# The Role of Complex Sentence Knowledge in Children with Reading and Writing Difficulties

by Cheryl M. Scott and Catherine Balthazar

As shown by the publication of this issue of *Perspectives on Language and Literacy,* there is increasing attention to the role of sentences and grammar in both typical and atypical readers and writers. We know that a child's oral language and, specifically, listening comprehension abilities are a major determinant of reading comprehension (Kamhi & Catts, 2012). We know that syntactic difficulties are a core feature in the profiles of children with specific language impairment (SLI), and we also know these children are at high risk for long-lasting reading difficulties (Catts, Bridges, Little, & Tomblin, 2008). We are gratified to see increased emphasis on sentence-level components of text complexity in the Common Core State Standards (CCSS). And, recent knowledge and practice standards for teachers of reading single out sentence processing and structure as important knowledge domains (International Dyslexia Association [IDA], 2010).

Although this attention to sentences is encouraging, it is another matter entirely to translate this information into principles and practices that influence what educators, clinicians, and special educators actually do. Even though sentence processing and structure are cited in IDA's Knowledge and Practice Standards for Teachers (*http://www.interdys.org/standards.htm*) as areas teachers should know about, sentences are not discussed in the section of the IDA standards on assessment for planning instruction, and there is only one brief mention in the entire section on structured language teaching, which adheres to the outline instantiated by the National Reading Panel, namely, phonology, phonics/word recognition, fluency, vocabulary, and comprehension. There are undoubtedly many reasons for the lack of translation to educational and clinical practice, but, in our view, three stand out. These include a lack of information or understanding about 1) syntax per se and the formidable processing challenges posed by syntactic variations found in academic texts, 2) how to determine whether syntactic difficulties are actually contributing to reading or writing problems for a particular student, and 3) instructional implications when a student's sentence understanding or production is not strong. In this article, we concentrate on the first two issues. (Authors Nelson, Schleppegrell, Eberhardt, and Hochman discuss instructional implications in their respective articles in this issue of *Perspectives*.)

## Syntactic Structures and Principles Important for Reading and Writing

Recently, we were working with a 10-year-old with a language disorder who was struggling academically. Although reading accuracy and fluency were within broad normal limits, he struggled to comprehend what he read. We suspected that poor sentence comprehension was part of the problem, and to investigate further, we read (out loud) a grade-level passage about Rachel Carson, periodically stopping to ask sentence-specific comprehension questions:

| | |
|---|---|
| The sentence just read: | Rachel Carson, who was a scientist, writer, and ecologist, grew up in the rural river town of Springdale, Pennsylvania. |
| The question: | What do you know about Carson now? |
| Student answer: | They grew up together in the same place. |

His answer provided a clue that he had "hooked up" the wrong subject with the verb *grew up*. Instead of the true subject, *Rachel Carson*, he thought the subject was the *scientist, writer, and ecologist*, in other words—*they*. This type of comprehension mistake—where the noun closest to the verb is taken to be its subject—is not unusual (Scott, 2009).

In our work with struggling readers and writers in whom we suspect sentence-level problems, we routinely ask questions such as those listed in Table 1. Answering these questions requires, at a minimum, knowledge of the types of syntactic features shown in the right column of the table. In the next several pages, we discuss a syntactic framework that should assist readers in addressing these questions. For this discussion, we will assume that simple sentences (those with one subject and verb) are adequately understood and produced, but complex sentences can present problems.

## What Makes Sentences Complex?

*Noun Phrase Expansion Increases Sentence Length* While length is not the only determinant of syntactic complexity, in general, longer sentences are more complex. One of the major ways that sentences become longer is by adding modifiers to nouns. Grammarians use the term *noun phrase* (NP) to define a noun and all the words that modify it. Nouns can have modifiers that come before (or *premodify*) them in the NP, such as adjectives, as in "I heard a *new song*." Nouns can also have modifiers that follow them (or *postmodify*), as in "The *song playing on the radio* is new." The following sentence contains two NPs (underlined) whose nouns are shown in italics:

1. <u>The three-alarm *fire*</u> destroyed <u>the recently refurbished apartment *building* that was just completed last year.</u>

The noun *fire* in the first NP is premodified by three words and is the grammatical subject of the sentence. The second NP serves as the grammatical object of the sentence. Its noun

*building* is premodified by four words and postmodified by a relative clause that has six words. To illustrate how NPs can "grow," consider the two sentences below. The subject of sentence 2 is a simple NP with two words, but it has the capacity to be expanded considerably, as in sentence 3 where the NP is now 10 words:

2. The *amendment* was a disaster.
3. The thoroughly rewritten and meaningless *amendment* inserted by his aide was a disaster.

Sentence 3 manages to tell three things about the amendment within the confines of the NP: that it was rewritten, that it was a meaningless revision, and that an aide inserted it. Creating long NPs with extensive pre- and postmodification is one of the major ways that writers "pack" information into a text. Because these long and complex NPs can be found any place that a noun is found in a sentence—as grammatical subjects, direct objects, indirect objects, and objects of prepositions, there is great potential to embed information in any one sentence—information that must be "unpacked" in the reading (or listening) comprehension process. Without the ability to recognize NPs as language units functioning *as a whole* in particular grammatical roles, the reader will have difficulty extracting meaning (like the student in the Rachel Carson example). We can also appreciate that, for writers, crafting sentences such as sentences 1 and 3 would require the ability to translate considerable knowledge about a topic into a complex linguistic form.

**Subordination Increases Sentence Length** Sentences are also lengthened by the process of subordination—when one or more clauses (basically simple sentences) are combined within one sentence in an arrangement where one clause is the main one (independent and can stand alone), and the other is subordinate to the main clause (dependent and cannot stand alone). In adult expository writing, the average sentence has three clauses, and some have many more. These multiclausal sentences take planning and effort to construct as a writer, and the reader must be able to discern the main proposition from the others and the subordinate and logical meaning relationships among them.

Three types of subordination account for a large majority of multiclausal sentences. In sentences with *adverbial clauses*, a subordinate clause is joined to a main clause with a conjunction such as *although, while, whereas, because, if, unless*, and so forth. These types of clauses expand on the verb in the main clause by adding information about time, manner, or place, just like adverbs (as single words). In the following sentence, the adverbial clause (underlined) adds manner information to the main clause by stating something unexpected:

4. Even though he had already broken the record for the most gold medals, he stated *that his goal was to win even more in the next Olympic Games.*

The prototypical adverbial clause appears after the main clause, but in the example above, it has been moved to an earlier position (pre-posed).

This sentence also illustrates a second type of subordination by using an *object complement clause* (in italics) where the direct object of the main clause verb (*stated*) is itself an entire clause. These types of clauses often begin with *that*, but this is optional, and, if taken away, the sentence would be perfectly grammatical. Other words that begin object complement clauses include question words such as *what, when who, where* (e.g., She decided *what she would wear to the inauguration*). Note that not all main clause verbs can "take" an object complement, and the ones that do tend to be verbs referring to state of being or communicative acts (stative and reportative verbs, such as *be, let, tell, say,* and *exclaim*) or that code mental states (cognitive state verbs, metalinguistic verbs) such as *think, know, conclude, decide,* and *predict*. This group of verbs is important in academic language because they allow writers to address processes, ideas, and opinions.

*Relative clauses*, the third type of subordinate clause, follow a noun (as in sentence 1) and provide additional information about that noun. As noted earlier, they form the postmodfication

| TABLE 1. Questions about Struggling Readers and Writers and Syntactic Knowledge Needed to Answer Them | |
|---|---|
| **Question** | **Syntactic Knowledge** |
| 1. Are the sentences the student speaks and writes of sufficient length, complexity, and well-formedness (free of grammatical errors) for his or her age? | • Recognize simple versus complex sentences<br>• For complex sentences, recognize:<br>　○ dependent vs. independent clauses<br>　○ number of clauses per sentence<br>　○ three main types of dependent clauses (adverbial, object complements, relatives)<br>　○ noun phrase structure<br>　○ common grammatical errors for students with language disorders<br>• General developmental guidelines<br>• How written sentence patterns differ from spoken patterns |
| 2. What are the syntactic requirements of assessment tests/tasks or of common class assignments? | • The ability to deconstruct a test/task (or classroom activity) and individual stimulus items according to syntactic requirements that may complicate processing<br>• Same as in question 1 |
| 3. Does the inability to parse a particular sentence (or sentences) in a text interfere with text comprehension? | • Same as questions 1 and 2 |

portion of the NP. Typically they begin with a relative pronoun (*that, who, whose, which*) but *that* can be optional, and sometimes the clause is further reduced (see sentence 3 where *that was* has been omitted before *inserted* but is still understood). A relative clause can modify any noun in a sentence—in sentence 1 it postmodifies the direct object *building* and completes the sentence. When a relative clause postmodifies a subject noun (see *amendment* in sentence 3) it interrupts the subject and verb. These are often called *center-embedded relatives*. In sentence 3, it is not the *aide* that is a disaster, it's the *amendment*. Relative clauses also vary in another important way, namely, whether the relative pronoun replaces the subject or object of the relative clause. In the complex sentence below, based on the two simple sentences shown beneath, the relative pronoun replaces the subject of the relative clause:

5. The candidate *that wins the primary* advances to the main election.
   Main clause: The candidate advances to the main election.
   Relative clause: ~~The candidate~~ wins the primary.

In sentence 6, however, the relative pronoun replaces the object, which then "moves" to the beginning of the relative clause:

6. The candidate *that the party nominated* ∧ went on to win the election.
   Main clause: The candidate went on to win the election.
   Relative clause: The party nominated ~~the candidate~~.

This type of relative clause is harder to process because the relative pronoun must be related to a "trace" (indicated by the caret) that is farther away than is the case for the subject in sentence 5. Linguists refer to these situations as "long distance dependencies."

Multiclausal sentences may contain all three types of subordinate clauses or more than one of each type. Because clauses, by definition, must contain a verb, a reliable way to tell how many clauses are in a sentence is to count the verbs, which are underlined in the following sentence:

7. Although the President <u>acknowledges</u> that recovery <u>is</u> slow, he <u>will not deviate</u> from key policies that his team <u>announced</u> earlier in order <u>to stimulate</u> growth.

This five-clause sentence begins with a pre-posed adverbial clause that has an object complement clause (*that recovery is slow*) embedded within it. A relative clause postmodifies *policies* in the main clause and another adverbial clause (*in order to stimulate growth*) is embedded within the relative clause. It is easy to imagine that a reader with weak general comprehension skills would struggle with this sentence.

***Other Contributors to Sentence Complexity*** Several other linguistic factors increase complexity and render sentences harder to comprehend and produce. First, any change from an expected word order increases processing load. English is a subject-verb-object (SVO) language where the canonical (or typical) word order is the grammatical subject (the agent) followed by the verb and object. In passive sentences, which are harder to process than active sentences, the grammatical agent follows the verb (*media* in the passive sentence that follows):

8. He was criticized by the media for his remarks.

Pre-posed adverbial clauses (see sentences 4 and 7) also represent a type of order variation because the entire main clause is "delayed." Cleft sentences are another variation on word order. In these types of sentences an element of the sentence is brought to the front for focus. In the following cleft sentence, the element *tone of voice* is moved to the left, making it harder to "reconstitute" the underlying SVO structure of this basic sentence (*Her boss reacted to her tone of voice*):

9. It could have been her tone of voice that her boss reacted to.

Another factor that increases complexity is when two critical elements that are normally close together are separated (also called long-distance dependencies, see sentence 6). Center-embedded relative clauses can be hard to understand because the main clause subject and verb are effectively interrupted (see sentences 3, 5, and 6).

**Sentences in Academic Texts**

From the mid-elementary through the secondary school years, the main job of a student is to learn, and this takes place increasingly in the context of language that is written (not spoken), is expository/informational (not narrative), and is discipline specific. Functional linguists (Halliday, 1987) have provided rich descriptions of sentence-level patterns unique to each of these distinctions. Compared with spoken sentences, written sentences are lexically dense (having a higher proportion of content words, that is, nouns, adjectives, verbs) and nominally embedded (having a larger number of long NPs with both pre- and postmodification). Written sentences are also longer, with more instances of multiclausal embedding, where one clause is subordinate to another subordinate clause. Halliday (1987) used the term *hierarchical* to refer to written text, which he contrasted with the *linear* format of spoken language, where clauses are connected with coordinating conjunctions (e.g., *and, but, so*) and common subordinating conjunctions (e.g., *because, when, if*). Others emphasize the fact that the writer, who has more time to make grammatical choices, uses a greater variety of complex structures than the speaker, who is under more stringent fluency constraints in real time (Biber, 2001). Due to these and many other differences, we could, with fair accuracy, judge which sentences were spoken and which were written if we heard them out of context. As evidence that they have somehow absorbed these grammatical differences, mid-elementary school children are beginning to write sentences that they would be unlikely to say, such as "*There stood a little tiger cub*"(an example used by Scott [2012, p. 255] that appeared in a story about a picnic written by an eight-year-old). When comparing sentences in narrative and expository texts, long complex NPs are again a contrastive feature of the latter. Additional high-frequency syntactic features of expository sentences include a) passives, b) nominalizations (use of the nominal derivative of a verb, e.g., *evaporate* to *evaporation*), c) nonfinite forms of verbs (verbs not marked for

tense or number, e.g., _failing_ to improve in the last quarter, the economy . . .), and d) phrasal coordination _(global warming is affecting agricultural productivity and wildlife migration patterns)_. (See Scott and Balthazar (2010) for a discussion of these and other syntactic features common in informational text.)

The fact that separate standards for history/social studies, science, and technical subjects are found in the CCSS belies an increased emphasis on disciplinary literacy—the idea that learning within a discipline requires an understanding of the way that discipline uses language to encode its unique nature and purposes. For example, the natural sciences are concerned with classification, description, and processes, while history works to "weave together" events and groups, often with incomplete evidence, thus requiring interpretation and perspective of the writer. In a recent article, Fang (2012) illustrates the lexical and syntactic features that distinguish science, math, and history texts and links these differences to underlying discipline-specific purposes. Readers of his work would find reference to many of the structures discussed in this section, but with an added appreciation for their unique employment as required by subject matter.

## Identifying Students Whose Syntactic Problems Contribute to Reading and Writing Problems

As a student gets older, language problems may have indirect and less obvious consequences for academic performance. The impact is often profound for overall academic achievement, but the evidence can be subtle—observable mainly in more challenging and complex contexts, such as when students are writing, or using an academic style of writing, or learning disciplinary content independently. For some students, sentence comprehension and production are major contributors. It is possible to ferret out sentence-level (syntactic) problems once they are suspected. The first step is understanding which students are likely to have syntactic problems.

### Using Language and Academic Histories to Identify Individuals at Risk

Syntactic limitations may be suspected when a student who is performing poorly with reading and writing has a known history of developmental language disorder, because syntactic deficits are a particular hallmark of language disorders (Leonard, 1998; Scott & Koonce, in press). Some, but not all, children with reading comprehension deficits have a documented history of difficulty with language development, and students with language disorders are at greater risk for reading comprehension problems (Catts & Kamhi, 2005). The evidence suggests that reading skill development (including both word identification and comprehension) among children with language disorders lags behind well into high school, although it follows a trajectory that is similar to that of typically developing peers (Catts, Bridges, Little, & Tomblin, 2008). For these reasons, students with a history of language disorders will be among the most likely to experience syntactic problems in reading and writing, and their problems should, as a general rule, be assessed with that in mind.

Whether or not a student has a documented language disorder, sentence-level problems should also be suspected in students who have difficulty with both listening comprehension and reading (Scott, 2009). Under the Simple View of Reading (Gough & Tunmer, 1986), reading problems can result from either poor word recognition or poor listening comprehension. Kamhi & Catts (2012) described subtypes of reading disability resulting from the combination of good or poor performance on these two factors in the Simple View. Students with poor word recognition and good listening comprehension were classified as dyslexic, while those with good word recognition and poor listening comprehension were classified as having a specific comprehension deficit. Researchers have shown that some of these latter children appear to be typical readers in early elementary years when the emphasis is on reading accuracy, only to "lose ground" by late elementary years when their texts become more challenging (Catts, Adlof, & Weismer, 2006). Struggling readers with poor performance in both word recognition and listening comprehension were designated as having a mixed reading disability and have been variously referred to as low achievers, backward readers, or garden-variety poor readers.

Children with reading disabilities that fall into either the specific comprehension deficit or mixed reading disability categories are candidates for further assessment regarding syntactic knowledge. Word (vocabulary), sentence (syntax), and discourse (e.g., inference) problems can all contribute to reading and writing difficulties, so is important to try to isolate the impact of sentence-level contributions. What follows are some general developmental guidelines that pertain to sentence-level syntactic abilities.

### Using Sentence Development Guidelines to Identify Individuals at Risk

By kindergarten, we should hear many complex sentences in a child's spoken language, and some examples of all three types of dependent clauses. By that age, there should be very few, if any, problems with verb tense in spoken language. As children progress through elementary school, average sentence length (in words) roughly corresponds to chronological age to age 10, or about the fourth grade. Also around that time, a child's writing should begin to contain sentences with distinctly written syntactic structures (i.e., sentences that would sound too formal if spoken). From late elementary school on into middle and high school, students' written language should continue to become more differentiated from spoken language and should demonstrate greater structural complexity and variety. A good sign that a student is increasing fluency with academic sentence form is the ability to combine several complex features within one sentence, for example, an adverbial clause and a relative clause. By age 12, a child should write sentences that are at least as long as spoken sentences, and sometimes longer (pertinent developmental studies and reviews include Berman & Nir, 2010; Mackie & Dockrell, 2004; Nippold, Hesketh, Duthie, & Mansfield, 2005; Scott, 2010).

There may be a sizable proportion of students with reading and writing problems who have no history of language disorders but who fail to progress with respect to these sentence-level developmental expectations. In such cases, some relatively quick and accessible testing tools might be used to further

narrow the field. If oral language skills have not been assessed, it is possible to look for indicators of potential sentence-level problems on tasks that include sentence recall, sentence combining, or recognizing sentence paraphrases. The following standardized subtests, any of which can be administered in 15 or so minutes, can be used for this purpose.

| Subtest | Test | Authors |
|---------|------|---------|
| Sentence Comprehension | *Comprehensive Assessment of Spoken Language* | Carrow-Woolfolk, 1999 |
| Listening Comprehension | *Woodcock Reading Mastery Tests, 3rd Edition* | Woodcock, 2011 |
| Sentence Recall | *Clinical Evaluation of Language Fundamentals, 4th Edition* | Semel, Wiig, & Secord, 2003 |
| Sentence Combining | *Test of Written Language, 4th Edition* | Hammill & Larsen, 2009 |

Poor performance on any of these measures would increase the likelihood of syntactic contributions to reading and writing problems, and indicate a need for consultation or referral for speech and language evaluation.

A survey of sentence types and quantity in a student's written work can also be revealing, especially if multiple samples can be reviewed. Consultation with a classroom teacher can usually produce examples of written sentences, such as responses to essay questions, journal entries, stories, and reports. Syntactic difficulties would be suspected when such samples are briefer than those of most classmates, contain little variety in sentence form, exhibit patterns of verb tense or pronoun errors, tend to omit words or word endings, or lack more formal, written-sounding sentences. Additionally, fragments and punctuation troubles that exceed grade-level expectations may indicate a lack of understanding about what constitutes a sentence—a skill necessary for writing.

Students with syntactic problems are likely to struggle more with the kinds of classroom activities that pose greater sentence-level challenges. It is important to do a task analysis of assignments that carry heavy sentence comprehension loads, such as verbal math problems, assignment instructions, and reading comprehension questions, as well as assignments that require writing at the text level. Poor performance in these contexts in particular presents "probable cause" for the existence of a syntactic contribution to reading comprehension problems (Scott, 2009).

### Identifying Individual Problems with Sentences

Because students must bring to bear multiple processes, skills, and knowledge as they meet academic challenges, it can be puzzling to sort out language problems at the sentence level from those more related to other aspects of language, such as vocabulary (especially multiple meaning words and, of course, unfamiliar words and concepts), problems related to general

knowledge (as when comprehension depends in part on prior experience with content), problems drawing inferences, decoding (misunderstanding when words are skipped or misread), or fluency (as when reading takes so long a student does not remember the content well).

There are several efficient ways to investigate whether and how syntactic deficits are affecting an individual's reading and writing performance. One way is to carefully scrutinize classroom performance for particular kinds of problems associated with syntactic difficulties. A second is to extend or modify assessment and intervention practices to better understand the specific syntactic barriers to a student's performance. The emphasis of this scrutiny should fall on those sentence structures that pose the greatest challenges to comprehension and tend to develop later.

***Examining Classroom Work for Syntactic Problems***
Individual student problems related to sentences can be seen in many forms. Table 2 summarizes some observable behaviors in oral and written expression among students with syntactic weaknesses. Not all of these behaviors would be expected for a given individual, and individual performance could vary substantially depending upon how challenging the task is.

For students with syntactic problems, it is common to find very limited oral or written language output relative to grade-level expectations, and this would in turn limit opportunities to observe features such as the variety and frequency of use of various sentence structures; however, many of the problems

---

**TABLE 2. Observable Behaviors in Oral and Written Expression among Students with Syntactic Weaknesses**

For complex sentences, recognize:
- False starts, multiple attempts, incomplete sentence formulation
- Fragments and punctuation troubles (especially placement of periods or commas) that exceed grade-level expectations
- Omissions of words or word endings, especially (but not only) verb tense errors
- Inflexibility with attempting different ways to say the same thing (in tasks requiring paraphrasing or clarifying or sentence combining)
- Errors or difficulties related to syntactic movement, embedding, and subordination:
  - Formulating questions
  - Formulating passives
  - Pronominal reference (pronouns and antecedents)
  - Constructing relative clauses (especially center-embedded and object-relatives),
  - Pre-posed adverbial clauses
- Errors or difficulties with key vocabulary for complex sentences:
  - Limited range of metacognitive/cognitive state verbs used
  - Atypical or awkward-sounding object complement clauses
  - Limited range of meaning and variety of adverbial conjunctions used, or overuse of one or a few conjunctions (e.g., *because*) whether viable or not

listed in Table 2 are evident even in small samples of student writing, and limited written output is itself a sign of potential sentence-level problems. It is also possible to get a better picture of student capabilities by looking at several work samples. As the examples of class work accumulate, patterns may emerge. An individual student's sentence-related performance can usually be characterized by one or more of the problem types in Table 2, and this information will direct further assessment and intervention with the exact sentence types requiring support. For example, a student who tends to connect sentences primarily with *and* and provides few details about nouns may have restricted ability with relative clauses. It would be useful to know whether he or she understands and could use relative clauses given the opportunity, and if so, which types. The extent of sentence-level knowledge can be evaluated dynamically using some of the methods described in the next section of this article.

### Extending Assessment and Intervention Practices to Sentences and Syntax

Assessment is an ongoing process that is integral to teaching and intervention. It is a process by which knowledge and skill are continually monitored and addressed directly in the course of instruction. Educators are familiar with assessments aimed at the word and text levels of language, and have many tools at hand for those purposes. Generally, such tools are not designed to provide a means of evaluating sentence-level capabilities; thus, it is left to the skill of the educator or clinician to find ways to do so. The following sections describe some common academic activities that can be adapted to examine sentences, to determine whether a particular type of clause or sentence is

---

**TABLE 3. Later-Developing Clause Structures**

**Relative clauses**
Center-embedded
- *The scientists <u>who discovered a way to help the body fight cancer</u> won the Nobel Prize for chemistry this year.*
Relative pronouns that stand for (deleted) objects in the relative clause (object-relative)
- Ranchers in the west closely watch the cattle, <u>which FDA inspectors have quarantined (the cattle)</u>.

**Adverbial clauses**
Adverbial conjunctions that express
- condition (*if, unless, even if, if only, in case, provided t*hat)
- contrast (*while, whereas*)
- concession (*although, even though, even if, while, whereas, when*)
Pre-posed adverbial clauses
- <u>While scientists debate global warming trends</u>, summers in southern states are getting hotter and hotter.

**Object complement clauses**
Main clause verbs that can take object complements and are
- low-frequency (e.g., *suggest, determine, speculate*)
  - *The audience* **speculated** <u>that the reality show contestants were actors</u>.
- "meta" (e.g., predict, hypothesize, assume)
  - *Every press conference* **confirms** <u>what we already know about the team</u>.

---

responsible for a student's problem. As a general guideline, we start with the prime suspects—later-developing varieties of subordinate clauses. Table 3 summarizes these later-developing structures.

*Sentence Combining* Generating sentences is a necessary part of writing at the text level, and use of more varied and complex sentence structures can be both assessed and supported with activities such as sentence combining (Scott & Nelson, 2009). When sentence combining is already a part of classroom activities, these activities can be focused or expanded to address the individual needs of a student with reading and writing problems. When sentence combining is not explicitly part of classroom activities, it can be incorporated into composition tasks as a part of the revision process. Sentence combining is a type of writing task that can be completed and evaluated relatively quickly, and it offers more control over the content and output than a free-writing activity (Scott & Nelson, 2009). Further control over specific sentence structure characteristics, such as subordinate clause position (which is a developmentally and clinically significant feature), can be exerted by limiting responses with a starter word or phrase, or by providing a cloze-type (i.e., fill-in-the-blank) response format. Sentence combining works particularly well to expand noun phrases using multiple tools such as relative clauses, appositives, and various noun modifiers, but it also can be used for generating subordinate clauses with adverbial conjunctions.

Application of these concepts is illustrated below for two later-developing structures—the center-embedded, object relative clause and the pre-posed adverbial clause. The center-embedded relative clause modifies a main clause subject noun. It must be placed right after the noun it modifies, and the subordinate clause will always have that main clause subject noun (or its pronoun) in it as either its subject or object. To create a sentence combining task to assess a center-embedded, object-relative clause, then, we generate two sentences, where the second sentence (sentence 11) has the subject noun of the first sentence (sentence 10) in object position. We instruct the student to make one longer sentence that says both things without using the conjunctions *and, but, so,* or *then*. This request could be open-ended, or a starter or cloze response format could be provided as in sentences 12 and 13. In the example below, the target sentence would be "*The store owner <u>that the plaintiff's attorney called to testify</u> witnessed the car accident."* Note that there are other ways to combine these two kernel sentences, such as "*The store owner who was called to testify by the plaintiff's attorney witnessed the car accident"* or "*The plaintiff's attorney called the store owner, a witness to the accident, to testify."*

10. **The store owner** witnessed the car accident. (Target main clause, target NP in bold)
11. The plaintiff's attorney called **the store owner** to testify. (Target embedded clause, target NP in bold)

Note that the target NP in the embedded clause is in object position, so it would have to be deleted and replaced with a relative pronoun, which would be moved to the beginning of the clause (this is the most difficult and latest-developing type of relative clause).

Students who have not developed facility with this structure will often attempt to combine using conjunctions, such as *The store owner witnessed the car accident and the plaintiff's attorney called him to testify*, even if instructed not to do so. If an open-ended request produces these types of attempts, the more restrictive response formats in sentences 12 and 13 can force an attempt at a relative clause:

12. The store owner that _____
    _____.
13. The store owner _____
    witnessed the accident.

Later-developing adverbial clauses can be elicited with sentence combining as well. We suggest "forcing" an attempt at pre-posing the adverbial clause so that it is stated before the main clause by using a cloze response format (which would allow the student to pick the exact adverbial conjunction) or by requiring the student to start with an adverbial conjunction (which would restrict the possible meaning relationships between the clauses). Two kernel sentences with some obvious or deducible (to the student) time, place, or manner relationship can be provided, such as sentences 14 and 15. Starter word and cloze response formats are shown in sentences 16 and 17. Here, our target production would be "*Whereas students elsewhere attend for at least 182 days, Chicago Public School students go to school 177 days a year.*" As before, there are other possible solutions, using other adverbial conjunctions that signal contrast such as *while* or *although*. If left open-ended, an acceptable response could also include non-pre-posed adverbial clauses, such as "*Chicago Public School students go to school 177 days a year, while students elsewhere attend for at least 182.*" The advantage of the open-ended and cloze formats is that the student must generate his or her own adverbial conjunction, and this can offer insight into the diversity and abstractness of their lexical choices for complex sentences. An advantage of the cloze format is that it can restrict the position of the adverbial clause to before the main clause, which is a later-developing form.

On the other hand, students with sentence-level problems often find both of these response formats to be very difficult, which could mask what they know. For this reason, it is also worthwhile to explore student responses when given a starter adverbial and the instruction, "Begin your sentence with the word I give you." Using that strategy, lower frequency adverbial conjunctions that a student is likely to encounter, or has already demonstrated problems with, can be sampled.

14. Chicago Public School students go to school 177 days a year.
15. Students elsewhere attend for at least 182 days a year.
16. Whereas _____
    _____
17. _____,
    Chicago Public School students go to school 177 days a year.

***Paraphrasing*** In the context of reading activities, it is very helpful to assess comprehension of individual sentences along the way, and one method for doing so is to ask a student to paraphrase periodically what he or she has learned (Gillam, Fargo, & Robertson, 2009; Scott & Balthazar, 2010). We have found paraphrasing to be particularly helpful for identifying student misunderstandings in longer sentences, which often involve multiple forms of complexity and challenging concepts or vocabulary simultaneously. The technique is less helpful with shorter sentences, which students might simply repeat from memory whether they understand them or not.

An informed instructor can identify potentially troublesome sentences as they occur during a reading activity or can review materials in advance. After each is read, a request to paraphrase can be inserted, such as "What did you learn about in this sentence?" or "Tell me what you just learned in your own words." When the student explains what he or she learned, we can question information that was left out or follow up with questions focused specifically on the meanings encoded by particular syntactic structures.

***Comprehension Questions*** Reading comprehension is typically assessed with a variety of question types at the end of a given passage, but for identifying sentence-level comprehension issues, strategic placement of comprehension questions after complex, later-developing sentence types is more useful (Balthazar & Scott, in press). It is best to prepare these questions in advance so that they can be formulated precisely to focus on specific syntactic culprits.

The art of asking sentence-level comprehension questions builds upon the ability to identify the later-developing clause structures and how they function in a sentence. Table 4 offers a few key landmarks for detecting the presence of later-developing relative clauses, adverbial clauses, and object complement clauses, and some examples of questions aimed at identifying potential comprehension problems.

For relative clauses, the emphasis should be on determining the student's understanding of *who did what* in the main and embedded clauses. Recall that the anticipated problem here is that the student will assign the closest NP before the verb as its subject, so when a relative clause intervenes between a subject and its verb, a misunderstanding may occur.

For adverbial clauses, there are two approaches. First, if a student has paraphrased or generated a sentence containing a pre-posed adverbial clause incorrectly, it is helpful to reduce the lexical difficulty and have them try again, replacing the adverbial conjunction with a more common synonym or alternative. If the student's problem resolves, then it is likely that it had more to do with vocabulary than sentence structure. If not, it is likely that the later-developing pre-posed position of the clause is at least part of the barrier to comprehension. The second approach would be to present a complex sentence with the adverbial clause twice, once in pre- and once in post-posed positions, and then ask if they mean the same thing. As a single instance, this may not be a reliable indicator, because a student has a 50/50 chance of a correct answer due to the nature of the question; but if several of these were presented, and if some foils were included, it would be possible to discern problems with the later-developing clause position.

For object complements, note that the difficulty a student might have here depends upon how well they have fleshed-out the sentence frames of lower-frequency verbs that take complements and recognize that the entire subordinate clause is the verb's object. The examples in Table 4 are focused on the structure of object complements for later-developing verbs, but object complements are found very early in language development with common stative and reportative verbs (i.e., verbs used to describe states of being, conditions, or behaviors), such as *be*, *let, have, say, ask,* and *tell,* as well as common verbs referring to social and emotional experiences, such as *promise, suppose, help, make,* and *try*. Most of these allow for the subordinate clause verb to be in an infinitive ("to") form (with or sometimes without the word "to" included) or nonfinite ("-ing") form, both of which are less common patterns to be associated with the later-developing verbs. As with adverbial clauses, the testing of comprehension for object complement clauses involves manipulating lexical difficulty by replacing a troublesome verb with a more common synonym. We have found that most students can understand sentences with object complement clauses, provided they have good knowledge of the verb. However, we suspect that part of developing knowledge of less frequent and more academic verbs involves deducing their meanings from subordinate clauses, and that this may be an area of weakness for students with sentence-level challenges.

## A Place for Sentences

Even with ample research pointing to sentences as a unit of language that confounds some struggling readers and writers, it isn't easy to apply this information. One obstacle is the fact that sentence structure (grammar) is a huge topic. Which structures? Which sentences? Unless educators and clinicians have a clear sense of how sentences become complex to the point of having an impact on reading and writing, it is difficult to take the next step—identifying which students have this problem. We hope that this discussion establishes a place for the sentence in our instructional practices for students with reading and writing problems and encourages educators and clinicians to identify and support them accordingly.

| TABLE 4. Landmarks and Comprehension Questions for Later-Developing Complex Sentence | |
|---|---|
| **Clause Type/Landmark Features** | **Comprehension Question** |
| **Relative Clause**<br>• Always follows the noun it tells about<br>• Often begins with a relative pronoun (that, which, who, whose, etc.)<br>**a) Center-embedded**<br>• Comes after the main clause subject NP and before the main clause verb<br>**b) Object-relative**<br>• Relative pronoun replaces the object NP in the relative clause | **Question Form: Who did what?**<br>Example for (a)<br>**Reading:** All insects **that go through incomplete metamorphosis** must shed their outer skeletons as they grow. A new larger skeleton then forms around its body.<br>**Question Options:**<br>*What insects shed their outer skeletons as they grow? (only the ones that…..)*<br>*Do all insects shed their outer skeletons as they grow? (no or just the ones that….)*<br>Example for (b)<br>**Reading**: The Berlin Wall, **which communist guards patrolled during the Cold War**, divided Germany into two sides.<br>**Questions**:<br>*What divided Germany into two sides? (the Berlin Wall….not the Cold War….)*<br>*What did communist guards patrol? (the Berlin Wall)* |
| **Pre-posed Adverbial Clause**<br>• Starts with an adverbial conjunction<br>• Comes before the main clause to which it is attached | **Question Form: Does it mean the same thing?**<br>Example<br>**Reading:** These insects have only three stages of development: egg, nymph, and adult. At each stage the insect looks different from the way it looks at another stage. **When a grasshopper nymph first hatches,** it doesn't have wings.<br>**Question Options:**<br>*Do grasshopper have wings? (yes, but not when they first hatch)*<br>*Does a grasshopper nymph have wings when it first hatches? (no)*<br>*Listen to these two sentences and tell me if they mean the same thing:*<br>***When a grasshopper nymph first hatches,** it doesn't have wings.*<br>*A grasshopper nymph doesn't have wings **when it first hatches**. (yes)* |
| **Object Complement Clause**<br>• Associated with cognitive state and metacognitive verbs<br>• Can be in the direct object or indirect object position<br>• May start with *that* or a question word | **Question Form: *What* did X verb?**<br>Example<br>Gregor Mendel, who was a monk and a scientist, spent much of his time working with pea plants in a monastery garden. He observed **that some plants produced green peas and others produced yellow peas**.<br>**Question Options:**<br>*What did Gregor Mendel observe? (that some plants…)*<br>*If I said, "He saw that some plants produced green peas and others produced yellow peas," would that mean the same thing? (yes)* |

## References

Balthazar, C. H., & Scott, C. M. (in press). The place of syntax in schoolage language assessment and intervention. In T. Ukrainetz (Ed.), *Schoolage language intervention: Principles and procedures for oral and written language success*. Pro-Ed.

Berman, R., & Nir, B. (2010). The language of expository discourse across adolescence. In M. Nippold & C. Scott (Eds.), *Expository discourse in children, adolescents and adults: Development and disorders* (pp. 99–122). Psychology Press/ Taylor & Francis.

Biber, D. (2001). On the complexity of discourse complexity: A multi-dimensional analysis. In S. Conrad & D. Biber (Eds.), *Variation in English: Multi-dimensional studies* (pp. 215–240). London: Longman.

Carrow-Woolfolk, E. (1999). *Comprehensive assessment of spoken language*. Circle Pines, MN: AGS Publishing.

Catts, H. W., Adolf, S. M., & Weismer, S. (2006). Language deficits in poor comprehenders: A case for the simple view of reading. *Journal of Speech, Language, Hearing Research, 49*, 278–293.

Catts, H. W., Bridges, M. S., Little, T. D., & Tomblin, J. B. (2008). Reading achievement growth in children with language impairments. *Journal of Speech, Language, and Hearing Research, 51*, 1569–1579.

Catts, H. W., & Kamhi, A. G. (2005). Classification of reading disabilities. In H. W. Catts & A. G. Kamhi (Eds.), *Language and reading disabilities, 2nd edition*, pp. 72–93. Boston, MA: Allyn and Bacon.

Fang, Z. (2012). Language correlates of disciplinary literacy. *Topics in Language Disorders, 32:1*, 19–34.

Gillam, S. L., Fargo, J. D., & Robertson, K. S. (2009). Comprehension of expository text: Insights gained from think-aloud data. *American Journal of Speech Language Pathology, 18*, 82–94.

Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education, 7,* 6–10.

Halliday, M. A. K. (1987). Spoken and written modes of meaning. In R. Horowitz & S. J. Samuels (Eds.), *Comprehending oral and written language* (pp. 55–82). San Diego: Academic Press.

Hammill, D. D., & Larsen, S. C. (2009). *Test of written language, 4th edition*. Austin, TX: Pro-Ed.

International Dyslexia Association. (2010). *Knowledge and practice standards for teachers of reading*. Baltimore, MD: Author. Retrieved February 19, 2013 from http://www.interdys.org/ewebeditpro5/upload/KPS3-1-12.pdf

Kamhi, A., & Catts, H. W. (2012). *Language and reading disabilities, 3rd edition*. Boston, MA: Pearson.

Leonard, L. (1998). *Children with specific language impairment*. Cambridge, MA: The MIT Press.

Mackie, C., & Dockrell, J. E. (2004). The nature of written language deficits in children with SLI. *Journal of Speech, Language, and Hearing Research, 47,* 1469–1483.

Nippold, M. A., Hesketh, L. J., Duthie, J. K., & Mansfield, T. (2005). Conversational versus expository discourse: A study of syntactic development in children, adolescents, and adults. *Journal of Speech, Language, and Hearing Research, 48,* 1048–1064.

Scott, C. (2009). A case for the sentence in reading comprehension. *Language, Speech, and Hearing Services in Schools, 40,* 184–191.

Scott, C. (2012). Learning to write. In A. Kamhi & H. Catts (Eds.), *Language and reading disabilities (3rd ed.)* (pp. 244–268). Boston, MA: Pearson.

Scott, C. M. (2010). Assessing expository texts produced by children and adolescents. In M. Nippold & C. Scott (Eds.), *Expository discourse in children and adults*. New York: Psychology Press.

Scott, C., & Balthazar, C. (2010). The grammar of information. *Topics in Language Disorders, 30:4,* 288–307.

Scott, C., & Koonce, N. (in press). Syntactic contributions to literacy learning. In E. Silliman, A. Stone, & G. Wallach (Eds.), *Handbook of language and literacy: Development and disorders, 2nd ed.*, New York, NY: Guilford.

Scott, C. M., & Nelson, N. W. (2009). Sentence combining: Assessment and intervention applications. *Perspectives on Language Learning and Education, 16*, 14–20.

Semel, E., Wiig, E., & Secord, W. (2003). *Clinical evaluation of language fundamentals, 4th edition*. San Antonio, TX: Harcourt Assessment.

Woodcock, R. (2011). *Woodcock reading mastery tests, 3rd edition*. San Antonio, TX: Pearson.

***Cheryl Scott, Ph.D., CCC-SLP***, *is a Professor in the Department of Communication Disorders and Sciences at Rush University Medical Center where her teaching, research, and clinical work focus on language and literacy disorders of school-age children and adolescents. Dr. Scott is currently collaborating with Dr. Catherine Balthazar on a study examining the effect of treatment centered on complex sentences in students with language disorders, with funding from the NIH/NIDCD. Dr. Scott is a fellow of ASHA.*

***Catherine Balthazar, Ph.D., CCC-SLP***, *is Associate Professor of Communication Disorders at Governors State University, where her teaching and research focus on language assessment and intervention for school-age children. She is a principal investigator for an NIDCD-funded study examining the effect of treatment on children's complex sentence knowledge.*