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## EXPLAINING GRAMMATICAL CONCEPTS

Although editing for grammatical correctness rightly begins when composing is basically complete, editing is—at least for unpracticed writers—almost as demanding as composing. Editing for grammatical errors is not a one-step process, but a complete series of steps which involve detecting a problem (finding a mistake), diagnosing the error (figuring out what’s wrong), and rewriting (composing a more acceptable version). Skilled writers don’t always consciously need to move through all of these steps, but most students do. As writing lab instructors, we are acutely aware of situations when students are able to detect sentence-level problems but have few clues for resolving them. “That sentence isn’t right—should I take it out?” a student will mumble as we sit with them. “This needs something, but I don’t know what,” another will say. Or, “I know I should be checking for commas, so maybe I should put some in this sentence.” Anxiety, frustration, and even

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anger surface as they flail around knowing that something should be done—if they only knew what.

Certainly no one needs prescriptive grammar to generate grammatically complete oral sentences: everyone masters this mysterious skill before the age of four. And as those opposed to the teaching of grammar are quick to point out, many people can rely on their competence as native speakers to “sense” a fragment or agreement error and correct it without resorting to conscious knowledge of grammar. But this detection skill does little or nothing to help many students edit their papers. Admittedly, these students don’t need to be able to spout grammatical *terminology* (e.g., “That’s a participial phrase”). But they do need to understand fundamental grammatical *concepts* so that they can successfully edit their writing. And grammatical concepts, effectively taught, can be learned. However, despite the hype of textbook salesmen, the glossy packages of supplements, and the stacks of free review copies of books that inundate our mailboxes, it is not particularly obvious *how* grammatical concepts can best be learned. As Patrick Hartwell notes, many tried-and-true explanations of grammar are COIK—clear only if known (119).

Hartwell has identified a core issue: too much of what passes for explanation of grammar may be perfectly clear to the teacher or textbook writer but leaves the student groping for help. To address this problem, we draw on concept learning research, a field which identifies the reasons why students generally have difficulties learning concepts and which offers tested strategies for overcoming these problems. Support for this approach comes from recent reviews of research on the teaching of grammar (Hillocks 140) and in the field of concept learning. What concept learning research offers is not some heretofore unknown approach or miracle cure but an affirmation of the need to combine a variety of interlocking strategies for success. Any standard textbook will illustrate some of these strategies or partial use of some approaches, but concept learning research emphasizes the need for thoroughness in our presentations. As we shall point out, using a few misleading examples to support a flawed explanation can cause confusion or misperceptions that may thwart a student’s attempts to edit for years to come.

The term “concept,” as used here and in concept learning research, refers to those mental abstractions that represent a class (or set) of entities which share certain essential characteristics. The names of these concepts (for example, the terminology traditionally used in grammar instruction) are merely conveniences for communicating about the concept. Although terminology can facilitate

talking about grammatical concepts, a focus on learning terminology may cause problems because learners can mistakenly think that knowing the name means knowing all the critical features of the concept. Being able to identify ten (or two hundred) restrictive clauses in no way ensures that the student knows all the critical features of the concept. The broad definition of concepts helps us to see that concept learning principles are meant for all disciplines. While some of the research in concept learning is conducted with lessons in other fields, many projects include instruction in grammatical and poetic concepts, which researchers have successfully taught to students in junior high through college. These studies are not often cited in composition research, perhaps because the work appears in journals that composition teachers don't normally think of as being in their domain, e.g., *Educational Technology and Communication Journal*, *The Journal of Educational Psychology*, and *Review of Educational Research*.<sup>1</sup> Our purpose in this essay is to show how insights and strategies from concept learning literature can make the teaching of grammatical concepts efficient and effective. Throughout, we use instruction in the grammatically complete sentence as an example of how the principles of concept learning can facilitate understanding of grammatical concepts.<sup>2</sup> We've chosen sentence completeness because it is one of the writer's basic tools for clear, correct writing. In addition, a shaky concept of the sentence can inhibit writers from composing sentences they might otherwise construct. In a study of sentence errors, Dona Kagan describes the fragment as "among the most prevalent and irremediable errors" found in student writing (127).

Research in concept learning shows that a basic criterion for good explanations of difficult ideas is that they address students' most frequent misunderstandings. Hence, to identify our students' notions of the complete sentence, we first examined and categorized fragments that they wrote. We then altered a student essay slightly so that each of these characteristic fragments was represented (see Appendix A). To see what information students call upon while editing for fragments, we asked 179 students to identify each of thirty items in the essay as either a sentence or a fragment and to explain, in writing, why they made each choice. The students were enrolled in nine classes at our university, classes ranging from freshman composition to advanced writing, business writing, technical writing, and journalism. This gave us a sample of students about half of whom were juniors or seniors who had completed one or more college writing courses and another half of whom were completing their first semester of freshman composition. The

tabulations of the students' responses (Table 1) show that while no item was correctly identified by all the respondents, some were more confusing to them than others.<sup>3</sup>

More important for our purposes than the matter of correct identifications are the reasons the students offered for their decisions. These responses open a window into student conceptions—and misconceptions—of the sentence. We use examples of these student responses to illustrate what concept learning researchers have identified as problems in learning concepts in nearly any field. After describing each problem, we offer strategies from concept learning research which overcome the particular difficulty. These strategies, as we illustrate, are found to some degree in contemporary grammar textbooks and programmed learning guides. However, concept learning research has shown that no one of these strategies can be truly effective if used alone. Instead, concept learning strategies are interlocking and reinforcing and achieve their purpose only in combination. In short, partial explanations, examples, and practice too often produce, at best, partial learning.

## **Learning Concepts: Key Difficulties and Effective Strategies in Overcoming Them**

### **1. Recalling Background Knowledge**

#### *Evidence of the Difficulty:*

The work of learning theorists like Robert Gagne shows that learning a new concept usually involves building on other, more basic, concepts. If these other concepts are not familiar to a student, any explanation of the new concept can be a classic case of COIK, clear only if known. This is obvious to a teacher trying to explain the sentence to students who lack knowledge of subjects and predicates. To understand the concept of subjects, students have to know not only what nouns and pronouns are but, ultimately, phrases and clauses too, since all can exist as subjects. They may have some partial knowledge of these concepts, but it is necessary that at some point they have access to complete knowledge of all forms that can act as subjects. Otherwise, as we saw among the students we studied, the inability to consistently recognize subjects and predicates causes frequent errors in distinguishing sentences from fragments. For example, some of the students who identified the complete sentences #22, 23, and 27 in the test essay (Appendix A) as fragments did so because they said that there was no subject, an indication that the pronouns in these sentences weren't

recognized as subjects. Even more confusion appears to exist for the student who identified a fragment (#16) as a sentence because it contains a verb, "perfect," and a noun, "his." Other students labeled item #19 as a fragment, saying "it has no subject or verb." (It has both, though in dependent clauses.)

Students also revealed their difficulties in distinguishing dependent from independent clauses. As a typical example, one student incorrectly identified item #4 as a fragment "because each clause cannot stand by itself," and another student incorrectly labeled item #13 as a fragment "because it is a prepositional phrase." This small, but representative sampling of the students' comments could be extended, but it is clear that these students' background knowledge is inadequate and that there is no point in expecting them to understand a definition of a fragment which assumes an understanding of the subject, verb, phrase, and clause.

#### *Strategy for Overcoming the Difficulty:*

Meeting this difficulty by providing background knowledge may seem to lead to an endless regression, but this is not the case. In their studies of concept learning, Tennyson and his associates have demonstrated the effectiveness of presenting background information at the point that the student seems to need help (Tennyson and Cocchiarella 62-63). For example, this technique is used to teach the sentence in the opening pages or "frames" of Joseph Blumenthal's *English 2200, 2600, and 3200*, a venerable and widely used—but not unflawed—series of self-instructional texts.<sup>4</sup> Included in Blumenthal's definition of a complete sentence are the concepts of subject and predicate which are defined as the "naming" and "telling" parts of the sentence. Practice is then offered for identifying the "naming" and "telling" parts of several sentences. In Lynn Quitman Troyka's *Simon and Schuster Handbook for Writers*, the sentence fragment is also defined and illustrated. Then, as the definition is extended, the concept of "verb" is introduced, explained, and illustrated, and the subject is explained next. Then, with this background information provided, the handbook explains dependent and independent clauses, beginning with an explanation of subordinating conjunctions (260-263). Thus at each step, background information is provided as needed.

## **2. Controlling All the Critical Features of a Concept**

#### *Evidence of the Difficulty:*

Another problem faced by students learning new concepts is that of internalizing *all* the concept's critical (or essential) attributes,

that is, of building a mental representation which includes every one of these necessary attributes. In the classic view of concept learning, recognizing a list of critical features was viewed as sufficient. But research on applied problems of concept learning has shown that people learn concepts by forming a mental prototype, that is, a clear case or best example (Reitman and Bower; Tennyson, Chao, and Youngers; Tennyson, Youngers, and Suebsonthi). In learning a specific concept, the more of its critical features our prototype includes, the fuller and more complete our grasp of this concept is. Nevertheless, what we store in memory is not a list of a concept's critical features but a prototype, an abstraction derived from *examples* of the concept that we've encountered.

The chief difficulty in forming a prototype is that of identifying the particular cluster of attributes which are truly critical and of distinguishing this cluster from the variable attributes, those that can and do occasionally or frequently appear, but aren't necessary. We can thus mistakenly include in the cluster of critical features attributes that are really only variables or omit a critical feature because we wrongly think it is a variable. For example, we can understand the source of confusion experienced by the child who, watching a kilted Scottish bagpiper in full regalia, says, "Why does that lady have a beard?" Skirts may be most frequently associated with women, but it is not a critical attribute of skirts that they be worn only by women. Assuming a variable to be a critical attribute is also a common source of humor, particularly with stereotypes: "Why did Adam remain happy when he left the Garden of Eden?" "Because he *still* had no mother-in-law." Unpleasantness, despite the vast repertoire of jokes on the subject, is a variable, not a critical attribute of mothers-in-law.

In our study we noticed numerous problems in students' prototypes of sentences which resulted from their confusion or misperceptions about critical and variable features. For example, in our pilot work, Teresa told us that the sentence, "John went to the store," was not a complete thought because it did not say what John bought at the store. For Teresa, the semantic feature "fully informative" was a critical attribute of all sentences rather than a variable attribute. (Sentences in context in paragraphs are not always fully informative.) Thus, we found students labeling as fragments complete sentences such as items #26, 27, and 30 because these items contained references to previous sentences by means of pronouns such as "he" and "that" and were therefore somehow "incomplete." Transition words (at the beginning of items #7, 13, and 15) and the phrase "on the other hand" in item #9 also provoked this sense of incompleteness. Among the students who

said that the transitional phrase “to sum up” (item #25) marked a sentence as a fragment, one explained that it was incomplete by noting “To sum up what?” To prove the point that “first” (items #7 and 15) causes incompleteness, one student wrote, “What’s second?” Another student wrote, “If there’s a first, there needs to be a second thought to complete the sentence.” These misperceptions raise the question of whether some students avoid the connectives we encourage for coherence because they see these as making a word group not “able to stand alone” (another commonly used definition of the sentence that students were unable to operationalize successfully). The conjunctions “and” and “but” are also definitely forbidden as sentence openers in the minds of many students. They noted that “and” as the first word of item #18 and “but” as the first word of item #26 identified these sentences as fragments. Said one student, “After putting in a subject and verb I allow a sentence to do almost anything it wants except begin with a conjunction.” This misconception is most probably due to advice that students mistakenly store as a fixed rule.

The problem of viewing variable attributes of sentences as critical caused other difficulties as well. For example, sentence length, a variable attribute, exists as a critical attribute in the minds of those students who incorrectly labeled items #5 and 21 as fragments with explanations such as “it’s too short” and a lengthy fragment (#28) as a sentence with explanations such as “it has enough words.” The criterion of word length was given for other items as well. (Kagan’s study documents the same misconception, that complete sentences need to exceed a certain number of words.) This raises the question of whether some students don’t vary the word length of their sentences because they fear violating some rule they think applies to complete sentences. We found internal punctuation within the sentence included in many students’ concepts of the sentence as well. For example, students incorrectly said that items #2 and 9 were fragments because of internal punctuation problems. Item #1 was incorrectly identified as a fragment because of “missing punctuation before the quote,” item #12 was incorrectly marked as a fragment because “it needs punctuation after ‘patience,’” and item #26 was also incorrectly identified as a fragment because “it needs commas.” For other students, usage errors caused a word group to be a fragment. Thus, for item #22, a reason given by several students for incorrectly identifying it as a fragment was their discomfort with the phrase “fast and easy.” Another student noted that item #27 (a sentence) was a fragment because “something is wrong with ‘both very much.’”

In all this confusion we can see either ignorance of what constitutes the critical features of a sentence or elaborate but dysfunctional representations of the sentence. As Shaughnessy has argued, the problem is not that students are novices with a “lack” of knowledge but rather that from their bits of knowledge, they have constructed some elaborate, convoluted, and misleading conceptions. Kagan reaches a similar conclusion when she notes that “poor writers may simply have misperceived examples of written language and thus have abstracted incorrect rules regarding the structure of complete sentences” (127). Behind many of the students’ comments in the responses we read, we heard echoes of familiar, overly brief, incomplete definitions such as “a sentence is a group of words with a subject and a verb,” “a sentence tells who and what,” “a sentence expresses a complete thought.” Such inadequate definitions, accompanied by a few examples carefully chosen to support the definitions, leave students thinking they understand what a sentence is. However, such definitions also leave students without any way to think about sentences where the “who” or “what” is less than obvious (as in the sentence, “What she did to him is wrong”) or about sentences which make sense only in context of other sentences (e.g., “They did it again”). The problem here is that students mistakenly apply the notion of “completeness” to the semantic meaning of the sentence and think that sentences must be fully informative. However, in reality, many grammatically complete sentences are not fully informative or “complete thoughts” outside the context of other surrounding sentences. In many of the mistaken student responses in our study, we observed a great deal of confusion when the students used semantic completeness as a test for a sentence rather than grammatical completeness. The weakness of the “tells who or what” definition is particularly evident in the frequency with which it turned up in student responses as justification for incorrectly identifying dependent clauses as complete sentences.

### *Strategy for Overcoming the Difficulty:*

In the discussion of student perceptions—and misperceptions—of the sentence, we noted that definitions help students mentally represent the critical attributes of a concept. Evidence for the usefulness of definitions comes from C. S. Dunn’s study of six methods of teaching science concepts. She found that the least effective was a “discovery” approach in which students were not given definitions. Instead, they were asked to discern the critical attributes of a concept from a set of diverse examples. Since the



purpose of a definition is to highlight the critical attributes of a concept, the definition should contain a list of these critical features with each feature graphically highlighted.

Along with definitions, clear, typical, and varied examples also help students to master a concept's critical attributes. Grammar handbooks, intended primarily to be used as references rather than as programs of instruction, do not generally have space to include all the typical examples that are needed, but they often have quite adequate definitions. For example, the definition in Troyka's handbook is helpful in that it includes, among several definitions from various perspectives, a grammatical one: "Grammatically, a sentence contains an independent clause, a group of words that can stand alone as an independent unit" (154). Troyka then goes on to discuss the structure of a sentence and also presents a range of clear, typical examples. Initially, there are also five examples of fragments. The first three are phrasal fragments (no verb, no subject, no verb or subject) which, as we and Kagan found in our studies, students are most likely to recognize. The last two are clausal fragments (dependent clause and a subject with a dependent clause), the ones which students have more trouble recognizing and are more likely to produce (Harris). The discussion in Troyka's book then builds up to more complex examples of typical fragments. Other widely used handbooks such as the *Harbrace College Handbook* or the *Random House Handbook* tend to have a more limited number and range of examples, and the difficulty of attempting a brief, easily grasped (but incomplete) definition can be seen in the popular workbook, *Grassroots*. Here students are told: "For a sentence to be complete, it must contain a *who* or *what* word." Further down the page in *Grassroots*, the subject is defined as the "*who* or *what* word" (4), thus failing to distinguish subjects from objects. Such a definition can create further confusion in that it does not allow for subjects which consist of more than one word. In sum, then, good definitions list *all* of the critical features of a concept and are accompanied by a range of clear, typical examples.

### **3. Recognizing New Instances of a Concept**

#### *Evidence of the Difficulty:*

Another problem in learning a concept, as suggested in the examples cited above, is that of recognizing newly encountered instances of the concept. In fact, researchers such as Homa, Sterling, and Trepel; and Tennyson, Chao, and Youngers say that this is one of the most frequent problems learners have. Certainly it is familiar to teachers: students can recite a definition of a sentence, but they

have difficulty identifying new examples of sentences or fragments, or examples in unfamiliar contexts. People struggle to recognize concepts in context because, first, some of the guises or forms in which a concept appears are easier to spot than others and, second, to identify a new instance of a concept one must recognize *all* of its critical attributes. For example, some of the students who incorrectly labeled items #18 and 26 as fragments did so because they noted that these items “lacked verbs.” What they did not recognize were verbs which are manifested in contractions (“he’s” and “that’s”). However, other examples of fragments were easy for students in our study to recognize. For example, most students recognized short, phrasal fragments such as those in items #6, 11, 16, and 29. But a dependent clause (in item #19) was harder to recognize. Kagan also found that students had difficulty recognizing as fragments verbs followed by various structures, particularly objects modified by prepositional phrases. From the perspective of concept learning research, then, some students either may not understand all of the forms in which subjects and predicates can appear, or they may not understand that fragments can be either phrases or dependent clauses.

### *Strategy for Overcoming the Difficulty:*

To help students recognize new instances of a concept, it is particularly important to use examples, more examples, and even more examples if possible, though they have to be carefully constructed and ordered. As already noted, we need to start with clear, typical cases that accompany definitions so that students can form and encode a prototype in memory. After that, students need an extended presentation of various kinds of examples, displayed in matched sets and discussed in easy-to-difficult order. The sets of examples should illustrate a wide range of critical and variable attributes. Highlighting for visual emphasis, particularly in explaining the examples, is very helpful.

- **Matched Sets.** Examples should be in matched sets of examples and nonexamples to help students discriminate between critical and variable features. Examples and nonexamples are matched when all the irrelevant or variable attributes of the set are as similar as possible. For example, because students may have trouble realizing that some contractions may include verbs, matched sets of examples and nonexamples could be used to illustrate this fact:

*Concept:* verb in a contraction

*Matched sets:*

Example: She **is** lovely.

Example: She's lovely.

Nonexample: She lovely.

Example: When cotton shirts are old, they **are** more comfortable.

Example: When cotton shirts are old, they're more comfortable.

Nonexample: When cotton shirts are old, they more comfortable.

*Explanation:* Some verb forms can be present in contractions. In the matched sets above, the word groups that can stand alone as sentences (examples) contain complete verbs. The nonexamples lack verbs.

The use of nonexamples may seem to contradict a currently popular approach, offering instruction which is described as “nonerror based.” The assumption in nonerror based instruction is that students should avoid seeing examples of errors. However, a number of studies indicate the power of the nonexample in effective concept formation (Markle and Tiemann; Tennyson 1973; Tennyson and Park; Tennyson, Woolley, and Merrill).

For example, since some students think that a pronoun cannot be the subject of a sentence (perhaps because a pronoun as the subject would cause the sentence to be less than fully informative), an effective sequence of instruction would present a sentence with a pronoun as a subject and an accompanying fragment with the same pronoun as a subject. An explanation of the pair would point out that both the sentence and the fragment have a pronoun as a subject. (Putting the sentence in the context of other sentences would help the student see that sentences refer to each other.) This kind of matching is helpful because the purpose of the nonexample is to have students see that a variable feature is indeed irrelevant.

Because the irrelevant or variable features to present are those likely to cause confusion, we can look at our students' writing to determine which variable attributes to illustrate. For example, since 20% of the students we studied labeled sentence #8 (a fragment containing a subject with a lengthy dependent clause modifying it) as a complete sentence, the following example/nonexample pair might be presented and discussed:

**Six** of the players who had poor grades on their mid-semester exams **are sitting** on the bench.

(This is an example of a sentence because it has a subject, “six,” with a lengthy word group describing it and then the verb “are sitting” which tells what the six are doing.)

**Six** of the players who had poor grades on their mid-semester exams.

(This is not a sentence because it has a subject, “six,” with a word group describing it but no verb. The word group after the subject describes only the subject.)

Given the confusions about sentence length that we found, another matched pair should contain only a few words while a third should be lengthy to emphasize that length is not a critical feature of the sentence.

The *English 2200, 2600, 3200* books make considerable use of this kind of matching. When these texts offer examples of new concepts, the examples are usually paired with matched nonexamples. For instance, in *3200*, Blumenthal offers the following advice and matched sets:

Remember, too, that the length of a word group has nothing to do with its being a sentence or not. Two words may form a sentence provided that they are a subject and verb and make sense by themselves.

a. [The] ***Neighbors objected.***      b. The ***neighbors.***

Which is a complete sentence?—

(33, frame 1367)

To further show that length is a variable and irrelevant feature of sentences, Blumenthal offers another matched set:

[a.] The ***neighbors***, who were annoyed by Joanne’s practicing her trombone at all hours of the day and night, (37, frame 1369)

[versus]

[b.] The ***neighbors***, who were annoyed by Joanne’s practicing her trombone at all hours of the day and night, ***complained.***

(41, frame 1371)

By using these and many more matched sets, Blumenthal illustrates the irrelevance of length as a feature of sentences and highlights the critical importance of subjects and verbs.

- **Easy-to-difficult order.** Researchers have also found that students benefit when matched pairs are discussed in “easy-to-difficult” order. Easy examples have variable attributes that students make

fewer mistakes with, and the progression should be to variable attributes that are more and more likely to cause students difficulties. To determine whether examples and nonexamples are easy or difficult, instructors can examine students' own writing or give diagnostic tests. In their work, Tennyson, Woolley, and Merrill found that when students are exposed only to easy items, they either fail to recognize *all* of the critical attributes of a concept, or they fail to recognize the full range of guises in which these attributes may appear. (Of course, this range will vary as students mature and become more proficient writers.)

- **Divergence between sets.** There should also be divergence between sets of examples. This helps students in discriminating a variety of apparent from real instances of a concept when they encounter new examples. Thus, for instance, when teaching sentences, we would include some matched sets of sentences/fragments beginning with the conjunctions, transitional words, and phrases that too many students think indicate fragments and other sets without such beginnings. Students would see, for example, both a sentence and a fragment starting with "but" and another matched set lacking this initial term. Other variable attributes would also be drawn from the lists of problems and confusions students have.
- **Highlighting.** Another characteristic that increases the effectiveness of presentations, particularly in discussing examples, is the use of "attribute isolation," that is, the use of typographical or graphic highlighting such as underlining, italics, and/or white space to call attention to the critical features of a concept (Tennyson "Pictorial Support"). A text that uses attribute isolation particularly effectively is Troyka's handbook which, in the discussion of fragments, uses boldface lettering, shaded boxes, contrasting colors of print (red and black), and generous use of white space to highlight important points. In the classroom, with homegrown materials, we are not likely to have at our disposal such elegant type features, but we can make use of underlining, circling, arrows, and white space.

Accompanying the examples should be explanations, to call attention to the various critical features that we want students to notice. For the sentence, we might present examples and nonexamples and note: "This is an example of a sentence because it has both a subject and a predicate, which constitute an independent clause," or "This is not an example of a sentence because it has only a dependent clause." These examples and accompanying explana-

tions (“expository presentations”) perform a necessary and important function in concept learning, for it is here that students see what Tennyson and Cocchiarella call the “dimensionality or richness of the conceptual knowledge” (61). Presenting only simple sentences with clear subjects and predicates sidesteps all the elaborations and variety of real sentences (and fragments) that occur when students actually write.

For examples of good expository presentations in current texts, see the discussion of fragments in the *Harbrace College Handbook*—which uses matched sets, divergence across sets, and some highlighting—or Troyka’s extended expository presentation on fragments (260–64) which makes good use of nonexamples in matched sets, divergence across sets, easy-to-difficult order, and highlighting. Although *Grassroots* has very short expository presentations or discussions of concepts, it does illustrate the use of practice exercises in easy-to-difficult order and uses some highlighting to emphasize key words. An example of a presentation which omits nonexamples, matched sets, divergence across sets, and easy-to-difficult ordering can be seen in the *Random House Handbook*.

#### **4. Discriminating Apparent from Real Instances of a Concept**

##### *Evidence of the Difficulty:*

A fourth aspect of learning difficult concepts is that of discriminating apparent from real instances of the concept’s application. Students develop this discriminatory ability only with time, practice, and feedback (Dunn). In our study, we did not explore the history of our subjects’ attempts to master the sentence-fragment distinction; however, the study does show that even as juniors and seniors, many students had fuzzy notions of the sentence which did little to help them master this distinction. Those who reported using the “complete thought” definition often seemed to use this in some vague semantic sense. Those who used the “who or what does the action” criterion failed to understand that their notion of the sentence did not include predication. For example, one student incorrectly identified item #24 as a sentence because it “gives who or what.” Perhaps such students have inaccurate notions because they never practiced the sentence-fragment distinction in a context where they received continual feedback which explained why their answers were correct or incorrect.

##### *Strategy for Overcoming the Difficulty:*

To distinguish between apparent and real instances of a concept, students continually need reminders about the features that are

truly critical to it. Tennyson and his associates found that students are more likely to classify concepts correctly and recall them better when they not only have a chance to read expository presentations of examples but also have the chance to work through “inquisitory practice sessions” (Dunn; Tennyson, Chao, and Youngers). These are exercises in which students are presented with new examples and nonexamples and are asked to identify them by working through a list of questions. After they give both correct and incorrect answers, students receive feedback which reminds them of the basis on which they should have made their identification (i.e., whether or not a given item had or didn’t have all critical attributes of the concept). By working through these questions (which ask students to think about a concept’s critical attributes) and by receiving feedback (which discusses the presence or absence of a given critical attribute in a particular item), students gradually learn to look for these critical attributes on their own. For an example of inquisitory practice, see Figure 1.

Similar strategies can be seen elsewhere in Troyka’s handbook where, for example, at the beginning of the first exercise on fragments, students are told: “Check each word group according to the Test for Sentence Completeness on p. 261” (264). Students have to flip back and forth between the test and the exercises, but they are reminded of how they should proceed in determining whether or not a word group is a sentence or a fragment. *Grassroots* does not phrase the critical attributes of fragments as questions, but it does remind students of at least some of these critical attributes by beginning an exercise with the following instructions: “All of the following are *fragments*; they lack either a subject or a verb or both. Add either a subject or verb or both in order to make the fragments into sentences” (17). Unfortunately, this fails to help students whose fragments are primarily dependent clauses, but it is more helpful than the instructions in the *Harbrace College Handbook*, which tells students: “Eliminate each fragment below by including it in the adjacent sentence or by making it into a sentence” (29).

Tennyson, Chao, and Youngers have demonstrated the importance of providing students with both expository presentations and inquisitory practice in a study which contrasted three learning situations. In the first, students were given only an expository presentation with examples. In the second, they were given only the inquisitory practice, while in the third, they were given both. The students in all three situations were able to recall the concept’s critical attributes and some examples. However, the students who worked through both the expository presentation and the inquisitory practice had significantly higher scores than the other two

Figure 1. "Applying the Test" exercises are examples of inquisitory practice. The first exercise (#1) should be easier than the second (#2) because it requires students to make fewer decisions. The second exercise is more difficult but more realistic, requiring students to detect, diagnose, and edit.

### **Inquisitory Practice**

**Concept:** Fragment

**Definition:** A fragment is one word or a group of words that cannot pass Troyka's Test for Sentence Completeness

#### **[Troyka's] Test for Sentence Completeness**

1. **Is there a verb?** If no, there is a sentence fragment.
2. **Is there a subject?** If no, there is a sentence fragment.
3. **Do the subject and verb start with a subordinating word—and lack an independent clause to complete the thought?** If yes, there is a sentence fragment. (Troyka 261)

#### **Applying the Test—1**

**Directions:** Identify all the sentence fragments incorrectly punctuated as sentences in the passage below. To do so, examine each numbered item by asking the three questions in Troyka's test.

#### **The Change in Our Family**

(1) When I was sixteen. (2) My father died. (3) Our family, my mom, me, and my two sisters, struggled to make ends meet. (4) We decided to move to an apartment because we couldn't afford our house any more. (5) The apartment, a big adjustment for us all. (6) For we had always seen ourselves as middle class. (7) The move made us wonder if we still were. (8) We have adjusted over the years and learned to be more realistic, I think. (9) It's not been easy. (10) But maybe we're a more honest family now.

#### **Applying the Test—2**

**Directions:** Using Troyka's Test to guide your decisions, punctuate the following passage.

**Passage:** To celebrate the opening of his theater the owner decided to give a television set to the person holding the lucky ticket when the number was called seventy-two people flocked to the box office each having the lucky number the printer had made a slight mistake. (Blumenthal 71, frame 1386)



groups in identifying new examples of the concept in context and in discriminating between instances of the concept and entities that appeared to be instances. In Dunn's replication of this study, once again it was the combination of explanations of matched examples and nonexamples and inquisitory practice that increased performance in every aspect of concept attainment.

## Conclusion

In all of the information that concept learning research has to offer, one point stands out: students do not learn difficult concepts when presented with any single technique. What works is a *combination* of techniques:

- Providing background information when and where it is needed
- Offering definitions that list critical attributes and that are not overly simple or misleading
- Using a wide array of examples and nonexamples, chosen to reflect students' actual difficulties, and discussing the examples
- Including practice sessions, with feedback, that help students turn a concept's critical attributes into questions they ask themselves.

As we have seen, some of these principles are at work in our textbooks, but not as consistently or thoroughly as concept learning research would urge. But we can keep these guidelines in mind when choosing workbooks and textbooks and when offering instruction—both in classrooms and in tutoring sessions. And we can supplement, where necessary, adequate but not entirely complete textbook assignments and computer-assisted instruction. (However, spending time on uprooting misconceptions caused by inept textbooks is, like swatting mosquitoes, a frustrating, unending task.) The use of concept learning strategies is not the only way into better explanation of grammatical concepts, but it is *a* way, one based on sound principles and extensive research. It may appear to involve a great deal of effort, but if our students have convoluted, erroneous concepts that have to be untangled or corrected, we can't give short shrift and expect good results. They come to our classes with the capacity to detect some editing problems. They should leave with their detection, diagnosis, and revision skills enhanced.

## Appendix A

(Included here is the essay that students in our study were given. They were asked to identify each sentence as either a sentence or a fragment and to explain their responses.)

### My Brothers

(1) The phrase I heard only too often when I was younger was "You're too little to play." (2) Whatever my older brothers did I wanted to do, wherever they went I wanted to go. (3) Pat being two years older than myself and allowed to hang out with Randy, being four years older. (4) Since there was such a difference in age, I developed different and unique relationships with each.

(5) My brothers have clashing identities. (6) Total opposites of each other. (7) First, Pat is the kind of brother you see on television. (8) The kind that would help you with your homework and your problems. (9) Randy, on the other hand, isn't the smartest brother in the world but, he's been around and knows a lot. (10) The best summary of Randy is that he's the Mr. Hyde of Pat. (11) Not exactly bad, though a lot different. (12) He has no patience especially when he gets angry. (13) Then he goes on apologizing for days.

(14) There are traits in both of my brothers that I dislike. (15) First, Pat is too perfect. (16) Much too perfect for his own good. (17) The biggest annoyance is that he gets great grades. (18) And he's always so nice to people that bother him. (19) Because he thinks it's important to be polite. (20) Not to mention his mannerisms are good at all times. (21) Randy likes to move around a lot. (22) He gets bored with a job fast and easy. (23) He just can't stay in the office very much. (24) Which makes him a very good salesman.

(25) To sum up, we have our differences. (26) But that's just like any other family. (27) I still like them both very much. (28) Any differences that I may have because of age or size which wasn't resolved or will be through time. (29) For a final note to this assignment. (30) I would never say any of this to their faces, just on paper.

Item #	No. (and %) identifying it as a sentence	No. (and %) identifying it as a fragment
1 (sentence)	161 (90%)	17 (9%)
2 (sentence)	144 (89%)	31 (17%)
3 (fragment)	3 (2%)	175 (98%)
4 (sentence)	161 (90%)	17 (9%)
5 (sentence)	165 (92%)	13 (7%)
6 (fragment)	4 (2%)	175 (98%)
7 (sentence)	153 (85%)	24 (13%)
8 (fragment)	36 (20%)	140 (78%)
9 (sentence)	168 (94%)	10 (6%)
10 (sentence)	175 (98%)	3 (2%)
11 (fragment)	4 (2%)	172 (96%)
12 (sentence)	162 (91%)	15 (8%)
13 (sentence)	98 (55%)	79 (44%)
14 (sentence)	174 (97%)	4 (2%)
15 (sentence)	160 (89%)	18 (10%)
16 (fragment)	9 (5%)	168 (94%)
17 (sentence)	164 (92%)	12 (7%)
18 (sentence)	60 (34%)	114 (64%)
19 (fragment)	23 (13%)	152 (85%)
20 (fragment)	75 (42%)	97 (54%)
21 (sentence)	167 (93%)	5 (3%)
22 (sentence)	148 (83%)	25 (14%)
23 (sentence)	156 (87%)	17 (9%)
24 (fragment)	14 (8%)	157 (88%)
25 (sentence)	144 (80%)	28 (16%)
26 (sentence)	54 (30%)	114 (64%)
27 (sentence)	154 (86%)	15 (8%)
28 (fragment)	21 (12%)	150 (84%)
29 (fragment)	3 (2%)	167 (93%)
30 (sentence)	154 (86%)	14 (8%)

*Table 1.* Tabulation of student responses to the test essay. (Number of students = 179. Because of some omitted responses, totals are not always 100%.)

## Notes

<sup>1</sup> In such journals one can find the work of Robert Tennyson and his associates, e.g., Johansen and Tennyson; Merrill and Tennyson; Tennyson, Welsh, Christensen, and Hajovy; and Tennyson, Woolley, and Merrill. An accessible summary for teachers of this work is M. David Merrill and Robert Tennyson's *Teaching Concepts: An Instructional Design Guide*. Reviews of more recent research in concept learning can be found in an article by Tennyson and Park and another by Tennyson and Cocchiarella.

<sup>2</sup> We should note that the "grammar" being referred to here is that set of school grammar conventions labeled "grammar 4" by Patrick Hartwell, to distinguish it from other grammars, such as the descriptive grammar of linguists, stylistic grammar, or the internal grammar which guides all of our language use.

<sup>3</sup> While it was not our purpose to look for developmental gains as students progress through writing courses, we should note here that the students in the upper level writing courses did not perform appreciably better than the freshmen in distinguishing complete sentences from fragments.

<sup>4</sup> The books we use as examples in this paper are among those frequently used to teach grammar at the college level, according to sales information from major publishers.

## Works Cited

- Blumenthal, Joseph C. *English 3200: A Programmed Course in Grammar and Usage*, 3rd ed. New York: Harcourt, 1981.
- Crews, Frederick and Ann Jessie Van Sant. *The Random House Handbook*, 4th ed. New York: Random, 1984.
- Dunn, C. S. "The Influence of Instructional Methods on Concept Learning." *Science Education* 67 (October 1983): 647-56.
- Fawcett, Susan and Alvin Sandberg. *Grassroots: The Writer's Workbook*, 3rd ed. Boston: Houghton, 1987.
- Gagne, Robert. *Essentials of Learning for Instruction*. Hinsdale, IL: Dryden, 1974.
- Harris, Muriel. "Mending the Fragmented Free Modifier." *College Composition and Communication* 32 (May 1981): 175-82.
- Hartwell, Patrick. "Grammar, Grammars, and the Teaching of Grammar." *College English* 47 (February 1985): 105-27.
- Hillocks, George Jr. *Research on Written Composition: New Directions for Teaching*. Urbana, IL: ERIC Clearinghouse on Reading and Communication Skills, 1986.
- Hodges, John C., Mary E. Whitten, with Suzanne S. Webb. *Harbrace College Handbook*, 10th ed. New York: Harcourt, 1986.
- Homa, D., S. Sterling, and L. Trepel. "Limitations of Exemplar-Based Generalizations and the Abstraction of Categorical Information." *Journal of Experimental Psychology: Human Learning and Memory* 7 (November 1981): 418-39.

- Johansen, Keith J. and Robert D. Tennyson. "Effects of Adaptive Advisement on Perception in Learner-Controlled, Computer-Based Instruction Using a Rule-Learning Task." *Educational Communication and Technology Journal* 31 (Winter 1983): 226-36.
- Kagan, D. M. "Run-on and Fragment Sentences: An Error Analysis." *Research in the Teaching of English* 14 (May 1980): 127-38.
- Markle, S. M. and P. W. Tiemann. "Some Principles of Instructional Design at Higher Cognitive Levels." *Control of Human Behavior*. Eds. R. Ulrich, T. Stocknik, and J. Mabry. Vol. III. Glenview, IL: Scott, 1974.
- Merrill, M. David and Robert D. Tennyson. *Teaching Concepts: An Instructional Design Guide*. Englewood Cliffs, NJ: Educational Technology Publications, 1977.
- Reitman, J. S. and G. H. Bower. "Structure and Later Recognition of Exemplars of Concepts." *Cognitive Psychology* 4 (March 1973): 194-206.
- Tennyson, Robert D. "Effect of Negative Instances in Concept Acquisition Using a Verbal-Learning Task." *Journal of Educational Psychology* 64 (April 1973): 247-60.
- . "Pictorial Support and Specific Instructions as Design Variables for Children's Concept and Rule Learning." *Educational Communication and Technology* 26 (Winter 1978): 291-99.
- Tennyson, Robert D., J. N. Chao, and J. Youngers. "Concept Learning Effectiveness Using Prototype and Skill Development Presentation Forms." *Journal of Educational Psychology* 73 (June 1981): 326-34.
- Tennyson, Robert D. and Martin J. Cocchiarella. "An Empirically Based Instructional Design Theory for Teaching Concepts." *Review of Educational Research* 56 (Spring 1986): 40-71.
- Tennyson, Robert D. and O. Park. "The Teaching of Concepts: A Review of Instructional Design Literature." *Review of Educational Research* 50 (Spring 1980): 55-70.
- Tennyson, Robert D., M. W. Steve, and R. C. Boutwell. "Instance Sequence and Analysis of Instance Attribute Representation in Concept Acquisition." *Journal of Educational Psychology* 67 (December 1975): 821-27.
- Tennyson, Robert D., James C. Welsh, Dean L. Christensen, and Halyna Hajovy. "Interactive Effect of Information Structure, Sequence of Information, and Process Learning Time on Rule Learning Using Computer-Based Instruction." *Educational Communication and Technology Journal* 33 (Fall 1985): 213-23.
- Tennyson, Robert D., F. R. Woolley, and M. David Merrill. "Exemplar and Nonexemplar Variables Which Produce Correct Concept Classification Behavior and Specified Classification Errors." *Journal of Educational Psychology* 63 (April 1972): 144-52.
- Tennyson, Robert D., J. Youngers, and P. Suebsonthi. "Acquisition of Mathematical Concepts by Children Using Prototype and Skill Development Presentation Forms." *Journal of Educational Psychology* 75 (April 1983): 280-91.
- Troyka, Lynn Quitman. *Simon and Schuster Handbook for Writers*. Englewood Cliffs, NJ: Prentice, 1987.