

# CONNECTIVES

## Fitting Another Piece of the Vocabulary Instruction Puzzle

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*Connectives (nonetheless, moreover) represent a special kind of vocabulary knowledge that students need to read and write academic texts. What does research indicate about the effective ways to teach connectives?*

Mr. Birr's (pseudonym) social studies class is preparing to debate whether secret wiretapping by the government should be legal. The introductory passage presenting the controversy is informative, engaging, and provocative and invites students to form their own positions on the issue. As is often the case when learning new content, it also contains some words and constructions that are unfamiliar to Mr. Birr's students.

To ensure that they will have sufficient word knowledge to comprehend the text, Mr. Birr points to five challenging vocabulary words that students will encounter in the article before delving into talk about the words' meanings: "Some of the new words we'll see in this reading are *wiretapping*, *source*, *suspicious*, *notwithstanding*—boy, that one's a *really* tough word—and *eliminate*, okay?" Most educators would agree that each of these five vocabulary words may be challenging for students. So why does Mr. Birr pause after he reads *notwithstanding*? Why does he single out this word as one that is likely to present particular difficulties?

*Notwithstanding* is an example of a "connective," the focus of this article. Connectives are cohesive devices, including conjunctions, such as *although* and *since*, and adverbs, such as *therefore* and *nonetheless*. Sometimes referred to as "signposts" or "glue," connectives are important because they link ideas and information within and between sentences. They also signal how ideas are related across longer passages in text. That is, connectives both clarify how readers should understand the relationship between

ideas they have already encountered in a text and also orient readers to upcoming information.

As we discuss, understanding of connectives represents a special kind of vocabulary knowledge that students need to develop to read challenging, academic texts with understanding and to produce academic writing. Yet the meanings of connectives are abstract, relational, and difficult to define. Tapping the meaning of connectives to support comprehension and academic writing may be especially difficult for some students, especially English learners (ELs).

In this article, we address how and why to provide instruction about connectives to students in the middle grades. Our research with students in the fifth grade suggests that students in the middle grades would benefit from explicit instruction about the meanings and roles of connectives, but that this instruction—although direct—should be provided within engaging, meaningful contexts.

We begin this article by demonstrating that connectives constitute an important domain of vocabulary in school-based reading materials. We then discuss why understanding the meaning of connectives plays such an important role in comprehension. Finally, we provide examples of instructional

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practices—informed both by research studies and our work with classroom educators—that illustrate how educators can teach students about connectives.

### How Frequent and Important Are Connectives in Typical Reading Materials?

Connectives vary in their frequency and complexity. Some connectives occur so often in oral language (e.g., *and*, *but*, *because*) that they are among the words that children typically learn in the early phases of language acquisition, between approximately the ages of 2 and 3 (Badzinski, 1988; Bloom, Lahey, Hood, Lifter, & Feiss, 1980). Although in the middle elementary school years, children are still refining their

understanding of the meanings of even the most frequently occurring connectives (Cain & Nash, 2011; Geva, 2006), there is some evidence that as early as third grade, children have begun to take advantage of the information offered by these connectives, such as *before* and *because* to support comprehension as they read (Cain & Nash, 2011). But what about less common connectives, such as *otherwise*, *subsequently*, and *nevertheless*, that are not frequent in informal, spoken language?

We now know that these more sophisticated connectives play an important role in linking ideas and clarifying meaning in reading materials in the middle grades. For example, an analysis of reading materials by Nair (2007) demonstrated that by sixth grade, connectives are abundant in some of the most ubiquitous, mainstream social studies texts. In her study, Nair identified all the words that are likely to be challenging for sixth graders (based on Dale & O'Rourke's *Living Word Vocabulary*, 1979), categorizing these words into two sets: "common" and "academic" words. (We have renamed the classification levels for our own explanatory purpose.)

The analysis revealed that middle school students encounter a range of connectives—both common and academic in typical, day-to-day reading materials. In fact, 12 of the words frequently encountered in middle school texts were from the common set and 17 were from the academic set (Table 1). We refer to these as "common connectives" and "academic connectives," respectively.

Common connectives represent those that are more frequent in print than in oral language, such as *in the meantime*, *moreover*, and *otherwise*, but are still quite high frequency and are more likely to be familiar to children than academic

**Table 1 Common and Academic Connectives That Appear in Middle School Social Studies Textbooks, in Alphabetical Order**

Common connectives	Academic connectives
Although	Albeit
However	Alternatively
Meantime	Consequently
Meanwhile	Conversely
Moreover	Despite
Otherwise	Eventually
Therefore	Finally
Though	In contrast
Unless	Initially
Until	Likewise
Whenever	Nevertheless
Yet	Nonetheless
	Previously
	Specifically
	Ultimately
	Whereas
	Whereby

*Note.* Adapted from Nair (2007).

connectives. Academic connectives are words that appear on the Academic Word List (AWL; Coxhead, 2000), a list of 570 words that appear frequently across a range of disciplines in university-level reading materials. Academic connectives are less common and even more strongly associated with academic writing than the previous set, including connectives such as *conversely*, *consequently*, and *nonetheless*.

Is understanding the meaning of connectives always necessary for comprehension? In some cases it is not. For example, if we were to remove all of the connectives from this paragraph (e.g., *for example*, *in fact*), it would become somewhat more cumbersome to read, but would still be comprehensible to the audience of this journal. In fact, some research has shown that skilled adult readers can comprehend a passage well when there are few

connectives to link ideas because they bring extensive background knowledge to comprehension.

It appears that these readers engage more actively with the text when they have to figure out the connections between ideas and information themselves, without relying on connectives (McNamara, 2001; McNamara, Kintsch, Songer, & Kintsch, 1996). However, by the time students reach third grade, they frequently engage with texts about topics with which they have little familiarity. For these students, the explicit marking of relationships afforded by connectives is very helpful for making sense of how ideas and information in a text "fit together."

At the same time, in some cases understanding the meaning of connectives is essential for understanding the message of a text, even if the reader brings extensive background knowledge and honed comprehension skills to the text. In these cases, even if a reader is able to grasp the basic ideas and information in the text, if he or she misinterprets the relationship between those ideas, comprehension will be impaired. In the examples that follow, let's assume the reader understands the two basic propositions in the sentence—(1) global temperatures continued to rise, and (2) Congress passed a bill to reduce carbon emissions—but does not understand the abstract meanings of each of the connectives. Notice the misunderstanding that could arise:

Global temperatures continued to increase *even though* Congress passed a bill to reduce carbon emissions.

Global temperatures continued to increase *until* Congress passed a bill to reduce carbon emissions.

Global temperatures continued to increase *even as* Congress passed a bill to reduce carbon emissions.

Global temperatures continued to increase; *however*, Congress passed a bill to reduce carbon emissions.

Global temperatures continued to increase *notwithstanding* Congress's eventual success in passing a bill to reduce carbon emissions.

Students who are unaware of the need to attend to connectives might assume that all five sentences convey the same basic meaning. Others who are aware of the critical—yet abstract—meanings carried by connectives but are unfamiliar with their meanings will be unable to unlock the different messages signaled by connectives.

Indeed, tapping into the meaning of connectives occurs on two levels. First, students must be aware of the important "cueing" function that connectives play (see Table 2), and students need to develop the habit of paying attention to them. That is, they need to develop metalinguistic awareness of the importance of connectives. Second, students need to have knowledge about the meanings and uses of specific connectives, including both common connectives and those academic connectives they will encounter in more complex reading materials as they progress up the grade levels.

In light of the second level, consider the following exemplar text from

the Common Core State Standards (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010) for grades 4 and 5. In one passage, excerpted from *We Are the Ship: The Story of Negro League Baseball* by Kadir Nelson, the author describes the overwhelmingly poor working conditions of African American baseball players in the Negro League, contrasting them with the conditions of white players in the Major League. Yet the author's historical account also reveals that not all historical figures thought and acted in the same way, suggesting the possibility of change through individual agency: "There were, however, a few owners [of Negro League teams] who did know how to treat their ballplayers. Cum Posey was one of them." (Appendix B, p. 74).

The fact that Cum Posey represents a rare but important exception to the actions of most Negro League team owners is signaled by the adversative connective, *however*. Even if a student reading this passage is aware that the connective may play an important role, if the reader mistakenly believes that *however* conveys a causal, temporal or additive relationship, the significance of Cum Posey could be misunderstood.

**Table 2 Sample of Types of Relations Cued by Connectives**

Category	Example	Explanation
Additive	During the summer, my mother works in an outdoor food market. <i>In addition</i> , she works at a farm.	The relation is considered additive because the two segments are considered equally true, yet there is no direct causal relationship. These relations are typically lists or enumeration.
Temporal	Put on your socks <i>before</i> you put on your shoes!	The relationship between two segments is sequential in time.
Causal	I was late to school <i>because</i> I missed the bus.	The relation is considered causal because the one segment occurs as a result of the other.
Adversative	Sonia still thinks of Maria as her best friend, <i>even though</i> they fight all the time.	Relations are considered adversative when they signal a causal relationship that is in opposition or contrast.

### Pause and Ponder

- Consider the expectations for writing arguments, informative/explanatory texts, and narratives in the Common Core State Standards ([www.corestandards.org/the-standards](http://www.corestandards.org/the-standards)). For example, the standards for writing arguments in grade 6 require students to "use words, phrases and clauses to clarify relationships among claims and reasons" (p. 42).
- How might instruction about connectives support students in meeting these expectations?
- What kinds of relationships between ideas and information do writers need to make in different genres? For example, what relations are especially important for writing narratives in comparison with writing arguments?
- Which connectives are useful for signaling these different types of relations?



## Are Connectives Equally Helpful to Students of Different Language Backgrounds and Different Levels of Background Knowledge?

We have seen that a range of common and academic connectives appear in school texts, that connectives often carry important meanings that are essential to comprehension, and that their meanings are sometimes difficult to infer from context. It is reasonable to expect, therefore, that students who know to exploit connectives to help them link ideas and information will read with greater comprehension than their peers who are less knowledgeable about the role and meanings of connectives. However, is this knowledge equally helpful to all students? In particular, are connectives similarly helpful to students of different language backgrounds who bring different background knowledge to comprehension tasks?

To investigate these questions, we carried out a correlational study with EL and monolingual “English-only” (EO) fifth graders. (For details of the design, analyses, and results, see the complete report in Crosson & Lesaux, 2013.) We administered standardized tasks of reading comprehension and vocabulary knowledge as well as a researcher-designed connectives task, all in English. We learned three major lessons from the study.

First, our research showed that students who know the meanings of

connectives are more likely to read with greater comprehension than students who are less knowledgeable about connectives. This finding was not surprising given the pivotal role that connectives can play in communicating the meaning between ideas and information in a text. Second, we found that for all students, academic connectives such as *despite that*, *consequently*, and *whereas* presented more of a challenge to students than common connectives such as *in the meantime* and *whenever*. Third, we found that EO and EL students who had relatively strong knowledge of connectives were *not* equally successful at using this knowledge to comprehend longer passages of text, but instead that EO students were more likely than EL students to use their knowledge of connectives to bolster comprehension.

This result suggests that other factors affecting the EL students’ reading comprehension overshadowed the role of their knowledge of connectives, such as the presence of other unfamiliar words, including polysemous words (i.e., words that have multiple, unrelated meanings such as a piece of buttered *toast* versus a champagne *toast*), in the comprehension passages. Therefore, even if EL students knew the meanings of the connectives, given the sheer number of other unknown vocabulary words, they would not necessarily grasp the ideas and information that the connectives were supposed to link. Connectives are only

helpful if you are making meaning of the ideas and words around them!

## Should the Meanings of Connectives Be Explicitly Taught? A Cautionary Tale

Our research revealed that many academic connectives are not well understood by EL students and EO students from low-income backgrounds who are at risk for reading difficulties. Because these students don’t necessarily understand what relationship is being signaled when they come across a connective such as *despite that* or *consequently* while reading, their comprehension is compromised. Without knowledge of what relationships are being cued by connectives, comprehension will suffer.

It is not surprising, therefore, that overall, those students who knew more about the meanings and functions of connectives were more likely to read with understanding. This would suggest a straightforward affirmative answer to the question, “Should the meanings of connectives be explicitly taught to students in the middle grades?”

However, our research revealed that the issue is not “whether or not” but instead “how and for whom?” We found that many students who do have knowledge about connectives do not exploit this knowledge in the service of reading comprehension. Although this study did not enable us to identify precisely why some EL students who knew a lot about connectives were less likely to exploit this knowledge, it is likely that whether (or not) students will use their knowledge of connectives to leverage comprehension effectively will depend not just on their knowledge of specific connectives, but also on whether this knowledge is useful given the constellation of other linguistic competencies and knowledge students bring to the task.

## What Does Research-Based Instruction of Connectives Look and Sound Like?

The major implication from our study is that students need explicit instruction about connectives, but that this instruction should be contextualized within learning about interesting and important content and should be integrated as part of a larger approach to promoting vocabulary development. Explicit instruction about the meanings and functions of connectives is no more a magic bullet than targeted instruction focused on any other discrete skill or competency related to reading comprehension, no matter how useful!

Here, we offer a set of guidelines for explicit instruction about connectives to both EL and EO students. These guidelines are drawn both from our research as well as our own observations and discussions with educators, and they are intended to support both understanding of the meaning signaled by connectives encountered when reading and also the use of connectives that indicate an academic voice in their writing.

First, we recommend some targeted teaching of common connectives for students in the upper elementary grades, with a shift toward academic connectives in middle school. Recommendations for selecting connectives can be found in Table 1, as these

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were identified in mainstream sixth-grade reading materials. Other sources for identifying connectives are the texts students are reading. It is important to select connectives from both narrative and informational texts, as narratives are more likely to contain temporal and causal connectives, and informational texts are more likely to contain adversative connectives.

Second, although it is essential that connectives that are selected for analysis be taught alongside other key concept words (e.g., *wiretapping*) and high-utility academic vocabulary words (e.g., *source*, *eliminate*), many of the principles of robust vocabulary instruction offered by Beck and McKeown and colleagues that apply to the more tangible general academic vocabulary words such as *source* and *eliminate* also apply to this domain of highly abstract words.

Third, we strongly recommend a balance of structured activities and moves designed to intentionally scaffold students’ understanding of the meanings and constraints of use of a variety of academic connectives—guided by many of the principles of robust vocabulary instruction, including active processing and multiple encounters in a variety of contexts—with those experiences that are embedded in students’ reading and writing and thus emerge spontaneously. In both cases the instruction is explicit, but the degree to which they are structured in advance varies.

We recommend the following instructional moves and practices. All of these are appropriate for teaching both common connectives and academic connectives. Note that they include both highly structured interactions as well as those that emerge from students’ own comprehension and writing needs.

- Ask probing questions—When encountering an unfamiliar connective in a text, first pose questions to gauge the degree to which students understand the relationship signaled by the connective. For example, when reading aloud the passage about covert wiretapping and the Protect America Act, Mr. Birr said, “Hmm. It says that, ‘Other people are against the act, notwithstanding the need for safety and security. They think wiretapping violates a person’s right to privacy.’ What do you think the author means when she says that other people are against the Protect America Act, *notwithstanding* the need to be safe and secure? What do you think she’s saying there?” When students’ responses evidence uncertainty, the teacher can explain the meaning of the text and point out explicitly how the connective played a critical role in clarifying the author’s meaning.

For example, the teacher might model his thinking as follows:



"Well, it says that people are against the act, and we know the author is talking about people being against the Protect America Act that was about allowing the government to spy on people without special permission from the courts. Then it says this was true notwithstanding the need to be safe and secure. *Notwithstanding* is a connective—it's one of those words that glues together ideas in the text. *Notwithstanding* is used to say that something happens even though there are strong reasons why it might have been prevented from happening. So the author is saying that some people are against the act, even though there are really good reasons to be concerned about being safe and secure."

- Think of synonyms—When students' understanding of the meaning of the connective in the text appears to be fragile or off base, it can be helpful to elicit or provide close synonyms that are high-frequency connectives. For example, the meaning of *notwithstanding* is shared in part by the meaning of *but* and *despite*. Pointing out the relationship between high-frequency connectives that are typical of informal colloquial contexts and academic connectives may prove useful in bridging the unknown to the known. It is essential that educators explain in very explicit terms how the meaning of

the high-frequency or colloquial connective links to its more formal academic synonym. However, it is also important to point out key differences in their uses and meanings and explain that the contexts in which each typically appears are very different (Crosson, Lesaux, & Martiniello, 2008).

- Generate examples—When grappling with texts in which connectives are unfamiliar to most students, it is helpful to take a few minutes to teach the academic connective by inviting students to use it in familiar contexts. Brief active processing activities can involve students in generating examples that support their understanding of both the meaning of the connective and prototypical constructions.

For example, students might be invited to generate examples of ways to use *notwithstanding* with the following sentence starters: "I decided to download the new version of Angry Birds..." or "The Yankees is my favorite baseball team..." Such sentence starters should always require that students deal with the relationship between ideas signaled by the connective and should also be open enough to lend themselves to a variety of responses.

Students are likely to generate examples that reveal their lack of familiarity with the connective

## "Connectives are a prevalent feature of academic language."

(e.g., "notwithstanding the price was really high"). When this happens, the teacher can simultaneously value the student's contribution of a new context and model prototypical use ("Yes, I decided to download the new version of Angry Birds, its high price *notwithstanding*. So what do you suppose she's thinking about this decision?"). A critical point about applying academic connectives to familiar contexts is that we should be transparent with the students that the purpose of generating such examples is to learn the meaning of a new sophisticated connective, even if these examples are less formal than the ones in which the connectives would typically appear.

- Get students writing—In addition to teaching the meanings and uses of academic connectives that students encounter in content-area reading, it is also essential to support students to begin to use connectives in their own writing to promote an academic voice and to effectively communicate ideas and information. In research we have conducted on fifth graders' writing, we have found that both EL and EO students tend to include a range of types of connectives in their writing (causal, temporal, additive); however, most students' use of connectives was limited to those that were high-frequency (Crosson, Matsumura, Correnti, & Arlotta-Guerrero, 2012). A highly

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contextualized way of teaching the meanings of different academic connectives is to explicitly demonstrate for students when a high-frequency connective could be more effectively replaced by a common connective, or even an academic connective.

For example, in a persuasive essay about whether children should be permitted to watch violence on television, one EL student from a Spanish-language background argued that viewing violence is important to raising awareness and prevention: "Parents don't want their children to do these mistakes in their lives so that's why it's bad for the children to watch violent TV shows." In addition to many other linguistic features that this student could address to argue his position with authority and to develop his argument, his essay would benefit from replacing the more colloquial "so that's why" with a connective that causally links the two major idea units (e.g., *therefore*, *thus*).

- Try sentence combining—Some students will benefit from sentence combining as a stepping stone to using connectives in their own writing. Sentence combining can be used to teach students how use both common and academic connectives. Resources such as Reading Rockets ([www.readingrockets.org/strategies/sentence\\_combining/](http://www.readingrockets.org/strategies/sentence_combining/)) and BBC Skillswise ([www.bbc.co.uk/skillswise/topic/connectives](http://www.bbc.co.uk/skillswise/topic/connectives)) provide concrete suggestions of short sentences that can be combined. Keep in mind that it is critical to communicate to students that sentence combining is not an end

## "Explicit instruction of connectives is embedded within the context of engaging and challenging content."

in and of itself, but instead is a strategy that can be used to clarify the relationship between ideas and information in their own writing.

- Plan ahead—Finally, additional and perhaps more critical work for improving writing lies in the planning process and requires improvement at the level of organizational structure and development of ideas, not just surface-level changes related to word choice (i.e., replacing a high-frequency with an academic connective). For example, our research has revealed that students rarely employ adversative connectives in their writing, even in the case of persuasive essays in which adversative connectives such as *nonetheless* and *whereas* are very effective in refuting counterarguments (Crosson et al., 2012). Thus when supporting students to improve their persuasive writing, first their attention needs to be brought to the rhetorical strategy of presenting counterarguments and rebuking them.

Teachers can then show students how adversative connectives serve the purpose of developing a highly persuasive text. Ideally, this work would begin by first analyzing models of persuasive writing, and as part of the analysis, pointing to the connectives that the writer uses to communicate relationships between warrants and

claims, counter-warrants and counter-claims.

For example, students might first engage in an interactive reading and analysis of the news article, "The Teen Brain: It's Just Not Grown Up Yet," and then might be asked to complete the following assignment: "Write a persuasive piece about how these scientists' findings should (and should not) have an impact on what adolescents are allowed to do at home and at school. Imagine that your reader is intelligent and friendly, but does not share your perspective. Think of arguments that your reader will make to convince you to agree with him or her. Use connectives to raise these arguments and refute them."

## Teaching About Connectives to Support Comprehension

Returning to Mr. Birr's lesson about whether secret wiretapping by the U.S. government should be legal, it is understandable that the teacher paused after reading *notwithstanding*, identifying it as an especially tricky word. Unlike the other target words—all nouns, verbs, and adjectives that are relatively concrete and imaginable—the meaning of *notwithstanding* is abstract and intangible. Yet this word is at least as critical to getting the meaning of the article as the other target words.

There are two essential components of Mr. Birr's initial approach to teaching



## TAKE ACTION!

1. Ask probing questions—For example, “What do you think the author means when she says that other people are against the Protect America Act, *notwithstanding* the need to be safe and secure? What is she saying there?”
2. Think of synonyms—For example, the meaning of *notwithstanding* is shared by the meaning of *despite* or even *but*.
3. Generate examples—For example, students might be invited to generate examples of ways to use *notwithstanding* with sentence starters such as, “The Yankees is my favorite baseball team...”
4. Get students writing—Show students how to use connectives as “signposts” in their writing, to write more concisely, clearly, and effectively. Support their understanding of both common and academic connectives through sentence combining activities.
5. Plan ahead—Analyze models of writing in which connectives are used effectively and plan long-term writing projects that will enable students to begin incorporating these in their own writing.

connectives that make this lesson very promising. First and foremost, his explicit instruction is embedded within the context of engaging and challenging content. Second, his instruction is not focused solely on the challenging academic connective, but instead he is also enriching students’ vocabularies of other kinds of words.

It is clear that focusing students’ attention solely on the meaning of the connective *notwithstanding* would have been insufficient to help them understand the passage given that it was surrounded by many other unfamiliar words. Indeed, *wiretapping* is essential for understanding the specific content

under study. *Source*, *suspicious*, and *eliminate* may be unfamiliar to students, and these words are likely to be encountered in a range of academic texts, and thus they are worthy of rich, direct instruction (Beck, McKeown, & Kucan, 2002).

In conclusion, research findings suggest that educators should explicitly teach the meanings and roles of connectives to students in the middle grades. We have seen that students will confront a range of connectives in their reading materials, as connectives are a prevalent feature of academic language. However, it is essential that this instruction be highly contextualized and integrated with learning about other types of vocabulary. If not, students—perhaps most likely EL students with limited vocabulary knowledge in English—may not be aware or able to use this knowledge to read with greater understanding.

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