse Processing

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- (22) Nick always eats in low-budget restaurants but Grace always eats in fancy places.

[from Crible & Pickering, 2020: 869]

In the first two experiments, the task simply involved reading and answering simple verification questions, in other words questions that either contained or did not contain an element of the sentence that was just read, that readers had to evaluate as being ‘true’ or ‘false’. They found that readers used parallelism as a cue for sentence processing both when it was conveyed by the adequate contrastive connective *but* and also when it was conveyed by the underspecified *and*. However, in a third experiment involving a harder comprehension question that followed the online reading, in which participants were asked to identify the discourse relation linking the segments, they found that the effect of parallelism was stronger when the relation was conveyed by the underspecified connective *and* compared to the contrastive connective *but*. They attributed this difference to the depth with which participants processed the sentences in both types of experiments. For the simple verification task, shallow processing was sufficient, whereas the more challenging task involving relation identification required deeper processing. This additional difficulty revealed that the use of alternative signals is all the more important when the connective itself does not fully serve to identify the intended relation. This study thus reveals the important role of alternative signals for discourse processing. This role will need to be further examined in future work for a broader array of relations and contexts before we fully understand the complex interplay of various signals for discourse processing.

#### 6.3.3 Processing Connectives from the Written Mode

So far, the experiments we have reported involved connectives that are very frequently used in spoken language such as *because* and *but* in English. However, Indo-European languages possess a vast repertoire of connectives (see Chapter 3), among which a large number are mostly used in the written mode, such as *therefore* and *nevertheless* in English. Only a few studies so far have assessed the role of connectives from the written mode for discourse processing. In one such study, Crible, Wetzel and Zufferey (2021) tested the different roles played for the processing of contrastive relations by a connective frequently used to express contrast in spoken French (*par contre*) and a French connective bound to the written mode (*en revanche*) in a self-paced reading task. They found that reading the connective from the written mode immediately delayed processing compared to the frequent connective in the

spoken mode. However, this additional complexity was quickly resolved, as no differences in reading times remained by the time readers reached the end of the sentence.

In another study, Wetzel, Zufferey and Gygax (2022) tested the perception of incoherence in causal and concessive relations created by misusing either a frequent connective in spoken French (*donc* ‘so’ and *mais* ‘but’) compared to a connective bound to the written mode (*ainsi* ‘therefore’ and *néanmoins* ‘nevertheless’) expressing the same relations. Results indicate that readers react to the incoherence earlier when reading the second segment when a frequent connective from the spoken mode is used compared to a less frequent one from the written mode. Importantly, however, the effect of incoherence is also apparent with less frequent connectives from the written mode, which indicates that their meaning is integrated by readers, albeit more slowly.

Taken together, these two experiments provide some initial indication that adult native speakers also integrate the meaning of connectives from the written mode during discourse processing, even though their intuitions about their correct usage is vaguer (see Section 6.5). However, integrating their meaning takes more time, leading to delayed reactions compared to sentences conveyed by frequent connectives. The difference between frequent and infrequent connectives bound to the written mode can be compared to the ease of access to the mental lexicon between frequent and less frequent content words like nouns. In this case as well, less frequent words were found to take more time to be accessed across various types of experimental paradigms (e.g., McRae, Jared & Seidenberg, 1990).

#### 6.3.4 Processing Ambiguous Connectives

In order to complete our survey of the role of connectives for discourse processing, we need to address one more important issue. So far, we have illustrated the usefulness of connectives for discourse processing by focusing mainly on cases where connectives conveyed one relevant meaning. However, many connectives are ambiguous and can convey different discourse relations depending on context (see Chapter 3). In some cases, these relations belong to different categories of relations in many taxonomies (see Chapter 2) such as temporality and causality, in the case of *since* in English. In other cases, the meanings are closely related, for example, concession and contrast, or even objective and subjective causality. In this section, we will discuss the way in which disambiguation takes place when readers have to process ambiguous connectives.

### 6.3 Role of Connectives for Discourse Processing

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As part of a study aiming at assessing processing differences between causal and concessive relations, Wetzel, Zufferey and Gygas (2022) tested the way readers integrate the meaning conveyed by an ambiguous connective in a self-paced reading experiment. They tested the French connective *aussi* in causal relations ('in addition'), a connective that also has an additive meaning (similar to the English 'also'). For concessive relations, they tested the connective *or* (similar to 'however') that also has a background meaning (this meaning cannot be fully translated into English but it resembles some uses of 'in fact'). In both cases, they found that readers integrate these connectives at the same pace as monofunctional connectives from the written mode, indicating that ambiguity as such does not trigger interpretation problems for adult native speakers. The important difference seems to be whether connectives are frequently used, especially in the spoken mode, or whether they are bound to the written mode.

This experiment illustrates the quick disambiguation process that takes place when readers have to integrate the correct meaning of a connective that can be used to convey two very different relations. Asr and Demberg (2020) have tested the ways in which people understand and process relations of concession and contrast encoded by the two closely related connectives *but* and *although* in English. The authors stress that according to the theoretical accounts of discourse connectives that describe them as lexical items encoding a procedural instruction guiding interpretation (see Chapter 3), these connectives should be considered as ambiguous between the two relations and therefore interchangeable. Yet, they found that these connectives do not express the two relations with a similar frequency in corpus data. In fact, when used in the sentence-medial position, *although* conveys a relation of contrast and a relation of concession roughly equally frequently. In contrast, *but* conveys a contrast three times more frequently than a concession. In an offline sentence continuation task, they found that English speakers are sensitive to this difference, as they chose *but* to indicate contrastive relations in 75 percent of the sentences, and equally used *although* for concession and contrast. In addition, they judged contrastive sentences with *but* as more coherent than contrastive sentences with *although* in a coherence judgment task. In an online reading experiment using eye-tracking, they also read sentences with a less expected combination (i.e., concessive sentences with *but*) more slowly compared to the same sentences with *although*. The eye-movement data indicated that these less expected combinations triggered more regression to previously read regions compared to the more frequent combinations in corpus data. All

together, these results indicate that readers have probabilistic expectations about the meaning conveyed by a connective depending on the frequency with which a connective expresses a given relation in language use. This means that native speakers do not only integrate the meaning of connectives but also their most frequent patterns of use, and use both types of information during discourse processing.

In their experiments, Asr and Demberg (2020) also compared the same connective *although* when used in two different syntactic positions: sentence initial and sentence medial. This comparison was based on the observation that this connective typically conveys distinct relations in the two positions in corpus data. While *although* is equally used for concession and contrast relations in the sentence-medial position, in the sentence-initial position this connective overwhelmingly conveys a concessive relation. Again, the authors found that readers are sensitive to this syntactic difference, and adjust their expectations about the meaning of *although* depending on its syntactic placement. This result thus provides some empirical validation of the intricate interrelations between connectives' meaning and syntax discussed in Chapter 4. Similar research is still needed to determine whether this sensitivity can also be observed for other connectives and discourse contexts, as research is still scarce on that topic.

#### **6.4 THE ROLE OF CONNECTIVES FOR RECALL AND COMPREHENSION**

While the role of connectives for speeding up discourse processing has been consistently found across studies and is now firmly established, their impact on the way readers recall and understand information in a discourse is much more debated. While some early studies found an effect on connectives for recall, these findings have not always been replicated and several methodological limitations have been evidenced. For example, Meyer, Brandt and Bluth (1980) found an effect of connectives on recall, as readers who had read the explicit version of a text containing connectives most often reproduced the original text structure in a recall task. In contrast, Meyer (1975) found no effect of either connectives or other signaling devices (e.g., expressions such as 'more importantly') on either immediate or delayed recall. Later on, Millis and Just (1994) did find an effect of connectives on both recall and comprehension. In their experiment, participants had to read segments that were either linked by a connective or not, and had to judge whether a probe word had been included in the segments they had just read. They found that recall was faster when the sentences were linked

#### 6.4 Role of Connectives for Recall and Comprehension

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by a connective, and that readers were also faster and responded more accurately to comprehension questions about the segments they had just read. Caron, Micko and Thüring (1988) found that semantically unconnected sentences linked by the causal connective *because* led to better recall than the same sentences simply connected by the additive connective *and*. It is not certain, however, that this result would generalize to other discourse relations, as Caron et al. (1988) found that people remember with more difficulty sentences that contain the concessive connective *but* compared to the causal connective *because*.

The effect of connectives on recall could not be clearly established either in the study by Sanders and Noordman (2000). The authors measured both immediate recall in the form of statements that participants had to verify (i.e., decide if the statement was correct or incorrect based on what they had just read) and delayed recall based on free recall tasks in which people were instructed to mention as many elements as they could remember reading. Results indicated a very marginal effect of connectives on immediate recall, as reaction times were faster for explicit relations, but only in the case of problem-solution relations. In addition, there was no effect of explicit marking on accuracy in this task. Similarly, the explicit marking of coherence relations by connectives did not have any effect on free recall. They concluded that connectives play a role for the online processing of coherence relations but do not play a lasting role on the mental model of discourse once it has been constructed.

Yet, even though their importance for recall is not attested, it does not mean that connectives do not help readers understand the content of a discourse. In fact, Degand, Lefèvre and Bestgen (1999) found evidence of the opposite. In an offline comprehension task, they assessed the role of causal connectives for discourse comprehension by asking participants to give short answers to questions targeting both the parts of the texts in which connectives were used in the explicit version and removed in the implicit version, and questions targeting their understanding of other elements of the text that were not part of a causal relation. Results from this experiment clearly showed that connectives are useful for text comprehension, as participants reached higher scores after reading the explicit than the implicit version of the texts. In addition, they also reached higher scores for questions not targeting the causal relations after reading the explicit version, which indicates that the presence of connectives increased their overall comprehension of textual content, and helped them form a coherent mental model. These findings were moreover replicated in a similar experiment aiming at comparing the role of connectives in

participants' native language and in a foreign language (Degand & Sanders, 2002). It seems therefore that connectives, and causal connectives in particular, can be useful for comprehension, at least in order to perform some tasks going beyond mere recall, and tapping on discourse comprehension. We will come back to these issues in Chapters 8 and 9, when discussing the importance of connectives for young readers and second language learners.

Going one step beyond comprehension, speakers' integration of the meaning conveyed by specific connectives also has an impact on their evaluation of the validity of an argument. In a series of experiments, Schumann, Zufferey and Oswald (2020) assessed the different roles of French causal connectives that can all be used to convey an attributive meaning for the acceptability of discourse segments containing a fallacious argument, such as *since*, *as*, and *given that* in English. In these experiments, participants read short dialogues like (23), and then had to evaluate the acceptability of Alexander's reply based on different factors.

- (23) Barbara: Il est crucial de mieux soutenir les jeunes parents parce qu'avoir un enfant signifie beaucoup de charges financières.  
Alexandre: Augmentons les allocations familiales, puisqu'on ne pense qu'à l'argent.  
'Barbara: It is crucial to better support young parents because having a child means having a lot of financial responsibilities.  
Alexandre: Let's raise the family allowance, since it's only about the money.'

[from Schumann, Zufferey & Oswald, 2021: 5]

In part of the dialogues, the answer contained a fallacious argument in the form of a straw man fallacy, as in (22), in other words a distortion of the opponent's argument to make it appear more extreme and therefore less acceptable (e.g., van Eemeren & Grootendorst, 1992). The authors manipulated the connective used to introduce the argument by alternating between four different French connectives (*puisque*, *comme*, *étant donné que*, *vu que*). Results indicated that participants reacted differently to these connectives, even though all of them convey a causal meaning and indicate an attribution of content to another source. However, only the connective *puisque* used in this experiment is often used in ironic contexts to express a caricature or an exaggeration (Franken, 1996; Zufferey, 2014). Participants reacted strongly to this cue, as *puisque* acted as a potent forewarner, alerting readers to the distorted nature of the argument. This experiment thus demonstrates that readers specifically integrate the fine-grained



nuances of connectives' meaning and use this information when processing, understanding, and evaluating the content of a discourse.

## **6.5 INDIVIDUAL DIFFERENCES BETWEEN READERS**

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So far, we have discussed the processing of discourse relations and connectives by adult native speakers, thereby implicitly treating them as a homogeneous group, who should not vary in their comprehension, recall and reading of connectives and discourse relations. This assumption of homogeneity is quite widespread in experimental studies in both linguistics and psychology involving between-subject designs, such as studies comparing differences between native vs. non-native speakers, teenagers with a high or low academic background, etc. In these studies, variations within groups are often discarded, because they are perceived as noise or even measurement errors. This reliance on group comparison has led researchers to overlook the important individual differences that exist in the way even adult native speakers process and understand their mother tongue. Yet, such differences have now been clearly established for many aspects of lexical and syntactic processing and comprehension (see Kidd, Donnelly & Christiansen, 2018 for a review). Given that connectives are at the interface between the lexicon, syntax and discourse, there are reasons to believe that individual variations in the way people process and understand them should also exist. Empirical evidence to this claim remains, however, few and far between.

Some evidence of individual variations was already hinted at in the early studies of discourse processing, as a way to explain some contradictory findings between them. For example, Meyer, Young and Barlett (1989) state that not all readers are sensitive to differences between discourse relations. More specifically, readers with average verbal ability do not seem to be sensitive to these differences. The effect of verbal ability was also mentioned by Rickards et al. (1997) who did not find an effect of signaling (i.e., connectives) for high-ability readers, which again points to the existence of variabilities among speakers depending on their level of linguistic competence.

Another source of variability was found in studies who compared people with high prior knowledge of the topic of discourse with people with low prior knowledge (McNamara & Kintsch, 1996; Kamalski, Sanders & Lentz, 2008). These studies found that connectives benefit more to readers with low prior knowledge compared to readers with high prior knowledge. Kamalski et al. (2008) even found a negative

effect of connectives for readers with high prior knowledge in their understanding of informative texts. The authors explain this effect by the deeper processing required to understand a more implicit discourse, which in turn increased participants' level of understanding.

Yet, these early studies did not explore in more detail the various speaker characteristics that lie at the source of these individual variations, beyond the role of verbal ability and prior knowledge. This topic has been dealt with again in two recent studies, underlying the link between people's sensitivity to connectives and other discourse signals and their degree of exposure to print.

Zufferey and Gygas (2020a) focused on the ability of adult native French speakers to evaluate the correct and incorrect uses of connectives from the written mode, by comparing the roles of cognitive complexity and connective frequency in corpus data in adults' ability to use them. They focused on four French connectives, each conveying a different discourse relation, with a variable degree of cognitive complexity: an additive connective [*en outre*], a consequence connective [*aussi*], a causal connective [*en effet*] and a concessive connective [*toutefois*]. Two of these connectives were highly frequent in written language as measured in corpus data (*en effet* and *toutefois*) and the other two were less frequent (*en outre* and *aussi*). Results demonstrated that *en outre* and *aussi*, the two less frequent connectives, yielded a lower performance compared to *en effet* and *toutefois*. It seems therefore that what causes difficulties in the mastery of connectives from the written mode for adult speakers is their low frequency.

The degree of exposure to the written mode that people have is also quite variable. The authors therefore expected that the ability to handle connectives from the written mode should be linked to the degree of exposure to print that people have. This was indeed the case, but importantly, individual variations were significant only for the two less frequent connectives (*en outre* and *aussi*). This means that all adult native speakers master the frequent connectives, but greater individual differences are found for less frequent connectives. For them, a greater exposure to print is necessary, and not all adults have had it, even in their native language.

Scholman, Demberg and Sanders (2020) also assessed individual variations among adult native speakers, but this time on their ability to use alternative signals indicating list relations. In their experiment, participants had to complete short discourses of two sentences with one or two sentences. Crucially, half of the stimuli contained an indication that a list was expected to follow while the other half did not. These indicators were the expressions *a few*, *a couple*, *multiple* and *several*.

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If participants are sensitive to these cues, it is expected that they should produce more continuations corresponding to a list relation than when sentences do not contain a signal. This was indeed the case, as the proportion of list relations was significantly higher when a signal was present. It is interesting to note, however, that in both conditions, the most frequent continuation was a causal relation. This result thus provides some further confirmation for the importance of causality in discourse. More importantly in the context of individual variations, the authors also found that participants who had a higher degree of exposure to print also provided the most list continuations. This study thus confirms the importance of print exposure to develop a sensitivity to the marking of discourse relations, be it with connectives or alternative signals.

In a nutshell, the studies reviewed in this section indicate that the analysis of individual differences represents an important line of enquiry to assess the way people produce, understand and interpret discourse relations and connectives. We will discuss the notion of individual variations again in Chapter 8 in the context of language acquisition.

### **6.6 SIMILARITIES AND DIFFERENCES OF PROCESSING ACROSS LANGUAGES**

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The processing studies that we have reviewed in this chapter have been conducted on a handful of different languages, mostly Indo-European (English, Dutch, German, French) but also in Chinese. Even though comparisons are limited to these specific cases, it is noticeable that most of the results seem to reflect great convergence between the languages in the way readers process and understand discourse relations. The difference of cognitive complexity between causal and concessive relations is a case in point, as was underlined in studies conducted in English (Murray, 1995; Morera et al., 2017), German (Köhne & Demberg, 2013) and Chinese (Xu et al., 2018). Despite these global similarities, fine-grained differences can also be observed in the way readers process and understand discourse relations across languages, even when they are typologically closely related. We review these differences in this section.

Blumenthal-Dramé (2021) conducted a fine-grained comparison of the way readers process causal and concessive relations when marked with an appropriate connective or by the underspecified connective *and* in English and *aber* in German. The rationale for this comparison is that English is a less synthetic language compared to German, with

little inflectional morphology and a tendency to have invariable word forms that are highly general both grammatically and semantically. As a result, Hawkins (2019) argued that German speakers, who speak a more synthetic language with richer morphology, should allocate more resources to the treatment of individual words compared to English speakers, who should focus more on units beyond words. Blumenthal-Dramé (2021) therefore hypothesized that this difference between the two languages should be reflected in differences in the ways readers from both languages process discourse relations. More specifically, it is expected that German speakers will pay more attention to connectives and will therefore benefit more from their presence. This hypothesis was tested by means of very similar self-paced reading experiments conducted in the two languages with adult native speakers. Results first provide some further confirmation of the causality-by-default hypothesis (Sanders, 2005) discussed above, to the extent that readers globally benefited more from the presence of concessive than causal connectives. An important difference was however also observed between the languages, as causal connectives provided a significant processing advantage over implicit relations for German readers but not for English readers. Besides, the use of connectives overall provided a greater advantage in German than in English, for both relation types. However, in another set of experiments comparing English and German causal and concessive connectives across eye-tracking and ERP experiments, Köhne-Fuetterer et al. (2013) did not find any differences between the two languages. It seems therefore that the exact nature and extent of these differences may depend on the connectives included in the experiment and the experimental paradigms used.

Another difference between the loose form–function mappings of English and the more precise connectives found in other Indo-European languages has also been discussed in the context of causal relations, and more specifically in the difference that separates objective from subjective causality. We already illustrated this difference in (6) and (7), repeated in (24) and (25) for convenience.

- (24) Heidi was proud and happy, because she won first prize at the art show.
- (25) Heidi could imagine and create things, because she won first prize at the art show.

[from Traxler, Bybee & Pickering, 1997: 485]

These sentences come from the online processing experiment conducted in English by Traxler et al. (1997). As these sentences illustrate,

## 6.6 Similarities and Differences of Processing across Languages

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in English both types of causal relations are typically conveyed by the same connective (*because*). However, in other languages like Dutch, specific connectives are used in both cases (see also Chapter 7). Canestrelli, Mak and Sanders (2013) replicated the English experiment in Dutch, using two different connectives: *omdat* for objective relations and *want* for subjective relations. This experiment revealed important differences between the two languages. While Dutch-speaking readers also slowed down when processing subjective causal relations compared to objective ones, they did so much earlier than in English. Recall that in Traxler et al. (1997), readers slowed down at the words ‘first prize’ in the second segment. In Dutch, readers slowed down earlier, at the words immediately following the connective *want*. This gap can be explained by the difference of marking between the two languages. In English, the connective *because* does not provide information about the type of causal relation that will follow. The readers have to infer it based on the linguistic content of the segments. As a result, they slow down as soon as an objective interpretation could be ruled out, at the words ‘first prize’. In Dutch however, the connective provides an indication of the intended type of causal relation. The connective thus provokes an immediate slow down, but later on in the sentence, readers do not slow down again at the words ‘first prize’ because they already have a subjective interpretation in mind.

French represents an intermediate case between English and Dutch, as two specific connectives exist to express objective and subjective causality, but the subjective connective *car* is used only in writing, as in speech the objective causal connective *parce que* is used for both types of causal relations (Simon & Degand, 2007).<sup>1</sup> This situation therefore raises the question of whether French speakers should behave more like English speakers, due to the situation in spoken French, or like Dutch speakers, even though their subjective causal connective is restricted to the written mode. In a reading experiment, Zufferey et al. (2018) compared the reading of objective and subjective causal relations with *parce que* and *car* using a translated version of the sentences from Canestrelli, Mak and Sanders (2013). Results from this experiment indicate that French readers share some of their behavior with Dutch readers, and some with English readers. Like Dutch readers, they slow down at the words immediately following *car*, but they also slow down again later on in the sentence like English readers.

<sup>1</sup> Note that in more recent studies a rise of the connective *car* is observed in more informal “spoken-like” registers like texting in which the connective is used in a more objective way (Blochowiak, Grisot & Degand, 2020).

This indicates that the information given by the connective did not allow them to infer subjectivity. The authors argue that the early slow down found at the words immediately following *car* in both objective and subjective contexts can be assimilated to a register effect. Indeed, due to its boundedness to the written mode, *car* is assimilated to a formal register by many French speakers, and it therefore represented an unexpected lexical choice in the informal register used in the experimental items. According to this interpretation, the slow-down observed after *car* reflects its unexpectedness rather than a link with subjectivity.

In sum, the studies summarized in this section testify to the fact that cross-linguistic differences exist even between closely related languages. These differences will need to be assessed further between other language pairs and discourse relations before firm conclusions can be reached regarding their magnitude, and their implications for discourse processing and understanding.

## 6.7 SUMMARY

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This chapter started with an overview of the way discourse relations are processed, recalled and understood. One of the major findings is that not all relations are processed and remembered in the same way. It seems that causal relations play a special role for creating coherence in discourse, as they are processed more quickly and remembered better. Conversely, because they are highly expected, causal relations benefit less from the presence of connectives compared to discontinuous relations like concession and confirmation. While connectives play an immediate role for discourse processing, readers also integrate the information provided by alternative signals such as syntactic structures indicating parallelism, and content words like adjectives (e.g., to infer a lexical contrast) and adverbs (e.g., *zwar* in German). In their native language, speakers are able to take advantage of all sorts of connectives for discourse processing, even those restricted to the written mode, and those that are ambiguous. We will see that the situation is somewhat different for children and learners in Chapters 8 and 9. However, variability also exists among adult native speakers, who should not be treated by default as a highly competent and homogeneous group. Finally, we saw a glimpse of the way crosslinguistic differences in the signaling of relations by connectives impacts their online processing. We will dig deeper into these crosslinguistic differences in Chapter 7.

### **DISCUSSION POINTS**

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- What are the main conclusions from studies that have compared the processing of different coherence relations?
- What are the functions of connectives during online processing?
- Can you think of experimental designs that could be used to analyze the processing of discourse relations other than the ones illustrated in this chapter, for example, temporal relations? (See also the way temporal relations were tested with children in the next chapter.)

### **FURTHER READING**

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Sanders & Noordman (2000) as well as Murray (1997) remain excellent examples of processing experiments that should be read to get familiarized with the methodology behind online processing for the comparison of discourse relations and connectives. Scholman, Rohde and Demberg (2017) provides an in-depth discussion of the role of connectives in creating expectations about discourse structure. Asr and Demberg (2020) show how corpus data can be combined with experiments to provide a detailed account of the factors affecting connectives' use and processing. Mak, Tribushinina and Andreiushina (2013) illustrate the way processing studies can be used for crosslinguistic comparisons.

# 7 Discourse Relations and Connectives across Languages and Genres

## 7.1 INTRODUCTION

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Most languages possess a repertoire of connectives to express discourse relations. The list of connectives can even be quite extensive in some languages, mostly (but not exclusively) in the Indo-European family. For example, the French database of connectives LEXCONN lists 328 different connectives (Roze, Danlos & Muller, 2012), the Lexicon of Czech discourse connectives has 205 entries (Mírovský et al., 2017) and the Arabic Lexicon has 390 entries (Keskes, Benamara & Belguith Hadrich, 2014). Yet, comparisons between connectives expressing a similar relation have shown that most of the time, exact translation equivalents do not exist, because of frequent semantic, syntactic and register differences between them.

In this chapter, we will first present the extent of these cross-linguistic differences and discuss their implications for theories of discourse. We will make a distinction between discourse relations that seem to exist in all languages and their mapping onto specific connectives that is most of the time language specific. Cross-linguistic studies very often rely on the use of multilingual corpus data. We will therefore present the kind of data that can be used to perform contrastive studies, emphasizing their advantages and limitations.

Connectives do not only differ between languages. They are also used quite differently across different genres within the same language. These differences are particularly evident between spoken and written genres. We will also present the variations linked to genres in this chapter and underline the necessity to develop more cross-linguistic studies that are also varied in terms of genres, as such studies are still rare for the time being. Results from corpus studies comparing languages or genres have increasingly been used as input for experimental research. We will discuss in particular how observations about connective usage across genres has been important for studies analyzing discourse processing, as well as first and second language acquisition.



## 7.2 Variations across Languages

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Taken together, we will see that analyzing variations between languages and genres is important so that results are generalizable beyond specific cases.

Comparing languages and genres raises the question of including data originally produced in one language and then translated, as translations have been said to represent a specific discourse genre, identifiable even by machine-learning algorithms (Baroni & Bernardini, 2006). We will close this chapter with a discussion of the use of connectives in translated texts and explain the importance of these observations for testing cognitive theories in the domains of discourse and translation studies.

### 7.2 VARIATIONS ACROSS LANGUAGES

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Even though contrastive linguistics has existed as a field since the middle of the twentieth century (e.g., Lado, 1957), it has taken a new turn since the 1990s with the arrival of large multilingual corpora (Johansson, 2007). Since then, contrastive linguistics has become ever more associated with the use of corpus data. In fact, Hasselgård (2020) reports that between 1998 and 2009, 69 percent of the studies published in the journal *Languages in Contrast* were corpus-based, and this percentage increased to 83 percent for the years 2010–18. At the beginning of this section, we will therefore briefly present the methodology underlying the use of corpora to compare languages. We will then discuss studies that have taken an onomasiological perspective on cross-linguistic comparisons, starting from one or several discourse relations, and examining the various ways in which they can be signaled by connectives and other means across languages. In the last section, we will discuss studies that have taken a semasiological perspective and compared pairs of connectives across languages.

#### 7.2.1 Methodological Aspects of Corpus-Based Contrastive Studies

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Contrastive studies can be performed based on two types of corpus data: comparable and parallel corpora. Comparable corpora are simply two independent corpora produced by native speakers in monolingual contexts that are put together to identify cross-linguistic differences. In order to make such comparisons possible, the data included in these two corpora must be as similar as possible. They must minimally correspond to the same time period, be designed for a similar audience, and belong to the same genre (Johansson, 1998). Depending on the

research questions, additional variables should be controlled for comparability as well. For instance, in the case of spoken corpora, the number of speakers present in the interactions should be the same in both languages. Thus, the main challenge when using comparable corpora is that finding highly similar data in two or more languages can be quite complicated, as some genres might simply not exist in one of them, or may not be publicly available. Yet, Aijmer (2008) observes that many European languages already have a lot of available corpora, and that in many cases, existing data can simply be put together to form a comparable corpus.

Another challenge linked to the use of comparable corpora is that not only must the data be comparable, but the comparative concepts must be chosen in such a way as not to bias the comparison due to the specific labels existing or not existing in the languages to be compared, and to put maximal light on existing differences between them. Krezeszowski (1990) calls the neutral comparison platform that must be used to compare languages a *tertium comparationis*. In fact, comparing languages directly to one another based on the labels used to describe relations and connectives in one of them can often be misleading, as it may induce artificial similarities or differences between them. Let us take an example. If English and French are compared based on the presence of a discourse relation called “chosen alternative” in an annotated dataset of connectives, these languages would appear to be totally different, as only English would have such a label linked to the uses of the connective *instead*. This is because French does not have a lexicalized connective similar to English to express this relation. However, alternative lexicalizations exist, such as *à la place* or *plutôt* that can perform the same function in some contexts. Conversely, if French and English are compared based on the existence of connectives expressing a causal relation, the two languages will misleadingly appear to be identical, whereas the lexicon of causal connectives in both languages exhibit important differences, as we will see below. In sum, it is crucial to find a *tertium comparationis* that involves comparable and language-independent concepts (König, 2012) with an adequate degree of granularity to reveal cross-linguistic differences. This can be a major challenge, especially since the very existence of universal categories has been put into question by some authors (e.g., Evans & Levinson, 2009).

Finally, in order to be compared, connectives or discourse relations found in comparable corpora must be annotated in both languages. Yet, such annotations can be quite difficult to perform. For instance, Cartoni, Zufferey and Meyer (2013a) trained two annotators to

categorize occurrences of the English connective *while* with four different labels corresponding to its different meanings in the Penn Discourse Treebank (PDTB) (see Chapter 2). They report that even after several rounds of training, the two annotators did not reach a high level of agreement, as only 68 percent of the annotations were congruent. This corresponds to a kappa value of 0.43, which does not reflect a reliable level of agreement (Arstein & Poesio, 2008). In a similar vein, Spooren and Degand (2010) discuss the difficulty of annotating coherence relations with a high degree of reliability. They advocate the use of very precise and transparent coding schemes, so that biases are at least clearly documented, and can be discussed in subsequent research.

An alternative solution to the use of comparable corpora, which solves many of its problems, is to resort to the use of parallel corpora, in other words, corpora containing original texts in one language and their translation in another language. The main advantage of parallel corpora over comparable ones is that they provide a direct way to compare languages, through the observation of translations. Contrary to sense annotations, this method, called *translation spotting* (Cartoni, Zufferey & Meyer, 2013b), is very easy and reliable, and it can even partly be performed automatically (Véronis & Langlais, 2000). But parallel corpora also have a number of shortcomings. The major one is that these corpora are still quite limited. In fact, in many genres, translations are simply not produced, which limits their availability to specific cases such as literary texts, newspaper articles, subtitles, and text produced by multilingual organizations and countries. In addition, these corpora are available for a limited set of language pairs only. Another problem with these corpora is that comparing original texts to translations can represent a bias in itself, as translated language represents a specific genre with its own characteristics (see Section 7.4).

In sum, both comparable and parallel corpora have their own problems and advantages. Importantly, these problems are different in both cases, and they can be at least partly overcome by using both types of data simultaneously. In this respect, the creation of large multilingual corpora such as the Europarl corpus<sup>1</sup> (Koehn, 2005), consisting of debates at the European Parliament, have provided a major step ahead. The principle of equality between all languages of the European Union means that every person speaks in their own language, and the speeches are later translated into all the other languages (24 at the time of writing). This means that portions of the Europarl corpus can

<sup>1</sup> [www.statmt.org/europarl/](http://www.statmt.org/europarl/).

be assembled to perform various types of comparisons. First and foremost, it allows for the creation of bidirectional corpora, in which both languages are alternatively sourced and targeted, thus avoiding the bias of looking at only one translation direction. It can also be used as a comparable corpus to compare original language productions in highly similar contexts, as all deputies speak about similar topics, in a similar environment, and samples can be taken from the same time period. Finally, it can be used to compare translations performed from various source languages, in order to investigate their influence on translated texts (see Section 7.4). Thanks to the simultaneous availability of parallel and comparable corpora, sense annotations can be combined with translation spotting, which provides a fuller picture of cross-linguistic equivalences and differences. In this chapter, we will present several studies performed on bidirectional corpora, many of them using Europarl.

### 7.2.2 Discourse Relations across Languages

In most models of discourse, coherence is defined as a cognitive notion (see Chapters 2 and 6). It can therefore be expected that similar relations linking discourse segments will be found across languages. There is indeed some evidence that different languages use a similar set of relations. In fact, most major models of discourse (see Chapter 2) have been used to annotate corpus data in several languages. For example, the PDTB framework has been used to annotate relations in Arabic, Chinese, Czech, Danish, Dutch, Hindi and Turkish. Rhetorical Structure Theory (RST) has been used to annotate data in Basque, Dutch, German, English, Portuguese and Spanish, and corpora annotated with Segmented Discourse Representation Theory (SDRT) exist in Arabic, French and English (Benamara Zitoune & Taboada, 2015). In some cases, the taxonomies of relations had to be modified, with the addition or elimination of some relations, or even an elimination of the hierarchical nature of some models like the PDTB (Prasad, Webber & Joshi, 2014). But the major cross-linguistic differences come from the mappings between connectives and discourse relations, rather than the existence of similar discourse relations.

Another line of evidence indicating that similar discourse relations hold across languages comes from the multilingual annotation experiment conducted by Zufferey and Degand (2017). They used the PDTB framework to annotate discourse relations in five Indo-European languages (Dutch, English, French, German and Italian). They also found that the framework could be used in all of them with only minimal changes. For instance, they added a relation of parallelism

to the comparison section, but this is not only due to the existence of specific connectives in some languages, but rather to a relation that appears to be missing in English as well, as the meaning of connectives like *similarly* did not find a straightforward tag in the original PDTB scheme. In the same vein, Kolachina et al. (2012) also suggested the addition of a “similarity” tag in the comparison section in the revised version used to annotate Hindi. One of the most important results from Zufferey and Degand’s (2017) study on multilingual annotation is the observation that the meaning of some connectives requires several sense tags to be accounted for rather than new tags. For example, the French connective *tant que* simultaneously conveys a meaning of temporality and condition in all of its uses. Allowing the annotation of relations with double tags therefore represents a necessary adjustment for these connectives.

In another line of research, some studies have focused on one specific relation and observed the various ways in which it can be signaled across languages. This approach also relies on an onomasiological perspective, as it starts from the relation rather than from specific connectives. One study that has taken this perspective was conducted by Taboada and de los Ángeles Gómez-González (2012), who focused on the relation of concession in English and Spanish, a notion that they consider to be similar across languages. They annotated comparable corpora from the written and the spoken modes (see Section 7.3.1) in both languages using the RST framework (see Chapter 2). Yet, they did also include lexical constraints on their analysis, as they extracted for annotation all the relations that were signalled by a marker, a notion broadly defined to include connectives, paraphrases and alternative lexicalizations. This approach enabled them to find concessive relations automatically, but it excluded relations that were conveyed implicitly. Based on their annotations, they conclude that the relation of concession functions in a very similar manner in English and Spanish, as most of the differences they found were linked to the different genres compared in the study (see Section 7.3).

In another study, Cuenca, Postolea and Visconti (2019) compared the signaling of contrastive relations in Spanish, Catalan, Romanian and Italian. They used a corpus-informed rather than a corpus-based approach, in so far as their study focuses on published materials in all languages rather than make direct comparisons between them using comparable or parallel corpus data. They also include a historical component to their analysis, by comparing cognate connectives, in other words connectives historically coming from the same source, such as *al contrario* (Spanish), *al contrari* (Catalan), *al contrario* (Italian)

and *din contra* (Romanian). All of these connectives have their source in the word for ‘contrary’ in the different languages. The main conclusion from this analysis is that cognate connectives often diverge in modern Romance languages, such as the connectives *pero* (Spanish), *però* (Catalan) and *però* (Italian). In Italian, *però* is only occasionally used to mark nonexclusive contrast, contrary to Spanish and Catalan, because a concurrent form (*ma*) exists in this language but not in the other two. This study is interesting because it underlines the fact that cognate connectives often evolve in such a way as to make them more different from one another. However, as it does not include corpus-based comparisons made on parallel data, the actual translation equivalents between connectives cannot be inferred based on this research. For this, a more fine-grained comparison between pairs of connectives is necessary.

### 7.2.3 Discourse Connectives across Languages

While studies focusing on discourse relations have found that the same relations exist and are expressed by similar means across languages, studies focusing on specific connectives have almost always revealed important differences between them. One of the reasons for these differences is that connectives are often polyfunctional (see Chapter 3), and equivalents are often found for just one of their meanings. For instance, the French connective *en effet* can express either a relation of cause in the sentence-initial position, or a relation of confirmation (similar to the English *indeed*) in the clause-medial and clause-final position (Charolles & Fagard, 2012). While its confirmative uses have translation equivalents in other languages like German and English, its causal uses do not, as illustrated by the fact that these relations are mostly left implicit in translations (Zufferey, 2016). Similarly, a contrastive study comparing French *en effet* and Russian *v samon dele* (Iordanskaja & Mel’čuk, 1999) also found that the meaning of these two connectives is only partially related, as both have functions that are better translated by other connectives or paraphrases. To take another example, in Lithuanian, one of the two most frequent contrastive connectives in spoken language, the connective *o*, does not seem to have a translation equivalent in English (Šliogerienė, Valūnaitė Oleškevičienė & Asijavičiūtė, 2015).

Another reason why connectives often don’t have translation equivalents is that they all come with their own syntactic constraints, that are often not shared across languages. For instance, the English connective *also* can be used to convey additive relations in all syntactic positions, whereas the French additive connective *aussi* can only convey

this meaning in the clause-medial or final position, as in the clause-initial position it takes a meaning of consequence (Roze, Danlos & Muller, 2012). Finally, there are also differences in terms of register between connectives expressing a similar meaning. In French, the causal connective *car* is now mostly used in the written mode (Simon & Degand, 2007) and perceived as formal by French speakers (Zufferey, 2012), but its Dutch counterpart *want* does not have similar restrictions (Spooren et al., 2010). In the rest of this section, we present studies that illustrate these differences using corpus-based methods.

Gast (2019) compared three concessive connectives: the English *although*, the German *obwohl* and the Spanish *aunque* using comparable data from the Europarl corpus. The author annotated many different dimensions of connective usage, such as the type of concession involved, the structural properties of the concessive clause, and the level of linking (propositional, illocutionary or textual). His results demonstrate that each connective has its own specificities not shared by the other two. First, the German *obwohl* seems to be more restricted than the other two in the type of concessions that it marks, and it is not used in preposed concessive relations, contrary to *although*, which is often used in this syntactic position. The author explains the differences between *obwohl* and the other connectives by the fact that German uses a specific word order for subordinate clauses (verb final position) and that this syntactic pattern blocks further distributional extensions for this connective (see Chapter 4). This study is very informative because of the number of dimensions that are compared. However, it does not make use of the parallel data also provided by Europarl, so that comparisons between the annotated features and the translation equivalents cannot be made.

In the domain of causal relations, Pit (2007) provides a comparison between four causal connectives in Dutch (*doordat*, *omdat*, *want*, *aangezien*), three in French (*car*, *parce que*, *puisque*) and three in German (*weil*, *denn*, *da*) based on comparable corpora made of newspaper articles and narrative texts. The main comparison criterion in this study is the degree of subjectivity of the causal relation (see Chapters 3 and 6 for a discussion of the distinction between objective and subjective causality). She reports that in all three languages, there is a scale on the degree of subjectivity that each connective typically conveys. The Dutch connective *doordat* is the most strongly associated with objective contexts. Then come the connectives *omdat* in Dutch, *weil* in German and *parce que* in French, which are slightly less strongly objective, but more importantly have a similar (and rather low) degree of subjectivity on the scale. In contrast, the connectives *want* and *aangezien* in Dutch, *denn* in

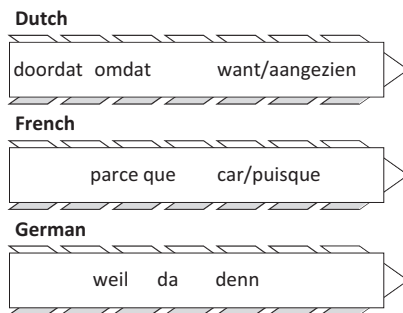


Figure 7.1 Scale of subjectivity across languages (adapted from Pit, 2007)

German and *car* and *puisque* in French have a high degree of subjectivity that is comparable across languages. Finally, the German connective *da* is situated between *weil* and *denn* on the subjectivity scale, and does not have counterparts in other languages, as illustrated in Figure 7.1.

In another corpus study involving the use of comparable and parallel corpora, Degand (2004) more specifically compared the Dutch connective *aangezien* to the French *puisque*, as both are often presented as a translation pair in bilingual dictionaries. Yet, Degand found that this is far from being the case, especially in the Dutch–French direction, as *aangezien* is translated by *puisque* in only 8 percent of the occurrences, against 48 percent of translations of *puisque* by *aangezien* in the French–Dutch direction. This study thus revealed that equivalences can be quite different in both translation directions. Degand attributes this discrepancy to the fact that *puisque* appears to be more strongly subjective than *aangezien*. For this reason, less strongly subjective connectives such as *étant donné que* are better translation equivalents for *aangezien*. In the other direction, as Dutch does not have an equally strongly subjective connective, *aangezien* is used to translate *puisque*, even though their meanings do not fully coincide. This study illustrates the advantage of combining corpus annotations in comparable data with translation data.

Using a similar method, Zufferey and Cartoni (2012) compared the meanings and translations of causal connectives in French (*car*, *parce que*, *puisque*) and English (*because*, *since*, *as*). They annotated 200 occurrences of each connective in original data from the Europarl corpus, using two dimensions. The first was whether the connective conveyed an objective or a subjective relation and the second was whether the cause segment introduced by the connective conveyed given or new



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information. The rationale for this second dimension comes from previous studies on French connectives, arguing that the main difference between the subjective connectives *car* and *puisque* is that *car* introduces new information whereas *puisque* introduces information that is already known or at least highly obvious for the hearer (Groupe lambda-1, 1975; Franken, 1996; Zufferey, 2014). In her analysis of French causal connectives, Pit (2007: 73) had already compared *car* and *puisque* in terms of givenness in corpus data, and found that this difference is borne out. However, she did not extend it to the other languages in her study, and her sample of occurrences was rather limited (50 for each connective).

In their analysis, Zufferey and Cartoni found that none of the causal connectives in English and French form an exact translation pair, and their different semantic profiles can be used to predict the chosen translation equivalents. For example, the English *because* is used to convey both objective and subjective relations. When it is used to convey an objective relation, its main translation equivalent in French is *parce que*, but when it conveys a subjective relation, its main translation equivalent is *car*. Another example is the connective *since*, mostly translated by *car* when it conveys new information, and by *puisque* and *étant donné que* when it conveys given information. Their results also confirm that *puisque* does not have an exact translation equivalent in English. As a result, this connective is used five times more in original French texts compared to translations.

Zufferey (to appear) made a similar comparison between French and Spanish causal connectives (*porque*, *ya que*, *puesto que*). Like English, Spanish causal connectives do not differ systematically in terms of their degree of subjectivity in monolingual corpus studies (Santana et al., 2018). In contrast, Zufferey found that these connectives differ in terms of their propensity to convey new or given information. Using the Europarl corpus, she found that *porque* is mainly used to convey new information, *ya que* also conveys a majority of new information but can also be used for given information in some contexts, and *puesto que* is used mostly for given information. Spanish and French causal connectives were also found to differ. The connective *porque* is used more often than *parce que* to convey subjective relations, and again the translation equivalent in French varies depending on this factor (*parce que* for objective relations and *car* for subjective ones). The Spanish *ya que* is more often used to convey given relations than the French *car*. In turn, *puisque* is more strongly subjective than *puesto que*.

In sum, all the contrastive studies presented in this section reveal important cross-linguistic differences between connectives, even

between closely related languages. The combination of comparable and parallel corpus data has in addition revealed that the semantic profile of connectives can be related to the chosen equivalent in translations.

### **7.3 VARIATIONS ACROSS GENRES**

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In addition to analyzing the way connectives vary across languages, studies have also investigated the impact of genre for variations in the use of connectives. In this section, we review studies that have compared the use of discourse relations and connectives across various spoken and written genres. We will see that the communication of various discourse relations is indeed sensitive to genre. These variations are more specifically linked to the different connectives used in all of them, as well as the registers they belong to. At the end of this section, we discuss the impact of genre for the processing and acquisition of discourse relations and connectives.

#### **7.3.1 Discourse Relations and Connectives across Spoken and Written Genres**

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In Chapter 2, we introduced different models used to annotate discourse relations, and we discussed their applicability to different languages in this chapter. While we concluded that these models can usually be applied to different languages with minimal changes, it is not clear that they would be equally successful for annotating discourse relations in all genres. In fact, several studies have questioned the fact that the models of discourse annotation, designed mostly for use in written language genres, can equally serve to annotate spoken data. For this reason, an alternative model, also encompassing tags accounting for typically spoken uses of connectives, has been suggested (Crible & Degand, 2019a). This model includes for instance the functions of quoting, topic resuming, disagreeing, etc. that are typical of spoken language interactions. In preliminary annotation experiments, it was found to be suitable to annotate connectives in written and spoken data, in both English and French (Crible & Zufferey, 2015). In addition to the existence of more interactive genres in the spoken mode, the justification for using a different kind of annotation framework for spoken data comes from the fact that in this mode, a limited number of connectives are used with a very high frequency, and with functions that they do not fulfill in written genres.

To make a case in point, in spoken data, the English connective *and* can take as many as eleven different functions, against only four in writing (Crible & Cuenca, 2017: 159). These functions include topic-shift, specification, contrast and temporality, to name but a few. The reason for this versatility is that *and* is an underspecified connective whose meaning can be enriched in context (Blakemore & Carston, 2005). In order to assess the role of genre for the use of underspecified connectives, Crible and Demberg (2020) analyzed the uses of *and* across three types of spoken data involving a different register: informal (face-to-face and phone conversations), semi-formal (interviews, classroom lessons) and formal (news broadcasts, political speeches). Their hypothesis was that some functions of *and* would be bound to specific registers. More specifically, they hypothesized that the use of *and* to mark contrastive relations (a non-canonical use of this connective that has a core meaning of addition) would only be found in informal registers, as more specific connectives would be chosen in more formal registers. In other words, in formal registers, they expected *and* to be closer to its core meaning of addition. Using a multi-genre corpus (Crible, 2018), they extracted all the uses of *and*, as well as two other underspecified connectives *so* and *but* in all genres. Their results indicate that *and* is indeed used more broadly in informal contexts. Similarly, *but* and *so* are also more used with their core meaning (contrast and consequence) in formal contexts. Thus, the relation between the use of underspecified connectives to signal a discourse relation and the different registers linked to various genres is confirmed in this corpus study.

These observations raise the question of determining whether the semantic profile of connectives established in corpus data from genres belonging to the written mode remain valid in spoken data. One study that addressed this issue was conducted by Simon and Degand (2007) who compared the semantic and prosodic profile of the French connectives *car* and *parce que*. The semantic comparison relied on the notion of subjectivity. They found an important difference between the two modes. While in writing, *parce que* appeared to be a predominantly objective connective and *car* was more subjective, in speech *parce que* was equally used for objective and subjective relations. This difference is due to the fact that in contemporary spoken French, *car* is very seldom used. In fact, they report that its frequency drops from 0.4 percent to 0.02 percent from the written to the spoken mode, while that of *parce que* increases from 0.32 percent to 3.7 percent. Degand and Fagard (2012) argue that this imbalance between the written and the spoken modes illustrates a situation of change in progress, in which one connective (*parce que*) is in the process of replacing another one

(*car*), and these changes always start in spoken communication before spreading to written genres.

In contrast, Spooren et al. (2010) found that the two causal connectives *omdat* and *want* in Dutch do not exhibit a similar difference between written and spoken genres, as *want* remains more subjective than *omdat* in spoken data. Sanders and Spooren (2015) also report that *want* remains more strongly associated to the communication of subjective relations than *omdat* across three different genres: written texts, conversations and chat interactions. Yet each connective has a mode of choice: *want* was the most frequent connective in spoken data whereas *omdat* was the most frequent one in written data. In that sense, mode also influences the use of Dutch causal connectives.

Similarly, Li, Sanders and Evers-Vermeul (2016) found that three causal connectives from Mandarin Chinese (*jiran*, *yinwei*, *youyu*) have a robust profile across three different written genres: news reports, novels and opinion pieces. In all genres, *jiran* expresses very subjective relations, whereas the connective *youyu* specializes in the communication of objective relations, and *yinwei* is situated between the other two connectives. In another study on Mandarin Chinese connectives indicating relations of consequence, Li, Evers-Vermeul and Sanders (2013) also found that the profile of several of them was robust across genres. There were two exceptions though: the connectives *suoyi* and *yinci* that resemble the English *so* and *therefore* were variable across genres. While these connectives were used more to convey subjective relations in news reports and opinion pieces, they conveyed more objective relations in novels. This indicates that genre interacts with the meaning of some but not all connectives. The authors argue that the differences between them may be related to the strength of their core meaning, as vaguer connectives may be more variable across genres, but this hypothesis still needs to be assessed in future research.

In a study on English, Andersson and Sunberg (2022) analyzed four connectives used to convey cause–result relations (*so*, *therefore*, *as a result*, *for this reason*) in various genres typically involving language with various register levels, from the spoken and the written modes. They found that contrary to Dutch or Mandarin Chinese, connectives are not systematically associated with a certain degree of subjectivity in English. The connective *so*, especially, is variable across domains, contrary to *therefore* that is always used to communicate epistemic (i.e., subjective) relations. In addition, *so* is the most likely connective to convey consequence relations in English, independently of the degree of subjectivity of the relation, which indicates again that subjectivity is not a strong factor to categorize English connectives. There were also clear register effects in

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the data, as some connectives like *therefore* were used more in contexts involving a high register, both in speech and in writing, whereas *so* was linked to the use of less formal registers. The connectives *as a result* and *for this reason* had a very low frequency in spoken language. It seems therefore that register is also an important factor to account for the use of connectives in some genres. We will see below that register is also an important factor for language processing and acquisition.

All the studies reviewed so far have underlined differences linked to genres pertaining to the spoken mode, as opposed to the written mode. Yet, other studies have also found differences between genres pertaining to the written mode. For example, Smith and Frawley (1983) compared the use of connectives in English across four written genres: fiction, journalism, religion and science. They noted different uses of discourse relations and connectives in all of them. For instance, they found a higher number of adversative relations in fiction compared to the other genres, especially science, that had very few such relations. Similarly, temporal relations were more prevalent in journalism compared to the other genres. Differences were also found at the level of individual connectives. For example, *yet* and *although* were used much more often in religious texts compared to *but*, a connective used more frequently in the other genres. Similarly, the causal connective *for* was used mostly in the religious genre and to a lesser extent in fictional texts. This difference can be linked to the high register associated to this connective in modern English. Liu (2008) also compared the use of connectives across five genres in the British National Corpus (BNC corpus), and found that the number of connectives used was quite variable across genres. Connectives were most frequent as a whole in academic texts, and least frequent in the news genre. The type of connectives used also varied across genres. For example, connectives indicating temporal simultaneity such as *meanwhile* and *in the meantime* were mostly found in the news genre.

In conclusion, all the studies reported in this section indicate that genre matters for connective usage, even though few of them have made comparisons between genres belonging to the same mode. We now look at the effects of these differences in the way discourse relations conveyed by connectives in different genres are processed and acquired in first and second language.

#### 7.3.2 The Impact of Genre for Language Processing and Acquisition

In Chapter 6 (see Section 6.6), we discussed the impact of cross-linguistic differences for discourse processing. We saw, for example, that the way

a discourse relation is encoded in a language can have an impact on processing with the example of *want* in Dutch, a connective that involved an immediate instruction of subjectivity causing readers to slow down (Canestrelli, Mak & Sanders, 2013). Another question is whether reading relations belonging to a given genre can also have an impact on discourse processing. Canestrelli, Mak and Sanders (2016) investigated this issue in an eye-tracking experiment in which readers had to read subjective relations with *want* appearing in short texts reproducing the features of two different genres: news items and letters to the editor. The authors hypothesized that letters to the editor would involve a more subjective style overall compared to news items. As a result, they predicted that reading these texts would take more time, as previous research has shown that inferring subjectivity is a costly process (see Chapter 6). However, they also thought that encountering *want* in highly subjective contexts would involve a smaller delay or even no delay at all compared to objective contexts, as readers would already be oriented towards the subjective domain. The first hypothesis was borne out, as reading subjective texts indeed took longer, but the connective *want* involved the same processing delay across both genres. In that sense, genre did not have an impact on processing, or at least did not prevent the processing cost associated with subjective connectives.

In another experiment in French, Zufferey et al. (2018) compared the processing of objective and subjective causal relations conveyed by *car* and *parce que*. Recall that in French, the connective *car* is seldom used in the spoken mode, and is associated with a formal register by French speakers. The authors hypothesized that because *car* is not used anymore in speech, French readers may not have strong intuitions about its meaning, and therefore not use it as a clue to infer subjectivity. They found that French readers slow down when they encounter *car*, but they do so independently of the type of relation it conveys (objective or subjective). The authors conclude the presence of a register effect: having to process a less familiar connective belonging to a formal register induces a delay compared to connectives frequently used in both written and spoken genres like *parce que*.

The role of genre, and more specifically the formal registers associated to some written genres, found further confirmation in a study by Wetzels, Zufferey and Gygas (2022), who compared reading times between correct and incorrect causal and concessive relations. More specifically, they compared the processing disruptions created by inappropriate connectives with different profiles in terms of semantics and register: in a first experiment they used connectives frequently used in spoken language (*mais* and *alors*), in a second experiment they used monofunctional connectives mostly used in the written mode

(néanmoins and ainsi) and in a third experiment they used polyfunctional connectives bound to the written mode that can be used to convey different relations depending on context (*or* and *aussi*). They found that even if native speakers' ability to detect inappropriate uses of connectives was robust across all experiments, their sensitivity decreased with connectives from the written mode. These experiments therefore provide further confirmation for the role of register on speakers' use of connectives during discourse processing.

The greater complexity of connectives bound to written genres was also found in studies targeting first language acquisition during teenage years. For example, Nippold, Schwarz and Undlin (1992) tested the comprehension of connectives from the written mode by teenagers and young adults, and found that connectives from the written mode are not fully acquired in this age group (see Chapter 8). Similarly, Tskhovrebova, Zufferey and Gygas (2022) tested the ability of French-speaking teenagers to understand four connectives from the written mode, and found that teenagers still perform poorer than adults even during high school. These difficulties are not generalized, however, as teenagers have a better performance (but not at the level of adults) when the task is made simple enough and the connectives are monofunctional (Tskhovrebova, Zufferey & Tribushinina, 2022). We discuss this issue in more detail in Chapter 8.

In the context of second language learning, connectives belonging to written genres are also an area of difficulty for learners. However, the factor of genre is not always the most relevant one to explain the problems encountered by this population. Register seems to matter as well, as learners master better connectives belonging to an informal than a formal register (Wetzel, Zufferey & Gygas, 2020). We will come back to this issue in Chapter 9.

#### **7.4 STUDIES COMBINING VARIATIONS ACROSS LANGUAGES AND GENRES**

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One of the main limitations of current contrastive studies is that in many of them, languages are treated as uniform entities, and variations between genres and registers are not considered. Yet, linguists performing contrastive analyses are increasingly recognizing the need to extend cross-linguistic studies in order to account for genre variations (e.g., Johansson, 2007). In several areas of cross-linguistic research, the inclusion of genre variations has led to fruitful results. For instance, Granger (2014) found that genres have an impact on the use of lexical bundles in French and English. In the domain of

connectives, studies including both cross-linguistic and cross-genre comparisons are still few and far between. We review them in this section.

First, the study mentioned above on concessive connectives in English and Spanish (Taboada & de los Ángeles Gómez González, 2012) also compared the use of connectives across a spoken corpus (telephone conversations) and a written corpus (online book and movie reviews) in the two languages. The authors found that language users make a different use of concessions in the two modes. In speech, concessions serve most of all to correct misunderstandings, and in the written mode they serve to qualify the writer's own opinions. In line with Crible and Cuenca (2017), they also report that concessions are conveyed with a lesser variety of connectives in spoken language, as *but* and *pero* are predominantly used whereas in writing the array of markers is much broader. Overall, they report that differences between genres are more numerous and prevalent than differences between languages. In her study on the use of discourse markers (see Chapter 3) across eight genres in English and French, Crible (2018) also found that genres matter more than language for the variations observed.

Kunz and Lapshinova-Koltunski (2015) analyzed the use of connectives and other cohesion markers (see Chapter 1) in a corpus of English and German containing ten different registers in each language, eight from the written mode and two from the spoken mode. At a general level, they found differences between the two languages in their use of cohesion markers. Regarding the use of connectives more specifically, they report that German uses more explicit connectives than English, thus confirming other observations about the low level of connectivity in English (Vinay & Darbelnet, 1995). They also report that German shows more variation overall in the use of cohesive devices across registers, but it is difficult to infer more specific differences about specific discourse relations from their data analyses.

Finally, Dupont and Zufferey (2017) investigated the use of four concessive connectives in English (*however*, *nevertheless*, *nonetheless*, *yet*) and four French concessive connectives (*toutefois*, *néanmoins*, *cependant*, *pourtant*) in three parallel corpora: the Europarl corpus of parliamentary debates, a selection of texts from the newspaper section of the PLECI corpus,<sup>2</sup> and the TED Talks corpus<sup>3</sup> (Cettolo Girardi & Federico,

<sup>2</sup> <https://uclouvain.be/en/research-institutes/ilc/cecl/pleci.html>.

<sup>3</sup> <https://yohasebe.com/tcse/>.



2012). In their analysis, they considered three dimensions of variation: the translation direction, the genre, and the level of expertise of translators. They report that all three dimensions matter for the observed translations of concessive connectives. First, the type of translation equivalent was often divergent between the two translation directions. But importantly, these differences were dependent on genre. For example, the English connective *nevertheless* is translated by *néanmoins* in 68 percent of the occurrences in the TED corpus, against only 39 percent in Europarl. More generally, some genres like parliamentary debates seem to encourage more specific translations, whereas the news genre has more generic translations with connectives like *but* and *mais*, and also more cases of implicit translations. Conversely, the frequency of each connective differs across genres, and these differences are more pronounced in English.

It is clear from the studies reported in this section that cross-linguistic studies of connectives should in the future strive to include more genre diversity, as both variables seem to have an impact on the use of discourse relations and connectives. The corpus studies reported in this section illustrate the complex intricacies between these two factors.

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## 7.5 CONNECTIVES IN TRANSLATIONS

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Discourse connectives are well known to be volatile in translations, as translators often add and remove them, or translate them by other lexical or syntactic means (Halverson, 2004; Denturck, 2012). These changes reflect the fact that connectives often don't have exact translation equivalents, as we discussed above. While being problematic for translators, connectives represent a valuable area of study for scholars interested in translation theory. Indeed, it has been suggested that translations represent a specific textual genre, distinct from texts originally produced in a language. The specificities of translations have been linked to the existence of universals of translation (Mauranen & Kujamäki, 2004), in other words, specificities emerging from the translation process itself. These universals include among other things a tendency for translated texts to be lexically and structurally simpler than original texts, to under-represent items that are specific to the target language, and to be more explicit than original texts due to a greater use of cohesion markers (e.g., Laviosa, 2009).

Connectives therefore represent a very interesting case study to assess the existence of a translation universal of explicitation. This

hypothesis has been tested in a number of studies, but many of them could not lead to strong conclusions because they were limited to one single language pair, and the analyses they provided were qualitative rather than quantitative. Taking advantage of the big multilingual corpus Europarl, Zufferey and Cartoni (2014) assessed the existence of a universal tendency for explicitation by comparing the use of causal connectives in French and English texts translated from four different source languages (Italian, German, Spanish, French/English). They counted the number of times four French causal connectives (*parce que*, *car*, *puisque*, *étant donné que*) and three English connectives (*because*, *since*, *given that*) were added in translations. They considered that explicitation had taken place when the relation was fully implicit in the source language, in other words, the segments were linked only by a comma or a full stop, and a causal connective was present in the translation. Their results indicate that explicitation does indeed seem to be a universal tendency in translations, in that the proportion of added connectives was similar for all source languages, in both target languages. However, they found significant differences between connectives. Connectives like *parce que* and *because* were almost never used for explicitation, whereas connectives like *puisque* and *given that* were very frequently used for explicitations. They relate this difference to the different semantic profile of connectives, as the connectives used for explicitation were highly subjective and marked a relation as given (see Section 7.2). It seems therefore that translators feel the need to mark subjectivity, and to signal givenness to their audience. In sum, the existence of explicitation as a universal of translation was reinforced based on this study, but one of its weaknesses is that it is limited to closely related languages. In another study on English and Chinese, Xiao and Dai (2014) also found evidence of explicitation phenomena, thus strengthening the hypothesis further.

In addition to explicitations, looking at the cases when connectives are removed in translations, in other words implicitations, is also very interesting from the point of view of discourse. We argued in Chapter 6 that there is an important cognitive difference between continuous relations that can easily be reconstructed by inference, like causal and additive relations, and discontinuous relations that need to be marked explicitly like concessive relations. If this difference does indeed represent a cognitive constraint, it should have an impact cross-linguistically, and prevent translators from removing connectives from discontinuous relations that are not signaled by alternative means. Hoek et al. (2017) investigated cases where connectives encoding several types of coherence relations were removed in translated

texts, and found that implicitation is linked to the degree of cognitive complexity of the relation, as defined in the Cognitive approach to Coherence Relation (CCR) framework (see Chapter 2). Cognitively complex relations like concessions are indeed left implicit less often than simpler relations like causal relations. Zufferey (2016) looked at implicit translations conveyed by three polyfunctional French connectives (*or, en effet, dans la mesure où*) that can each convey a continuous or a discontinuous relation. Results indicate that for all connectives and in the three target languages (German, English, Spanish), connectives were significantly more frequently left implicit in translations when they conveyed a continuous relation than a discontinuous one, thus providing further confirmation for the validity of the cognitive constraint of continuity.

In a parallel corpus study of Lithuanian and English connectives based on the TED talk corpus, Valūnaitė Oleškevičienė et al. (2022) confirmed the results presented so far: most of the explicit discourse relations in English were translated explicitly in Lithuanian (about 80 percent of the occurrences) and the remaining 20 percent corresponded to a large extent to uses of *and* in English source texts, hence a continuous additive relation. Analyzing academic papers published in Catalan and translated into English, Cuenca (2022) also found a role of the type of discourse relation, but also of syntactic factors and other specific criteria related to the language pair in question.

In sum, connective usage varies in translations, but these variations are not random: explication occurs mostly for continuous relations that were often left implicit in source texts such as causal ones, and conversely these relations are also the ones often left implicit in translated data. In contrast, leaving discontinuous relations implicit creates difficulties that are recurrent across languages and that limit translators' choices.

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## 7.6 SUMMARY

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This chapter presented variations in connective usage across languages, and across different genres and registers within the same language. One of the main conclusions from cross-linguistic studies is that similar discourse relations exist across languages, as a way to create coherence within text and discourse. The encoding of these relations in specific connectives is, in striking contrast, almost always language specific. Connectives do indeed differ between languages in the number and type of meanings they convey, their syntactic restrictions,

and the genres and registers in which they are typically used. These differences have been repeatedly observed, even between closely related languages such as French and Spanish, or German and Dutch. In the second part of the chapter, we observed that variations are also wide ranging between genres, especially between those belonging to the written and to the spoken modes, but also within one mode. These differences have an impact of language processing, as even native speakers have less clear-cut intuitions about connectives bound to the written mode, and these connectives are also acquired later by teenagers. Cross-linguistic differences observed in parallel directional corpora can also be used to study connectives in translated texts. These observations are crucial to test different theories in translation and discourse studies, such as the existence of a translation universal of explication, and the role of continuity for the implicit communication of discourse relations.

### **DISCUSSION POINTS**

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- In what respects do connectives differ between languages?
- Why are connectives difficult to translate?
- Why do you think that so many connectives are polyfunctional, and why are all these meanings almost never fully convergent between languages? (Hint: look back at the discussion on the evolution of connectives in diachrony in Chapter 5.)

### **FURTHER READING**

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Johansson (2007) is a must read to get acquainted with the use of multilingual corpora. A cross-linguistic study of connectives and other discourse markers in eight different genres can be found in the study by Crible (2018). Good examples of the use of parallel corpora to study specific connectives across languages and genres are Dupont and Zufferey (2017), and Degand (2004). The notion of genre and its application to discourse is discussed in detail in the book edited by Stukker, Spooren and Steen (2016). The notion of translation universals is presented in Mauranen and Kujamäki (2004) and discussed more succinctly by Laviosa (2009).

## 8 Acquiring Connectives in a First Language

### 8.1 INTRODUCTION

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In this chapter, we first introduce the questions of when and how children start using connectives and discourse relations during their first years of life, and discuss the reasons as to why these early productions do not reflect a fully mature usage. We will see more specifically that mastering the form–function mappings involved in the understanding of many connectives is a complex task for young children. In addition, we will present research investigating school-age children’s comprehension of connectives and show that it is only around the end of their primary school years that they fully understand frequent connectives like *because*, *but*, *before* and *after* in English. We will explore the causes of these difficulties and discuss the differences between various connectives and discourse relations, emphasizing the importance of children’s cognitive and linguistic competences, as well as the input that they receive, as factors helping them to develop an adult-like mastery of connectives. We will then move on to other studies analyzing the way older children understand connectives, and see that their acquisition is not fully in place after primary school years, as teenagers keep developing their competence with connectives, especially those bound to the written mode such as *nevertheless* and *therefore*. We will argue that the difficulties encountered by teenagers stem from different causes than those limiting younger children’s comprehension. Finally, we will briefly discuss the acquisition of connectives and discourse relations by children suffering from linguistic or cognitive impairments such as Specific Language Impairment (SLI) and autism, and argue that their developmental patterns do not match those of typically developing children with a delay, but rather show evidence of specific difficulties. We will conclude that analyzing these difficulties provides important insights for understanding the complex array of linguistic, cognitive and social skills involved in the mastery of connectives.

## 8.2 EARLY SPONTANEOUS PRODUCTIONS

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By the age of three and often even earlier, children are able to produce several consecutive utterances. These early productions are not randomly put together. In fact, most of the time, they convey various types of identifiable discourse relations. As an illustration, consider these productions from Sarah and Adam,<sup>1</sup> two children recorded in the CHILDES English Brown<sup>2</sup> corpus (Brown, 1973).

- (1) He not little. He big.  
(Sarah, 3;0.18)
- (2) I going take it outside. That's fun.  
(Adam, 3;0.25)
- (3) You find them. I can't find them.  
(Sarah, 3;2.10)
- (4) I can't. I a boy. You a girl.  
(Adam, 3;2.21)

As these examples illustrate, young children already produce a wide array of different discourse relations, such as corrections in (1), elaborations in (2), causality in (3) and (4) between the first two sentences, and contrast in (4) between the last two sentences. It is also noticeable that in all these examples, the relations are conveyed without using a connective. This pattern is quite typical of what has been observed in the literature, as children often start by producing mostly implicit relations before using connectives (e.g., Evers-Vermeul & Sanders, 2009). Yet, by the age of three, most children already produce some frequent connectives such as *and*, *but*, *because* and *when* in English, as illustrated in (5) to (9), also from the Brown corpus.

- (5) But you find them. You could find them.  
(Sarah 3;0.27)
- (6) Because I always step on the flowers.  
(Sarah 3;0.27)
- (7) I can't get them out because my hand is too big.  
(Adam 3;3.18)

<sup>1</sup> In language acquisition research, children's age is indicated in the following format: years;months.days.

<sup>2</sup> <https://chilDES.talkbank.org/access/Eng-NA/Brown.html>.

## 8.2 Early Spontaneous Productions

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- (8) I swallow water when I drink and I cough and cough.  
(Adam 3;5.01)
- (9) Mommy, we haven't got there but we landing.  
(Adam 3;9.16)

These early productions raise two important questions. First, in what order do connectives typically emerge in children's productions? And second, if there is a fixed order, what factors account for it? These questions were first addressed using corpus data by Bloom et al. (1980) who reported that children in their sample always followed the same acquisition sequence in their productions of discourse relations. First, they produced additive relations, followed by temporal ones, then causal ones and finally adversative ones (i.e., concession and contrast). They explained this order of acquisition by the fact that relations seem to build on one another. For example, a temporal relation includes an additive relation plus something else (temporal order). Similarly, a causal relation involves an additive and a temporal component plus something else (an implication relation). It is therefore logical that relations that include more components of meaning should be acquired later than those that include fewer ones.

However, in their study, while the observed order of acquisition for the different relations was consistent for all the children, the order of acquisition for connectives was more variable. The only consistent finding was that *and* always appeared first in children's speech. But the other connectives from their study, namely *and then*, *so*, *because* and *but* appeared in a variety of developmental patterns. Bloom and colleagues concluded that while children's conceptual development could explain the order in which they acquired the various discourse relations, the linguistic forms used to convey them was not similarly influenced.

Yet, Evers-Vermeul and Sanders (2009) have shown that this somehow inconsistent finding can be explained by resorting to a different view of conceptual development. They analyzed the early productions of Dutch connectives in relation to their degree of cognitive complexity, using the Cognitive approach to Coherence Relation (CCR) model put forward by Sanders, Spooren and Noordman (1992; see Chapter 2). Following this model, connectives encoding more cognitively complex relations require more advanced conceptual knowledge than easier ones, and should therefore appear later in children's speech. Recall that in the CCR model, all relations can be decomposed into a set of four primitives. For each primitive, a relation can take one of two different values, or be unspecified (cf. Chapter 2). From a cognitive perspective, one of the alternatives is always deemed to be

more complex than the other. For example, the dimension of basic operation separates relations with an additive component from those with a causal component. Additive relations are weaker in that they only involve logical conjunction, while causal relations additionally require that an implication relation is inferred between the segments. Thus, relations with a causal value are cognitively more complex than relations with an additive value. The same reasoning applies to the other dimensions as well. It is therefore possible to compute a score of cognitive complexity for each connective by adding their level of complexity in each dimension. For example, connectives conveying an addition are the easiest, as they are not causal and do not involve a fixed order of the segments. As in Evers-Vermeul and Sanders (2009), we do not consider for the time being the dimension of source of coherence (but see Section 8.3).

It follows from this classification that while some connectives typically encode relations that are easier than others, there are also connectives that have the same degree of cognitive complexity while being different, because the source of complexity is different in each case. For example, additive temporal positive connectives have one source of complexity (the temporal order of the segments) and positive causal nontemporal connectives have another one (the implication relation involved in causality). It is therefore predicted that children should acquire both types of connectives at around the same time. When connectives differ in terms of cognitive complexity, the prediction is that they should be acquired in sequence. For example, the first causal connective is predicted to occur after the first additive one. Similarly, the first negative connective is expected to occur after the first positive one. Following the same logic, the first negative causal connective is expected to occur after both the first positive causal and the first negative additive connectives, which are in turn expected to occur simultaneously. Evers-Vermeul and Sanders (2009) have assessed these hypotheses by tracking the first occurrences of common Dutch connectives in the language of children aged 1;5 to 5;6 in corpus data. They considered that a connective was acquired as soon as children had produced it once, as long as it was used to conjoin two clauses (as in examples 7–9 above but not in 5 and 6) and in a creative way (not as an immediate imitation of adult speech). Their results indicate that for eleven out of the twelve studied children, the predictions based on the CCR model were borne out, thus providing solid evidence in favor of the role of cognitive complexity for the early acquisition of connectives.

Yet, in addition to their semantic components, connectives are typically used in various types of syntactic structures, such as coordinating



## 8.2 Early Spontaneous Productions

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and subordinating clauses, and some of them are more complex than others (Diessel, 2004). Evers-Vermeul and Sanders (2009) have also assessed the role of syntactic complexity by comparing the acquisition of connectives used as coordinating and as subordinating conjunctions. They found that this factor does play a role, as, for example, children always produced a causal relation with a subordinating conjunction (*omdat*) after they produced it with a coordinating conjunction (*want*). Yet, they found that this factor is only secondary to that of cognitive complexity, as it does not determine the whole pattern of acquisition across various connectives. In other words, a cognitively complex connective used in a simple syntactic structure does not appear earlier than a cognitively simpler connective.

In addition to conceptual and syntactic development, the order of acquisition for connectives could also be influenced by the frequency with which they are used in children's input. Indeed, in usage-based models of language acquisition (e.g., Tomasello, 2003; Kidd, Lieven & Tomasello, 2006), the input that children receive from their environment is thought to be of primary importance to explain the order of acquisition between various elements. Van Veen et al. (2009) measured the role of two types of input (local and global), as well as that of conceptual development, to explain the order of acquisition between various German connectives in the language of one child aged 1;11 to 2;11 in a dense longitudinal corpus. The factor of local input measured the influence of connectives heard by the child in the same recording as their own productions of this connective. The factor of global input estimated the influence of the cumulated number of occurrences heard by a child at a given age on their own productions. Finally, conceptual development was operationalized simply by recording the age of the child in each sample, given that children's conceptual competence matures as they grow older. All three factors were then included in a growth curve analysis.

Results indicated that all three factors play a role for the acquisition of connectives. The child's use of a connective significantly increased with age, indicating an effect of conceptual development. Parental input also mattered greatly, both in the short and in the long term. In the short term, parental use of a connective in a given sample significantly influenced the child's propensity to also use it in the same sample. In the long term, the effect of parental usage was also apparent. The more parents had used a connective in previous samples, the more it was used by the child in a given sample. Parental input additionally seems to have a variable effect over time. In a first acquisition phase, it does not seem to have any influence, as children do not

immediately react to it. In a second phase, it has a major influence on children's productions, before having little influence again in a third phase. This last phase may reveal that the connective has been acquired and is used autonomously by the child.

The fact that parental input does not have an influence in the first phase may reflect the fact that parents adapt their speech to the perceived level of competence of their children. In other words, they may use more complex language with older children when they feel that they will be understood. This phenomenon of parental adaptation is known as "audience design" (Clark & Murphy, 1983). Van Veen and colleagues looked for traces of audience design in their data but did not find any evidence of it. To put it differently, parents made a similar use of connectives throughout the corpus. However, parental adaptations were found in another growth curve analysis conducted by van Veen et al. (2013), in which they analyzed the speech of five German-speaking and five English-speaking children aged 0;10 to 4;3. In this study, children produced a lot of causal connectives (*weil* and *because*) in response to parents' elicitations in the form of *why/warum* questions. In return, children also received a lot of input on the use of these causal connectives in response to their own productions of *why/warum* questions. This result shows that children not only reacted to parents' linguistic input, but also played an active role in influencing the type of input they received.

In sum, the studies presented in this section provide evidence that children start using connectives to convey all sorts of discourse relations early in their development. The order of acquisition between them is dependent on several factors such as the degree of cognitive and syntactic complexity involved, as well as the frequency with which connectives are used in the input that children hear. Of course, these studies are limited in that they included only a handful of children, growing-up in three closely related languages (English, Dutch and German). As is the case with language acquisition research in general, further studies are still needed to determine if the acquisition pattern observed in these Germanic languages is also found for children exposed to languages from other families, and who grow up in contexts in which adults use different socialization routines.

### **8.3 ACQUIRING COMPLEX FORM-FUNCTION MAPPINGS BETWEEN RELATIONS AND CONNECTIVES**

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In the previous section, we reviewed the order of acquisition between connectives by taking a quantitative perspective and looking at the

### 8.3 Acquiring Complex Form–Function Mappings

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number of connectives that children produce at a given age. This approach is very useful to determine when children start producing various connectives conveying different types of discourse relations, but it is also limited in several ways. First, it does not prove that children produce these connectives correctly in the same broad variety of contexts as adults. Second, connectives are very often polyfunctional, and can be used to express different discourse relations or various nuances of meaning within the same relation (see Chapter 3). In this section, we will take a qualitative perspective to analyze the way children progressively learn to use the same connective to express a variety of different meanings depending on context.

For this, we will first look at a specific case study: the acquisition of the capacity to express various types of causal relations (see Chapters 2 and 3). We will investigate more specifically the distinction between the three causal domains identified by Sweetser as the content domain (10), the speech act domain (11) and the epistemic domain (12). All examples were produced by Ross, a child recorded in the MacWhinney corpus (1991), also on the CHILDES database.<sup>3</sup>

- (10) I did it because you got mad. (2;10.17)
- (11) Don't carry Marky because Marky might get snow on Marky's socks. (2;10.1)
- (12) But it isn't dark now because I have to get up. (3;2.13)

Recall that causal relations in the content domain link events or states happening in the real physical world. For example, in (10), the reason why Ross did something in the real world is that someone else got mad, again in the real world. By contrast, in (11), the fact that Marky might get snow on his boots causes Ross to produce a directive speech act in the form of an imperative. And finally, in (12), the fact that Ross has to get up leads him to conclude that it is probably not dark, but it does not cause the absence of darkness in the real world.

Several studies aimed to determine the order of acquisition between these various types of causal relations. First, Kyratzis, Guo and Ervin-Tripp (1990) analyzed the productions of the connectives *because* and *so* by 21 English-speaking children from the age of 2;4 to 12;0 in the

<sup>3</sup> <https://chilides.talkbank.org/access/Eng-NA/MacWhinney.html>.

Ervin-Tripp family corpus. Their findings indicate that children first start producing causal relations in the speech act domain, followed by the content domain. The epistemic domain comes last and remains infrequent throughout the corpus. The explanation provided by the authors reflects a socio-pragmatic account of language acquisition: children first learn to use connectives to produce speech acts enabling them to perform actions and interact with others, before moving on to less interactive functions later on in their development. Evers-Vermeul and Sanders (2011) pointed out, however, that several methodological choices could have influenced the outcome of these observations. First, by limiting themselves to a corpus containing social interactions within the family, the authors could not observe the way children use connectives in other contexts. Second, when coding children's productions of causal connectives, Kyratzis and colleagues have excluded all occurrences in which children only produced part of the causal relation themselves, as in Sarah's production in (6) above. This limitation has likely affected the number of content relations observed, as many of them are at first produced in answers to *why*-questions (Braunwald, 1997; Diessel, 2004).

To avoid these problems, Spooren and Sanders (2008) have analyzed the order of acquisition between various types of causal relations in Dutch, using an experimental approach. In two elicitation tasks, they asked children aged 6–7 and 11–12 to either describe pictures (to elicit content relations) or to formulate their opinions on various topics (to elicit speech-act and epistemic relations). They monitored not only the use of connectives but the production of implicit causal relations as well. Their results indicate that the younger children produced more content relations overall compared to the older children. There was also a significant influence of context on children's productions, as children from both groups produced more speech-act and epistemic relations in the conversation task, while in the description task they produced more content relations. Spooren and Sanders concluded that children likely acquire content relations first, based on evidence that younger children used them more often. However, they only had indirect evidence of this phenomenon, as children from both age groups produced all kinds of relations.

Evers-Vermeul and Sanders (2011) also investigated this question, combining corpus and experimental data. First, they used two elicitation tasks similar to that of Spooren and Sanders (2008) but including younger children. The first task compared children aged 4 and 6 on tasks aimed at eliciting speech-act and epistemic relations. The second task compared children aged 3 and 4 on tasks aimed at eliciting all

### 8.3 Acquiring Complex Form–Function Mappings

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three relation types. Even though children aged 3 produced fewer epistemic relations, the authors found that overall, from the age of 3, children were able to produce all types of causal relations. To determine the order of acquisition between domains, they resorted to data from younger children recorded in corpora. They analyzed the speech of 12 Dutch children recorded from the age of 2 to 3;6, and searched for their uses of four Dutch causal connectives: *want*, *omdat*, *dus* and *daarom*. These connectives vary in the order of the segments they involve (*want* and *omdat* involve a backward order and *dus* and *daarom* a forward one), and belong to a different grammatical category (coordinator, subordinator or adverb), but also on the type of domain in which they are typically used by adults (*omdat* and *daarom* are mostly used in the content domain while *want* and *dus* are used in the epistemic domain). Results from this corpus analysis indicated that children do not all produce content and speech act relations in the same order, but epistemic relations were always acquired later. In addition, at the age of 3;0, children already preferred to use *dus* in epistemic relations and *daarom* in content ones, thus showing a sensitivity to the mapping of each relation type with a specific connective. They did not show a similar preference, however, for the backward connectives *omdat* and *want*. A similar sequence of acquisition was found by Zufferey (2010) who studied the acquisition of the French causal connective *parce que*. She found that children start producing this connective to convey content and speech act relations shortly after 2;6, but start producing epistemic relations only by the age of 3;0. According to both studies, the observed acquisition sequence can be explained in terms of cognitive complexity, as epistemic relations require the ability to reason and draw conclusions on the basis of subjective claims.

The studies summarized so far investigated natural or elicited productions. Other studies have analyzed young children's intuitive comprehension of causal relations. In an eye-tracking study in which children aged 2;0 and 3;4 had to look at images that were causally linked to auditory stimuli either in the content or in the epistemic domain, van Veen (2011) found that the two age groups did not differ in their ability to create causal links in the content domains, but that three-year-old children were better at creating links in the epistemic domain. This comprehension study thus complements corpus data and elicited observations, and confirms that epistemic relations involve a greater degree of cognitive complexity compared to content relations. Another comprehension experiment involving older children aged 5–8 was conducted in French and Dutch by Zufferey, Mak and Sanders

(2015). It involved an offline comprehension task in which children had to answer a series of *why*-questions following short stories. They found that epistemic relations were acquired later than content relations, as children did not score at ceiling for these relations even at the age of 8 in the more complex task involved in their experiment, contrary to content relations. In addition, no difference was found between the two languages, even though Dutch typically uses different connectives to express each type of backward causal relation (*omdat* and *want*) while there is only one backward causal connective used in spoken French (*parce que*, see Chapter 7). The authors concluded that children's cognitive development sets the pace of the acquisition of causal relations, independently of the way these relations are encoded in the input language, whether with one ambiguous connective or with two different ones.

Another interesting case study to analyze the way children progressively master various uses of the same connective comes from their productions of connectives like *but* in English. Indeed, in many languages, *but* and its translation equivalents can have several different meanings, like expressing a concession (13), a semantic contrast (14), a contrast at a pragmatic level (15, see Chapter 3), and finally a discourse marker used for topic management (16). All examples are again from Ross, the child recorded in the MacWhinney corpus (1991).

(13) I'm not cold but sometimes my feet get cold on here.  
(2;11.14)

(14) In other words, you can salt your peas but don't do mine.  
(2;8.5)

(15) That shirt's [= Spiderman shirt] not for girls but I like it.  
(2;7.18)

(16) Father: Will you go?  
Child: But why can't mummy come with us?  
(3;5.12)

Gülzow et al. (2018) have investigated the order in which two English-speaking and two German-speaking children started producing the various uses of *but* in English and respectively *aber* in German. Their results showed a relation between the type of use (monologic and dialogic) and the functions of *but* that are prevalent in children's speech. While concessions and semantic contrasts are mostly found in monologic contexts, pragmatic contrasts (what the authors call

#### 8.4 Comprehension of Connectives during Primary School Years

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“illocution”) and topic management are mostly found in dialogic contexts. Their results are in line with those of Peterson (1986) who also found that children mostly used semantic contrasts and concessions when narrating a story. The study by Gülzow et al. (2018) thus underlines the fact that the speech context (monologic or dialogic) greatly influences the uses that are observed in children’s speech, even for the same connective. In their study of causal domains, Evers-Vermeul and Sanders (2011) also found that excluding dialogic contexts, in which children used a causal connective in response to a *why*-question, strongly biased the observed order of acquisition. This factor should therefore be taken into account when analyzing the order of acquisition for various functions of a connective, as children usually start producing more dialogic uses of connectives at the beginning of the acquisition process (Diessel, 2004).

In sum, while children start using frequent connectives early, there is still an observable sequence of acquisition between the various functions of each connective, which can be explained based on their degree of cognitive complexity. Moreover, young children already use connectives differently according to each speaking situation. Acquisition studies should therefore strive to include as many different contexts as possible when evaluating the early productions of connectives in children’s speech.

#### **8.4 THE COMPREHENSION OF CONNECTIVES DURING PRIMARY SCHOOL YEARS**

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So far, we have discussed the early acquisition of connectives in spontaneous productions and in elicitation tasks. However, the fact that children can produce some connectives appropriately does not mean that they understand all the functions of these connectives when they appear in written sentences. In fact, experimental research with primary school children reveals a wide gap between these earlier productions and children’s understanding of the same connectives when they appear in writing (e.g., Irwin & Pulver, 1984). In this section, we will discuss studies that have assessed the way primary school children understand connectives that are frequent in spoken language when they are used in written sentences or texts.

One of the first studies that has systematically compared children’s comprehension of connectives across online and offline tasks was conducted by Cain and Nash (2011) who analyzed 8- and 10-year-olds’

comprehension of frequent connectives used to convey causal, temporal and concessive relations. In the first offline task, children had to insert the correct connective to fill in the blanks between two sentences. Connectives were chosen amongst the most frequent ones in spoken English, namely: *after*, *although*, *because*, *before*, *but* and *so*. For each sentence, children were given a choice between the appropriate connective, an inappropriate connective and the underspecified connective *and*. The results from this offline task revealed a difference between relations. While the 8-year-olds and the 10-year-olds did not differ for causal relations, 10-year-olds reached higher scores for temporal and adversative relations. In addition, even though the children's number of correct answers was high, they did not perform on par with adults for any of the relations. Children also had a higher tendency than adults to resort to the underspecified connective *and*, suggesting that they have a lesser knowledge of the meanings of the more specific connectives. In a second offline task, children had to evaluate the coherence of sentences linked by appropriate or inappropriate connectives. In this task, children gave higher ratings to coherent than incoherent sentences, indicating some sensitivity to their meaning. However, adults rated coherent sentences higher than both groups of children, and 10-year-olds gave higher ratings than 8-year-olds. At the age of 10, children only differed from adults on their rating of temporal relations, whereas at the age of 8, children gave lower ratings for all relations. Taken together, these offline tasks – which reflect the level of children's comprehension after they have processed sentences with connectives – seem to indicate that children are not yet adult-like in the comprehension of connectives.

In order to complement these results, Cain and Nash (2011) ran two self-paced reading experiments assessing online comprehension, as it occurs while children read sentences. In these experiments, 8- and 10-year-old children read short texts with sentence pairs linked by connectives: either appropriate, inappropriate or underspecified ones (*and*). Then, they indicated if the sentences made sense after reading them. Results from these judgments confirmed that children were more likely to accept coherent than incoherent sentences, and that 10-year-olds had more correct judgments than 8-year-olds for all relation types. Results from the reading times indicated that children from both age groups read sentences following an appropriate connective more quickly compared to either an inappropriate or an underspecified one. This effect was identical for the two age groups, indicating that 8-year-olds also benefit from the presence of connectives during reading. In a fourth experiment, children read sentences linked with



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connectives more quickly compared to implicit relations, thus confirming the importance of connectives as processing signals for young readers. In a nutshell, the study by Cain and Nash indicates that primary school children already benefit from the presence of connectives during reading, even though they are not yet able to use them appropriately in offline tasks.

In similar offline experiments involving 184 Turkish-speaking children aged 8–9 and 9–10, Oğuz and Özge (2020) also found that temporal connectives are particularly challenging for children compared to causal and concessive ones. This study also revealed important individual differences between high-achieving and low-achieving children at the age of 9–10. Indeed, only high-achieving children had a similar performance to adults. However, the evaluation of children's level of academic competence was solely based on teachers' evaluations and was not measured in the study. We will come back to the question of individual differences and their sources below.

Other studies involving primary school children have focused more specifically on the comparison between causal and concessive relations. According to studies of processing by adult speakers, concessive relations are more complex than causal relations (see Chapter 6). In the early acquisition studies, adversative (i.e., contrastive and concessive) relations were also found to appear later in children's speech than causal ones. Yet, this difference did not clearly appear in the experiments of Cain & Nash (2011), as children used both types of connectives during reading, and performed similarly for both relations in the offline tasks. It is possible, however, that this similarity was due to the specificities of their experiments and to the connectives tested. Indeed, Cain and Nash (2011) also conclude that instead of investigating the acquisition of a given discourse relation, it would be more fruitful to analyze the acquisition of specific connectives, as they usually differ in many ways that have an influence on their degree of cognitive complexity (for example, the order of the segments, their register, frequency, etc.). In line with this observation, among the other studies that have specifically assessed the acquisition of causal and concessive connectives, many of them show evidence that concessive connectives are more challenging for primary school children than causal ones.

For example, several studies in French, German and Dutch have found that children have difficulties separating correct from incorrect uses of concessive connectives (Kail & Weissenborn, 1984; Dragon et al., 2015) and choosing an appropriate conclusion for a sentence containing a concessive connective (Janssens, Drooghmans & Schaecken, 2015). In one of the studies, Knoepke et al. (2017) compared children's

evaluation of concessive sentences like (17) and (18) to causal ones in German:<sup>4</sup>

- (17) Sandra war nicht müde. Trotzdem ging sie ins Bett.  
'Sandra was not tired. Nevertheless, she went to bed.'
- (18) Das Wetter war gut. Trotzdem setzte Laura eine Sonnenbrille auf.  
'The weather was good. Nevertheless, Laura put on her sunglasses.'  
[from Knoepke et al., 2017: 10]

Children aged 6;9 to 11;4 performed almost on par with adults when shown positive causal relations conveyed by the connectives *darum*, *daher*, *deshalb* and *denn* (corresponding to English 'that's why/for'). But with sentences like (17) and (18), always conveyed with *trotzdem* ('nevertheless/anyway') in German, their judgments were quite different, as they systematically judged coherent items like (17) as incoherent and incoherent ones like (18) as coherent. This behavior might indicate that children treat concessive connectives like positive causal links. In the filler items of this experiment, children were shown sentences where the segments were not causally related and contained either a positive (19) or negative (20) causal connective. If children based their judgments on the plausibility of the causal link, they should reject all these items. However, they accepted sentences with the negative connective (20) while correctly rejecting the sentences with a positive connective (19).

- (19) Die Löwen brüllen laut. Dann wiegt es weniger.  
'The lions roar loudly. Then it weighs less.'
- (20) Sina isst ein Stück Kuchen. Trotzdem fallen die Blätter im Herbst.  
'Sina is eating a piece of cake. Nevertheless, the leaves fall in autumn.'

[from Knoepke et al., 2017: 13]

This led the authors to conclude that at least part of children's difficulty comes from their lack of understanding of the negative connective itself. This conclusion is further corroborated by Spenader (2018) who conducted a context choice task (see also Champaud & Bassano, 1994) in which Dutch-speaking children aged 7–10 had to choose either a positive oriented or a negative oriented generalization on the basis of a sentence containing either a positive connective (*want*) or a negative

<sup>4</sup> The German connective used in this experiment (*trotzdem*) belongs to a less formal register than the English *nevertheless*.

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one (*maar*) as in (21). The sentences were designed in such a way that children could not resort to world knowledge to provide their answers.

- (21) Sven comes from Sweden, but he's not good at hopscotch.

Conclusion 1: Swedes are usually good at hopscotch.

Conclusion 2: Swedes are usually not good at hopscotch.

[from Spenader, 2018: 621]

In this task, children were very competent in choosing the correct conclusion when sentences contained the positive connective (*want*) but performed far below chance level when they contained the negative one (*maar*). These results indicate that children do not perceive the fact that concessive connectives involve a denial of expectation. Taken together, these studies thus confirm that causal and concessive relations do not raise the same challenges for children, and that the greater complexity of concessive relations is reflected in the later age at which they are acquired.

In the experiments of Cain and Nash (2011), temporal relations seemed to be particularly complex for children, as even 10-year-olds did not perform on par with adults in the offline tasks. Other studies have more specifically investigated the reasons for this complexity. Pyykkönen and Järviö (2012) tested the ability of Finnish-speaking children aged 8, 10 and 12 to understand temporal relations in which the two segments did not contain a typical sequence of events that could be established based on world knowledge (e.g., falling and getting hurt). They assessed two factors that could potentially influence children's ability to infer the correct temporal order between two events. First, whether the order of the segments in the relation corresponded to the order in which they happened in the world as in (22) and (24), or to the reverse order as in (23) and (25). Second, whether the temporal indication was given at the beginning of the sentence, before children had started building a mental model of the discourse, as in (24) and (25), or sentence-medially as in (22) and (23), thus requiring a revision of the mental model when the connective did not indicate an order of the segments iconic to the order of events in the world, as in (23).

- (22) Ilkka luki kirjeen ennen kuin meni kouluun.

'Ilkka read the letter before he went to school.'

- (23) Ilkka luki kirjeen sen jälkeen kun meni kouluun.

'Ilkka read the letter after he went to school.'

- (24) Ennen kuin Ilkka luki kirjeen, hän meni Kouluun.

'Before Ilkka read the letter, he went to school.'

(25) Sen jälkeen kun Ilkka luki kirjeen, hän meni kouluun.

‘After Ilkka read the letter, he went to school.’

[from Pyykkönen & Järvikivi, 2012: 523]

Comprehension was assessed by asking children to indicate which event occurred first, or if they thought the two events occurred simultaneously. Results from this experiment clearly indicated that both the placement of the connective and the order of the segments play a role, as children had a lower performance with the connective *after* for which the textual order of the segments is reversed with respect to the order of events in the world. In addition, the placement of the connective in the sentence also greatly mattered, as children reached a lower performance when the connective occurred sentence-medially than sentence-initially. A likely reason is that in this case, children have to revise their mental model of the discourse mid-sentence, while in the sentence-initial position, they start building it with the correct representation in mind. In addition, this effect was visible even when children had to decode linguistic elements in a reversed chronological order (with *after*). Children’s performance was also found to improve with age. While 8-year-olds performed only slightly above chance level in sentences like (23), the older children performed better, even though their scores remained lower in this condition. Even at the age of 12, children did not perform on par with adults on these sentences. This provides a strong indication that dealing with temporal relations is complex when the discourse does not follow the chronological order of events, and even more so when children have to revise their representation of an event in their mental model.

Blything, Davies and Cain (2015) assessed children’s comprehension of temporal relations in English, using a simplified task to evaluate the comprehension of younger children, aged 3–7. In their experiment, they used short videos, and children were simply asked at the end to choose which of two images corresponded to the thing that the character did first by touching the corresponding image on the computer screen. They assessed the role of the connective (*before* or *after*), the role of the order of events (chronological or nonchronological) and the placement of connectives (sentence-initial or sentence-medial). They also included in their design the factor of world knowledge (i.e., whether it allowed children to infer the order of events) as young children have been found to resort to it in previous studies (e.g., French & Brown, 1977). In addition, they included a test of working memory capacity. Their results indicate that young children at the age of 3–4 have a limited knowledge of the meanings of these two connectives, and resort to the order of presentation of the two segments to infer temporality.

## 8.5 Mastering Diverse Connectives during Teenage Years

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In contrast, the factor of world knowledge did not play a role. Children's performance increased with age, but children aged 4–6 still performed worse than 7-year-olds. Working memory capacity was also a significant predictor of performance. These results led the authors to conclude that the comprehension of temporal relations may fail when processing demands are high (reverse chronological order, sentence-medial connective). Still, this research also indicated that children show evidence of understanding temporal relations sooner than expected when the task is made simple enough for them.

In addition to comparing the order of acquisition between connectives and relations, another important issue in the developmental process of connectives during primary school years is the degree of individual variation during this period. Volodina and Weinert (2020) assessed the comprehension of a variety of connectives conveying the main types of discourse relations by German-speaking primary school children, and assessed the contribution of a variety of factors on their acquisition, such as the family's socioeconomic status, parents' joint activities with the child, as well as their language background and general language skills. Using growth curve models, they found that the socioeconomic status of families as well as children's level of receptive grammar have the greatest impact on their mastery of connectives. These factors were important both to explain children's initial level, and the subsequent growth rate of connective comprehension. We will come back to individual variations in the next section, when discussing the competence of teenagers.

To summarize, we have illustrated in this section the way children progress in their comprehension of various types of discourse relations and connectives during primary school years, emphasizing important differences between relation types, and between subtypes of a given relation (e.g., temporal relations), depending on their degree of cognitive complexity. A recurrent finding was that children do not show evidence of a fully adult-like comprehension at the end of the primary school years. This leads us to examine the ways in which children continue developing their understanding of connectives during their teenage years in the next section.

### **8.5 MASTERING MORE DIVERSE CONNECTIVES DURING THE TEENAGE YEARS**

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Although children show evidence of mastering frequent connectives in simple tasks at the end of their primary school years, a number of

open questions remain about the way their competence continues to develop. First, do teenagers equally benefit from connectives in all types of texts? Are there differences between teenagers depending on their level of reading skills? These questions are all the more relevant given that connectives are used differently across genres (see Chapter 7), and that they seem to benefit adult readers differently depending on their degree of prior knowledge on a topic (see Chapter 6).

Van Silfhout, Evers-Vermeul and Sanders (2015) analyzed the effects of connectives on how secondary school students in grade eight (aged 13–14) with various levels of reading competence process and understand connectives across narrative and expository texts. Using eye-tracking, the authors studied the processing differences between texts with and without connectives, in particular, the speed with which the second segment of a relation was read, and the duration of regressions to previous portions of the text for rereading. They also measured the role of connectives for local comprehension by asking comprehension questions involving bridging inferences, and for global comprehension by using a sentence ordering task. In the experimental materials, they manipulated the presence or absence of additive, temporal and causal Dutch connectives. Their results reveal that connectives are useful for the online processing of discourse relations in texts, as all teenagers read the segments immediately following a connective more quickly and spent less time rereading previous regions. This study thus further confirms that connectives give processing instructions that facilitate reading, even for young readers. In addition, connectives were also found to enhance local comprehension, independently of the reading skills, as evidenced by the ability of all readers to derive bridging inferences. In contrast, connectives did not seem to play a role for global comprehension, as they did not help readers organize sentences in the correct order after reading. All these effects were similar across narrative and expository texts, indicating that young readers equally benefit from connectives in both genres. This study does not however provide information about potential differences between discourse relations, as they were not analyzed separately.

In a larger-scale study involving 794 Dutch-speaking teenagers aged 13–16, Kleijn, Pander Maat and Sanders (2019) tested the role of additive, temporal, causal and contrastive connectives that were either added or removed from expository texts originally intended for teenagers. The texts were of two types: educational texts and public information texts on topics of interest for teenagers. The task involved a cloze test in which teenagers had to restore previously deleted words.

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Just like van Silfhout et al. (2015), the authors did not find differences between teenagers depending on their reading skills or academic level, as for all teenagers, connectives helped local comprehension. They also found an effect on global comprehension, limited to the more difficult texts. In this study, the role of each type of discourse relation was also assessed separately. Results indicate that connectives are useful to help the comprehension of concessive and causal relations, but that they conversely diminish the comprehension of additive relations. Temporal relations were not frequent enough to draw solid conclusions. The authors explain the striking difference between relations by the fact that concessive and causal relations, being the most cognitively complex ones, are also the most informative. In such relations, connectives help readers to integrate the upcoming segment, and construct a coherent interpretation. In the case of additive relations, it is possible that the connective drew excessive attention to the intended relation, and invited readers to look for a more sophisticated interpretation than a simple conjunction. In that sense, they may have made the relations appear more complex, thus decreasing comprehension.

In sum, both studies summarized so far indicate that connectives are helpful for all teenagers and should therefore be used as much as possible in teaching materials destined to this age group. The situation appears to be somewhat different, however, for primary school children and teenagers coming from language-minority backgrounds, who have to read school materials in what is for them a second language. In a study assessing the competence of fourth grade language minority children in the United States, who spoke Spanish at home and read English only as a second language, 10-year-old children were found not to benefit from connectives in the way native English-speaking teenagers do (Crosson, Lesaux & Martiniello, 2008). In addition, while for English-speaking children, connectives made a specific contribution with respect to general vocabulary skills to explain text comprehension, this was not the case for language-minority children in fifth grade (Crosson & Lesaux, 2013). Overall, this seems to indicate that connectives pose a specific challenge for non-native speakers (see Chapter 9). Interestingly, in fourth grade, two factors explained the specific difficulty of some of the connectives inserted in the experiment. First, the cognitive complexity of the relation they encoded, and second their degree of familiarity, for example, frequent connectives like *because* or *but* or less frequent ones like *furthermore* or *however* (Crosson & Lesaux, 2008). In fifth grade however, the role of cognitive complexity disappeared, and the comprehension of connectives was only predicted by their degree of familiarity (Crosson & Lesaux, 2013). This seems to

indicate a shift from the early acquisition period, when cognitive complexity is a major factor explaining children's difficulties, to a later acquisition phase in teenage years when the difficulty of understanding connectives is linked to their familiarity.

The importance of the mode in which connectives are typically used, and more generally their frequency in language use, was underlined in other experiments focusing on populations of teenagers. Nippold, Schwarz and Undlin (1992) specifically assessed the comprehension of connectives used in the written mode in English, such as *moreover*, *furthermore*, *nevertheless* and *conversely* by teenagers aged 12;9 and 15;10, and young adults attending respectively college and university, and aged on average 19;2 and 23;8. Across a sentence-continuation task and a connective insertion task in short texts, they compared the comprehension of continuous (that they call "concordant") and discontinuous (that they call "discordant") connectives (see Chapter 6). Their results indicate that teenagers and young adults understand connectives encoding continuous and discontinuous relations equally well, thus adding further support to the claim that during the teenage years, cognitive complexity is no longer a relevant factor to explain offline comprehension. However, they also found a progression from the teenage years to young adulthood (especially between the 15-year-olds and the 19-year-olds) in the mastery of connectives in general, indicating that the full mastery of connectives from the written mode keeps developing until early adulthood and possibly beyond. Finally, their results show a discrepancy between the connective insertion task, in which teenagers performed better, and the sentence continuation task. This seems to indicate that while teenagers understand connectives rather well, they still experience difficulties using them appropriately.

A similar discrepancy was found by Zufferey and Gygax (2020b) who studied the acquisition of four French connectives bound to the written mode, which convey four types of discourse relations (*en outre* 'in addition', *aussi* 'therefore', *en effet* 'for', *toutefois* 'however') by 16-year-old teenagers from two different academic levels. They also found that the degree of cognitive complexity of the relation conveyed by a connective did not impact students' ability to use it in a connective insertion task. The difficulty of connectives was related instead to their frequency in language use, as all teenagers performed less well with the two less frequent connectives (*en outre* and *aussi*). In addition, the academic level of teenagers was found to play a role, thus testifying to the existence of individual variations during the teenage years. Tskhovrebova, Zufferey and Gygax (2022) tested the comprehension



## 8.6 Children with Language and Cognitive Impairments

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of the same four French connectives in a larger sample of 191 teenagers at secondary school level (aged 12–15 on average), and from high school level (aged 16–18 on average). Various levels of academic competence were represented in each age group. They also compared teenagers' ability to use these connectives across two insertion tasks: one between two sentences and the other within short texts. Their results confirm that the two less frequent connectives are mastered less well among teenagers from both age groups. They also found a progression from secondary school to high school, but only for the two more frequent connectives (*en effet* and *toutefois*) thus underlining again the role of frequency as a factor influencing teenagers' level of competence with connectives. In both age groups, important differences were found depending on teenagers' academic level, thus confirming the existence of individual variations. The latter were found to persist even among adults (see Chapter 6). Finally, they found that inserting connectives in short texts was more challenging than inserting them between sentences. They explain this discrepancy by the fact that interpreting discourse across several sentences is cognitively more demanding, thus decreasing teenagers' ability to identify the relevant segments, and to infer the correct relation.

In sum, the studies presented in this section clearly indicate that the acquisition of connectives, while starting very early, spans over a long period of time. While cognitive complexity limits young children's ability to understand connectives until the end of their primary school years, the frequency of connectives is a better predictor of teenagers' difficulties with some connectives.

### **8.6 CONNECTIVES IN CHILDREN WITH LANGUAGE AND COGNITIVE IMPAIRMENTS**

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In this last section, we will take a brief look at the way children with specific language impairment and autistic children use and understand connectives, as a way to shed further light on the cognitive and linguistic skills required for their acquisition.

Children with specific language impairment (SLI) typically exhibit a form of linguistic impairment without other cognitive, hearing or affective impairments (Leonard, 1998). One of the main aspects of language that is impaired in SLI is inflectional morphology, yet other forms of lexical deficits have also been found in this population (e.g., Leonard & Deevy, 2004). Difficulties at the discourse level, although less often investigated, have also been found, such as a generally poor

ability to use cohesion markers (Norbury, Gemmel & Paul, 2014). In the case of connectives, a study with Portuguese-speaking children showed that children with SLI tend to underuse connectives compared to typically developing children (Gonsalez et al., 2012), and another one involving Mandarin-speaking children found that children with SLI underuse connectives indicating temporal and causal relations, and tend to overuse sequential connectives such as the equivalent of 'and then' in English (Tsai & Chang, 2008). Other studies have found that children with SLI tend to misuse connectives more often than typically developing children (Purcell & Liles, 1992). All these studies focused mostly on quantitative properties of connective use, yet there is also evidence that children with SLI are not sensitive to all the semantic nuances between closely related connectives. Tribushinina, Dubinkina and Sanders (2015) compared the uses of two Russian additive connectives (*i* 'and' and *a* 'and/but') by 7-year-old SLI and typically developing children. Their results indicate that while the two groups use these connectives equally as often, there are subtle qualitative distinctions between them. Namely, children with SLI used the connectives more often in a way that was not compatible with the causal link present in the story they were asked to narrate based on pictures. In a follow-up experiment 16 months later, the errors remained high in the group of children with SLI. These errors were, however, not due to their misunderstanding of the causal links between elements of the story, as they were able to answer *why*-questions appropriately. Rather, their difficulties stemmed from their lack of understanding of the subtle semantic nuances encoded in these connectives.

Many bilingual children do not have the same level of linguistic skills as monolingual children in one or two of their languages. As a result, these children have sometimes been mixed up with children suffering from SLI (Armon-Lotem, De Jong & Meir, 2015). For example, in a production study, bilingual Dutch-Russian children with Dutch as a dominant language and Russian-speaking SLI children were both found to have difficulties distinguishing between the two additive connectives discussed above, as the two groups were indistinguishable in terms of error rates and types (Tribushinina et al., 2015). Yet, other studies have revealed that bilingual children and children with SLI have distinct linguistic profiles with regard to their use and understanding of connectives. For example, Mak et al. (2017) compared the online processing of sentences with the two Russian connectives *i* and *a* across monolingual Russian-speaking children, Russian-Dutch bilingual children and Russian-speaking children with SLI. They found that the monolingual typically developing children and the bilingual children

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have similar processing patterns for these connectives, indicating that they integrated their meaning very rapidly during sentence processing. In contrast, children with SLI did not similarly integrate their meaning. Therefore, surface similarities between SLI and bilingual children in production tasks do not necessarily mean that their understanding of connectives is similar. Kupersmitt and Armon-Lotem (2019) reached the same conclusion when comparing the expression of causal relations in a narrative task between monolingual and bilingual children, with and without language impairments. Monolingual and bilingual typically developing children made a similar use of causal relations, while children with language impairments had a lower ability to express them. These results thus confirm that having a form of language impairment matters more than the level of linguistic proficiency to explain difficulties in expressing and understanding connectives.

In addition to SLI, the mastery of connectives and discourse relations has been assessed in autistic children. Contrary to children with SLI, autistic children suffer more from communicative or pragmatic deficits rather than from language impairments (Frith, 1989). Several studies have assessed the ability of autistic children to use causal relations in narratives. A study in English found that autistic children spontaneously produce fewer causal statements than typically developing children (Hallin, Garcia & Reuterkiöld, 2016). Another involving Mandarin-speaking children (Wen-hui & Pao-chuan, 2015) found that autistic children produced narratives that were less causally connected and less coherent. In a study assessing the comprehension of temporal relations in Dutch, Overweg, Harman and Hendriks (2018) found that autistic children had difficulties understanding the order of events, but contrary to typically developing children, their difficulties were not more pronounced when the order of events in discourse were not iconic to their order in the world. In addition, this study revealed that autistic children's competence was correlated with their IQ, working memory, verbal ability and theory of mind. Working memory capacities and verbal ability probably helped them to understand the complex sentences conjoined by temporal connectives. The role of theory of mind ability was more specifically linked to the understanding of sentences in which temporality in discourse was not congruent with world order. The authors conclude that understanding these sentences requires the ability to shift from one's own perspective to another temporal frame, an ability which typically pertains to theory of mind skills.

In sum, since studies are still too limited to draw final conclusions on the role of linguistic and cognitive impairments for the use and

understanding of connectives, analyzing these populations is a fruitful area of investigation, as they present specific deficits that shed more light on the competences required to master them.

## **8.7 SUMMARY**

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This chapter opened with a presentation of young children's early productions of discourse relations and connectives. We have seen that while most children start producing a variety of relations by the age of three, all connectives do not appear simultaneously in their speech. The observed order of acquisition matches chiefly the degree of complexity of each connective, and to a lesser extent its syntactic complexity. We have also seen that parental input greatly matters, both to foster productions locally, and also in the long run to help the development of connective usage. Yet, a puzzling result from the acquisition literature is that children's early productions are not matched by a mature comprehension of connectives. Part of the reason for this discrepancy is that understanding connectives requires the ability to process written language, and the latter typically contains longer and more complex sentences than spoken language. In addition, children's own early productions of connectives do not cover all the contexts in which they are used by adults. We have argued in particular that important differences in the age of acquisition can be observed between various functions of the same connectives, or between different subtypes of the same discourse relation. During the teenage years, children's repertoire of connectives continues to increase to include connectives from the written mode, but it is not until early adulthood that these connectives are fully mastered. Another important finding from this chapter is that important individual differences between children are found throughout the acquisition process, in relation to different environmental factors such as the socioeconomic status of families, the degree of exposure to print that children have had, and their academic background. Research on children with language impairments and bilingual children additionally revealed that a lower proficiency does not always prevent bilingual children from understanding connectives, contrary to children with language impairments. Yet, research on language minority children indicates that the level of linguistic proficiency can also matter, as these children typically possess a smaller repertoire of connectives and benefit less from their presence in texts. We explore the mastery of connectives by non-native speakers in more detail in the next chapter.

### **DISCUSSION POINTS**

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- What are the advantages and limitations of studying children's production of connectives versus their comprehension of them?
- What is the order of acquisition between discourse relations and how can this order be explained?
- Why would one think that the factors that best explain children and teenagers' difficulties with connectives evolve with age? (See in particular the studies involving teenagers.)

### **FURTHER READING**

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Evers-Vermeul and Sanders (2009) provide an excellent overview of the early acquisition of connectives. The distinction between the acquisition of objective and subjective causal relations across languages is discussed by Zufferey, Mak and Sanders (2015). For the primary school years, the study by Cain and Nash (2011) is a complete and accessible reference for both online and offline comprehension. The role of connectives for text comprehension is analyzed in a comprehensive large-scale study by Kleijn, Pander Maat and Sanders (2019). The distinction between SLI and bilingual children's comprehension of connectives is discussed in an eye-tracking study by Mak et al. (2017).

## 9 Mastering Connectives in a Second Language

### 9.1 INTRODUCTION

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Connectives are notoriously difficult to master for second language learners, because they require an array of complex competences. Learners must know how to use them appropriately in various genres and registers, have a fine-grained understanding of the meaning differences between connectives used to convey similar discourse relations, and also automatize this knowledge so that it is activated during discourse processing (implicit knowledge), and not only when they consciously elicit usage rules (explicit knowledge).

In the second language acquisition literature, an important body of studies has empirically demonstrated that learners experience many difficulties with connectives, even at advanced stages of language acquisition. When producing texts with connectives, these difficulties are both quantitative (overuses and underuses) and qualitative (misuses). These difficulties are reflected in the fact that the use of connectives is often moderately or even negatively related to writing quality (Crossley, Kyle & McNamara, 2016). Comparatively, studies that have investigated learners' comprehension of connectives are fewer and far apart. Yet, the comprehension of connectives is important for reading comprehension, not only in a first but also in a second language (Crosson & Lesaux, 2013).

In this chapter, we will present an overview of current knowledge about learners' use and understanding of connectives, assess the reasons why connectives are problematic for learners, and discuss the competences that foster the acquisition of connectives in a second language. We will argue that research on the second language acquisition of connectives contributes to answering important questions, such as what makes connectives difficult to master (see also Chapter 8), how they are they used across languages (see Chapter 7), and also how they should be included in teaching curricula.

## 9.2 LEARNERS' USES OF CONNECTIVES

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The way learners use connectives in their textual productions has been the topic of a very large body of literature, starting mostly in the 1990s with researchers discussing observations from their own teaching experiences. For example, Lamiroy (1994: 183) reports that Dutch-speaking students of French at university level “encounter very serious difficulties in handling French connectives”. She illustrates these problems with examples from students' writings. They include a lack of connectives in contexts where they are needed for coherence, such as a lack of concessive connectives (see Chapter 6), a wrong choice of connective to express a given relation, and an excessive use of a limited set of connectives in contexts where they would not be used by a French-speaking writer. Similar observations were made by Crewe (1990: 317) based on his experience of teaching English in Hong Kong: “The misuse of logical connectives is an almost universal feature of ESL students' writing [. . .]. In Hong Kong, we are all familiar with students who use ‘on the contrary’ for ‘however’/‘on the other hand’, thus adding an unintended ‘corrective’ force to the merely ‘contrastive’ function sought”. These interesting observations could not, however, lead to any generalization about learners' difficulties with connectives. For this, a bigger sample of more controlled productions are needed, in the form of corpus data.

This gap has since been filled thanks to the high number of learner corpora that have been created over the past decades (Granger, Gilquin & Meunier, 2015). Many of them have been used to investigate the way learners use connectives, mostly in English as a foreign language. These corpus studies have consistently found differences between the uses of connectives by learners and those of native-speaking writers. For example, Tapper (2005) reports an overall overuse of English connectives by Swedish learners compared to American and British university students. Both datasets come from the International Corpus of Learner English<sup>1</sup> (Granger, Hung & Petch-Tyson, 2002). Tapper found that learners produce a lot more connectives in their essays compared to native speakers. However, the distribution between the various types of connectives (causal, concessive, etc.) was almost identical, as learners overused all types of connectives. Both in learners and native students' writings, the most frequently used connectives were those marking a concessive or a contrastive relation. This is likely due to the fact that

<sup>1</sup> <https://uclouvain.be/en/research-institutes/ilc/cecl/icle.html>

these connectives are necessary for the correct relation to be inferred (see Chapter 6) and means that learners have a good grasp of the factors that are necessary to produce a coherent text. Based on holistic scores of writing quality produced on a subset of each corpus, Swedish learners were found to be as competent as native speakers at writing. This may explain why they did not produce misuses of connectives but only differed quantitatively from native writers. A similar result was found by Tazegül (2015) who analyzed the uses of the connective *on the other hand* by Turkish PhD students, and found that they overused this connective but did not misuse it. Again, these learners can be considered to be quite proficient.

Yet, many other studies have provided a more complex picture for advanced learners, by showing that they do not overuse all connectives. In one of them, Granger and Tyson (1996) analyzed the connective uses of French-speaking learners of English, also in the International Corpus of Learner English. In this study, learners were not found to overuse connectives across the board, but only some of them like *indeed*, *in fact* and *moreover*, while underusing others like *however*, *yet*, *therefore* and *thus*. This pattern of over- and underuse was later found in many other studies involving learners from a variety of first languages and backgrounds. For example, Hinkel (2001) analyzed productions of Japanese, Korean, Arabic and Indonesian learners of English, and found that while they globally overused connectives compared to native speakers, they resorted to a smaller repertoire and did not always use them in a way that facilitated textual comprehension for readers (see also Carrió Pastor, 2015 for a similar pattern with Spanish learners, Lee, 2013 for Korean learners, and Zhang, 2014 for similar problems with conclusive connectives used by Chinese learners).

Granger and Tyson (1996) also make two other observations that have been corroborated in many other studies. First, learners tend to almost exclusively use connectives in the sentence-initial position, even if other syntactic positions are possible for many of them (see Chapter 4). Field and Yip (1992) also found that the sentence-initial position was the default position for all non-native writers that they analyzed, and Ha (2014) reported a similar pattern for Korean learners.

The second observation is that learners do not seem sensitive to the differences of registers, and mix informal connectives like *what's more* with formal ones like *moreover*. This is again congruent with the finding by Field and Yip (1992: 26) who reported that learners “give confusing signals of register” using connectives from very different registers alongside each other. In a similar vein, Leedham and Cai (2013) also report an overuse of informal connectives like *besides*, *last but not least*,



## 9.2 Learners' Uses of Connectives

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and *what is more* by Chinese students studying at UK universities, and an underuse of more formal connectives like *however* and *therefore*. An overuse of *besides* was also found by Lee and Chen (2009) in their study of Chinese undergraduates.

In addition, while the overuse of connectives was found to globally diminish with proficiency, problems with register remained. For instance, Chen (2014) reports that more advanced Chinese learners start using a more informal style as their proficiency increases. Similarly, Tapper (2005) also observed that very advanced Swedish learners make a heavy use of the connective *still*, whereas both American and British native-speaking students prefer the more formal connectives *however* and *yet* to indicate contrast. An exception to the preference for informal connectives was found by Hu and Li (2015) who report that students from Hong Kong and Singapore adopt a more formal style than both other Asian learners and native speakers. This hints to the fact that learners' first language may influence their use of connectives in L2, an observation we return to later on in this chapter.

While many studies have reported cases of connective overuse, some of them also report marked cases of underuse. In one of them, Don and Srinivas (2017) found that Malaysian students' essay writings in English contained overall fewer connectives than those of native speakers. In one rare study that has focused on spoken productions, Shi (2017) also found a marked underuse of contrastive and concessive connectives by Chinese learners of English. Interestingly, the overuse of connectives in the sentence-initial position reported above was also found in spoken data. In a study focusing on the connective *thus* by Turkish advanced learners of English, Uçar and Yükselir (2017) also found a marked underuse of this connective compared to natives. However, a more in-depth analysis of the functions of *thus* also revealed another difference between the two groups, as learners overused it to mark cause-consequence relations while neglecting its other functions.

Many studies have documented that learners' difficulties with connectives are not only quantitative. They also qualitatively misuse connectives in their productions. For instance, Hamed (2014) found that Libyan students majoring in English misuse many connectives. The most difficult ones were contrastive and concessive connectives, followed by additives and causals. In a study focusing on the contrastive connectives used by Korean speakers, Park (2013) found misuses of connectives to express contrast such as *in contrast*, *on the contrary* and *on the other hand*. Additionally, it is noticeable that the connective *on the other hand* was the third most frequent one in learners' writings, so this mistake was quite prevalent. Misuses of connectives are also reported

for Chinese students by Zhang (2014), who found that learners misuse conclusive connectives like *all in all*, *in conclusion*, and *ultimately*.

The findings from corpus studies are further corroborated by controlled experimental contexts, in the form of elicitation tasks. Degand and Hadermann (2009) elicited the use of connectives in French by Dutch-speaking learners using silent videos. Similarly to corpus studies, they report that learners overuse connectives compared to native speakers. In fact, learners used a causal, temporal or contrastive connective every 28.8 words on average compared to every 41.5 words for native speakers. Yet, they also specifically analyzed the use of temporal connectives, and found that learners use as many different temporal connectives as native speakers.

All in all, we can conclude from these studies that learners do not use connectives like native speakers in their textual and spoken productions. These problems include misuses, but also and even more predominantly quantitative problems due to the overuse and underuse of some connectives. These problems are in addition not limited to producing connectives with an appropriate meaning in context, but also include limitations in syntactic placement and inappropriate register. More specifically, learners seem to avoid formal connectives from the written mode.

These production studies are, however, not sufficient to get a full picture of learners' competence with connectives. First, they cannot tell us anything about the way learners actually understand the meaning of each connective, nor do they provide us with answers about the causes of these production difficulties. Another limitation applying in particular to corpus studies is that learners' level of competence in L2 is only reported for the whole group, and is often described in generic terms such as *advanced* or *higher-intermediate*. Similarly, the type of writing task that was performed in the corpus is often only described as an "essay" without more precision about the conditions in which it was performed or the topics. In addition, the role of learners' first language cannot really be ascertained because they are often not compared to learners on the same writing conditions. Finally, the comparison is often made with students writing in their L1. Yet, Bolton, Nelson and Hung (2002) found that students writing in their L1 also overuse connectives compared to professional writers. Thus, it is not clear whether learners' difficulties can be attributed to writing in an L2 or to an immature writing style. For all these reasons, production studies must be complemented by studies assessing learners' comprehension in more controlled experimental contexts, with the use of specific measures assessing the linguistic profile of each participant. We now turn to these studies.

### **9.3 LEARNERS' COMPREHENSION OF CONNECTIVES**

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Contrary to production, comprehension cannot be observed directly, hence the need to resort to indirect techniques indicating whether learners understand a connective or not. Depending on the studies, these techniques require a different type of knowledge. In the literature on second language acquisition, a major distinction is often made between learners' explicit and implicit knowledge (e.g., Ellis, 2009; VanPatten & Smith, 2022). Explicit knowledge implies conscious awareness, can be verbalized and is also weakly held, whereas implicit knowledge is more intuitive and unconscious, more systematic and also more deeply held. For example, implicit knowledge would be used when a learner says that a connective is correctly used (or not), without being able to explain why. With explicit knowledge, a learner could verbalize the reasons as to why the connective is correctly or incorrectly used. Conversely, having an explicit and declarative knowledge of a connective does not mean that it will always be used correctly when speaking or understood during reading, as the time pressure of speech planning and online comprehension does not allow access to explicit knowledge.

Both types of knowledge are also typically assessed using different tasks. Explicit knowledge is tested using metalinguistic tasks such as providing judgments, explanations without any time pressure, etc. Implicit knowledge can be assessed either online, as comprehension unfolds while reading or listening, or offline, after the whole process has taken place, in order to assess the product of comprehension. In this section, we illustrate the difference between explicit and implicit knowledge of connectives with studies that have used these various types of tasks.

One of the first experimental studies to systematically assess learners' comprehension of connectives in English was conducted by Steffani and Nippold (1997) with Japanese learners at American universities. In a series of two experiments, they compared learners with age-matched American students. In one experiment, participants were asked to perform a completion task. They were given three sentences describing a context, and a sentence starting with a connective typical of the written mode, such as *nevertheless* or *moreover*. They were asked to write a continuation for the sentence. Answers were then classified as correct or incorrect by the authors. Results indicate that learners have significantly more difficulty in understanding these connectives than native speakers, as they produced only 5 correct continuations on average for the 10 scenarios, against 9.5 for the American students.

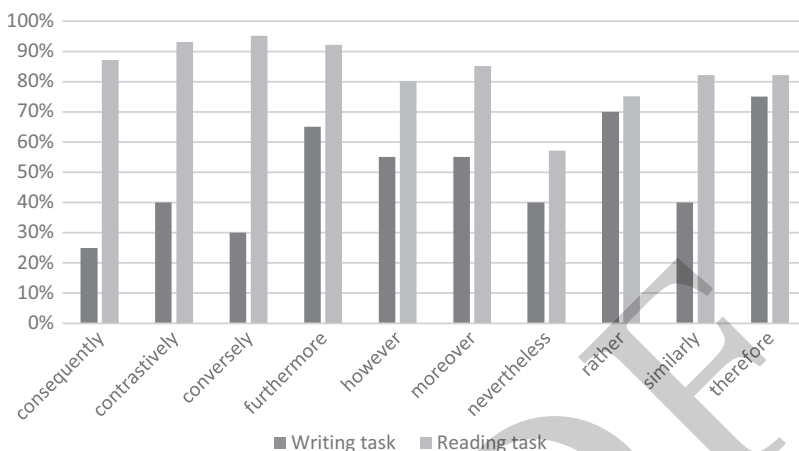


Figure 9.1 Percentage of correct answers for Japanese learners of English across both tasks

However, the authors had also classified sentences containing grammar mistakes as incorrect, even when they reflected a correct interpretation of the connective. If only sentences that demonstrate an incorrect understanding of the connective are counted as incorrect, the learners' score increases to 7.9 correct answers. This score is still significantly lower than that of the native students.

In a second task, students had to choose the appropriate connective from a list of four possibilities to fill in a gap within a small text (reading task). Learners also performed significantly lower than American students on this task, with an average of 83 percent correct answers against 95 percent for the natives. Interestingly, the scores of non-native speakers were quite different for most connectives across both tasks, as illustrated in Figure 9.1, adapted from Steffani and Nippold (1997: 1052).

This study therefore provides some confirmation that learners have difficulties understanding connectives from the written mode, which might explain why they avoid using them in their textual productions. It does not tell us, however, if these difficulties also extend to more frequent connectives, or whether learners are able to use the information provided by connectives to help them understand a text.

Degand and Sanders (2002) investigated this question in a comprehension experiment focusing on causal relations communicated by Dutch and French connectives frequently used in spoken language like *omdat* and *parce que* (both close to the English 'because'). They asked

### 9.3 Learners' Comprehension of Connectives

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French-speaking and Dutch-speaking participants to read 18 short texts that were manipulated to contain explicit (with connective) and implicit (without connective) causal relations. Half of the texts were in Dutch and the other half in French. Participants read all the texts, which means that their scores could be compared across their L1 and their L2. Comprehension was assessed by asking a series of questions after reading the text. In the case of causal relations, it was tested by the use of *why*-questions. Results indicate that participants understand textual content better when it is conveyed explicitly by a connective or a causal paraphrase such as *that is the reason why* than when it is conveyed implicitly. Interestingly, this effect did not differ between their L1 and their L2. This means that participants understood connectives just as well in both languages, but also that they did not need them more in their L2, despite the greater difficulty in understanding a text in a second language. Both results are likely due to the high proficiency level of participants, and also to the exclusive use of frequent causal connectives in the experiment. This study thus provides a step forward by showing that connectives are also beneficial for L2 readers. However, it is limited to causal relations, and does not provide indications about the usefulness of cognitively more complex connectives such as concessive and contrastive connectives (see Chapter 2), nor does it assess comprehension with more formal connectives typical of the written mode.

Wetzel, Zufferey and Gygax (2020) attempted to assess learners' comprehension of connectives using a more diversified set of six different discourse relations, with two different connectives per relation varying in their frequency in written corpus data. This experiment did not include a whole textual context, but only two isolated sentences. Participants were German-speaking learners of French and native French speakers. They were asked to choose the appropriate connective from a list of six possibilities. Results indicate that learners do not master most of these connectives as well as native speakers, but no systematic difference was found between relations, nor did the most frequent connective systemically elicit higher scores compared to less frequent ones. This means that the two factors (relation type and frequency) which were found to be important for first language acquisition (see Chapter 8) do not matter to a similar extent for second language learners. Instead, the authors report a register effect, congruent with the observations from corpus data. One of the connectives they tested, the contrastive connective *par contre*, has a low frequency in written corpora, because it belongs to an informal register. This connective triggered significantly higher scores compared to the more

frequent *en revanche* that belongs to a more formal register and is more frequent in written genres. Thus, it seems that learners have difficulties specifically with connectives belonging to a formal register bound to the written mode. They also uncovered another factor that may explain learners' performance: the connective *c'est pourquoi* triggered very high scores in view of its low frequency. The authors hypothesized that this may be due to the fact that its meaning, literally 'that is why' in English, is rather transparent. Learners may therefore have been able to understand it compositionally thanks to their understanding of the words it is made of. At the other end of the scale, highly opaque connectives like *en outre* in French (a connective meaning roughly 'in addition') are difficult even for a sizable portion of adult native speakers (see Chapter 6).

These studies thus provide a nuanced picture of learners' understanding of connectives, indicating that they are able to integrate the meaning of frequent connectives but have more difficulties with connectives from a higher register. They were all conducted using offline methodologies, in other words analyzing the product of comprehension. Other studies have also integrated an online component, in order to compare learners' implicit and explicit knowledge about connectives. In one of them, Zufferey et al. (2015) specifically focused on the role of L1 transfer for learners' ability to integrate connectives' meaning in a second language. In their study, they used eye-tracking to measure the way native English speakers, as well as French-speaking and Dutch-speaking learners of English process sentences containing either an appropriate or an inappropriate use of connective. They included two misuses, each specific to one population of learners, and attributable to negative L1 transfer. In the case of Dutch learners, it was the misuse of *when* to convey a conditional instead of a temporal meaning, as in (1). In the case of French, it was the misuse of *if* in contrastive sentences, as in (2).

- (1) The kids don't look tired today. When they don't sleep now, we can go out for a walk.
- (2) Admission policies are variable across universities. If in some of them all students can enroll, in others there is an entrance examination.

[from Zufferey et al., 2015: 390]

By comparing the way participants read the same sentences with a correct and an incorrect connective, they were able to assess whether learners intuitively reacted to the mistake, by slowing down their

### 9.3 Learners' Comprehension of Connectives

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reading and going back to previous portions of the text for checking. Results from the eye-tracking study revealed that advanced learners intuitively spot the incoherence created by a misused connective, even when it corresponds to a possible use in their L1. In fact, the analysis revealed no difference between learners and native speakers on this task. The second part of the study consisted of a judgment task containing a selection of the same sentences. Learners were asked to judge if every sentence was correct or incorrect, and to circle the mistakes they had spotted. This time, learners had great difficulty in spotting the misuses linked to their L1 (but not other misuses), showing a clear negative transfer effect. It appears therefore that their intuitive knowledge did not translate into an ability to formulate usage rules, and learners therefore resorted to the rules of their L1 when performing a task requiring explicit knowledge, creating negative transfer effects.

Other online studies that have used the technology of self-paced reading (see Chapter 6) have also investigated the ability of learners to read coherent and incoherent sentences. Across two experiments, Wetzel, Zufferey and Gygax (2022) investigated whether German-speaking learners of French are able to detect the loss of coherence in the communication of causal and concessive relations. These two relations were chosen because of a major difference between them: while causal relations can be conveyed implicitly without loss of coherence, concessive relations need to be marked explicitly. Yet, contrary to native speakers, learners were not sensitive to this loss of coherence. But like native speakers, they read concessive relations more slowly than causal ones, indicating that the cognitive complexity of relations is a factor affecting reading in both L1 and L2 (see also Recio Fernández (2020) for a similar result in Spanish). In a second experiment, they rendered half of the sentences incoherent by using an inappropriate connective: the causal connective *donc* (similar to the English *so*) in concessive relations and the concessive connective *mais* (similar to *but*) in causal ones. This time, L2 readers reacted to the incoherence, but they did so later on in the sentence and this effect did not last as long as for native readers. Overall, L2 readers appear to be less sensitive to the information provided by connectives during discourse processing, as incoherence does not disrupt processing to a similar extent as for native speakers.

Another question is whether learners are able to integrate the various meanings of polyfunctional connectives (see Chapter 3). In order to test this, Zufferey and Gygax (2017) assessed the online processing and offline judgments of native French speakers and German-speaking learners for the French connective *en effet*. According to the Lexconn dictionary of connectives (Roze, Danlos & Muller, 2012), *en effet* can

either convey a relation of cause (3) or of confirmation (4) (similar to the English *indeed*) depending on context. Just like concessive relations, confirmation relations cannot be conveyed implicitly without disrupting reading for native speakers (Zufferey & Gygax, 2016).

- (3) Susanne ne fait manifestement pas attention à ses affaires. En effet, elle a oublié son portefeuille dans le bus.  
'Susanne is obviously careless with her belongings, for/because she forgot her purse in the bus'.
- (4) Susanne avait l'impression qu'il lui manquait quelque chose. Et en effet, elle a oublié son portefeuille dans le bus.
- (5) 'Susanne felt she had lost something. And indeed, she forgot her purse in the bus'.

[from Zufferey & Gygax, 2017: 4]

In a self-paced reading experiment, they assessed whether learners were also sensitive to the loss of coherence provoked by implicit confirmation relations, and found that this was not the case. In a judgment task, they asked participants to assess the coherence of explicit and implicit causal and consequence relations, either conveyed by *en effet* or implicitly. Contrary to native speakers, learners judged implicit relations as more coherent for both causal and confirmation relations. This leads to the conclusion that they do not master any of the two functions of this polyfunctional connective, despite its high frequency in French (Zufferey & Gygax, 2020a).

So far, we have explored learners' understanding of relations between discourse segments made of whole clauses. In some cases, relations can be clause-internal, as for example in the case of specification relations in (5).

- (5) The woman, that is, my old neighbor from above, is nice.

[from Wetzel, Crible & Zufferey, 2022: 207]

Wetzel, Crible and Zufferey (2022) assessed learners' ability to understand specification relations. From a syntactic perspective, they should be easier to process because they do not require conjoining two different clauses. From a discourse perspective, the signaling of these relations by a connective is usually optional, but different preferences for explicit marking are also observed between languages. Using corpus data, the authors found that in German these relations are often conveyed by the connective *also*, whereas in French they are mostly implicit. Yet, due to the similarity between *also* and the French



### 9.3 Learners' Comprehension of Connectives

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connective *alors* (similar to *so*), they hypothesized that learners might erroneously believe that the two connectives have the same functions, due to negative transfer. They assessed this hypothesis in a self-paced reading task and a judgment task. In the judgment task, learners did reject the specifications containing *alors* as incorrect, but they did not judge as correct the explicit version of specifications with *c'est-à-dire* in French to a similar extent as native speakers, indicating that they were not sure how to express this relation explicitly. In the self-paced reading task however, they did not react to the incorrect uses of *alors* in specifications, contrary to native readers. This seems to indicate that even though they explicitly learned that *alors* cannot be used in specification relations in French, they do not use this knowledge during reading. In sum, as in the study by Zufferey et al. (2015), this study shows a discrepancy between learners' explicit and implicit knowledge. However, learners' competences are different in both cases: Zufferey et al. (2015) found evidence of implicit knowledge of connectives in the absence on an explicit ability to judge the same sentences, whereas Wetzel et al. (2022) reported that learners had the ability to reject incorrect uses of *alors* in a judgment task but did not react to it intuitively while reading. More research is still needed to determine why sometimes learners' explicit knowledge is better than their implicit knowledge, while in other cases it is the other way around.

Finally, in addition to connectives, discourse relations can be conveyed by an array of other syntactic, lexical or even graphical means. Across three self-paced reading experiments, Crible, Wetzel and Zufferey (2021) assessed the usefulness of parallel structures as in (6) for English-speaking learners' understanding of contrastive relations in French.

- (6) Lucas s'intéresse aux films réalistes. En revanche, Kevin s'intéresse à la science-fiction.

'Lucas watches many realistic movies. By contrast, Kevin is interested in science fiction.'

[from Crible, Wetzel & Zufferey, 2022: 6]

They report that when the connective used is one that learners have mastered well (in that case *par contre*), learners rely mostly on the connective to understand the relation and the parallel structure does not add anything, whereas it is useful when the relation is implicit. In addition, when the connective is less familiar because it is mostly bound to the written mode (*en revanche*), the usefulness of parallelism becomes more apparent, as it helps participants read contrastive relations more quickly. However, contrary to native speakers, when the

connective used is underspecified for a contrastive relation (*and*) and requires an inference in order to build the contrastive relation, learners fail to use the clue provided by parallel syntactic structures. It seems therefore that they remain at the level of explicit meaning, and do not extend it by inference the way native readers do.

Even though they are still scarce compared to corpus studies, experimental studies presented in this section tend to indicate that learners have some understanding of connectives. However, even at an advanced level of acquisition, their mastery is not equal to that of native speakers. Learners have difficulties in particular with connectives from a higher register, polyfunctional connectives, and often fail to detect incoherence during online reading, probably due to the great burden of reading in a second language. This effect was particularly apparent in self-paced reading experiments, because this methodology places a higher cognitive load on readers compared to eye-tracking.

In a nutshell, connectives remain difficult for learners even at advanced stages of language acquisition. Yet, it is also clear that these difficulties do not affect all learners to a similar extent. We now present these individual differences and discuss the factors that could explain them.

#### **9.4 INDIVIDUAL DIFFERENCES IN LEARNERS' MASTERY OF CONNECTIVES**

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The range of individual variation during second language learning is wide for all aspects of linguistic competences (e.g., Dewaele, 2009; Zafar & Meenakshi, 2012). In the case of connectives, the offline comprehension study by Steffani and Nippold (1997) offers a good illustration. In their writing task, in which learners had to provide an appropriate continuation after a connective typical of the written mode, they find that the range of correct responses (out of 10) was 1–9, whereas it only varied between 8 and 10 for native speakers. Similarly, in the reading task involving the insertion of a connective from a list inside a short text, the range of scores (out of 30) was 15–30, against 23–30 for native speakers. This means that even between college students, a portion of learners get perfect scores on connective tasks, while others still struggle quite a lot. What could the factors explaining these important variations be?

One obvious candidate that has often been discussed in the literature is learners' overall proficiency level in the second language. For example, Cho and Shin (2014) gather data from three different

#### 9.4 Individual Differences in Learners' Mastery of Connectives

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proficiency levels of Korean learners in their corpus data, and found that the overuse of connectives diminishes as proficiency increases, but does not disappear completely. In a spoken production task, Ozono and Ito (2003) also found that Japanese learners with a higher proficiency level were better able to choose an appropriate connective in a reading task and were not affected by the type of discourse relation, contrary to learners with a lower level. Also using an experimental setting, Geva (1992) found that more advanced learners had a better ability to understand connectives in an extended discourse context.

Learners' level of proficiency is also correlated with the number of connectives that they use. Leedham and Cai (2013) report for example that the tendency to resort to a small lexicon of "teddy bear" words, that is, words they feel comfortable using, diminishes with proficiency. Chen (2014) also compared two proficiency levels of Chinese learners (intermediate and advanced) and found that the tendency to limit their use of connectives to a small set of items diminished as proficiency increased. However, advanced students in this study also tended to use a more informal style, thus learners' inability to select connectives from an appropriately formal register was not solved. Focusing on the connective *on the other hand*, Tazegül (2015) found that contrary to secondary or high-school learners, doctoral students do not misuse this connective, but they still tend to overuse it compared to native speakers. This indicates again that part of the problem disappears as proficiency increases, even though learners do not engage in a fully native-like usage of connectives. Yang and Sun (2012) also compared the use of connectives in corpus data by Chinese learners in the second and fourth year of undergraduate studies, and found that their ability to use connectives significantly increased. However, they also report that correct uses of connectives were correlated with writing quality, irrespective of the learners' proficiency level. This means that other factors affecting writing quality might be at play.

One of the factors that correlates with writing quality is the amount of exposure that learners have had to written genres, otherwise known as the degree of exposure to print. People's exposure to print is often measured using the Author Recognition Test (Stanovich & West, 1989). In this task, participants see a list of author names (some real and some fake) and have to check a box next to all the names that they recognize as belonging to authors. This task has been found to correlate with a number of linguistic competences in participants' first language, such as a better sentence processing ability (Acheson, Wells & MacDonald, 2008), a better vocabulary and world knowledge (Stanovich, West & Harrison, 1995) as well as better spelling skills (Stanovich & West,

1989). Exposure to print in a speaker's mother tongue is also a good predictor of their reading comprehension and writing in L2 (Sparks et al., 2012). In the case of connectives, Wetzel, Zufferey and Gygax (2020) found that the ability of German-speaking learners of French to handle French connectives was correlated with their degree of exposure to print in German. The authors explain this correlation by a "linguistic coding difference hypothesis" (Sparks et al., 2006) stating that the acquisition of a second language is rooted in the competences in the first language, allowing learners to transfer competences from one language to the other.

Other studies have underlined the role of more specific linguistic competences as being good predictors of the mastery of connectives for children from a minority language background attending school in a second language. For instance, Crosson, Lesaux and Martiniello (2008) found for fourth-grade students from a Spanish-speaking background in the United States that knowledge of connectives is correlated with vocabulary knowledge and listening comprehension. In a study of children with Dutch as their first or second language, van den Bosch, Segers and Verhoeven (2018) found that syntactic knowledge is correlated with the ability to process causal relations during reading. Research conducted with adult learners has revealed that competence with connectives is correlated with strong L2 oral language proficiency (Geva, 1992).

Other factors of individual differences linked to second language competence that are related to learners' personality such as motivation and language learning aptitude (Ortega, 2008) have not been tested yet in relation to the level of competence with connectives.

### **9.5 WHAT COULD CAUSE LEARNERS' DIFFICULTIES WITH CONNECTIVES?**

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So far, we have listed learners' numerous difficulties with connectives, and underlined the existence of variations between learners depending on their level of proficiency and their degree of exposure to print. Yet, we have still not discussed why connectives are particularly difficult for learners. This is the topic of this section.

A major cause for difficulties with connectives that has been repeatedly pointed out in the literature comes from the fact that these items are prone to create negative transfer effects. This hypothesis stems from the observation that even though most languages have connectives, the way they are used can differ in important ways, even between closely related languages. In fact, it is difficult to find exact translation

pairs (see Chapter 7). Transfer effects from the learners' first language can produce various types of phenomena in L2 productions (Ortega, 2008). They can lead to misuses, but also to overuses and avoidance patterns.

In the case of quantitative problems, Tapper hypothesized that the overall greater use of connectives by Swedish learners compared to native speakers of English could be due to stylistic transfer, as it has been observed that connectives are used more frequently in Swedish than English in corpus data (Altenberg, 1999). Cases of misuse come from more specific confusions between linguistic items. For instance, Granger and Tyson (1996) attribute the overuse of *indeed* in English by native French speakers to the frequent use of the French connective *en effet*. They also attribute the frequent misuse of *on the contrary* by French learners to transfer from the seemingly similar French connective *au contraire*. Similarly, Hamed (2014) attributes the frequent misuses of *and* by Libyan learners to transfers from the Arabic connective *wa* that can also take a continuative function not similarly marked in English. Kanno (1989) specifically attributes the misuse of causal connectives by Japanese speakers to transfer, whereas cases of overuses of additive connectives (strongly linked to the connective *and*) are attributed to an appropriate spoken style. Lee (2013: 86) attributes Korean learners' difficulties with contrastive connectives in English to the "lack of one-to-one correspondence between these Korean and English connectives". The role of L1 transfer between linguistic items was also confirmed in several experimental studies, showing that it can lead to incorrect judgments (Zufferey et al., 2015) or to an inability to intuitively detect incoherence during reading (Wetzel, Crible & Zufferey, 2022).

However, L1 transfer is not the only explanation, nor does it always seem to be corroborated by the data. For example, Granger and Tyson note that French-speaking learners overuse corroborative connectives like *actually*, *of course*, and *indeed*. While the overuse of *indeed* was likely due to negative transfer, it is not clear that this is the case for the other two connectives. In fact, the authors note that these connectives are overused to a similar extent by German-speaking learners in the ICLE corpus. In addition, Tapper (2005: 124) found a similar trend in Swedish learners, and concluded that it might be a "shared learner feature". From a study with Chinese-speaking learners, Zhang (2014: 124) also concludes that "direct language transfer [...] in their first language seems to be the least important [factor]. Developmental problems, which are more universally shared, appear to be far more important".

The question is, therefore, why the interlanguage of learners does not enable them to use connectives appropriately and understand all of

them for a long time during the acquisition process? There are several factors that can be called upon to sketch an explanation. First, connectives often link several sentences or sometimes even paragraphs in textual contexts. They therefore require a high processing capacity, whereas learners often experience planning and structuring limitations when writing in L2 (Ellis, 1994). In addition, many connectives belong to a high register and are bound to the written mode (Crible & Cuenca, 2017), whereas learners typically use a more informal style or “oral tone” compared to native speakers (Field & Yip, 1992; Cobb, 2003; Lee & Chen, 2009). In addition, in Indo-European languages, the repertoire of connectives is usually very big (see Chapter 7), whereas learners tend to limit themselves to a small number of “lexical teddy bears” (Hasselgren, 1994: 237), in others words lexical items that they know well and feel comfortable using, and this likely limits the range of connectives that they spontaneously use (Leedham & Cai, 2013; Wetzal, Zufferey & Gyax, 2020).

In addition to the limitations linked to the second language learning process, there are also reasons linked to connectives themselves that render this functional category particularly difficult to master. One aspect of this difficulty comes from their frequent polyfunctionality (see Chapter 3) which implies the need to make complex form–function mappings. This seems to be problematic for learners, even for very frequent connectives (Zufferey & Gyax, 2017). Another difficulty is that connectives can also be underspecified, and convey an array of different relations in context. For example, the connective *and* can, in addition to its additive meaning, convey a relation of cause, temporality or contrast. In fact, in speech, this connective has as many as eleven different functions (Crible & Cuenca, 2017). Yet, it seems that learners only integrate their encoded meaning and do not make additional inferences in context (Crible et al. 2021).

Another aspect of this difficulty comes from the fact that using connectives appropriately does not only imply understanding their different functions, but also integrating their syntactic, graphic and register restrictions. All this is again problematic for learners. For example, Yoon and Yoo (2011) provide evidence that Korean learners of English often use coordinating conjunctions in the sentence-initial position in inappropriate grammatical contexts, and also use more sentence fragments than natives. In addition, they add inappropriate punctuation marks after coordinating conjunctions or omit necessary ones. Another aspect is that many connectives are specifically used in a given register, yet several studies have reported that learners use connectives from an inappropriate register, mostly relying on informal

## 9.6 *Suggestions of Teaching Techniques*

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ones with an oral tone (Field & Yip, 1992; Granger & Tyson, 1996). One final area of difficulty is related to discourse relations themselves, and more specifically to the necessity to grasp when a relation can be left implicit and when a connective is needed to ensure coherence. As Zamel (1984: 116) notes: “learning when not to use them [connectives] is as important as learning when to do so”. Yet, learners do not detect the incoherence of some implicit relations like concessions during reading (Wetzel, Crible & Zufferey, 2022).

Learners’ difficulties with connectives are rendered more acute due to the fact that they are inappropriately taught. For example, Zamel (1984) notes that these problems may in part occur because learners are often only taught how to use connectives by function, with a list of different connectives for each of them, without indications about their differences. Crewe (1990) also reports that several textbooks misleadingly present lists of connectives as simple alternatives to convey a given relation. These lists are also accompanied by exercises encouraging learners to pick a list of connectives from several possibilities, thus reinforcing the impression that whole lists of connectives can be equivalent. Hamed (2014) also remarks that some misuses of connectives by Libyan students might be attributable to inappropriate teaching techniques, because in both secondary and tertiary education the focus is placed on grammatical teaching of isolated sentences, rather than on learning the connectives’ functions in a larger context. Cho and Shin (2014) observe that other cohesive devices such as alternative signals are not taught in Korean textbooks for English as a second language, leading to the overuse of a limited range of connectives, observed in many corpus studies (for Korean, see Lee, 2013). Finally, Leedham and Cai (2013) also attribute some Chinese learners’ difficulties with connectives to inappropriate teaching techniques. Connectives are often presented as lists, exercises mostly illustrate isolated sentences, and examples of usage very often contain connectives in the sentence-initial position. Several authors have suggested alternative teaching techniques to improve learners’ knowledge of connectives. We discuss them in the next section.

## **9.6 SUGGESTIONS OF TEACHING TECHNIQUES**

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Several authors have provided alternative ideas to teach connectives more effectively in a second language. Zamel (1984) suggests starting by teaching connectives as grammatical categories (coordinating conjunctions, subordinating conjunctions, etc.) so that learners integrate

how each category can be used within the sentence or between sentences. Starting from a grammatical perspective also allows teachers to present the correct punctuation that needs to be used, as these marks are elicited by grammatical structures. Of course, it is not enough to focus on grammar, and learners must also be taught that each connective has a specific role within the lexicon of a language, going back to Saussure's (2011) definition of meaning as essentially differential. Zamel suggests a number of exercises that can be used to achieve this objective. For example, asking learners to fill in the appropriate subordinating conjunction at the beginning of sentences to achieve a coherent link depending on the related segments. A possibility is to insert the subordinate clauses and ask learners to provide an appropriate continuation. Another exercise is to present pairs of sentences, ask learners to identify which of them require a connective, and to insert the appropriate one. Teachers can also give learners pairs of sentences and ask them to join them by any connective they find appropriate. This exercise can later on be used to discuss in class the different meanings created by using either *moreover* or *therefore* for example. Finally, an option is to use more extensive discourse contexts and ask learners to order scrambled sentences. All these exercises are meant to draw learners' attention to the unique features of each connective, rather than present them as interchangeable lists.

Crewe (1990) also discusses three compatible pedagogical approaches that can be used successively during the acquisition process to increase learners' awareness of the textual meanings of connectives. The first one is a reductionist approach consisting of forcing learners to use only a small subset of connectives, in order to help them become sensitive to the differences between them. The second one is an expansionist phase, during which learners should be encouraged to augment their initial list of connectives with alternative lexicalizations or paraphrases rendering the coherence link more transparent, such as *this is the reason why*, *for this purpose* or *a different view is*. These two steps still focus mostly on the words themselves, whereas the third one aims at including the whole discourse context. The principle consists of asking students, before they start writing, to explicate the logical transitions that they envision between the arguments they want to present. Once this is clarified, students will be better able to choose an appropriate connective from a more extensive list. One final piece of advice is to ask students to write a first draft of their text without connectives, and only add them (or ask another student to add them) in places where they feel the argument is unclear if it is left implicit, in order to avoid the overuse of connectives often observed in corpus data.



Granger and Tyson (1996) also note that students should be made aware that connectives are not mere “stylistic enhancers” but act as links between discourse units. When analyzing authentic texts, emphasis should be placed on the way connectives are used in their role for coherence. Teachers should also place more emphasis on questions of style in order to help learners avoid using connectives from an inappropriate register.

In short, all these methods provide interesting ideas to improve the teaching of connectives that can easily be applied in a classroom context. However, their efficiency should be assessed experimentally before clear recommendations can be made.

## **9.7 SUMMARY**

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In this chapter, we have focused on the way second language learners use and understand connectives. We saw that learners experience many difficulties when using connectives in their textual productions, ranging from the use of connectives conveying an inappropriate meaning in context, syntactic errors due to incorrect placements within the sentence, and the use of connectives from an inappropriate (mostly informal) register. Even when connectives are not misused, learners also inappropriately use connectives from a quantitative perspective, by overusing some of them that they feel confident with (their lexical teddy bears) while avoiding others. These production difficulties are partially reflected in limitations found in comprehension studies. While controlled experiments have found that advanced learners are able to understand frequent connectives used in spoken language, they score lower than native speakers with formal connectives from the written mode. In addition, they often fail to detect the loss of coherence created by the use of inappropriate connectives or the lack of connectives in contexts that require them.

The chapter then discussed the reasons why learners have so many difficulties with connectives, emphasizing the role of negative transfer effects and processing limitations in a second language, but also the high demands related to the nature of connectives themselves, as elements that are the crossroad of lexical, syntactic and discourse knowledge. The role of inappropriate teaching methods has also been emphasized. Another important observation was the wide range of individual variations between learners in their ability to use and understand connectives. These variations have so far been linked to learners’ proficiency level, degree of exposure to print in their first language, as

well as syntactic and vocabulary level in their second language. We concluded with some suggestions to improve the teaching of connectives.

### ***DISCUSSION POINTS***

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- What are the causes for learners' difficulties with connectives?
- What is the role of linguistic proficiency for learners' ability to use connectives?
- Think of your own foreign language learning experience. Were connectives taught at all in your curriculum, and if so, how? Do you think that teaching helped you to use connectives effectively?

### ***FURTHER READING***

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The corpus study by Granger and Tyson (1996) is a very good illustration of all the problems encountered by learners, and the way they can be analyzed using a quantitative corpus-based approach. The comprehension study by Zufferey et al. (2015) compares two groups of learners and compares explicit and implicit knowledge. To learn more about transfer as a general phenomenon in second language acquisition, see Odlin (2022). The notions of explicit and implicit learning in the context of second language acquisition are clearly presented in VanPatten and Smith (2022). Wetzel, Zufferey and Gygax (2020) assess several factors of individual differences in learners' competence with connectives. To find out more about individual differences in second language acquisition, see Ortega (2008). The problems of inappropriate teaching techniques, and the methods that can be used to improve them are described in Crewe (1990).

# Conclusion

The take-away message from this book is quite simple: studying connectives and discourse relations matters because they represent cornerstone elements of discourse coherence. Throughout the book, our aim has been to illustrate the wide variety of research produced over the past decades on these two central notions. We have seen that although both concepts are intrinsically related, they cannot be entirely merged. Discourse relations can be conveyed in the absence of connectives through simple juxtaposition, and connectives can in many cases be used to convey more than one discourse relation depending on context.

A major goal of the book was to assume a broad view on both concepts and their interrelations. We illustrated not only connectives' meanings and functions, but also their links to syntax and their emergence in diachrony. We encompassed the comparison of connectives and discourse relations across different languages, genres, and populations of language users. We reserved a large space for the discussion of psycholinguistic studies, illustrating the importance of both concepts for discourse processing, memorization and comprehension throughout the lifespan, for speakers with various degrees of linguistic competences in the spoken and the written modes.

We have addressed a number of important issues linked to the notion of discourse relations. One of them was to explain why a list of unanimously accepted discourse relations cannot be found in the literature. We argued that this lack of consensus reflects the fact that the definition of discourse relations depends to a great extent on the goals of an annotation project, and the level of granularity that it requires. However, we also saw that similar relations exist across frameworks, and that a broad consensus seems to exist about what constitutes a discourse relation. From a psycholinguistic perspective, we saw that different discourse relations do not play the same role for discourse processing. While causal relations seem to be an essential building block for discourse coherence, facilitating both discourse processing and comprehension, other relations are either more

complex to process (e.g., concessive relations) or do not always facilitate comprehension (e.g., additive relations). Importantly, these processing constraints seem to hold cross-linguistically, at least between the Indo-European languages in which most experiments have been performed. For example, a processing difference between causally or temporally continuous and discontinuous relations (Murray, 1997; Sanders, 2005) has been found in several languages, both in experimental research and in cross-linguistic research performed on parallel directional corpora. Another important finding with respect to the notion of discourse relations – that partly explains differences in processing – is that they are not equal in terms of their degree of cognitive complexity. As a result, children do not acquire them at the same pace. Finally, a crucial observation emerging from the study of discourse relations is their variability across genres, as for example the prevalence of temporal relations is higher in narrative than in argumentative discourse.

We also tackled a variety of questions arising from the study of discourse connectives. We discussed the thorny issue of their categorization depending both on the type of meaning they convey and their actual use in discourse. Regarding their semantic description, we have shown how the semasiological and onomasiological approaches are complementary in uncovering connectives' polyfunctionality. We have also illustrated the multidimensional links that they have with syntax, a lesser-studied topic that nonetheless plays a crucial role in their disambiguation, especially in computational applications. By integrating a diachronic perspective, we were able to sketch different scenarios for the evolution of several categories of connectives, such as coordinating and subordinating conjunctions. We have stressed that most of these diachronic paths are cross-linguistically valid. We also underlined connectives' crucial role for discourse processing and comprehension. In this respect, one of the most notable results is that connectives facilitate discourse processing, and in many cases, also improve comprehension compared to implicit relations, for both children and learners. In the field of first language acquisition, we illustrated the fact that connectives are not easy to master for children. Indeed, while young children already produce many frequent connectives by the time they reach their third birthday, they do not fully understand the same connectives when they are used in texts until the end of their primary school years. We discussed several factors that could explain these difficulties, including the cognitive complexity of the discourse relations that they convey, the order of the segments, but also their polyfunctionality and their frequency in language use.

We saw that the connectives that remain difficult to master during the teenage years are precisely those with a lower frequency that are often bound to the written mode and polyfunctional. Similar problems are in part responsible for learners' difficulties with connectives, although some of learners' limitations are also specific. For example, many studies have illustrated the role of transfers from the first language, a problem not encountered by monolingual children acquiring their first language. Taken together, these results illustrate the many reasons why connectives are a particularly important but also challenging category of lexical items to master, explaining why important variations of competence remain even between adult native speakers.

It is more than likely that research on discourse relations and connectives will continue to expand during the next decades, bringing answers to currently open questions. We briefly highlight some of the most pressing issues and promising avenues of enquiry. First, most of the empirical research so far included a limited set of mostly Indo-European languages, as well as some widely spoken languages such as Arabic and Mandarin Chinese. Yet, the use of connectives is likely to be much more variable than what has been observed so far based on this rather limited dataset. It will be crucial for future research to target languages from other families and continents in order to broaden the scope of our knowledge, for example, by exploring the use of connectives in languages that are not written. In this respect, Marchal, Scholman and Demberg (2021) showed that pidgin languages too can develop at least some specific uses of connectives. There is also emerging research in the area of signed languages, where the focus has mainly been on a restricted set of signs fulfilling discourse connective (and discourse marker) functions (Gabarró-López, 2019; Crible & Gabarró-López, 2021). More research of a similar nature will represent an important step ahead to understand the way discourse is structured across languages, be they written, spoken or signed.

The inclusion of languages without writing systems in empirical research is all the more important as the use of connectives in speech was found to be quite different from their written usages, even in Indo-European languages (e.g., Crible & Cuenca, 2017). In speech, the line between discourse connectives and discourse markers is also less clear-cut than in writing, leading to interesting renegotiations of the meanings and functions for both categories. Here again, the inclusion of more spoken languages will be crucial to add validity to current definitions. In addition to including more languages, future research will also need to compare genres more systematically, both in the written and the spoken modes. Spoken genres and written genres related to

new media are still far too underrepresented in current analyses compared to more traditional written genres such as journal articles and argumentative texts (but see Sanders and Spooren (2015) for a study including chat interactions or Uygur-Distexhe and Degand (2015) for a comparative study between face-to-face, chat and SMS interaction). This limitation is all the more important in cross-linguistic studies, which are still mostly limited to one or two genres. In this respect, the development of new corpora and tools to analyze them will enable researchers in future years to broaden these comparisons to more numerous and diverse genres. A few studies have already shown that crucial differences emerge from such cross-linguistic, cross-genre comparisons, both for connectives (e.g., Dupont & Zufferey, 2017) and discourse relations (Lapshinova-Koltunski, Nedoluzkho & Kunz, 2015), but similar comparisons should be generalized to cross-linguistic corpus research.

Another currently underexplored area of research concerns the role of alternative signals such as syntactic patterns, semantic relations between content words and punctuation marks for the communication of discourse relations. Even though corpus research has demonstrated that a large majority of discourse relations are signaled by such means rather than by connectives (e.g., Das & Taboada, 2013), they have so far not been the topic of much empirical research (but see Crible & Pickering, 2020; Schwab & Liu, 2020). Such studies will be crucial to enhance our understanding of the factors that guide discourse processing and comprehension, and constitute a promising avenue of enquiry for future research.

Alongside these new theoretical developments, the use of experimental methods has spread at a very rapid pace in linguistics over the past decades (Zufferey & Gygax, 2023), and these new methods have been applied to the study of discourse relations and connectives. As we saw in Chapters 6, 8 and 9, such studies have already proved invaluable to increase our understanding of connectives' functions in discourse, as well as the way discourse relations are acquired, understood and processed during reading. In the coming years, experiments should be devised to assess a broader range of connectives, as well as discourse relations in many different languages, as these studies still, for the time being, almost exclusively focus on prototypical and frequent connectives, in a handful of languages. In addition, while it is clear that all connectives are not equally difficult to process and understand, the factors that could influence this complexity are still not fully known. So far, most studies focus on the notions of cognitive complexity and frequency in language use, yet other factors such as

the mode in which a connective is typically used, its register, as well as the semantic transparency of the connective's meaning should also be investigated more systematically. In terms of populations, more studies are needed in particular to assess growing competence during the teenage years, in order to bridge the gap between early acquisition studies and studies focusing on adult populations.

In the case of adults, a crucial development for future research will be the inclusion of more systematic measures of individual variations, as these seem to be quite large, at least for connectives from the written mode. Yet, compared to other domains of language, research on individual variations in the domain of discourse remains scarce (Kidd, Donnelly & Christiansen, 2018). Future research should therefore strive to include more sociolinguistic diversity in the tested populations, and to resort to crowdsourcing techniques to test the validity of theoretical categories such as discourse relations that are defined by linguists (see, e.g., Scholman & Demberg, 2017; Scholman et al., 2022). Another domain in which experimental research still needs to be expanded is the study of second language learners, as so far, corpus studies still largely dominate the field. Yet, experimental data provides a unique viewpoint on the causes of learners' many difficulties with connectives. Future studies should also investigate the impact of teaching techniques for the acquisition of connectives, both in L1 and L2, as current experimental research often lacks concrete pedagogical applications.

In sum, the study of connectives and discourse relations has been very prolific for the past decades, leading to important new findings regarding the way discourse is structured, processed and understood. This research already provided a unique viewpoint on the manifold links between the lexicon, grammar and discourse, across languages and minds. Yet, the many open questions still remaining will keep linguists and psychologists busy for decades to come.

## Glossary

**Additive connective:** connective indicating a discourse relation of addition, in which two segments are linked by a logical conjunction without a relation of implication between them.

**Alternative signal:** linguistic indication of a discourse relation other than a connective, such as a verbal tense, a semantic relation between lexical items or a punctuation mark.

**Ambiguous connective:** connective that can be used to convey different discourse relations depending on context.

**Asyndetic relation:** discourse relation that is not marked by an explicit linguistic marker.

**Bottom-up approach:** methodological approach, mainly in corpus linguistics, that starts from the observation of the linguistic data to construct or confirm a theoretical model.

**Causal connective:** connective used to indicate a discourse relation of causality, that is a relation involving a logical implication between the two related segments.

**Clause-combining:** different ways in which simple clauses may be combined syntactically to form complex clauses, such as coordination and subordination.

**Cognitive impairment:** difficulties affecting the ability to think, learn and remember information, typically impacting memory, language and judgement.

**Cognitive primitive:** used in the CCR framework to designate the meaning components of discourse relations, including basic operation, order of the segments, source of coherence and polarity.

**Coherence:** cognitive notion designating the meaning conveyed by a discourse, both at a local level by adequately connected sentences and at a global level.

**Cohesion:** linguistic notion designating the linguistic features used to link sentences together within a discourse such as anaphora, verbal tenses and discourse connectives.

**Computational linguistics:** linguistic approach applying computer science to the analysis of written and spoken language.

**Conceptual meaning:** in lexical semantics, conceptual meaning refers to the literal encoded meaning of a word.



- Concessive connective:** connective used to indicate a discourse relation of concession, that is a counterfactual relation, indicating that the situation expressed in the main clause is contrary to expectation.
- Connective (discourse connective):** explicit linguistic marker of a discourse relation between two discourse segments.
- Connectivity:** property of linguistic markers to express discourse relations.
- Contrastive connective:** connective used to indicate a discourse relation of contrast, that is a relation involving a semantic opposition between the two related segments.
- Contrastive linguistics:** field of linguistics dedicated to fine-grained synchronic comparisons between specific aspects of a limited number of languages.
- Cooptation:** operation whereby a linguistic expression at the sentence level is deployed for use at the discourse level.
- Coordination:** type of clause combining, whereby the two related segments are functionally and syntactically independent from one another.
- Core meaning:** the basic and most important meaning of a lexical item, of use mainly in the monosemic approach (see **Monosemy**).
- Corpus linguistics:** methodology involving the empirical analysis of a large quantity of naturally occurring digitalized data from written or spoken sources.
- Corpus-based analysis:** quantitative or qualitative empirical analysis of a linguistic feature based on corpus data.
- Dependency relation:** syntactic, semantic or functional relation between a head and its dependencies.
- Diachronic linguistics:** linguistic approach aiming to describe linguistic change over time.
- Discourse annotation:** manual or semi-automatized annotation of discourse features such as discourse relations or connectives in corpus data.
- Discourse comprehension:** understanding of the meaning of a spoken or written discourse, encompassing the linguistic decoding of its linguistic content and the derivation of inferences based on world knowledge.
- Discourse marker:** text structuring device linking the host utterance to the broader context, making explicit speaker's attitudes and speaker-hearer management strategies. Connectives are a subclass of discourse markers.
- Discourse relation:** nature of the logical link uniting discourse segments, such as causality, addition, consequence and concession.
- Experimental pragmatics:** use of experiments applied to pragmatic phenomena such as implicatures and speech acts, in order to study language processing and comprehension.
- Explicit relation:** discourse relation conveyed by the use of a connective.
- Eye-tracking:** method used to infer the position and movements of the eyes to study the cognitive processes at play during spoken language comprehension and online reading.
- First language acquisition:** developing ability to understand and use the language or languages that children are exposed to during their first years of life.

**Genre:** a conventional way to use language in a certain domain such as newspaper articles, literary novels, online chats, etc.

**Grammatical category:** class of linguistic units (like nouns or verbs) or features (like number or case) that share a set of common properties regarding their use in the grammar of a language, also known as part-of-speech (POS).

**Grammaticalization:** diachronic process whereby lexical items become grammatical items.

**Implicit relation:** discourse relation not conveyed by a connective.

**Individual differences:** the different levels of cognitive or linguistic competence between several persons when they perform the same task.

**Mode (spoken -, written -):** the spoken mode refers to language use in spoken form, the written mode refers to language use in its written form.

**Monosemy:** methodological approach in lexical semantics according to which (most) lexical items have a single encoded core meaning.

**Natural language processing (NLP):** computational approach aiming at using computer science techniques to understand how language works.

**Non-truth-conditionality:** meaning of a linguistic expression that cannot be described in terms of truth or falsity.

**Onomasiological approach:** linguistic method aiming at describing meaning differences for broader categories, for example the differences and similarities between causal connectives and contrastive connectives (in contrast with semasiology).

**Periphery (left and right):** position at the beginning or at the end of a linguistic segment.

**Polyfunctionality:** refers to the fact that some connectives can be used to convey several different discourse relations depending on context.

**Polysemy:** methodological approach in lexical semantics according to which lexical items may encode more than one core meaning (contrasts with monosemy).

**POS-tagging:** (automatically) adding a grammatical category label to all tokens in a corpus.

**Pragmaticalization:** diachronic process whereby a lexical or grammatical item becomes a discourse item.

**Procedural meaning:** in lexical semantics, procedural meaning refers to non-conceptual meaning, in other words meaning that does refer to instructions on how to manipulate concepts rather than to (referential) concepts themselves.

**Processing (of discourse):** the mental operations enabling the decoding and understanding of language as it unfolds.

**Psycholinguistics:** a field combining linguistics and psychology to study the processing, representation and acquisition of language in the brain.

**Recall:** the amount of information remembered from a text after reading it.

**Register:** the degree of formality of the language used in a given genre.

**Second language learning:** a field of linguistics studying the acquisition of additional languages acquired after the period of first language acquisition.

- Self-paced reading:** a method used to assess online reading by splitting sentences into segments and measuring the time needed to read them across experimental conditions.
- Semantic path:** description of the way semantic (relational) meanings (typically) evolve over time, for example temporal > causal.
- Semasiological approach:** methodological approach in lexical semantics aiming at describing semantic differences and similarities from specific linguistic items.
- Sociolinguistics:** a field of linguistics analysing the relations between language and society, such as regional, class- and gender-related differences in language use.
- Subordination:** syntactic dependency relation between a main clause and a subordinated clause.
- Syndetic relation:** relation that is expressed by a linguistic marker.
- Taxonomy:** hierarchical classification of concepts, such as discourse relations.
- Temporal connective:** connective that signals a temporal relation, either synchronous (different moments following in time) or asynchronous (at a particular time).
- Top-down approach:** methodological approach whereby the empirical analysis follows a preconceived theoretical model.
- Usage-based linguistics:** linguistic approach that considers authentic language use as it is observed in natural contexts as its object of study.
- Weak-clause association:** property of a linguistic element to be syntactically independent from its host clause or in a loose syntactic dependency relation.

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