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Toward a linguistically informed, responsive and embedded pedagogy in secondary literacy instruction

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ABSTRACT

Learning in secondary content areas involves at least some interaction with complex disciplinary texts. The engagement requires discipline-specific reading/writing skills that go beyond those students have mastered in the elementary grades. This advanced literacy ability, or disciplinary literacy, is best fostered through a pedagogy that is informed by sound linguistics theory, responsive to student needs, and embedded in meaningful disciplinary experiences. Such a pedagogy, with its focus on how language is used in disciplinary meaning making, has the potential to promote knowledge building and advanced literacy development at the same time.

1. Introduction

In secondary schooling, students are expected to engage with increasingly specialized knowledge of academic disciplines. This knowledge is typically presented in texts that are simultaneously technical, dense, abstract, and metaphorical (Fang 2012). To access disciplinary content and habits of mind, then, students must be able to read, write and evaluate these texts. In fact, knowing a discipline is synonymous with being able to read and write in that discipline. As Hasan (1996, 398) observed,

> It would be difficult to draw a distinction between pupils' knowledge of an academic discipline and their discursive ability to listen/read, speak/write the discourses of that discipline. Academic disciplines are, after all, largely a constellation of certain types of discourse, and, in the end, what counts as knowing a discipline is the ability to participate successfully in the discourses of that discipline.

In other words, the development of what science educators Norris and Phillips (2003) referred to as the derived sense of disciplinary literacy – knowledge about the content of a discipline including its key concepts, core ideas, and unifying themes – is highly dependent on the fundamental sense of disciplinary literacy, or the ability to read and write in the discipline.

This advanced literacy ability has traditionally been developed in the U.S. (and likely elsewhere) through a pedagogy modeled after that for developing basic, or elementary, literacy, with a focus on cognitive strategies, fluency, and vocabulary. In this paper, I argue

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that such a pedagogy is woefully inadequate to address the new literacy demands of disciplinary learning in academic content areas and that an alternative approach to advanced literacy development is needed in secondary schooling. Specifically, I suggest that advanced literacy is best developed through a pedagogy that is informed by sound linguistics theory, responsive to students' needs, and embedded in disciplinary inquiries. To this end, I first provide a brief critique of the currently popular approaches to literacy instruction in content areas, arguing that a focus on language is warranted in secondary literacy instruction. Next, I describe and exemplify a language-based pedagogy that promotes language learning, advanced literacy development, and knowledge building at the same time. I then discuss the implications of this pedagogy for teacher education. I conclude the paper with a plea to make language a central concern in secondary literacy instruction.

2. Rethinking secondary literacy instruction

It is well recognized that a large proportion (70%) of students in the U.S. middle and high schools, including many of those who were deemed proficient readers in the elementary school, struggle with reading and writing texts in academic content areas (e.g., National Center for Education Statistics 2011; Salahu-Din, Persky, and Miller 2008). This recognition has led to calls for continuing emphasis on literacy and literacy instruction in secondary schools (e.g., Council on Advancing Adolescent Literacy 2010). A major focus of literacy instruction in secondary content areas has been on cognitive strategies, i.e., mental routines or procedures for accomplishing cognitive tasks such as understanding a text, writing an essay, or solving a problem. Strategies such as inferring, predicting, visualizing, questioning, monitoring, summarizing, synthesizing, rereading, thinking-aloud, determining main ideas, concept mapping, note-taking, and highlighting are widely promoted as the key to improving adolescents' reading comprehension and written composition (c.f., Deshler et al. 2007; Fisher et al. 2018; Graham and Perin 2007; Vacca, Vacca, and Mraz 2016). This focus on cognitive strategies in secondary literacy instruction is problematic for several reasons. First, children, barring severe disabilities, have typically acquired many of the cognitive strategies being taught in school (e.g., predicting, inferring, and questioning) by the time they reach school age, and thus may not need a heavy dose of this sort of instruction. In fact, they use these strategies proficiently in their listening comprehension. For example, they regularly predict, infer, and monitor in their daily verbal interactions with friends and family members. When they see dark clouds in the sky, they predict it is going to rain. When their mother tell them that money does not grow on trees, they infer they will not be allowed to buy the toy they want from the Toys-R-Us store. For this reason, Hirsch (2010) has questioned the wisdom of an excessive emphasis on cognitive strategies in reading comprehension instruction. Citing the research review by Rosenshine and Meister (1994), he noted that while there may be some initial benefits of explicit strategy instruction for young children, there is no need to teach cognitive strategies for an entire school year and over many years (from elementary through secondary schools).

Second, some cognitive strategies – such as summarizing and using graphic organizer – are not, as many teachers have been led to believe, comprehension strategies. These strategies are best viewed as activities that provide worksheets for students to document

what they have already comprehended. In other words, they are, to borrow from Catts (2009, 180), "more the product of comprehension than the cause of comprehension." For example, to successfully complete a concept map that shows relationships among key ideas or terms in a text, students must first understand what they have read in the text. This means that effective use of these strategies often depends on the extent to which students have comprehended the text. The more students have comprehended a text, the better able they will be to take thoughtful notes, ask relevant questions, and provide quality summaries.

These arguments call into question the findings of literally hundreds of studies that have reported positive effects of explicit cognitive strategy instruction on text comprehension and recall (see Dole, Nokes, and Drits 2009; National Reading Panel 2000; Pyle et al. 2017 for reviews). How, then, do cognitive strategies work to improve comprehension? Cognitive strategies, according to Catts (2009), "are not essential skills necessary for reading comprehension but rather activities that focus readers' attention on what is important in comprehension" (180). They alert readers to the ultimate goal of reading, reminding them that reading is not simply calling out words (i.e., decoding), but building a coherent mental representation of what the author tried to convey in the text. It is this new understanding of what reading is that, Catts surmised, likely contributes to comprehension success. From this perspective, some explicit strategy instruction could be beneficial, especially for young children who may equate reading with only decoding and not endeavor to integrate text with their prior knowledge. However, such instruction does little to assist those who are struggling with print processing in the first place. In other words, cognitive strategies should not be the sole or principal focus of literacy instruction, particularly at the secondary level, where texts become more complex and challenging for adolescents, who generally understand that the goal for reading is not decoding but to make meaning from these texts.

Reading research over the past few decades has shown that the extent to which a reader comprehends a text is influenced by three key factors (Fang 2008). The first is the reader's prior knowledge about the topic of the text. Familiarity with the text topic contributes to constructing a meaningful situation model of what the text is about. The second is the reader's proficiency with the language of the text. Without this proficiency, the reader would have trouble accessing prior knowledge, much less text content. The third is cognitive strategies, which facilitate integration of text information with the reader's background knowledge. Effective use of these strategies, however, hinges upon the extent to which the reader understands the text language and is familiar with the text topic (Kintsch 2004). One reason students are able to use cognitive strategies proficiently in everyday listening comprehension is that the topic of conversation is usually familiar and its language commonsensical. With disciplinary texts, however, the topic is typically unfamiliar and the language is often challenging; and to learn the unfamiliar topic, students must first of all be able to process the challenging language in which the topic is codified and transmitted. This means that a focus on language is of paramount importance in secondary literacy instruction. After all, content is made prototypically of language and presented to students primarily through language in textbooks and other written media. Students who struggle with reading and learning often exhibit a range of language problems, including difficulties in vocabulary, grammar, and text-level processing abilities (Stone et al. 2013). This is particularly true in middle and high schools, where the texts students are expected to engage with become more specialized

and complex. Students need support when interacting with these texts in disciplinary learning.

What makes the language of disciplinary texts challenging is that it is unlike the language students use to socialize with friends and family members or the language they typically interacted with in early readings. Compare, for example, the two excerpts in Table 1. Both excerpts are about the Boston Massacre, a historically significant event. Text 1 sounds like a story in that it provides a dynamic, real time account of people and events in a chronological order. Text 2, on the other hand, not only retells but also interprets and generalizes from what happened. Text 1 resembles the sort of text more commonly found in earlier grades and that students generally feel comfortable reading, whereas Text 2 is more typical of the sort of texts that students are expected to engage with in middle and high schools but often find daunting to read and write. As this comparison illustrates, the language of academic disciplines (like history) in secondary schooling tends to be more technical, abstract, dense, and metaphoric than the mother tongue that students use in their everyday spoken interactions or the language they typically encounter in early reading materials. This difference is a significant source of reading and learning difficulty for adolescents in secondary schooling. As Halliday (2016, 130) observed,

> In a sense, just as the move into generalization marks the transition to the mother tongue and the end of babyhood, and the move into abstraction marks the transition to writing and into school – from commonsense knowledge to educational knowledge – so the move into metaphor marks the transition from primary to secondary school: to learning that is based on the recognized school disciplines (science, maths, history, literature and so on) and on the different varieties of written English that go with them. So, children are likely to have problems if faced with and expected to learn from highly metaphorical texts at a stage where they are not yet really in control of this kind of language.

Table 1. Comparison of two texts on Boston massacre.

Text 1	Text 2
On 5 March 1770, violence erupted. A fight broke out between some Bostonians and soldiers. As British officers tried to calm the crowd, a man shouted, "We did not send for you. We will not have you here. We'll get rid of you, we'll drive you away!" The angry townspeople surged forward. They began throwing sticks and stones at the soldiers. "Come on, you rascals, you bloody backs, you lobster scoundrels, fire, if you dare," someone in the crowd shouted. After one soldier was knocked down, the nervous redcoats did fire. They killed five colonists. Among the dead was Crispus Attucks, a dockworker who was part African, part Native American. One Bostonian cried: "Are the inhabitants to be knocked down in the streets? Are they to be murdered . . . . ?" The colonists called the tragic encounter "the Boston Massacre." (from Brinkley et al. 2013, 127)	British officials, faced with a breakdown of law and order, landed two regiments of troops in Boston in 1768. Many of the soldiers were drunken and profane characters. Liberty-loving colonists, resenting the presence of the red-coated "ruffians", taunted the "bloody backs" unmercifully. A clash was inevitable. On the evening of 5 March 1770, a crowd of some sixty townspeople began taunting and throwing snowballs at a squad of ten redcoats. The Bostonians were still angry over the death of an eleven-year-old boy, shot ten days earlier during a protest against a merchant who had defied the colonial boycott of British goods. Acting apparently without orders, but nervous and provoked by the jeering crowd, the troops opened fire and killed or wounded eleven citizens, an event that became known as the Boston Massacre. One of the first to die was Crispus Attucks, described by contemporaries as a powerfully built runaway "mulatto" and a leader of the mob. Both sides were in some degree to blame, and in the subsequent trial (in which future president John Adams served as defense attorney for the soldiers), only two of the redcoats were found guilty of manslaughter. The soldiers were released after being branded on the hand. (from Kennedy, Cohen, and Bailey 2009, 110)

Thus, recognizing and responding to the linguistic realizations of the challenges of disciplinary learning is key to advanced literacy development and effective scaffolding of student learning in the discipline. Clearly, there is a need to foreground language in secondary literacy instruction. Gee (1999, 358) highlighted this need over two decades ago, arguing,

> If we do not begin to transform debates about reading into debates about language, literacy and learning …, then, I predict, we will soon face another and new "crisis": elementary, middle school, and high school classrooms will be filled with children who have successfully passed basic reading tests by the third grade and yet cannot use language (oral or written) to learn, to master content, to work in the new economy, or to think critically about social and political affairs.

A focus on language, however, has typically been taken to mean a focus on fluency, grammar, or academic vocabulary. In the case of fluency, attention is often focused on accuracy, speed, and prosody, with the number of words correctly decoded and read (aloud) per minute used as a proxy for comprehension. These fluency measures make sense only when reading texts whose language is close to the reader's everyday spoken language. They are, however, not appropriate when reading texts whose language is distinct from the reader's everyday spoken language. As noted earlier, academic and disciplinary texts are often simultaneously technical, dense, abstract and metaphorical. They are difficult to comprehend aurally when read aloud. They are generally meant to be read silently, slowly, and closely because they encode abstract ideas and complex relationships.

In the case of grammar instruction, the focus has usually been given to traditional grammar categories, such as parts of speech, tense, voice, participles, subject-verb agreement, and syntactic structure. Often conducted in a decontextualized fashion, such practice, as Gebhard and Martin (2011) pointed out, pays little attention to meaning or function, imposes rigid rules and conventions that proficient language users often violate, and does not truly empower readers and writers.

In many classrooms, a focus on language in secondary literacy instruction sometimes becomes a focus on academic vocabulary, as if a text consists of words only. Yet, meaning is made not by words alone. That is, meaning does not reside so much in individual words as in collections of words. Different arrangements of words result in different meanings and create different effects on the reader. As Halliday noted, "lexical items do not function by themselves; they are brought to life, and validated, by the grammar" (Halliday 2013, 224) and "it is the total effect of the wording – words and structures – that reader is responding to during reading" (Halliday and Martin 1993, 71). In other words, words are only meaningful when understood in relation to other words. Readers do not process a text word by word; rather, they do so in meaningful chunks (e.g., phrases, clauses, sentences). Moreover, a focus on vocabulary alone can obscure important semantic relationships among disciplinary concepts and deprive students of the opportunity to learn the linguistic resources needed to express those relationships (Bruna, Vann, and Escudero 2007; Robinson 2005). For example, students may be able to identify and define discipline-specific terms through vocabulary instruction, but often struggle with using the terms to accurately and concisely convey and develop ideas in their content areas. To successfully comprehend, compose, and critique disciplinary texts, students must expand their linguistic repertoires. More specifically, they must develop the capacity to

understand and use language for the purposes of construing uncommonsense knowl-edge and engaging in advanced literacy tasks of distilling, abstracting, technicalizing, theorizing, generalizing, interpreting, and logical reasoning (Christie 2002). This ability cannot be effectively developed with traditional approaches that focus on cognitive strategies, fluency, vocabulary, or traditional grammar.

3. A functional linguistics approach

An emphasis on the role of language in advanced literacy learning and knowledge building necessitates a different approach to secondary literacy instruction than the ones that are currently popular with teachers. This approach must be responsive to student needs and does not needlessly repeat what they already know and are fully capable of doing. It also needs be guided by sound linguistics theory so that the focus of instruction is not on form alone but on how form realizes meaning and function in discipline- and genre-specific ways. Equally important, the approach needs to embed language instruction within the context of meaningful disciplinary experiecnes, where students engage in authentic, discipline-specific, and language-intensive practices of inquiring, reading, writing, talking, thinking, and reasoning. This will give the language/ literacy work relevance, purpose and meaning, ensuring that a functional focus on language serves the dual goal of content learning and advanced literacy development.

One such linguistically informed, responsive, and embedded approach is functional grammar analysis, or FGA (Fang and Schleppegrell 2008, 2010). FGA is informed by systemic functional linguistics (SFL) (Halliday 1978; Halliday and Matthiessen 2014), a powerful sociosemiotic theory that views grammar as a creative resource for making meaning, literacy as involving the use of contextualized language, and language use as both shaping and being shaped by context. The approach recognizes language as the hidden curriculum of schooling and advocates explicit teaching of grammar as a way to promote advanced literacy development and provide students access to disciplinary genres, knowledge, habits of mind, and world views. It promotes a different way of talking about language and text that helps students make sense of what they are reading and at the same time develop insights into how a text means what it means. Moreover, it provides teachers with a set of tools and a metalanguage for engaging students in analyzing how lexical and grammatical choices simultaneously present content, organize text, and infuse points of view in discipline- and genre-specific ways.

To engage students in functional grammar analysis, teachers can refer to the frame-work presented in Table 2, using the metalanguage provided by SFL. For example, they can explore what a text is about, or experiential meaning, through analysis of verbs (which denote processes of doing, thinking/feeling, being/having, saying, etc.), nouns (which denote participants in various roles – actor/agent, goal, senser, phenomenon, carrier, sayer, receiver, etc.), adjectives (which ascribe attributes to participants), and adverbs and prepositional phrases (which denote circumstances of time, space, manner, cause, degree, matter, accompaniment, or role) in each clause. They can explore how a text is organized, or textual and logical meanings, through analysis of what begins each clause, how clauses are combined, and how cohesive resources (e.g., pronouns, synonyms, antonyms, con-junctions) are used. They can explore the authorial perspective, or interpersonal meaning, through analysis of mood (e.g., declarative, imperative, interrogative), modals (e.g., *can,*

Table 2. An instructional framework for functional grammar analysis.

Meaning Focus	Questions to Ask about the Text	Analysis Strategies
Content: *Experiential Meaning*	* What is the text about? * What does the author tell us? * Who does what to whom, how, when and where?	Analyze each clause, identifying the relationships constructed in the nouns, verbs, and other language elements
Organization: *Textual and Logical Meanings*	* How does the text weave meanings into a coherent message? * How is the text organized? * By what logic are the ideas in the text developed?	Analyze what begins each clause, how clauses are combined, and how cohesion is created
Voice/Perspective: *Interpersonal Meaning*	* How does the author infuse judgments and points of view? * What is the author's perspective? * What is the tone of the text?	Analyze mood and speech functions, modality, and other word choices for attitudes, evaluation, and authorial perspectives

Adapted after Fang and Schleppegrell (2010, 593).

may), and other word choices (e.g., adjectives, adverbs, nouns, verbs). These analyses enable readers to gain key ideas and details; understand writing craft and structure; and critically evaluate knowledge, claims, and evidence, all of which are the goals that the U.S. Common Core State Standards (www.corestandards.org) deem important for any close, attentive, and purposeful reading.

Functional grammar analysis (FGA) is not done in isolation. Rather, it is most effective when embedded in a sequence of discipline-relevant activities that also engage with students' background knowledge, prior experience, and motivation. Fang et al. (2019) recently described a pedagogical heuristic for engaging students in FGA in disciplinary contexts. This heuristic – dubbed 5Es (Enquire, Engage, Examine, Exercise, and Extend) – is akin to a rocket that can be used to launch FGA, the spaceship, into orbit so that the exploration of language and content can proceed in meaningfully productive ways.

As can be seen in Figure 1, the heuristic puts Enquiry in the center, making it the foundation upon which FGA and the entire edifice of text exploration is built. Students engage in first-hand exploration of an idea, issue, or problem that is significant to the discipline or of interest to them. The exploration is typically done through units of study and can involve experiments, observations, field trips, interviews, reading, writing, talking, and performing, among others. During the Engage phase, students read and discuss many texts that are important to the topic under investigation and that will help develop their understanding of the key concepts and core ideas related to the topic. During the Examine phase, the teacher identifies important but potentially challenging segments of a text and engages students in reading these segments closely, using the functional grammar analysis strategies presented in Table 2. During the Exercise phase, the teacher designs tasks that highlight or reinforce key or new language patterns identified in the texts students have been reading closely. Finally, in the Extend phase, the teacher guides students in developing new texts that synthesize the information they have learned through disciplinary experiences, approximate the genre they hope to emulate in their study, or critically evaluate the texts they have been reading in the curriculum unit.
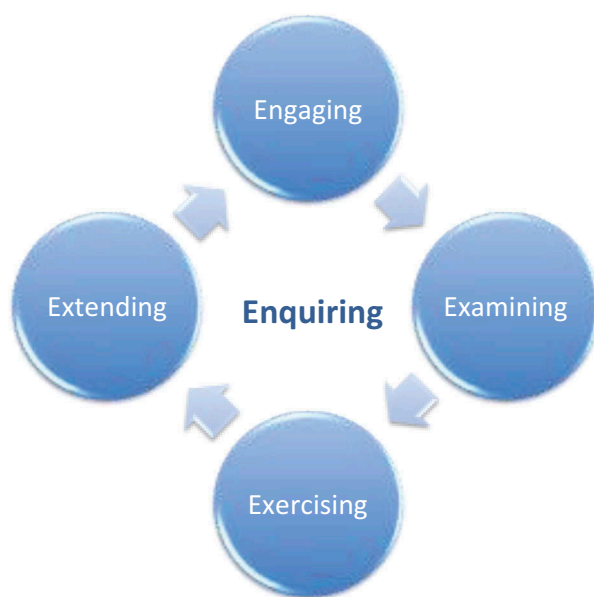
Figure 1. 5Es pedagogical heuristic.

4. Using FGA in secondary literacy instruction: an example

This section exemplifies how FGA can be used within the 5Es model to promote language learning, literacy development and knowledge building at the same time in a tenth-grade American History class, where students are inquiring into the causes and effects of the Boston Massacre as part of a curriculum unit on the American Revolution. Through the exploration (i.e., **Enquire**), students are expected to identify key events, facts, and historical figures related to the Boston Massacre; detect contradicting views of the historical event using primary sources; evaluate the trustworthiness of historical documents; understand what counts as legitimate evidence and argument; develop a sophisticated understanding of historical time, agency, and causality related to the Boston Massacre and the American Revolution; and recognize author's interpretive perspectives. To accomplish these goals, students read and discuss multiple texts (including paintings) on the Boston Massacre, watch related YouTube videos, interview experts, and visit historical sites and museums in Boston.

Recognizing that history is a discipline built on evidence-based interpretations and arguments involving texts of primary and secondary sources such as original documents, maps, political cartoons, trade books, paintings, photographs, newspapers, videos, and online links (Nokes 2013), the teacher has students spend the bulk of their unit time in reading, viewing, examining, and discussing many textual and visual resources (i.e., **Engage**). As they interact with these resources (see Figure 2 for sample resources), they engage in the strategies that historians employ in their social practices. These include sourcing, corroborating, contextualizing, inferring, and perspective taking (Nokes 2013; Wineburg, Martin, and Monte-Sano 2010; VanSledright 2012). In sourcing, students consider the author's sociocultural and educational background, his/her physical location

Textual Resources
- The Boston Massacre (https://www.bostonhistory.org/bots-blog/2017/1/17/the-boston-massacre)
- The Boston Massacre (https://hsi.wm.edu/cases/boston/boston_documents.html#doc2)
- The Boston Massacre (https://www.khanacademy.org/humanities/us-history/road-to-revolution/the-american-revolution/a/the-boston-massacre)
- After the Boston Massacre (http://www.john-adams-heritage.com/after-the-boston-massacre/)
- Boston Massacre Trial (https://www.nps.gov/bost/learn/historyculture/massacre-trial.htm)
- An account of a late military massacre at Boston, or the consequences of quartering troops in a populous town (http://www.loc.gov/teachers/classroommaterials/presentationsandactivities/presentations/timeline/amrev/brittwo/account.html)
- The Boston Massacre, 1770: The British perspective (http://www.eyewitnesstohistory.com/bostonmassacre.htm)
- Anonymous account of the Boston Massacre (http://www.ushistory.org/us/9e.asp)
- A short narrative of the horrid massacre in Boston (Palala Press)
- *The American pageant: A history of the American people, Vol. I: To 1877* (Boston, MA: Wadsworth)

Videos
- https://www.history.com/shows/america-the-story-of-us/videos/boston-massacre
- https://www.youtube.com/watch?v=-K2UgQFRr38
- https://www.youtube.com/watch?v=O05rNWygHF4

Paintings
- Paul Revere engraving
- Paul Revere sketch of the massacre scene Henry Pelham engraving
- William Nell illustration, c. 1855
- Howard Pyle illustration, c. 1883
- William Champney drawing, c. 1856
- Engraving based on Alonzo Chappel painting (1868)

Figure 2. Textual and visual resources used in the Boston massacre unit.

during an event, and his/her purpose for creating the text. In corroborating, students compare across different accounts of the same event to determine the validity and reliability of each source. They take note of points of agreement/disagreement across sources and what the author chose to include/exclude and highlight/background in each source. They seek explanations for discrepancies across sources and assess the credibility of each source. In contextualizing, students comprehend and evaluate text against the physical, social, and temporal contexts of a document's creation, taking into consideration such factors as the geography surrounding an event, the time and day the event occurred, the cultural and social setting of the event, the biographical profiles of the participants in the event, and even the changing meaning of words across time. In inferring, students make inferences based on background knowledge and evidence (artifacts). In perspective taking, students develop historical empathy by trying to understand the physical, social, and interpersonal context that gave rise to an individual's actions and worldviews.

In their interactions with the textual resources, students likely encounter texts with unfamiliar language patterns that pose challenges to comprehension and critique. A sample of this sort of text is presented in Text 2 (see Table 1). The teacher zeros in on the excerpt, helping students unpack the passage, clause by clause and sentence by sentence (i.e., **Examine**). Specifically, using the instructional framework presented in Table 2 as a guide, the teacher first helps students explore what the text is about by engaging them in analysis of the grammatical constituents (i.e., verbs, nouns,

adjectives, adverbs, prepositional phrases) in each clause. Together, they construct a visual like Table 3, which identifies the processes used in the text and associated participants, attributes, and circumstances. Identifying the process (realized in the verb) in each clause helps students think about what is going on in the text, that is, what historical events are presented and what background information is provided. Identifying the participant (realized in the noun) helps students think about who or what is involved in each process. Identifying the circumstance (realized in the adverb and the prepositional phrase) helps students think about when, where, and how events happened. Identifying the attribute helps students think about how events and participants are characterized.

Through the analysis, students discover that two processes are dominant in the passage – doing and being. The doing processes describe the actions of British officials (*were faced with, landed*), British soldiers (*shot, acting, opened fire, killed or wounded*), and colonists/ Bostonians (*taunted, began taunting and throwing, provoked*). For the other four actions (*blame, found, released, and branded*), the agents are not explicitly stated because they may be unknown to the author or unimportant to the text, and thus have to be inferred. The being processes allow the author to infuse his/her explanations and interpretations of these events. They characterize British soldiers as *drunken* and *profane*, but *nervous*; Bostonians as *angry*; and the clash between the colonists and the soldiers as *inevitable*. They also identify the killing as *the Boston Massacre*, one of the first victims of the massacre as *Crispus Attucks*, Crispus Attucks as *a powerfully built runaway "mulatto" and a leader of the mob*, and the defense attorney for British soldiers as *future (American) president John Adams*. One minor process in the passage, feeling (*resenting*), presents how colonists felt about the British soldiers. Additional information about these processes – such as time (*on the evening of 5 March 1770; in 1768; ten days earlier; in subsequent trial*), space (*in Boston, during a protest against a merchant, on the hand*), manner (*unmercifully, apparently without orders, in some degree*), cause (*over the death of an eleven-year-old boy, of manslaughter*), and source (*by contemporaries*)-–is provided in the circumstance element of each clause.

Constructing a visual like Table 3 is by no means a mechanical exercise of copying words and phrases into cells. As students partition each clause, they have to think about the meaning of each clause constituent in the context of the text, the logical links among clauses, and historical agency. For example, to truly comprehend the first three sentences (clauses #1-5), students need to be able to uncover the grammatical subject for each non-finite clause (i.e., subordinate clause introduced by a verb that does not show tense) from the main clause ("*British officials*" for "*faced with a breakdown of law and order*" and "*liberty-loving colonists*" for "*resenting the presence of red-coated 'ruffians'*"), track participants (e.g., *bloody backs – redcoats – soldiers – troops; colonists – Bostonians – townspeople*), detect the cause-effect relationship between the non-finite clause and the main clause (i.e., a breakdown of law and order led British officials to land two regiments of troops in Boston in 1768; colonists' resentment led to their taunting of British soldiers), sort out the chronological sequence of events (e.g., breakdown of law and order occurred before the British troops arrived; colonists resented British troops after the troops had arrived), recognize the conflation of time and cause (breakdown of law and order→British troops arrived→colonists resented British troops→ colonists taunted British troops→British troops opened fire→ colonists were killed or wounded), and unpack densely abstract noun phrases (*a breakdown of law and order, the presence of the red-coated "ruffians"*).

Table 3. Functional grammar analysis of a sample text.

Clause	Circumstance	Participant	Process	Participant	Circumstance	Attribute
1		(British officials)	were faced with [doing]	a breakdown of law and order		
2		British officials	landed [doing]	two regiments of troops	in Boston in 1768	
3		Many of the soldiers	were [being]	drunken and profane characters		
4		(Liberty-loving colonists)	resenting [feeling]	the presence of the red-coated "ruffians"		
5		Liberty-loving colonists	taunted [doing]	the "bloody backs"	unmercifully	
6		A clash	was [being]			inevitable
7	On the evening of 5 March 1770	a crowd of some sixty townspeople	began taunting [doing]			
8		(a crowd of some sixty townspeople)	(began) throwing [doing]	snowballs		
9		The Bostonians	were [being]	a squad of ten redcoats	over the death of an eleven-year-old boy	still angry
10		(British soldiers)	shot [doing]	an eleven-year-old boy	ten days earlier during a protest against a merchant who had defied the colonial boycott of British goods	
11		(the troops)	acting [doing]		apparently without orders	
12	but	(the troops)	(was) [being]			nervous
13		jeering crowd	provoked [doing]	(the troops)		
14		the troops	opened fire [doing]			
15		the troops	killed or wounded [doing]	eleven citizens		
16		(the killing)	(is) [being]	an event that became known as the Boston Massacre		
17		One of the first to die	was [being]	Crispus Attucks		
18		Crispus Attucks	(was) described … as [being]	a powerfully built runaway "mulatto" and a leader of the mob	by contemporaries	

(Continued)

Table 3. (Continued).

Clause	Circumstance	Participant	Process	Participant	Circumstance	Attribute
19		(...?...)	blame [doing]	both sides	in some degree	
20	and in the subsequent trial	(...?...)	were found [doing]	only two of the redcoats	of manslaughter	guilty
21		future president John Adams	served as [being]	defense attorney for the soldiers		
22		(...?...)	released [doing]	the soldiers		
23	after	(...?...)	branded [doing]	(the soldiers)	on the hand	

Students also need to be able to recognize that cause-effect relationships are not always realized through the familiar resources of conjunctions, but are sometimes realized clause internally – that is, within a single clause – through the use of prepositions or non-finite clauses. In clause #4, for example, the non-finite clause – *resenting the presence of the red-coated "ruffians"* – can be understood as the cause of colonists' unmerciful taunting of British soldiers. In clause #9, where the cause of anger is introduced with a preposition *over*, rather than a typical conjunction like *because* or *therefore*. In other words, the crowd was angry because an 11-year-old boy was shot dead. Similarly, in clause #20, the preposition *of* signals that manslaughter is the cause of a guilty verdict against the soldiers. In the last two sentences (clauses #19-23), students need to turn passive voice into active voice, and in the process think about the actors who assigned the blame, found two of the redcoats guilty, branded the soldiers, and released the soldiers.

It is likely that disagreements will arise during the above grammatical analysis. For example, some students may classify "taunted" as a saying process because it involves verbal shouting, whereas others may classify it as a doing process because it involves gestural intimidation (e.g., raising fists) accompanied by verbal shouting. In another instance, some students may classify "served" in clause # 21 as a doing process and "as the defense attorney for the soldiers" as a circumstantial element (i.e., role), but other students may classify "served as" as a being process and "the defense attorney for the soldiers" as identifier. Such disagreements are fine. What is more important here is the meaning-focused discussion itself, not necessarily the final decision that is rendered. The key is that students have to provide evidence and rationale to defend their position. Nor should students get bogged down in metalinguistic terminology here. Instead of using the more technical process terms such as "material", "relational", and "mental", students can substitute them with, for example, "doing", "being", and "feeling", respectively. A focus on language does not distract from a focus on content. Rather, discussion about language and grammar from a functional standpoint is essentially a discussion about meaning, or content, of the text. It is time well spent because it sensitizes students to language and at the same time develops their insights into the varied ways meanings are made through language in a text.

With an understanding of the "content" of the text, students are now ready to discuss how the text is organized. They note that the passage chronicles what happened before, during and after the Boston Massacre. This is, as noted earlier, not a simple retelling of past events, however. The excerpt reads more like a "historical account" than "historical recount" (Coffin 2006) in that the author embeds explanations and interpretations within the recounting of a sequence of past events. The first three sentences (clauses #1-5) provide the background events that led up to the Boston Massacre. The fourth sentence (clause #6) presents the author's interpretation of the situation (*a clash is inevitable*). The rest of the passage recounts the sequence of events resulting in (clauses # 7–18) and following (clauses # 20–23) the massacre. Embedded in this recounting are the author's judgment of which side was to blame for the clash (clause # 19) and interpretations of the often implicit causal relationships among events.

Because history is not the past but a narrative of the past, how the stories are told depends on the narrator's perspectives and biases (Coffin 2006). This means it is important to explore the author's point of view in the text. This can be done by attending to word choices. Through reading and discussion, students note, for example, what

transpired in this particular period of U.S. history was referred to as the "Boston Massacre", a term that seems to foreground the brutality of the violence that occurred. Given the number of people who were killed at the scene and in light of other much more atrocious historical events that were described as a massacre, students wonder if terms like "Boston Riot", "Boston Incident", or "Boston Encounter" could have been used instead to characterize the clash. They are curious as to how the British side characterized the event. (In fact, the British called the event "the Incident on King Street".) They recognize that the term "Boston Massacre" carries the author's interpretive bias and was likely used to underscore the incident as a highly significant event that led to the America Revolution.

Students also comment that British soldiers were portrayed negatively as *drunken and profane characters, ruffians*, and *bloody backs*, whereas colonists were favorably labeled as *liberty-loving*. An examination of the processes (verbs) used in the text suggests that the author presented the colonists as the instigator (e.g., *taunting, jeering, throwing*) and the British soldiers as the main perpetrator of the Boston Massacre (e.g., *opened fire, killed/ wounded*). However, the author also seemed to be sympathetic to the British soldiers, as they were described as *nervous, provoked, taunted … unmercifully*, and *acting apparently without orders*. The depiction of Crispus Attucks, one of the first victims killed, as *powerfully built* and *mob leader* further heightens the threat that British soldiers encountered. These descriptions led the author to conclude that "*Both sides were in some degree to blame*". It is clear that the author endeavored to present a balanced, unbiased account of the historical event. Finally, the inclusion of Crispus Attucks in the text and explicit reference to his ethnic identity (*runaway "mulatto"*) perhaps signal the author's recognition of the seldom-talked-about fact that African Americans played a heroic role in the history of the United States.

The above analysis and discussion focus on three key elements of text – content, organization, and perspective – that are typically the central preoccupations of every literacy teacher. Although time consuming, this work is often necessary to help students tackle the linguistic challenges of academic/disciplinary texts and expand their linguistic repertoire. It enables students to not only learn about basic historical facts but more importantly, develop deeper and more complex understanding of text. It is through intensive examination of text that students begin to, for example, recognize that in historical texts, cause-effect relationships are often not made explicit and causes and effects tend to be presented as abstractions that function as grammatical participants in a sequence of events and chains of reasoning. Ultimately, such an in-depth exploration of text helps students develop a more sophisticated understanding of how time, agency, and causation are construed in history and a deeper appreciation for how language is strategically deployed to present information, structure text, infuse judgment, develop argument, and design meaning.

Having gained a deep understanding of the text, the teacher then moves into the next phase of the pedagogical heuristic – **Exercise**. In this phase, the teacher designs tasks that provide opportunities for students to enhance their understanding of, as well as facility in using, key or new language patterns. With respect to the history unit, for example, the teacher spotlights non-finite clause, showing students how its deployment has both costs and benefits. On one hand, it makes the text appear more compact, focused, and tightly knit; on the other hand, however, it buries agency and logical connections that readers have to uncover to ensure full comprehension. To help students better understand the

logic, structure, function, and meaning of non-finite clause, the teacher has students search for the linguistic device in the texts they have been reading, practice turning it into a complete sentence, explain what the transformation entails, and discuss how the transformation impacts the meaning and discursive flow of the text.

Finally, as a culminating activity of the unit (i.e., **Extend**), the teacher has students use primary and secondary sources to compose an essay that discusses the causes and effects of the Boston Massacre. In this assignment, students are encouraged to imitate the structure and language used in the texts they have been reading closely and spotlighted during the Exercise phase of the pedagogical heuristic. Alternatively, students can write an essay evaluating the credibility of different accounts of the Boston Massacre across several historical documents (e.g., texts and paintings), discussing the possible motivations of these accounts, and determining the author's point of view. To extend the unit further, students are encouraged to do some research on other historically significant events that are similar to the Boston Massacre – such as the Haymarket Riot in Chicago in 1886, the Kent State shooting in Ohio in 1970, or the Los Angeles Riots in 1992 – and compare/contrast how these events were used as propaganda by interest groups at the time.

History education scholar Jeffrey Nokes (2013) defined historical literacy as the ability to construct meaning with historical texts, critically evaluate texts, use texts as evidence in developing original interpretations of past events, and create texts that meet discipline standards. Developing this ability requires a critical awareness and understanding of how historians use language (and other semiotic resources) to retell, analyze, and interpret significant past events. The linguistically informed, responsive, and embedded pedagogy described here has the potential to help students develop this critical language awareness and understanding. Effective enactment of this pedagogy may require collaboration between literacy/language teachers and disciplinary experts, who are more intimately familiar with the norms, worldviews, values, and habits of mind of their discipline. Such collaboration will only maximize opportunities for student engagement and result in deeper learning.

5. Implications for teacher education

This paper focuses on using functional grammar analysis (FGA) in disciplinary reading instruction, but the applications of FGA are much broader. Not only can the approach be used to help improve students' reading comprehension, it can also be used to guide curriculum design (Fang 2011), promote critical literacy development (Gebhard and Graham 2018; Fang et al. 2019; O'Hallaron, Palincsar, and Schleppegrell 2015), assess text complexity and text difficulty (Fang 2016), establish concrete criteria for evaluating student writing (Fang and Wang 2011), and inform writing instruction and intervention (Fang et al. 2017; Symons 2017). Moreover, it provides a framework for developing shared knowledge about language among teachers and students, which can make text exploration more efficient and effective (Schleppegrell 2013).

Implementing a linguistically informed, responsive, and embedded pedagogy such as FGA requires a strong "linguistic subject knowledge" in English (Love, Macken-Horarik, and Horarik. 2015; Myhill et al. 2012). Such knowledge encompasses at least three key areas: (a) an understanding of how language use varies across academic disciplines and

tasks, (b) the ability to identify and interpret language features characteristic of various disciplinary discourses and academic genres, and (c) control over a metalanguage for engaging students in explicit discussion about the ways English is used in the texts they read and write (Fang 2014; Schleppegrell 2018). This knowledge is central to supporting students in advanced literacy development and disciplinary learning (Love 2010). It can help teachers better scaffold student learning, such as unpacking lexically dense or grammatically intricate sentences, describing the contribution of grammatical structures to patterns of meaning in texts, identifying and responding to the linguistic challenges of academic texts for reading comprehension, explaining why the author made particular language choices, offering evidence-based insights into what makes a text more or less successful, and articulating concrete suggestions for improving comprehension and composition of texts.

Despite the importance of linguistic subject knowledge, many literacy teachers lack a deep grasp of this knowledge. In the U.S., for example, even motivated and experienced reading teachers, language arts teachers, speech-language pathologists, and special education teachers were found to have little understanding of the structure of spoken and written language, as this knowledge has been "the missing foundation in teacher education" (Moats 1994, 81; Moats and Foorman 2003). Indeed, the role of language has traditionally been marginalized in teacher preparation programs across the U.S. (Schleppegrell 2004) and elsewhere (Love, Macken-Horarik, and Horarik. 2015; Myhill 2010), with the consequence that teacher candidates in reading/language arts or other content areas often feel ill-prepared or are unwilling to take up a language-based pedagogy (Fang et al. 2014). One main reason for this problem has been a lack of serious attention in teacher preparation to language as the hidden curriculum of schooling. Over the past decade or two, teacher preparation programs have devoted much time and effort to addressing issues of equity, social justice and power and/or to techniques that are popular among teachers, but far less time and effort to teaching teachers the "down-and-dirty tenacity" associated with helping students figure out how to read complex, demanding texts (Duff 2006). Frequently, discussion about language and grammar in teacher education is perceived (a) to be a discourse of "deficit", as if such discussion is exclusively about "proper" English and remediation of grammatical errors, (b) as relevant only to those with the responsibility of teaching English language learners, as if students who are native speakers of English were already proficient with language and required no further support in developing advanced literacy, or (c) too technical to be useful to practicing teachers. As a result, many teachers eschew grammar or reject its value in English literacy teaching (Myhill 2010).

This situation needs to change, but change is only possible when language is properly understood and given due respect in literacy and disciplinary learning. Williams and Hasan (1996) have argued that "no literacy program is worthy of that name if it ignores the richest and most effective resource which resides in the lexicogrammar" (xvi). Instead of casting language in a supportive role subservient to content, teacher educators need to make language a central concern in their teaching, for, as Halliday (2016) pointed out, "[t] he core of all subject learning in school is the language that is used to learn with and to teach with" (75). In other words, language should be considered part and parcel of the content for literacy and for other content areas as well. Knowledge about language and its meaning-making potential needs be part of the professional knowledge base for every

teacher. This knowledge is not peripheral to the teaching of literacy or other content areas but rather a constitutive part of the body of content knowledge that all teachers need in order to be effective teachers of their content areas. After all, students cannot engage with disciplinary content knowledge without simultaneously engaging with the means through which this knowledge is produced, communicated, critiqued, and renovated. Teachers who understand and can explicate the roles and functions of language in disciplinary meaning making will be better able to support their students in advanced literacy development and disciplinary learning.

Recent work in both Australia and the U.S. has shown that teachers can learn to embrace and enact a linguistically informed, responsive, and embedded pedagogy such as FGA. For example, Gebhard et al. (2013) from the University of Massachusetts (USA) reported that the teacher candidates in their TESOL master's degree program were able to attain a "good enough grammatics" (i.e., a usable functional metalanguage) for the purposes of designing curriculum and instruction for diverse learners in the context of a 14-week course focused on applying functional grammar in second/foreign language teaching and learning through tasks such as reading and discussing SFL-related materials, analyzing and evaluating sample student writing, planning and implementing units and lessons that infused grammar instruction, and reflecting on the course experiences. Love (2010) described a short but intense training course (18 hours in 6 weeks) titled "Language and Teaching" in a two-year Master of Teaching program at the University of Melbourne (Australia) aimed at preparing middle and high school teachers with no prior linguistic subject knowledge to be "master teachers" capable of supporting academic learning through literacy. The course addressed the following components of linguistic subject knowledge she deemed important to these teacher candidates: (a) knowledge about how spoken and written language are structured for learning, (b) understanding that disciplines differ in their language use and hence literacy practices, (c) capacity to plan lessons and units of work that account for discipline-specific literacies and language practices, and (d) control of a metalanguage that fosters conscious awareness and critical reflection on language use in the classroom. A cohort of over 300 teacher candidates enrolled in the course. They came from disciplines ranging from the humanities (e.g., English, history, psychology) and visual and performing arts (e.g., music, art, media studies, drama) to mathematics, sciences, physical education, business studies, and information technology. They succeeded in developing a capacity to plan content area instruction with an informed understanding of the role language and literacy play in disciplinary learning. Specifically, they were able to identify the literacy demands inherent in a unit of work they had planned and to outline strategies for supporting learning through literacy. According to Love (2010), the finding illustrates how even a little linguistic subject knowledge can "provide a strong foundation for subject specialists to further scaffold their diverse learners into the advanced literacies required of their specializations" (346).

Schleppegrell, Greer, and Taylor (2008) described a sustained professional development program in California (i.e., Building Academic Literacy through History) aimed at helping teachers improve students' reading comprehension and academic writing in history. The project has served nearly 300 teachers since 2003 in summer institutes, academic year programs, and an online course. The focus of the project was to engage teachers in learning to use functional grammar analysis strategies for unpacking dense

text and for talking about how language works to construct knowledge and value in history. Project content was typically presented in a five-day summer institute, where university faculty and teacher-coaches who had used functional grammar analysis strategies in their own classrooms through prior participation in the institute presented the curriculum and guided teacher-participants in working through demonstration lessons as students would. The teacher-coaches also presented the theoretical framework and linguistic rationale for the functional grammar focus and addressed the benefits and pitfalls of the approach from their own classroom experience. Through the institute, the teachers were introduced to a new metalanguage based in functional grammar, as well as a framework for unit planning that involved developing guiding questions, selecting challenging texts for analysis, conducting intensive work with vocabulary, and using functional grammar analysis strategies to deconstruct text and discuss its content, organization and voice. As the teachers learned new strategies for approaching reading and writing, they also discussed the classroom implications and possible adaptations for their own contexts. With the assistance of teacher coaches, they then took the strategies and developed new lessons to be used in their own classrooms. The teachers bought into functional grammar analysis because they experienced firsthand how the approach helped them achieve their curricular goals by addressing students' literacy needs and engendering more complex and in-depth class discussion of the historical content. They felt well equipped to help students work through challenging texts. Most impressively, students of the teachers who had participated in the training, particularly English language learners, made greater gains on a standardized measure of historical literacy (California History-Social Science Test) and wrote more effectively than students whose teachers had not participated in the project. The researchers suggested that it is the close reading and analysis of texts enabled by a functional metalanguage that made these learning outcomes possible.

Taken together, these studies and others (e.g., Humphrey 2017) suggest that it is indeed possible for teachers to learn to use functional grammar and associated metalanguage in a way that supports their curriculum goals and lesson objectives. With careful scaffolding and sustained support, teachers can develop a good enough "understanding about linguistic systems relevant to the ways different school subjects foreground particular meanings through their discursive practices and favored genres" (Schleppegrell 2018, 5). This understanding enables them to better support their students in language learning, literacy development, and knowledge building.

6. Conclusion

There has been a strong push in recent years to focus secondary literacy instruction on experts' literacy practices, such as, in the case of history, sourcing, contextualizing, and corroboration (e.g., Moje 2008; Shanahan and Shanahan 2008). This new orientation is a positive development, but at the same time it seems to underestimate the profound challenges that many decoding-proficient adolescents are experiencing in processing the complex texts of academic disciplines. These students need linguistic support in order to more effectively interact with disciplinary texts and engage with the literate practices of disciplinary experts. Related to this point, Halliday (2007) has argued that the concept of disciplinary learning as primarily a linguistic process is "the best way we have of

understanding, and therefore of intervening in, the directions and practices of education" (96). This means a functional focus on language can help us better understand and address critical issues in disciplinary teaching and learning. At the same time, Langer (2011), a literacy scholar, reminded us that "reading, writing, and familiarity with language, structure, and disciplinary conventions are at the root of learning in academic coursework … [and] need to be taught, through first-hand disciplinary experience, as language and thought-in-use, in content-area classes" (4). That is, language and literacy work must be situated within authentic disciplinary experiences. The linguistically informed, responsive, and embedded pedagogy described in this paper answers the calls by both scholars. It has the potential to promote simultaneous development of advanced literacy, critical literacy, and disciplinary literacy for all students.

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