

What do Readers Need to Learn in Order to Process Coherence Relations in Narrative
and Expository Text?

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Perhaps we should start with some questions. What do you need to learn to understand the title of this chapter? What does “processing coherence relations” mean? Why should a teacher, let alone a student, care about coherence? We care about coherence because we believe, based on years of research, that processing coherence relations is a cornerstone of comprehension. Coherence breaks down when there are gaps in the text and the reader has trouble handling them. The text is less coherent when there are many conceptual and structural gaps in the text, and the reader does not possess the knowledge to fill them. At the other end of the continuum, the text is progressively more coherent to the extent that there are few gaps and the reader has the prerequisite knowledge. This chapter identifies the specific cues or characteristics of text that fortify coherence.

Our research, and research from many others, has pointed to various properties of the text as one important mission for improving readers’ comprehension. The recent RAND report on *Reading for Understanding* (Snow, 2002) has communicated the pressing need to improve reading comprehension in schools throughout the country. Students’ ability to understand the complex material expressed in textbooks is indeed suffering. For teachers, this pressing need for change may have seemed evident for many years, and certainly didn’t require an official report. However, the report also documents a remarkable evolution in our understanding of reading comprehension. It is now quite evident that a critical aspect of reading is the comprehension meaning. Indeed, the centerpiece of the RAND report was *comprehension*. This contrasts with the historical focus on lower level decoding processes, such as the processing of letters, sound units, syllables, words, and syntax. This change in tide marks not only a better understanding

of these lower level processes, but also the increased recognition of the importance of comprehension in addition to decoding processes.

The RAND report's framework for thinking about reading comprehension included four interactive components: The *reader*, the *text*, comprehension *activities*, and the *sociocultural context* (see Chapter 1). This chapter focuses on the *coherence relations* that organize text content. A text is perceived to be *coherent* to the reader when the ideas hang together in a meaningful and organized manner. How is this accomplished? Coherence *relations* are constructed in the mind of the reader with the help of linguistic and discourse *markers*. A marker is an explicit word, phrase, sentence, or feature that guides the reader in interpreting the substantive ideas in the text, in connecting ideas with other ideas, and in connecting the ideas to higher-level global units (such as the overall theme of the text).

An excellent way to clarify the meaning of coherence relations is through examples. Consider J.K. Rowling's *Harry Potter* series, which is the top selling children's series in the United States and is now featured in blockbuster movies. The first book in the series, *Harry Potter and the Sorcerer's Stone* (1997), begins with the following paragraph.

Mr. and Mrs. Dursley, of number four, Privet Drive, were proud to say that they were perfectly normal, thank you very much. They were the last people you'd expect to be involved in anything strange or mysterious, because they just didn't hold with such nonsense (p. 1).

The substantive ideas capture the facts and events in the story. These include: Mr. and Ms. Dursley live on number four Privet Drive, the Dursleys were perfectly normal, the

Dursleys didn't get into anything strange and mysterious, and the Dursleys believed that the strange and mysterious were nonsense. In addition to these substantive ideas, this beginning paragraph contains coherence relations that vary in type and subtlety. *Text-connecting* relations connect words or clauses in the text. For example, pronouns signal a frequent type of text-connecting relation. *They* refers to Mr. and Mrs. Dursley in the above example. *They* serves as a bridge that links the two clauses in the first sentence with the two clauses in the second sentence.

Conjunctions are another frequent type of text-connecting relation. For example, *because* is a conjunction that connects the two clauses in the second sentence. More specifically, *because* is a signal to the reader that the second clause (the Dursley's believe the strange and mysterious is nonsense) is an explanation of the first clause (the Dursley's were the last people to be involved in the strange and mysterious). The *because* conjunction always means that there is a *causal* coherence relation. The excerpt that begins chapter 14 of *Harry Potter* has a large number of conjunctions and other expressions that connect clauses in text.

Quirrell, however, must have been braver than they'd thought. In the weeks that followed he did seem to be getting paler and thinner, but it didn't look as though he'd cracked yet (p. 228).

However, *but*, and *in the weeks that followed* help the reader connect the clauses in this excerpt. *However* and *but* are *adversative* conjunctions that signal that a clause has information that is different from a claim or expectation. *In the weeks that followed* signals a *temporal* relation. Discourse analysts have proposed a number of taxonomies

that classify these conjunctive coherence relations into subcategories (Halliday & Hasan, 1976; Mann & Thompson, 1986).

Some coherence relations are pitched at more global levels of organization and require the reader to make many inferences. The first sentence of the first Harry Potter example ends with *thank you very much*. This would be a confusing expression to a young reader if taken literally. Who is thanking who? And for what deed? In fact, no one is being thanked at all. Instead, *thank you very much* is a vernacular expression that conveys an attitude. Children and adolescents use the expression frequently as a somewhat derogatory reply to anyone who challenges them with a question or request. But who is expressing the attitude to whom in the story? Perhaps the narrator wishes to convey that the Dursleys are very proud of being normal and would dramatically defend their attitude to any imaginary person who might question their normalcy. Perhaps the narrator is expressing this attitude to the reader. This example illustrates two facts about narrative discourse. First, there are multiple levels of dialogue to worry about in narrative. Not only are there explicit speech acts between characters in the plot, but there are implicit acts of communication between characters, implicit dialogues between the narrator and audience, and implicit dialogues between the writer and reader. Second, many of these implicit levels of communication are largely invisible to the reader and require sophisticated forms of world knowledge. Indeed, background knowledge and the process of making inferences are crucial to successful comprehension.

Harry Potter is replete with excerpts that illustrate how inferences and world knowledge are necessary for connecting sentences and clauses in text. The beginning of

chapter 8 in *Harry Potter*, for example, illustrates this in a simple dialogue between characters.

“There, look.”

“Where?”

“Next to the tall kid with the red hair.”

“Wearing the glasses?”

“Did you see his face?”

“Did you see his scar?” (p. 131)

This beginning of chapter 8 clearly relies on the previous chapters in order for the reader to reconstruct the speaker and listener of each speech act in the dialogue. The text has minimal cues for directing a coherent mental picture of the dialogue. There are only quote symbols and turn-taking conventions for 2-party dialogues. The child learning to read must learn what quote symbols mean and that writers sometimes leave out *who says what*. The child must learn how to recognize embedded conversations between characters and that people take turns speaking in dialogue.

The previous excerpt also illustrates the use of *deictic* coherence relations. These are words that point to characters, locations in space, and points in time in conversation and communication (Clark, 1996; Halliday & Hasan, 1976). Sometimes references to a particular person, place, or time are expressed with many words. For example, there is a rich description of the Dursleys in chapter 1, to the location of a face in chapter 8 (*the face with the scar and glasses, located next to the tall kid with red hair*), and to a point in time in chapter 14 (*in the weeks that followed*). At other times, however, deictic markers are semantically depleted references to people (*I, you, he, she, him, his, her*), to people or

things (*this, that, these, those*), to locations (*here, there, from, to, nearby*), and to times (*now, then, whenever*). Speakers in a conversation often use gestures to point to people, locations, and points in time, but all of this needs to be reconstructed by the reader when text is read. Once again, world knowledge and inferences are needed to accomplish these reconstructions.

Most children have an impressive amount of world knowledge and capacity for generating inferences when reading children's stories (Mandler, 1984; Trabasso & Magliano, 1996; Van den Broek, 1996). The information in stories has a comparatively high similarity to experiences in everyday life (Bruner, 1986; Graesser, Singer, & Trabasso, 1994). A story is a *microworld* with characters who perform actions in pursuit of goals, events that present obstacles to goals, conflicts between characters, emotional reactions, spatial settings, objects and object properties, traits of characters, and mental states of characters. This sort of content has a high correspondence to what the child experiences in everyday life. Of course, there are some violations of everyday life when the story embarks on the supernatural. But even the supernatural must have verisimilitude. When stories and other forms of narrative text are read, the reader wants to be entertained and to learn about the wisdom of life. All of this is buttressed on a rich set of experiences and world knowledge.

In contrast to narrative stories, expository text is written to inform readers about technical ideas with which they are unfamiliar. Young readers normally have much less world knowledge about the ideas in expository text. Expository texts describe objects and parts in complex systems, the functions of these components, causal mechanisms that explain how mechanisms work, procedures for accomplishing objectives, and logical

justifications of claims. Much of this content is abstract and technical, far removed from everyday experiences. For example, a popular expository textbook on technology and science, David Macaulay's *The Way Things Work* (1988), provides illustrated texts on hundreds of everyday devices, ranging from screws to steam engines. Consider the following excerpt about a button battery.

The zinc loses electrons as it becomes zinc oxide, while the mercury atoms gain electrons as the mercury oxide changes to mercury. The battery produces a current of 1.35 volts (p.288).

This expository text has a high density of unfamiliar terms, which is typically the case for expository texts designed to teach readers about technical material. Whereas the temporal connectives (*as, while*) explicitly clarify the timing events in the first sentence, it is notable that there are no causal conjunctions and there are no substantive words that overlap between the first and second sentences. Therefore, the learner will have to infer the relationship between these two sentences. Does the battery produce a current of 1.35 volts *because* the mercury oxide changes to mercury? Or, are these clauses not linked by causal relations? These types of inferences are necessary to understand expository texts. However, these inferences rely heavily on the reader's ability to draw on previous knowledge – knowledge that most readers don't have.

When there are more conjunctions and overlapping terms explicitly mentioned in the text, the text is often more coherent and most readers process it more easily.

Numerous studies have reported that increasing the explicit coherence relations in expository texts improves memory and comprehension (Beck, McKeown, Sinatra, & Loxterman, 1991; Britton & Gulgoz, 1991; McNamara, 2001). Paradoxically, expository

texts often lack the necessary linguistic and discourse markers (and resulting coherence) that is needed for most students to successfully comprehend them. Moreover, the comprehension deficits that arise from texts with low coherence are particularly problematic for readers with less knowledge about the domain (McNamara, Kintsch, Songer, & Kintsch, 1996, McNamara, 2001). This combination of factors results in the common situation of frustrated learners faced with nearly incomprehensible textbooks.

There are many different types of relations that improve the coherence of expository text. We have already described the referential, causal, temporal, spatial, adversative, logical, and deictic coherence relations. There are two additional classes of coherence relations. There are headers, sub-headers, and highlighted words that help organize the content hierarchically and that signify the type of expository text. These *signaling devices* can unveil the organization and purpose of the expository text very quickly. Texts about dishwashers have very different signaling devices when written for a school course, versus a repair manual, versus an advertisement. It is interesting to note that narrative texts do not have the prevalent array of headers, sub-headers, and word highlighting that occurs in expository texts.

The final class of coherence relations, particularly in expository text, consists of paragraph conventions. It is a good policy for expository text writers to follow a Topic Sentence + Elaboration rhetorical format. The first sentence identifies the main topic or theme of the paragraph, whereas the subsequent sentences supply additional detail that is relevant to the topic sentence. In contrast, the paragraph conventions for narrative are different and less constrained because narratives often map onto our own experiences in the world. One reason why paragraph conventions are more frequent in expository text is

that they reduce the number of conceptual gaps, which is more important when reading the less familiar information in such texts.

Now that we have described and illustrated coherence relations, we turn to the more practical questions of what educators need to consider when teaching children how to proficiently master coherence relations during reading. We will accomplish this in three parts. First, we will briefly identify the mental representations and processes that researchers believe are part of the comprehension of meaning. Second, we will present a comprehensive set of coherence relations that teachers and young readers need to learn. There are differences in the difficulty of mastering the various classes of coherence relations, which presents challenges for students and teachers. Third, we will discuss the implications of this research on reading instruction.

Mental Representations and Processes

When readers comprehend text, they mentally build meaning representations at multiple levels. Each level has its own special characteristics. Most researchers who investigate text and discourse comprehension talk about five levels (Graesser, Millis, & Zwaan, 1997; Kintsch, 1998):

- (1) *Surface code*. The exact wording and grammar of the sentences.
- (2) *Textbase*. The meaning of the clauses that are explicitly mentioned in the text.
- (3) *Mental model*. The ideas or microworld of what the text is about. Inferences based on world knowledge are needed to construct the mental model; that is, the meaning in the mental model goes beyond the explicit text.

(4) *Text genre*. The category of the text. The major genre categories are narrative, expository, persuasive, and descriptive texts, but some texts are combinations of these basic categories. Each genre has its own rhetorical structure. For example, simple folktales have a Setting+Plot+Moral rhetorical structure whereas an expository text on a scientific argument would have a Claim+Evidence rhetorical structure.

(5) *Communication channel*. The act of communication between the reader and writer, or narrator and audience. Such acts of communication normally require a global theme, message, point, or purpose in writing the text. The ground rules for the communication differ among the various genres, such as arguments, tutoring sessions, jokes, and newspaper articles.

A text is coherent when there are adequate connections and harmony both within levels and between levels.

It should be perfectly obvious that children need to master each of these levels in order to be a proficient reader. They need to learn the meaning of the words, the grammatical forms, the subject matter, the rhetorical structure, and the communication conventions. Moreover, it may not be enough merely to *learn* all of this; they may have to *overlearn* it. That is, they may need extensive practice, in diverse contexts, so the codes, structures, and processing skills become automatic (Perfetti, 1985). A child becomes *proficient* with a level of representation when they know what the code is (called *awareness*), they can mental build the code reliably (called *mastery*), they know when to construct the code (called *tuning*), and they can know how to execute and monitor the construction of code very quickly (called *skill*). Reading proficiency is not

achieved by merely lecturing to the child. There needs to be extensive practice, with guidance and feedback from the teacher (or peers or a computer), so that there is active application of the knowledge. Frequent reading is arguably the most critical gateway to improving reading skill, but high quality feedback from the teacher on the reading process presumably is also important.

Reading researchers have traditionally focused on reading proficiency at the levels of the surface code and to some extent the textbase. Children receive drill and practice on letter-sound correspondence, phonemic awareness, syllable composition, meanings of words, and sometimes grammatical form. The development of reading proficiency at the deeper levels of comprehension have been comparatively neglected, although there have been more serious attempts to fill this gap in recent years (Cornoldi & Oakhill, 1996; Palincsar & Brown, 1984; Pressley & Afflerbach, 1995; Trabasso & Magliano, 1996; Van den Broek, 1996; Williams, 1993). Part of the reason for this neglect was the lack of scientific research on the deeper levels of comprehension 25 years ago. However, fortunately times have changed. Researchers in the field of *discourse processes* have dissected the deeper levels of comprehension in rich detail and have made some impressive progress. It is beyond the scope of this chapter to reference all of this important research that has investigated deeper levels of comprehension. However, we do recommend a number of books that review this literature (Graesser, Gernsbacher, & Goldman, in press; Kintsch, 1998; Louwse & Van Peer, 2002; Otero, Leon, & Graesser, 2002). At the same time, however, we should acknowledge that there are considerable gaps in the available research literature, so the reading researchers have a full research agenda.

It is worthwhile to enumerate some of the key assumptions about how the mind functions in theories of reading and discourse processing (Graesser et al., 1994, 1997; Kintsch, 1998). These assumptions will hopefully allow the reading teacher to better understand why some coherence relations are easier to master than others. The following nine assumptions are routinely adopted by discourse researchers.

(1) **Information sources.** Three important information sources are the explicit text, relevant background knowledge, and the communication context that situates the reading of the text. The background knowledge includes both general knowledge (e.g., what the reader knows about door locks in general) and specific experiences (e.g., an experience of that the reader previously had about being locked in the bathroom one day).

(2) **Memory stores.** The three memory stores are short-term memory, working memory, and long-term memory. Short-term memory holds the current clause being processed, whereas working memory holds a handful of recent important clauses. It is difficult for some readers to link the immediate clause being read in the text to sentences and paragraphs several pages earlier; this earlier content has either left short-term memory and working memory, or it takes too much time to fetch it from long-term memory. These difficulties are more severe for readers with less knowledge of the topic.

(3) **Discourse focus.** The discourse focus is the idea that is directly in consciousness. Content in the discourse focus can be referred to with pronouns (*he, she, this, it*). The content outside of the discourse focus needs to be described in more words so that the reader can easily recognize to what the writer is referring.

(4) **Harmony within and among levels.** Confusion is elicited by disharmony among information sources and levels of mental representation. The disharmony

stimulates additional thought and mental effort to resolve such contradictions. For example, an explicit coherence relation that does not mesh with the substantive ideas requires more reading time and thought by a diligent reader.

(5) ***Repetition and automaticity.*** Repeated activation of a word or idea increases the speed of accessing it from long-term memory. After many repetitions, the word or idea is automatically fetched from long-term memory with very little mental effort.

(6) ***Satisfaction of reader goals.*** Readers are motivated by one or more comprehension goals when reading a text. The goals are either idiosyncratic to the reader or are appropriate for the text genre. For example, a skilled reader of a mystery novel knows that an apparently irrelevant fact (e.g., the author mentioning a character's scar) may have explanatory significance later in the narrative. Good readers allocate their mental effort to explicit information and inferences that address the reader's comprehension goals.

(7) ***Local and global coherence.*** The comprehender's goal is to construct a meaningful representation that establishes local and global coherence among clauses expressed in the text. Local text coherence is established when clauses next to each other in the text can be connected coherently. Global coherence links up larger chunks of text.

(8) ***Explanation.*** A proficient reader attempts to explain *why* events in the text occur and *why* the author explicitly mentions particular information in the text. Such explanations include motives of characters' actions, causes of events, and justifications of claims. Why-questions guide comprehension to a greater extent than other types of questions (e.g., where, when, how, and what happens next). Explanation of expository text is particularly important. Readers who consistently attempt to explain what the

content means, rather than passively processing the text, understand the text better and at a deeper level.

(9) *Levels of mental representation*. As mentioned earlier, there are multiple levels of understanding during comprehension. Five levels were listed and described earlier in this section (surface code, textbase, mental model, text genre and communication channel). Among these, understanding at the level of the mental model has particularly important implications for comprehension because this is the level at which many readers struggle.

It is important to reiterate the RAND panel's view that comprehension has four interactive components, namely the text, the reader, comprehension activities, and sociocultural context. Empirical studies of reading have uncovered some intriguing, and sometimes counterintuitive, interactions among the text, reader, and task variables (Cote, Goldman & Saul, 1998; McNamara et al., 1996; McNamara, 2001). For example, McNamara et al. (1996) manipulated text coherence (high versus low), measured readers' knowledge about passage topics (high versus low knowledge about science), and administered several tests that tapped different levels of mental representation. High coherence texts benefited readers with low knowledge, regardless of the type of comprehension test (to no one's surprise). However, when tests of deep comprehension were analyzed, high-knowledge readers showed substantial benefits from having read texts with *low* cohesion (to the surprise of many). The low-coherence texts encourage the knowledgeable readers to work harder and actively build richer mental representations. Comprehension researchers are currently discovering and explaining many such higher order interactions (e.g., Cote, Goldman & Saul, 1998; McNamara et al., 1996; McNamara,

2001). Such complexities of course present challenges for those who teach comprehension skills.

Classes of Coherence Relations

The purpose of this section is to identify a comprehensive set of coherence relations. There are special challenges in becoming proficient in mastering each of these classes of coherence relations. Some of these challenges are discussed in this section and the subsequent section.

(1) **Coreference.** Coreference occurs when two words (or verbal expressions) refer to the same person, thing, abstract concept, or idea. Pronouns are a textbook case of coreference. *They* is a coreference with the *Dursleys* in the first *Harry Potter* example. A proficient reader needs to figure out the coreferent whenever there is a pronoun in the text: *he, she, him, her, his, hers, they, their, it, this, that, which, what, who*, the list goes on. Pronoun comprehension is complicated and takes longer to achieve when the coreferent of the pronoun is *ambiguous* (the pronoun can refer to two or more entities) or is *vague* (it is impossible to precisely resolve the pronoun) (Clark, 1996; Gernsbacher, 1997). Many pronouns are indeed ambiguous or vague in naturalistic discourse, particularly the pronouns *it* and *they*. What does *it* refer to in *It is raining?* What individuals are involved when a child says *They don't like me?*

When an entity is first introduced in a text, a good writer grounds it with a rich description (e.g., *a big bad wolf*). A subsequent reference to it can be made with a pronoun (*it, he*) or a noun (*the wolf*), unless there are multiple wolves that need to be discriminated. If the entity has not been mentioned for several sentences and pages, a

good writer needs to reintroduce the entity with a rich description (e.g., *the big bad wolf that had earlier been lurking in the forest*). Beginning readers need to learn these conventions of coreference in English. They often need to do so when writers are not particularly simple and systematic in following the conventions.

Inferences are also needed when a different noun is used to refer to a previous entity or event. Consider the following examples.

The musician brought the bassoon, but the woodwind was never played.

Pakistan is fighting India. The conflict is escalating.

A bridging inference is needed to link *woodwind* to *bassoon* and to link *conflict* to the *fight* between Pakistan and India. As mentioned earlier, low-knowledge readers have trouble making these bridging inferences so it is a good policy to have explicit coreferences in texts for low-knowledge readers (Britton & Gulgoz, 1991; McNamara et al., 1996; McNamara, 2001).

(2) **Deixis**. As discussed earlier, deictic references point to the people, locations, and time in a conversation among participants. The conversation may be between the writer and reader, between the narrator and the audience, or between two characters in a story. There are pronouns that refer to people (*I, you, we*), to locations (*here, there, over there*), and to time (*now, then, later*). As in the case of coreference, a good writer makes sure that the referents are in the *common ground* before these pronouns and adverbs are used. A referent is in the common ground when both the writer and comprehender understand who or what it is (i.e., it is shared knowledge).

(3) **Given-new cues**. The content of every sentence in a text can be segregated in to *given* (old) information and *new* information. Given information has already been

introduced, mentioned, or inferred from the previous text (i.e., prior to the sentence being read). New information advances the discourse with new content. Consider the following sentence from Harry Potter: *The table was almost hidden beneath all Dudley's birthday presents* (p. 19). Some of the given and new ideas are enumerated below.

There is a table (given)

There are birthday presents (given)

Dudley exists (given)

The birthday presents are for Dudley (given)

There are several birthday presents (given)

The table is almost hidden (new)

The table is beneath the presents (new)

Given information is frequently tucked in the nouns and noun modifiers in the sentences, whereas the main verb and its modifiers capture the new information. It is beyond the scope of this chapter to discuss the many cues that contrast given and new (see Clark, 1996), but we do advocate that understanding the distinction be an important exercise for children learning to read.

(4) *Conjunctive relations*. These are text-connecting relations that normally link adjacent clauses or sentences. These relations can be classified according to particular characteristics of world knowledge, mental models and communication. Among the subcategories of conjunctive relations are additive (*and, also, moreover*), temporal (*and then, then, when, before, after, during, while*), causal (*because, consequently, as a result*), intentional (*in order to, by means of*), adversative (*but, although, however*), and logical (*therefore, so*) (Halliday & Hasan, 1976).

Sometimes proficient readers are able to infer the relations without the presence of the conjunctions. How do they do this? They can reconstruct the relations on the basis of world knowledge in conjunction with the various levels of meaning representation. However, beginning readers and low-knowledge readers benefit from the conjunctions being explicitly mentioned in the text. The inclusion of conjunctions tends to lengthen sentences, which has the unwanted side effect of taxing working memory. However, the benefits of clarifying the coherence relation between the clauses normally outweigh the penalties of increasing the load on working memory. Available research suggests that the tradeoff should be tipped toward clarity for low-knowledge readers (McNamara et al., 1996).

(5) ***Verb tense and chronology.*** The events in stories unfold in a chronological order. Similarly, expository texts that describe event chains unfold in a sequential order. In the vast majority of texts, the order of mentioning the events corresponds to the chronological order. This correspondence is indeed assumed when explicit temporal cues are absent; if the author mentions events A, B, and C, then it is assumed that A occurred before B and B occurred before C. A good writer adds the explicit temporal cues when there are deviations from this chronological order, as in the case of flashbacks and flash forwards. The tense of the verbs (i.e., past, present, future) also plays an important role in keeping track of the chronological order of events. A cooperative writer gives rich reorienting descriptions when there are major shifts in the time line, such as *Last week at the Sunday dinner* or *Later on in his career*. It is safe to assume that the next event described in a text is the next step on the chronological timeline unless there are linguistic

or discourse cues that signal temporal deviations. Such deviations take additional time for the reader to process (Zwaan & Radvansky, 1998).

(6) **Scene changes.** A scene is a spatial context that houses the characters who interact in a story or the entities that exist in an expository text. Scene changes are explicitly signaled by a good writer, e.g., *meanwhile*, *back at the ranch* or *the governments in other countries such as China*. It takes additional processing time for the mental camera to shift from one scene to another (Rinck, Williams, Bower, & Becker, 1996).

(7) **Headers and highlighting.** As discussed earlier, headers, subheaders, and highlighted words serve numerous discourse functions. They help organize the text and allow the reader to recognize the relevant text genre. They guide the reader's attention and comprehension strategies in a top down fashion. These *signaling devices* are particularly helpful to low-knowledge readers.

(8) **Topic sentences.** One rhetorical convention for expository text is that the first sentence in a paragraph should capture the main topic or theme of the paragraph. Subsequent sentences embellish the topic sentence. Writers who deviate from this convention run the risk of confusing the reader.

(9) **Punctuation.** We have already discussed the importance of quotation marks to signify speech acts of characters in stories. Speech acts in quotes (*John said to Mary "I hate lasagna."*) can alternatively be articulated without quotes (*John told Mary that he hated lasagna*). Speech acts in quotes emphasize the performance, experience, and timing of the conversation (how it was said) whereas forms of indirect address settle for the bare bones meaning (what was said). Aside from quotes, there are other forms of

punctuation that have well established conventional meanings, namely periods (.), colons (:), semi-colons (;), commas (,), exclamation points (!), and dashes (-). Beginning readers may not fully understand the discourse function of these forms of punctuation.

(10) *Signals of rhetorical structure*. There are different subclasses of narrative and expository texts that have distinct rhetorical structures. Coherence relations play a prominent role in the recognition and organization of the rhetorical structure. Consider the different types of expository texts below and the associated explicit coherence relations.

Lists and orderings (*First, Second, Third, a, b, c*)

Procedures (*The first step is, The second step is*)

Compare-contrast (*On the one hand, On the other hand, whereas*)

Claim+Evidence (*The primary claim is, support for*)

There are distinctive words for recognizing other major subtypes of expository texts: Problem+Solution, Data+Conclusions, Explanations, Logical Syllogisms, Definition+Examples, and Introduction+Methods+Results+Discussion. Obviously, it is not sufficient for the reader to simply memorize what discourse markers are distinctively associated with each particular rhetorical structure. The reader also needs to understand the world knowledge and communication function associated with each subtype of genre.

Implications for Reading Instruction

How do we improve the reader's proficiency in handling coherence relations? This will not be an easy agenda. Very few teachers are aware of the broad landscape of coherence relations because the field of discourse processes has only a 25-year history.

Most researchers who have studied text coherence have not yet considered the implications of coherence for teaching reading.

One obvious first step is to increase the reader's awareness of the different types of coherence relations. Just as there are reading programs that promote phonemic awareness, there should be those that emphasize coherence awareness. There needs to be a cottage industry of workbooks, computer software, and teacher training workshops that identify the different types of coherence relations. There should be definitions, examples, and extensive drill and practice for each class of relation. It is not sufficient to spend a day or two giving a lecture on the taxonomy of coherence relations. The process of identifying and interpreting such relations will need to *overlearned* to the point of being automatic. There are likely to be benefits from coordinating the writing of the coherence relations with proficiency in reading them. However, it remains to be seen what sort of curriculum will optimize reading proficiency for different types of learners.

We have emphasized throughout this chapter that world knowledge plays a major role in constructing most of the coherence relations. The importance of coherence relations becomes more critical to the extent that the reader knows less and less about the subject matter. The teacher's selection of topics for the reader is likely to be a bit tricky. If the reader knows too much about the topic, then attention to the coherence relations will have small payoffs. If the reader's knowledge about the subject matter is bankrupt, then there will not be enough foundation to generate the inferences that must accompany the explicit relations. We suspect that an intermediate amount of world knowledge may be optimal -- at the reader's *zone of proximal development*.

There presumably are advantages to exposing the reader to a variety of text genre and coherence relations. They will read fairytales, mysteries, scientific texts, persuasive essays, newspaper articles, recipes, memos, jokes, and so on. These texts should provide a balanced repertoire of all 10 classes of coherence relations that were enumerated in the last section. The resulting reading proficiency will hopefully be broad and flexible.

The purpose of this chapter was to identify what readers need to learn about coherence relations in narrative and expository texts. We have provided a glimpse of what needs to be known. Our claims have been grounded in empirical scientific research on text comprehension, but it is informative to note that the vast majority of this research has been on high school and college students rather than children. There needs to be more attention to investigating effective methods of teaching such relations in classrooms, tutoring sessions, computer-based training, and other learning environments. It is time for teachers and reading researchers to roll up our sleeves and get started.

Author Note

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