

Clinical Forum

A Case for the Sentence in Reading Comprehension

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amhi's (2007) provocative article on the case for the narrow view of reading provides an opportunity to stand back and think about how we define reading.

Do we look at reading from a narrow perspective as the process of accessing words, or do we think of reading as what occurs after all the words are (accurately and quickly) recognized and we are mulling over the content of what we have read—analyzing it, evaluating it, perhaps even creating new knowledge from it, or, in the words of Perfetti (1985) and others, thinking guided by print? Kamhi's remarks provide an opportunity for us to look critically at what we mean by reading. He asks us to separate word recognition from reading comprehension and then think carefully about the process of reading comprehension. He draws a distinction between efforts to teach reading comprehension by working on domain-general comprehension skills on the one hand, or strengthening the knowledge base (content) that feeds reading comprehension on the other. For example, do we believe that teaching a generic (domain-general) comprehension strategy in carefully controlled texts will really help a student understand the textbook description of electricity and magnetism and related science topics? Wouldn't it be better to teach electricity and magnetism vocabulary and/or facts and theory?

Like all the contributors to this forum, I want to know why many children and adolescents struggle to comprehend what they read. I will make the case that sentence comprehension is a culprit for some readers and is commonly overlooked when thinking about improving reading comprehension and content knowledge. If a reader cannot derive meaning from individual sentences that make up a text, that is going to be a major obstacle in text-level comprehension. This statement seems so obvious that it is all the more puzzling that so little attention has been paid to sentence parsing as a component of reading comprehension. The word *sentence* does not even appear among the recommended domains of best practice instruction taken up by the National Reading Panel (2000) and popularized as the five topic headings of phonemic awareness, phonics, fluency, vocabulary, and text comprehension. Nor are sentences discussed at all under the topic of text comprehension.

Three perspectives have influenced my thinking about sentences and how this "chunk" of language is related to reading comprehension. The first is just a matter of personal interest. I have always been fascinated with the structural form of the language that goes between a capital and a period and how some children develop fluency with that form so early and effortlessly. I love listening to

ABSTRACT: Purpose: This article addresses sentence comprehension as a requirement of reading comprehension within the framework of the narrow view of reading that was advocated in the prologue to this forum. The focus is on the comprehension requirements of complex sentences, which are characteristic of school texts.

Method: Topics included in this discussion are (a) evidence linking sentence comprehension and syntax with reading, (b) syntactic properties of sentences that make them difficult to understand, (c) clinical applications for the assessment of sentence comprehension as it relates to reading, and (d) evidence and methods for addressing sentence complexity in treatment.

Conclusion: Sentence complexity can create comprehension problems for struggling readers. The contribution of sentence comprehension to successful reading has been overlooked in models that emphasize domain-general comprehension strategies at the text level. The author calls for the evaluation of sentence comprehension within the context of content domains where complex sentences are found.

KEY WORDS: reading comprehension, sentence comprehension, syntax, syntactic complexity, specific language impairment

a 5-year-old tell about an experience using a sentence with three clauses and connectives like *until*, *wherever*, and *actually*. During the primaries preceding the November election, a news commentator got my attention right away when I heard the comment that one of the presidential hopefuls speaks in “six-clause sentences,” the implication being that the candidate had substantive things to say. A second perspective stems from my interest in linguistic variation. I have studied the ways that sentences children are asked to read and those they eventually write can be very different from those they hear and say (Scott, 2004a; Scott & Windsor, 2000). A third influence on my thinking comes from clinical work assessing spoken and written language skills in school-age children and adolescents. Here I have observed that children who score poorly on norm-referenced tests of language comprehension, many of which test sentence-level comprehension in decontextualized ways, are also poor readers—even those whose word recognition skills are broadly within normal limits.

In the first part of this article, I discuss relationships between the sentence comprehension skills of children and how these skills may impact reading comprehension. Although there is evidence that children’s sentence comprehension may also relate to accurate decoding (e.g., Nation & Snowling, 2004), my focus will be on the relationship between sentence comprehension and reading comprehension (i.e., understanding at the text level). Then, in order to see the full force of how sentence comprehension difficulties might influence reading comprehension, I outline some of the structural features of sentences in the language of schools and textbooks and how these features can exacerbate comprehension problems. Finally, I discuss clinical applications including (a) how to determine if a child has language comprehension problems that could be affecting reading, and (b) whether there is any evidence that interventions at the sentence level might impact reading. I would like to be clear that my concept of the sentence in this article encompasses *both* form (syntax and morphology) *and* meaning encoded by the combinations of words and clauses (e.g., the logical semantic relation of reason communicated by joining two clauses with the subordinate conjunction *because*). Although the sentence is clearly the “domain” of the syntactic component of language, and syntax is of great interest in the abstract to linguists and cognitive scientists, for my purposes as an applied researcher and clinician, I see syntax as the vehicle, even “workhorse,” of meaning. As such, it is also a vehicle (not the only one, but a major one) for acquiring the knowledge base needed for reading comprehension. If this vehicle is flawed, it will not transport the knowledge very well.

Sentence Comprehension and Reading

There are several lines of research that demonstrate associations between general (oral) sentence-level syntactic/semantic abilities and reading comprehension. Researchers who have followed children with language impairment (LI) longitudinally have shown that a sizeable number of these children have problems in reading in later school years (Scarborough, 2001), even when their word recognition skills are age appropriate (Catts, Adlof, Hogan, & Ellis-Weismer, 2005). In a second approach, older children (mid-elementary and above) who were identified as poor (reading) comprehenders were tested on oral sentence-level semantic and syntactic tasks and were found lacking compared to those with better reading comprehension

(e.g., Catts, Adlof, & Ellis Weismer, 2006). In a review of research on the nature of the association between syntax and reading, Scott (2004b) concluded:

It is relatively easy to establish an association between syntactic ability and reading. By way of contrast, it is exceedingly difficult to understand the true nature of this relationship. Syntax-as-knowledge is difficult to isolate from syntax-as-process, and any one syntactic structure or task that might be chosen for study is a small slice of the entire syntactic faculty. (p. 354)

More recently, Cain and Oakhill (2007) analyzed the evidence for sentence-level skills and processes as explanations for reading comprehension difficulties. They distinguished between studies that tap syntactic *knowledge* (i.e., the implicit knowledge that one would draw on, unconsciously, when listening to sentences) and those that tap syntactic *awareness* (i.e., a more “meta,” or explicit level of knowledge necessary to detect/correct syntactic errors). They reported mixed findings for studies that used implicit tasks but stronger associations for those that used syntactic awareness tasks. These reviews reinforce the idea that it would be a mistake to think of a unitary syntax ability as a contributor to reading comprehension. Different results from studies often stem from using different sentence tasks that tap different abilities and impose different constraints.

The fact that reading is a developmental process that takes place over several years is important to remember when considering potential relationships between an individual’s oral (or general) syntax skills and his or her reading comprehension. This relationship may change according to when children are tested and observed. Scarborough’s (1990) study is often cited as one of the first to show a strong relationship between early syntax facility and later reading; she studied 2½-year-old toddlers whose language was changing at a rapid rate. In a recent study where kindergarten language data were available retrospectively, only one third of a group of eighth-grade poor reading comprehenders met the criteria for primary LI as kindergartners (Catts et al., 2006). Perhaps this is because, by ages 5 and 6, preschoolers who were late talkers may be entering a stage of illusory recovery, when there is a developmental plateau, at least for expressive language (Scarborough & Dobrich, 1990). Among the reasons why a group of poor comprehenders might seem to emerge with time is the nature of poor sentences that children are expected to comprehend as they progress through school. Many clinicians have observed this. The key phrase here is *seem to emerge*. It is probably not coincidental that the time when reading comprehension problems become apparent is when sentences in school texts present challenges that are not encountered in more casual oral language. In the next section, I highlight the syntactic features that can make written sentences difficult to understand.

An additional factor to consider as we think about relationships between oral language skills at the sentence level and reading comprehension is the well-documented linguistic heterogeneity in the population of children with primary LI. Not all children are poor at language for the same reasons. Over the years, researchers have proposed several typologies (subtypes) of LI. A standard approach to the question of subtypes is to administer a large battery of standardized tests that cover a range of lexical, sentence, and discourse skills, and to use factor analysis to sort participants into groups. Of interest here is the finding that poor performance on sentence-level comprehension and production tasks (often labeled receptive or

expressive grammar) is a prominent characteristic of participants in several subgroups of LI (e.g., Conti-Ramsden & Botting, 1999; van Daal, Verhoeven, & van Balkom, 2004).

What specific characteristics of sentences do children with primary LI find so difficult? Inflectional morphology, particularly verb tense and agreement, is one such area (Rice, 2003). Sentences that feature long distance dependencies (e.g., reflexive pronouns, object relative clauses, passive voice) are also problematic. The children and adolescents with these types of focused grammatical impairments are said to form a subtype of LI, which van der Lely (2003, 2005) named grammatical specific language impairment (G-SLI). These types of language problems are thought to result from a specific grammatically based representational deficit as opposed to a more domain-general cognitive difference, as discussed by Silliman and Scott (2006). However, the jury is still out on this matter, and we continue to see many studies that are designed to explicate the nature of the relationship between syntactic difficulties and cognitive/processing domains (e.g., Leonard et al., 2007). What does seem clear is that many young children who have difficulty comprehending and producing sentences at a standard that is comparable to their peers are at risk for reading problems, and that even those without ostensible sentence difficulties may be labeled as poor comprehenders when they cross over to the reading-to-learn, mid-elementary years of school (see Ehren, this issue, for a perspective on this crossover).

What Makes Sentences Complex and Difficult?

Speech-language pathologists (SLPs) are familiar with the concept of sentence complexity. The global measure of utterance length (mean length of utterance [MLU] in morphemes or words) is a commonly used measure for capturing sentence complexity in young children's naturalistic language production (conversations or narratives). For older children, SLPs have used additional measures of sentence complexity including the extent to which sentences contain more than one clause, and the extent and nature of complexity in noun phrases (NPs) and verb phrases (VPs). An example of NP complexity is shown in the contrast between sentences (1) and (2) below:

- (1) The amendment was a disaster.
- (2) The thoroughly rewritten and meaningless *amendment* that was inserted by the aide was a disaster.

Both sentences have the same subject (*amendment*). The subject NP is greatly expanded in (2), however, with an additional four words that premodify the head noun *amendment* and six postmodifying words in the form of a relative clause. The relative clause, being center embedded, interrupts the main clause subject (*amendment*) and its predicate (*was a disaster*). The *aide* is not a disaster—the *amendment* is a disaster. This sentence could challenge the listener, who must contend with fleeting auditory input, and the reader, who does not have the benefit of prosody.

In reference to their work with adults with aphasia, Thompson and Shapiro (2007) identified four variables that contribute to sentence complexity, including (a) the number of propositions (this aligns with the number of verbs, which in turn aligns with the number of clauses); (b) the number of embeddings; (c) the order in which major elements appear in the sentence, whether canonical (i.e., subject-verb-object; SVO) or noncanonical (e.g., passive sentences); and (d) the distance between crucial elements in the sentence. The sentence below, taken from my local newspaper, shows how the first two variables, adding propositions and embeddings, increase sentence complexity:

- (3) The promulgation of a sweeping set of standards for America's schools *has triggered* a widening protest from state and local officials, who *complain* that the administration *is interfering* with their own education reform efforts and *usurping* what traditionally *has been* a jealously guarded realm of state and local initiative.

There are five propositions in this 49-word sentence, aligning with the five clauses signaled by the five italicized verbs. There are several depths of clausal embedding that the reader must compute, as illustrated by placement of the clauses at different levels in Figure 1.

To illustrate the effect of order, sentence (4), because it follows canonical SVO order in English, would be easier to comprehend than the passive sentence (5) or the cleft sentence (6), which are noncanonical:

- (4) John (S) kicked (V) the ball (O)
- (5) The ball (O) was kicked (V) by John (S)
- (6) It was the ball (O) that John (S) kicked (V)

Other effects of order include sentences with left-branching subordinate clauses, which force the reader to "wait" for the main clause proposition, as in (7):

- (7) Seeing that her arguments were not having the effect she hoped for, Mary made no further comments at the meeting.

Figure 1. A schematic illustrating the levels of embedding in sentence (3). The clause with the verb *complain* is subordinate to the main clause; the clause with the verbs *interfering* and *usurping* is subordinate to the clause with *complain*, and so forth.

The promulgation of <i>HAS TRIGGERED</i> and local officials		
1 st	who <i>COMPLAIN</i>	relative clause modifying <i>officials</i>
2 nd	that the administration <i>is INTERFERING</i> with...and <i>USURPING</i>	coordinated object complement clauses serving as the direct object of <i>complain</i>
3 rd	what traditionally <i>HAS BEEN</i>initiative	another object complement clause serving as the direct object of <i>usurping</i>

The final variable discussed by Thompson and Shapiro (2007), the distance between crucial elements in a sentence, encompasses several different structures. Basically, the premise is that when words intervene between elements that are typically closer together in a canonically constructed sentence, the parser (reader) has to work harder. We saw this in (2) above where the main clause subject and verb were interrupted by the center-embedded relative clause of six words. The same thing occurs in (3), where nine words intervene between the subject *promulgation* and the verb *has triggered*. Other examples are more subtle because the relationship is between an element and a “trace” left by an element that has moved to another place. This occurs in several types of sentences that include *wh*-questions (8), object relative clauses (9), and object cleft sentences (10). In each of these examples, the elements that relate to one another are shown in italics; the trace element is shown in brackets but is not actually said (or written).

(8) *Who* did the English teacher send [*? someone*] to the principal’s office?

(9) Picasso crafted the vase *that* the museum in New York purchased [*the vase*].

(10) It is the player from the minors *that* the team signed [*the player*] yesterday.

More than 20 years ago, Perera included a section titled “reading difficulty at the sentence level” in her book, *Children’s Writing and Reading: Analyzing Classroom Language* (1984). This material remains one of the best descriptions of sentence processing requirements imposed by “academic” language that I have ever read. Included in her long list of sentences that are difficult to process are all of the forms discussed in this section.

The sentences of expository text are of greatest concern. Students are spending much of their school day reading informational language—the language of science, history, math, and other content subjects. I and many others have written elsewhere about sentence-level differences imposed by modality (i.e., writing compared to speaking) and genre (i.e., expository compared to narrative discourse) and the reasons for these differences (e.g., Ravid & Tolchinsky, 2002; Scott, 2004a, 2005). We know that informational sentences written by adults are, on average, longer and more complex than narrative sentences. The average sentence in a newspaper editorial is 20 words long and contains 3 clauses (Francis & Kucera, 1982). The developmental course of modality and genre effects on children’s language production has been documented across the span of elementary and secondary school years (e.g., Berman, 2003). Studies comparing modality (reading with listening) and genre structural contrasts in comprehension are rare (Carlisle, 1991), particularly those that would try to isolate sentence-level contributions, probably because comprehension is much less transparent than production.

In the years since Perera’s (1984) contribution, the problem of how children comprehend/process sentences continues to interest researchers in many disciplines. Methods of brain imaging including functional magnetic resonance imaging and evoked response potentials are now used to uncover the neuroscience of sentence processing. Again, the types of sentences used in these studies are often complex ones that pose inherent processing challenges for children. There is no question that we will know a great deal more about the contribution of grammatical constraints to online reading in the years to come. In the meantime, in the process of writing this article, I uncovered a study that was published 28 years ago

that makes a good case for sentence complexity as a contributor to reading comprehension. Distefano and Valencia (1980) asked seventh-grade students to read grade-level texts that varied in sentence complexity but were matched for readability level. The students were grouped according to their reading accuracy level as independent (95% correct), instructional (90%–95%), or frustration readers (<90%). Using a transformational grammar model that was in vogue at the time, Distefano and Valencia calculated the average sentence complexity score for texts that were read by the seventh graders. They learned that sentence complexity did not affect comprehension for the independent readers (who comprehended all of the passages at high levels), nor did it affect frustration-level readers (who struggled with all of the passages equally), but it had a robust deleterious effect on instructional-level readers. This outcome is exactly what we would predict if sentence complexity interacts with general comprehension within a “zone” where fairly subtle complexity factors could make the difference to a weak sentence parser.

CLINICAL IMPLICATIONS

My own clinical context at the present time is a hospital-based pediatric outpatient clinic. Many of the children and adolescents we see for assessment meet typical exclusionary criteria for specific language impairment (SLI), meaning that there is no obvious cognitive, neurological, medical, sensory, or socioemotional explanation for the impairment. The most common “chief complaint” of parents is that their child is not succeeding academically. Some of the children have a former or current individual educational plan, but many do not. Although our protocol varies depending on the individual child’s history and the questions and hypotheses we formulate for him or her, we commonly test both comprehension and production domains in oral language at word, sentence, and discourse levels, and we commonly test reading (i.e., word recognition and comprehension) and writing (i.e., composition and spelling). The typology of reading disorders that has been advanced by Catts and Kamhi (2005) has been very helpful with these children. This model, based on the simple view of reading (Gough & Tunmer, 1986), categorizes struggling readers according to their word recognition and general comprehension abilities. The two types of poor readers of interest in this discussion are (a) those with word recognition abilities within normal limits but poor general comprehension (specific comprehension deficit) and (b) those with poor word recognition *and* poor general comprehension (mixed).

Assessment of Sentence Comprehension in Struggling Readers

For both types of poor readers, we want to know if and how poor (general) sentence comprehension (via listening) contributes to the reading comprehension problem. This is, of course, easier said than done. Almost all comprehensive oral language tests include sentence comprehension subtests, but they go about it quite differently. For example, the Listening Grammar subtest of the Test of Adolescent and Adult Language—3 (Hammill, Brown, Larsen, & Wiederholt, 1994) presents three sentences auditorily, and the examinee indicates on an answer sheet (using letters A,B,C) the two sentences that mean the same thing (or stated differently, which two

are paraphrases). Many of the sentences are complex (two or three clauses), and the three sentences involve syntactic alterations between structures that have been discussed previously as contributors to sentence complexity (e.g., active/passive voice or SVO/cleft constructions). If poor sentence-level comprehension for complex sentences is an area of language difficulty, it is hard to imagine a student doing well on this subtest. The subtest for assessing sentence comprehension of the widely used Clinical Evaluation of Language Fundamentals—4 (CELF-4; Semel, Wiig, & Secord, 2003) is Concepts and Following Directions. Some of the items in this subtest are quite long (up to 19 words) and/or involve several subordinate clauses (e.g., *before you point to the small houses point to the large shoe separating the fish*). Sentence comprehension is tested in a knowledge-neutral way because vocabulary is limited to simple objects. These types of sentences are devoid of syntactic or semantic redundancy; almost every word and structure contributes information that is crucial to carrying out the direction correctly. The Concepts and Following Directions subtest is hard for many children with LI; if a child did poorly on this subtest, I would feel confident in saying that the child's sentence-level syntactic difficulties contribute to reading comprehension difficulties.

Because these types of comprehension tasks are decontextualized, I have often asked myself whether and how they inform "real" sentence comprehension that takes place as a student reads. In one of those clinical "a-ha" moments during a therapy session several years ago, I had at least a partial answer. The incident made such an impression that I have written about it previously (Scott, 2004b), but it bears repeating. I was working with John, a fourth-grade student who was struggling to understand grade-level reading material. We were practicing the comprehension strategy of generating questions about content during reading (Palincsar & Brown, 1984). The text stated the following (pay particular attention to the sentence in italics):

Thousands of pioneers went to live in unsettled land between the Appalachian Mountains and the Mississippi River. This land was then known as the West. Land that was part of the United States but did not have enough people to be a state was called a territory. *The land to the west of the Appalachian Mountains was divided into two territories.*
^ The Northwest territory was the land

At the point indicated by the arrow in the last line of the text, I asked John to write a question about what he had been reading. His question was: *Why was the appellation mountains divided into two parts?* [his spelling]. This is a perfect example of an errant analysis (parse) of a complex sentence. In the wording of his question, John's parse became transparent: He connected the predicate *was divided* with the immediately preceding proper noun *Appalachian Mountains*, which he interpreted to be the grammatical subject. The true subject of the predicate was the noun *land* (underlined in the passage), but postmodifying information (*to the west of the Appalachian Mountains*) created a gap between the subject and predicate that fooled him. Obviously, this had implications for text comprehension. This example with John encourages us to think about possible ways that sentence comprehension status could be more routinely evaluated in online reading. Periodically stopping a reader and asking him or her to paraphrase a difficult sentence would be one way. Cloze tasks could also be used in this manner. In fact, the Passage Comprehension subtest of the Woodcock Reading Mastery Tests—Revised (Woodcock, 1987), which uses a cloze format to evaluate reading comprehension, may be useful. It

would be interesting to analyze the extent to which cloze targets on this test are tied to syntactic/semantic operations that contribute to complexity in ways that were discussed in the previous section. Of course, generating questions as John was asked to do may also be helpful.

One could argue that poor performance on decontextualized sentence comprehension tasks results from weaknesses in verbal working memory, not linguistic knowledge. There is no doubt that these subtests tax verbal working memory because the listener must "hold the sentence input in mind" long enough to manipulate it mentally as required for the task (e.g., we might imagine the Concepts and Directions examinee asking him- or herself: "Did she say the big house or the small house? Did she say house or houses?"). In addition, because many of the sentences used as test items are complex, they invoke the parsing constraints discussed in the previous section (e.g., "hooking up" sentence elements that relate but are separated by intervening words). Recent findings confirm the fact that working verbal memory accounts for significant variance in the composite language test scores of adolescents (Leonard et al., 2007) and in complex sentence comprehension of typically developing children (Montgomery, Magimairaj, & O'Malley, 2008). Because language via listening is fleeting but language via reading leaves a permanent record that can be re-examined, some might conclude that verbal memory requirements are relaxed when reading. However, there is an extensive line of research that links reading disability and verbal working memory regardless of whether verbal material is presented visually or auditorily (as reviewed in Brady, 1995). The important point for this discussion is that the ability to comprehend complex sentences is associated with verbal working memory for *both* listening and reading modalities. Because sentence comprehension is more often tested orally (reading comprehension tasks usually draw on text-level processes), these tests/subtests are an important part of a comprehensive reading evaluation.

A final clinical issue on the side of assessment concerns the relationship between sentence complexity in production and in comprehension. Because of the transparency factor, as mentioned previously, a child's competency (or lack of) with complex sentences is easier to observe in production tasks. In our assessment sessions, we make observations about sentence complexity in conversation, narration, or informational discourse, spoken and/or written, comparing findings to benchmarks that are available in the literature. A substantial literature documents reduced sentence complexity in spoken and written naturalistic language produced by children with SLI (e.g., Gillam & Johnston, 1992; Scott & Windsor, 2000). Are these findings relevant to reading comprehension? I am not aware of research that provides a definitive answer. Just as children may use a word without full knowledge of all of its features, I suspect that the same is true of complex sentences—that children could produce structures that might, under certain circumstances, present problems on the comprehension side. Certainly from a clinical perspective, we often see children whose difficulties with sentence complexity span both comprehension and production, and a thorough assessment of sentence complexity would test broadly. It is my hope that future research will provide a more detailed picture of sentence complexity relationships across all four modalities—listening, speaking, reading, and writing. At the present time, though, I do not think that we can be entirely confident that production is always an accurate predictor of comprehension or vice versa.

Treatment of Sentence Comprehension in Struggling Readers

Finally, we need to ask if a problem comprehending complex sentences is amenable to treatment and how that might be accomplished. Although we have been concerned with the comprehension of complex sentences as it applies to reading, the little information that is available on treating sentence complexity does not divide treatment into neat domains by modality (i.e., work that is applicable for reading, or listening, or speaking, or writing). Furthermore, outcomes are usually measured in terms of production—whether participants' spoken or written sentences increased in complexity (which is frequently the stated goal of treatment). As discussed previously, this is understandable because spoken and written sentences, if well formed and appropriate for the broader discourse context, provide prima facie evidence of competence. Nevertheless, to the extent that a common knowledge base underlies the comprehension and production of complex sentences, it would be hard to specify that any particular therapy task is a production or a comprehension task, and it would be premature to exclude any studies that use production outcome measures. In fact, teaching children to write more complex sentences may be a good way to improve sentence-level comprehension in reading.

With colleagues, I have searched for applicable intervention studies for teaching sentence complexity (Balthazar & Scott, 2007; Silliman & Scott, 2009). It is notable that the SLP treatment literature that provides an evidence base for teaching sentence-level grammar applies most often to preschool children and targets morphology. A recently published systematic review of language intervention practices for school-age children with spoken language disorders (Cirrin & Gillam, 2008) yielded only three studies related to sentence-level grammar, and only one of these targeted structures that I have categorized as complex. In that study (Bishop, Adams, & Rosen, 2006), 8- to 13-year-old children with receptive SLI were trained to respond to passive sentences in a computer game format. The results were not encouraging, and the researchers concluded that rote comprehension training was not an effective approach for treating SLI.

A study by Hirschman (2000), which was not tagged in the Cirrin and Gillam (2008) review, did find positive outcomes from explicit teaching of sentence complexity. In this study, 9- to 10-year-old children with SLI were taught to identify complex sentences in fables and then to identify constituent clauses of the complex sentences as well as subordinate conjunctions. The children then rewrote the fable. Compared to a control group who did not receive the treatment, the experimental group made significant gains in both oral and written language. Levy and Friedmann (in press) were motivated by the view of SLI as a grammar-specific deficit for structures involving long-distance dependencies, as discussed earlier. They taught a 12-year-old with grammatical SLI to explicitly manipulate constituents in these types of sentences. Positive results were maintained as late as 10 months beyond treatment.

Probably the best-researched technique for helping students produce more complex sentences is sentence combining. In this paradigm, students are presented with short one-clause sentences that are combined into one longer sentence using deletion, insertion, addition, switching, and other syntactic operations. By manipulating the structure and meaning of the short sentences, it is possible to "force" many different varieties of sentence complexity (e.g., relative, adverbial, or object complement subordinate clauses; NP

pre- or post-modification). A recent systematic review of the effects of sentence combining instruction compared with more traditional grammar teaching methods clearly favored sentence combining, with moderate-to-high effect sizes on writing quality (Andrews et al., 2006). Of particular note for our purposes here, there are also several studies that show positive effects of sentence combining on reading comprehension (Neville & Searls, 1985; Wilkinson & Patty, 1993). Eisenberg (2006) described sentence combining and several other techniques for the direct teaching of sentence complexity to school-age children with LI. Eisenberg and others who have suggested similar activities do not recommend them as isolated, decontextualized exercises. Rather, they can be carried out within a contextualized skill framework where children can see how complex sentences are used in real academic tasks (Scott, 1995; Scott & Balthazar, 2008; Ukrainetz, 2006). The goal would be for students to recognize sentence complexity when they see it in a particular content domain, to be able to deconstruct that complexity so that they can comprehend the sentence, and to be more fluent with complexity when they talk or write about the same content.

CONCLUSION

In summary, Kamhi opened the door for a discussion of the nature of reading comprehension that provides an opportunity to examine its complexities. If the contributions to this forum share a common theme, it is that reading comprehension is too complex to be encapsulated in a box filled with generic comprehension strategies that cut across content domains. Content knowledge and many types of language competencies are tapped for reading comprehension. In this article, I have highlighted the contribution of sentence comprehension. If a reader cannot parse the types of complex sentences that are often encountered in academic texts, no amount of comprehension strategy instruction will help. The syntax of complex sentences poses challenges that are not accounted for by text-level processes such as relating sentences or reading beneath the lines to draw inferences. My intention is not to add another box (the sentence comprehension box) to a model of reading; rather, I have offered another reason why domain-general text comprehension can be difficult to teach and why the narrow perspective on reading can help us see comprehension for what it is. Sentence complexity might be amenable to treatment that impacts reading comprehension, but most likely not in the form of isolated drill-like exercises that are devoid of the content contexts where such complexity is found. I hope that future research will strengthen the case for the sentence in reading comprehension.

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