Research Article

Performing Critical Thinking in Written Language: Defining Critical Thinking from the Assessor's View

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Scholars interested in the intersection of critical thinking and writing, in publications such as *Double Helix*, often operate with competing frameworks for the term "critical thinking." When the arguably broad concept of critical thinking is examined more widely in scholarly literature, it becomes clear that the concept is often categorized and defined differently across three disciplinary silos: critical thinking in philosophy, critical thinking in psychology, and critical thinking in education (Lai, 2011).

In philosophy, critical thinking has historically emphasized the intellectual processes and procedures required to arrive at logical and reasoned conclusions. Facione (1990) authored *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction: Research Findings and Recommendations*, which offers the following definition: "A CT [critical thinking] skill, like any skill, is the ability to engage in an activity, process or procedure. In general, having a skill includes being able to do the right thing at the right time. So, being skilled at CT involves knowing, perhaps implicitly or without the ability to articulate this knowledge, both a set of procedures and when to apply those procedures" (p. 27). In this domain, informal logic becomes the method for critical thinking, and philosophy becomes the disciplinary home for such instruction. The door is, however, left open for critical thinking as implicit and without the need to be articulated, complicating the ability to assess it.

In psychology, critical thinking is recognized as "self-direction" (as opposed to guided direction) within a core set of "mental activities." Cognitive psychologist Daniel Willingham (2008) explained: "From the cognitive scientist's point of view, the mental activities that are typically called critical thinking are actually a subset of three types of thinking: reasoning, making judgments and decisions, and problem solving. I say that critical thinking is a subset of these because we think in these ways all the time, but only sometimes in a critical way" (p. 11). For Willingham, self-direction that achieves a "critical" status among these three "mental activities" explains the cognitive process required for critical thinking. So, a self-directed process of reasoning may sometimes become "critical thought," but the criteria for critical versus regular reasoning remains open for interpretation. This domain leads us down a path where critical thinking becomes vaguely categorized as *excellent thinking, the best kind of thinking,* or *the most innovative thinking.*

The application of these philosophical and cognitive views of critical thinking commonly become the concern of researchers in the domain of education, which is positioned to classify how critical thinking is both *delivered* (taught) and *assessed* in curricula. Studies of rhetoric, language, and writing being deeply inter- and even trans-disciplinary in nature are (like education) positioned to understand and apply philosophical, psychological, and education domains of critical thinking to our work. Language acts are at

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once philosophical, psychological, communicative, and educational, and, therefore, researchers of writing must navigate these interrelated domains of critical thinking as we consider the uptake of critical thinking into writing theory. *Double Helix* has been at the forefront of this task since its inception.

Recent works in *Double Helix* have emphasized both the psychology and education domains of critical thinking research, which are inevitably taken up in discussions about transfer and second-language acquisition. Hallstead and Pritchett's (2013) *Double Helix* article "Reading: The Bridge to Everywhere" draws heavily on the view of critical thinking from the domain of psychology. Far more work in *Double Helix* has drawn on the education domain of critical thinking, including Addy, LeProvost, and Stevenson's (2014) "Thinking Critically in Undergraduate Biology: Flipping the Classroom and Problem-Based Learning," Samuels's (2014) "Techniques for Capturing Critical Thinking in the Creation and Composition of Advanced Mathematical Knowledge," and Engle and Delohery's (2016) "Cultural Intelligence's Impact on Cross-Cultural Problem-Solving Performance."

Tim John Moore's (2011) *Critical Thinking and Language* grounded his study of "dimensions of difference" in critical thinking in the education domain, citing a central debate between Robert Ennis and John McPeck on the state of critical thinking as either a general set of skills or a highly contextualized situational, discipline-specific set of skills. According to Moore, Ennis represents the generalist view while McPeck represents the specifist view.

Scrutinizing some of the critical thinking definitions that researchers in writing studies import from the education domain—namely, the work of Robert Ennis—makes clear that its framework doesn't adequately account for the role of language in critical thought. In place of this definitional domain, we suggest that writing studies researchers must further explore critical thinking not just as it happens in the mind but as it is assessed in student writing. To support this proposal for writing studies, we offer an excerpt from our own study of critical thinking, which resulted in five definitional themes that emerged in interviews with faculty from across the curriculum. We will consider how these faculty expectations for critical thinking get translated into language performances.

Robert Ennis and the Education Domain of Critical Thinking

A forerunner of modern critical thinking research, Robert H. Ennis (1991, 1993, 2015) has spent his life articulating critical thinking as a reflexive, contextual concept, one which is difficult to encapsulate in standard testing or assessment procedures. Ennis (1993) provided us with what is perhaps one of the most comprehensive definitions of the concept to date: "Critical thinking is reasonable reflective thinking focusing on deciding what to believe or do" (p. 180). While this definition in itself is vague, as admitted by Ennis, he went on to provide a detailed list of particular characteristics to which critical thinkers are naturally "disposed."

Critical Thinking Dispositions

1. seek and offer clear statements of the thesis or question,
2. seek and offer clear reasons,
3. try to be well informed,
4. use credible sources and observations, and usually mention them,
5. take into account the total situation,

6. keep in mind the basic concern in the context,
7. be alert for alternatives,
8. be open-minded,
    a. seriously consider other points of view,
    b. withhold judgment when the evidence and reasons are insufficient,
9. take a position and change a position when the evidence and reasons are sufficient,
10. seek as much precision as the situation requires,
11. try to "get it right" to the extent possible or feasible,
12. employ their critical thinking abilities.

Critical Thinking Abilities

1. have a focus and pursue it,
2. analyze arguments,
3. ask and answer clarification questions,
4. understand and use graphs and maths,
5. judge the credibility of a source,
6. observe and judge observation reports,
7. use their background knowledge, knowledge of the situation, and previously established conclusions,
8. deduce and judge deductions,
9. make, and judge, inductive inferences and arguments (both enumerative induction and best-explanation reasoning),
10. make, and judge, value judgements,
11. define terms, and judge definitions,
12. handle equivocation properly,
13. attribute and judge unstated assumptions,
14. think suppositionally,
15. deal with fallacy labels.

Nonconstitutive but helpful abilities

16. are aware of, and check the quality of, their own thinking ("metacognition"),
17. deal with things in an orderly manner,
18. deal with rhetorical strategies.

Ennis's research extends beyond this definition, most notably to address current practices of testing and how critical thinking fits into its stringent frameworks. Although Ennis was hopeful on the matter of assessment, he also accounted for current pitfalls in critical thinking testing: "One of my chief criticisms of most existing critical thinking tests is their lack of comprehensiveness. For example, they typically fail to test for such important things as being open-minded, and many even fail to test for judging the credibility of sources" (p. 180). Going on to provide advice on how to avoid these oversights, Ennis analyzed the best practices for including critical thinking in testing. He took care to note the "traps" often associated with critical thinking testing (e.g., differences in background experiences among groups of individuals, including those of the test makers) and offered solutions to remedy

these issues (e.g., implementing "multiple choice with written justification" wherein students justify the reasoning behind their answers) (p. 184).

Ennis (1989) opposed the specifist view of critical thinking. His position was clear: Critical thinking is more of a general skill than it is specific to any one "domain," "subject," or "topic," and so should be demonstrable through general critical thinking tests. To make a case for a generalist view of critical thinking, Ennis deconstructed what he saw as three chief views on subject specificity—domain subject specificity, epistemological subject specificity, and conceptual subject specificity. Further, he offered four common curricular models for handling critical thinking: a general approach, an immersion approach, an infusion approach, and a mixed approach. The first view of subject specificity, "domain specificity," relies heavily on what Ennis referred to as an infusion approach, in which critical thinking is taught within the domain of a given subject. An instructor using an infusion approach makes explicit specific "critical thinking dispositions and abilities" (p. 5) for students to focus on in a given course of study and then provides students with "domain specific" material with which to practice, obtain, and exercise these skills. In this type of curriculum, critical thinking instruction is infused with disciplinary content in disciplinary courses. So, for example, criminal justice students might learn explicit critical thinking skills specific to the domain of criminal justice and then practice those skills on criminal justice material, such as a case study. The second view outlined by Ennis is "epistemological subject specificity," which relies heavily on an immersion approach. In this approach, students learn critical thinking implicitly by enacting the epistemological rules of the discipline or domain. An example would be an instructor presenting students with subject-specific material but never explicitly stipulating any critical thinking dispositions/abilities to be gleaned from the material; rather, it is up to the students to acquire critical thinking abilities themselves. Thus, a criminal justice student might learn what forms of reasoning are valued in the domain of criminal justice by analyzing and responding to criminal justice case studies. The third view, "conceptual subject specificity," can be thought of as the anti-general perspective and could presumably be taught through "infusion" (though Ennis does not specify any particular approach). This view is founded on the idea that "general" critical thinking skills that would cut across all subject domains are flawed—"[t]hinking is always thinking *about* something," according to McPeck (1990, p. 8), and thus there can be no such thing as a course in general critical thinking skills. That is, critical thinking as a concept is always already subject-specific. An example of conceptual subject specificity would be an instructor focusing solely on their domain of study and teaching critical thinking only through this domain with no general set of critical thinking skills from which those skills are derived. Ennis troubled this view by noting that even within domains activities will vary, and thus critical thinking would have to vary significantly. Ultimately, Ennis was most troubled by the conceptual subject specificity view which he sees as reliant on a vague and slippery conception of "domains," "disciplines," and "fields" as well as the slipperiness of critical thinking within those domains, prodding readers to consider whether critical thinking (in physics) about rod-bending is substantially different from critical thinking about sphere-rolling. Instead, Ennis seemed to encourage more research into what he described as a "mixed approach" in which students are given general critical thinking instruction in an explicit critical thinking course, and those skills are then transferred into disciplinary domains. Ennis eventually concluded that although the topics may show some differences, "whether there is a practical difference among them is not clear. As with most variables involving human beings, there appears to be a continuum"

(p. 6). While explaining the pitfalls of using language in more definitive a manner than it can reasonably accommodate, Ennis admitted along the way: "It depends on the set of phenomena, concepts, laws, and explanatory mechanisms we choose to associate with a given example" (p. 7). Right here, it seems there is an answer as to why "domain" may lack the meaning that Ennis was searching for: without proper contextualization, most anything can be considered vague.

John E. McPeck (1990) provided a notable reply to the discussion brought forth by Ennis. He presented varying points of disagreement with Ennis, one being that Ennis's own argument regarding the vague nature of subject specificity can be turned around and applied to Ennis's own theories: "concepts such as *general thinking skill*, *critical thinking skill*, and the like, are equally vague" (p. 10); in other words, if Ennis were to contextualize language such as "domain," it would take on more of the real-world meaning that Ennis complained language lacks. McPeck also accounted for language's natural fluidity, stating that deciphering a definitive meaning from one word is contingent upon the contextualization of that word, which Ennis did not acknowledge; rather, Ennis's argument is conditional upon any one word within a language holding a single, inherent meaning, which McPeck realized is impossible, not to mention the difficulty in transferring one meaning that spans varying languages, cultures, and backgrounds. In summary, McPeck defended his stance that these terms that Ennis deemed too vague indeed present themselves more clearly if approached through any one specific discipline: "The criteria for applying and assessing critical thinking derive from the thing (call it a topic, subject, field, or domain) being discussed or thought about at the time" (p. 10). Without context, situational application is impossible, and testing becomes even more murky.

Finally, McPeck (1990) tackled an idea that Ennis ignored: that learning happens outside of school, and that subjects taught in school do, indeed, prepare students for other facets of life not directly broached in school. McPeck pointed out how Ennis failed to recognize that while history, for example, might not be directly applicable to everyday life, the lessons learned within the discipline *are*. McPeck noted, "The whole point of school-subject knowledge is to enlighten people about our everyday world for this everyday life" (p. 11). McPeck specifically examined how Ennis pointed out in his own article that if a juror is serving on a case that involves "stabbing," that juror was never explicitly taught in school how to think critically about stabbing. As McPeck pointed out, critical thinking about stabbing is not the issue in this case; rather, serving as a juror on any case requires "understanding a complicated network of evidence and counter-evidence, claims and counter-claims, in a legal context in which most people will have had no experience" (p. 11). In short: McPeck concluded that these jurors are able to come to a socially understood definition of stabbing based on context and previous experience, even though they didn't specifically *learn* about stabbing or law in school.

In some of Ennis's (2013, 2018) more recent work, a higher education curriculum for critical thinking was explored. Ennis's (2013) paper delivered at the 10th International Conference of the Ontario Society for the Study of Argumentation was developed into Ennis's (2018) "Critical Thinking Across the Curriculum: A Vision" in *Topoi*. In this article, Ennis addressed a dissatisfaction with higher education instruction in critical thinking, as evidenced by Arum and Roksa (2011), De Vise (2012), and Belkin (2015), by organizing his conception of critical thinking skills and dispositions into a hypothetical curriculum at "Alpha University." Ennis called for a six-credit, first-year course that spans two semesters

and "helps students learn to apply [general critical thinking abilities and dispositions] to their civic, personal, vocational, and academic lives." In the final third of this course, students explore "three subject-specific issues (in case studies) calling for critical thinking in subject-matter areas" (p. 168). The "general critical thinking skills and dispositions" are those previously discussed and include dispositions such as "take into account the total situation" and "try to be well-informed" and abilities such as "analyze arguments," "judge the credibility of a source," "make and judge value judgments," "define terms and judge definitions," and "employ rhetorical strategies" (p. 167). In the final third of this introductory course, Ennis proposed "humanities," "sciences" and "professional field" case studies, arguing: "the conscious application of general critical thinking abilities and dispositions to this subject-matter content will not only reinforce the general abilities and dispositions in new situations (i.e., transfer), but also reinforce students' willingness and ability to apply them in new contexts (further transfer)" (p. 169).

After this first-year course, Ennis (2018) proposed "Subject-Matter Courses" "that include not only subject matter content, but also both general and subject-specific critical thinking that will be applied in some or most courses" (p. 171). Ennis offered perhaps his most remarkable concession toward McPeck's (1990) specifist view by proposing a "distinction between general and subject specific critical thinking abilities and dispositions," not as "a sharp either-or distinction," but as "a rough continuum with clear examples at either end" (p. 168). Providing examples such as an analysis of co-variance in social science or planning double-blind experiments in medicine, Ennis argued that these moves require critical thought and are indeed distinct to such fields, but they also connect in clear ways to more generalized skills. Citing the aforementioned debate with John McPeck in the 1990s, Ennis wrote, "I still hold that position [of critical thinking as general], as do most critical thinking specialists, but am here suggesting that there are also subject specific critical thinking abilities and dispositions" (p. 168). Though it seldom enters his view of critical thinking, Ennis advocated an explicit place for writing in his Critical Thinking Across the Curriculum program, offering that faculty "will be urged to include writing tasks that are appropriate for undergraduates in the fields (including general education), perhaps articles, reports, proposals, letters to an editor or editorials—and to request students to exercise their critical thinking in so doing" (p. 171). The proposed curriculum would culminate in a senior thesis or capstone project that Ennis argued should practice and demonstrate general and subject-specific critical thinking skills. Ennis proposed that a critical thinking faculty coach might work alongside a disciplinary faculty member and student to check and explore the quality of critical thinking in the final project.

Troubling Ennis's Critical Thinking Framework for Writing Studies

We argue that Ennis's work, while substantial, suffers from an inattention to knowledge production and invention as, first and foremost, rhetorically constituted. The contributions Ennis has made to scholarship on critical thinking cannot be understated; his work has propelled discussions of critical thinking in higher education from vague platitudes toward a tested taxonomy that can now be developed with coherence into higher education curricula. Yet, a new understanding of critical thinking emerges when we consider theory and research in rhetoric that articulates thinking as the product of situated contexts that are always already bound in language. Closer attention to the role of language in critical thinking (a view advocated by John McPeck and Tim John Moore) can offer a new framework for

understanding how thinkers do the work of being critical; and, perhaps most importantly, it offers a clear opportunity to place Ennis's (2018) proposed critical thinking curricula within the composition pedagogies (first-year writing and writing across the curriculum) already in place at most universities. For the purpose of teaching critical thinking in curricula, we do not contend that Ennis's critical thinking dispositions and abilities are inaccurate, nor do we contend that critical thinking instruction *must* utilize language composition, either spoken or written; rather, we contend that it is the assessment of students' critical thinking dispositions and abilities that is of paramount interest in the development of curricula, and this act of assessing critical thinking, first and foremost, requires students to compose their thoughts in language, often through writing.

To examine how the assessment of student critical thinking dispositions and abilities gets translated into expectations for student language use and writing performances, we will present five faculty definitions for critical thinking that emerged in a one-year study of faculty conceptions of critical thinking across the curriculum. These definitions reveal not what Ennis has characterized as the inner workings of a critical thinker's mind; rather, they reveal what faculty across the curriculum seek from students as they encourage critical thinking. Although many of Ennis's critical thinking dispositions and abilities are reflected in the definitions observed in our study, these definitions represent five distinct collections of dispositions and abilities that require *different language performances*, and, thus, we must come to consider what those dispositions look like as written acts in the social context of education. From these five definitions, we will consider the role of language and writing/language performances as the means by which such thinking is assessed in our curricula.

Faculty Conceptions of Critical Thinking Across the Curriculum

In 2016–2017, we conducted a qualitative study of faculty conceptions of critical thinking that involved 45- to 60-minute individual interviews with thirty-seven faculty members at West Chester University of Pennsylvania. Faculty were selected at random, and invitations were made with an explicit goal to achieve diverse representation across disciplines. The greatest number of interviews were held with faculty in the College of Business and Public Management (9), followed by the College of Arts and Humanities (8). The College of Sciences and Mathematics (7) and the College of Education and Social Work (7) had equal participation, while the College of Health Sciences (6) had the least participation among faculty. All interview participants signed written consent forms prior to participation.

This study's methodology was modeled on Tim John Moore's (2011) *Critical Thinking and Language* and involved the collection of three types of data for analysis: interviews recorded as a typed transcript, assignment sheets and descriptions from faculty, and faculty suggestions of works (articles, books, films, etc.) that each participant saw as showcasing critical thought in their discipline. The typed transcript was produced by co-author Lauren Detweiler who attended all in-person interviews. To ensure proper meaning was understood, a shorthand transcript was also taken by the primary interviewer, Justin Rademaekers, and could be used to clarify meaning in the written transcripts. Interviewees agreed to provide any follow-up clarification if needed following the interviews. There were an estimated thirty-two hours of interview data collected from the thirty-seven participants. The questions asked of participants were, with some variation, based on questions outlined in Moore's study of critical thinking. A significant portion of the results of this study and an

overview of its methodology can be found in "Getting Specific About Critical Thinking: Implications for Writing Across the Curriculum" (Rademaekers, 2018). In the present article, we will focus on data from faculty responses to just one question that was not addressed in the 2018 article: "How do you define critical thinking?"

Using a grounded-theory approach, we coded the thirty-seven faculty definitions of critical thinking collected in these transcripts into categories, resulting in what we saw as five discrete definitions of critical thinking, ranked, as follows, in order of frequency:

1. critical thinking as a matter of open-mindedness toward information being received, especially with source material;
2. critical thinking as an ability to move between the "micro" and the "macro," sometimes described as "seeing the bigger picture";
3. critical thinking as a matter of situated content application, which is an upper-division or even post-graduate ability to activate content and theory knowledge in particular professional situations;
4. critical thinking as a matter of self-awareness, self-reflection, or an ability to think about one's thinking ("metacognition");
5. critical thinking as avoiding the impulse to conclude a "bigger picture," or to reach a conclusion about the whole based on too-little information or without fully understanding interrelationships.

These definitional themes were made clear by faculty in their interviews about critical thinking as well as in the assignments they provided to students. Table 1 below offers faculty data representative of each definitional theme and examples of the assignments provided in an attempt to activate that approach to critical thinking.

Table 1 *Definitional Themes, Disciplines, and Examples of Assignments*

Critical Thinking Definition	**Example Discipline**	**Example from Assignment Sheet**
Critical thinking as a matter of open-mindedness toward information being received (evident among 29% of participants).	Interview with Biology 1: This professor teaches critical thinking through an "Earthworm Lab" where students study "earthworm burrowing and force production" (how earthworms use fluid to move).	Following the earthworm lab, the faculty member asks specific mathematical questions about "the class mean" for worm rates of contraction but then poses an open-ended critical thinking question: "what factors could affect the strength and rate of contractions?"
Critical thinking as an ability to move between the "micro" and the "macro," sometimes described as "seeing the bigger picture" (evident among 24% of participants).	Interview with Geography 1: This professor teaches about the World Bank and global development, and students have to reflect on the film *The Trade Trap*.	For reflection on the film, the faculty member poses a core discussion question: "How does the availability of cheap, imported maize from countries like the United States affect farmers in Ghana?" Such questions push students to connect local agricultural practices to global impacts.
Critical thinking as a matter of situated content application, which is an upper-division or even	Interview with Special Education 2: This professor teaches students that are both preparing to be placed and are	This faculty member meets with student-teachers immediately after observing their instruction and then has them write a post-meeting personal reflection. The purpose of

post-graduation ability to activate content and theory knowledge in particular professional situations (evident among 21% of participants).	already placed as student-teachers in special education classrooms.	these reflections is for students to identify disciplinary concepts (practices, theories, skills) that help explain what was witnessed in the teaching situation. This professor's objective is to get student-teachers to apply special education concepts learned in the classroom to the practice of teaching.
Critical thinking as a matter of self-awareness, self-reflection, or an ability to think about one's thinking ("metacognition") (evident among 19% of participants).	Interview with Athletic Training 1: This professor teaches "clinical reasoning" for the "allied health profession," such as in an exercise science program where students prepare to become sports therapists and occupational therapists.	Students role-play patient-clinician interaction, and the scenario is taped on video. Students are then asked to watch the video and analyze how their own interaction with the hypothetical patient could have gone differently. The objective is to train students to think about their own thinking as they interact with patients as future clinicians.
Critical thinking as avoiding the impulse to conclude a "bigger picture," or to reach a conclusion about the whole based on too little information or without fully understanding inter-relationships (evident among 11% of participants).	Interview with History 1: This professor teaches local history and has students visit local sites or conduct primary research of local archives with the goal of writing about what happened, when it happened, where it happened, and (possibly) why it happened. This professor emphasizes "historical thinking" which shows how small, local happenings can have "big impacts."	Students read letters from soldiers in World War 2 as they try to historicize the conflict. Early student writing jumps to conclusions based on the observations of these soldiers in their letters, but then they have to revise to avoid this impulse. The goal is for students to learn that there is little they can "conclude" about the whole event of war based on information in letters; the letters are small limited pieces of evidence used to inform only a piece of the story of this conflict.

We do not intend for these definitions to supplant Ennis's series of critical thinking dispositions and abilities; however, we find these definitions compelling because they offer us a view of critical thinking from the vantage point of the assessor, not the thinker. We argue that these definitions offer us insight into what faculty across disciplines are looking for as evidence that critical thinking has happened in the minds of their students, and, by closely examining these definitions, we can better understand the role that language and writing play in performing these critical thinking moves through curricular activities.

Open-Mindedness

The most common (n=11) definitional theme among faculty was open-mindedness toward information being received, especially with source material. This definition was evident in a wide range of disciplines, including biology, communication studies, economics, women's and gender studies, management, marketing, philosophy, physics, psychology, and public health. A biology professor, for example, explained what critical thinking is *not*: "Students are not trained to have an open enough mind to get what is unexpected and be able to correctly evaluate it . . . they want the 'right answer,' not what's most logical or thoughtful … so in essays, they try to parrot back what the professor said, even though there may not be a right or wrong answer." Or, as a women's and gender studies professor explained: "I tell students that each time we talk, I don't want you to take that information passively, I want

you to think about it [because] controversial topics are normalized . . . how gender is constructed . . . gender behavior . . . [in] media, ads . . . it's recognizing something that was normalized in society and bringing it to their attention." Although the disciplines of biology and women's and gender studies may seem quite distinct from one another, both emphasized critical thinking as a need to be so open-minded that students can "get to what is unexpected" or be open-minded enough to recognize that which has been "normalized." In these cases, critical thinking is about taking in information (films, advertisements, scientific claims) and being able to avoid judgment or narrowing too quickly so as to remain attuned to other possibilities outside of our own worldview. This definitional theme of open-mindedness aligns with two of the eight critical thinking definitions identified by Moore. The first is what Moore (2011) described as "the exercise of careful judgment or observation" (p. 66); the second is "careful and sensitive reading," which Moore noted is "very much in line with the conceptions of critical thinking in the literature" (p. 86).

What's the role of language in performing open-mindedness?

While at first glance it seems that open-mindedness is merely thinking about alternatives, a closer examination reveals that language plays a central role in determining what's expected and what's been normalized. In this sense, the critical thinking task of open-mindedness is in direct contrast to the expectations and normalizations that language has created. To be an open-minded and critical thinker within the framework of this definition might require careful scrutiny of language choices as a springboard to open-minded thinking. For example, if a student were to diligently adhere to the teachings of a course text, then careful adherence or devotion to that text might limit that student's ability to think outside of it in other contexts. In this case, being open-minded means thinking contextually as well as textually.

There are a variety of ways that this expectation for open-mindedness as a signifier of critical thinking may become embedded in language expectations and writing assessment. One such way is the expectation for students to have transparency in their source selection. If students are thinking open-mindedly, then they ought to carry a contextual understanding of the texts that inform their thinking, and this could be observed if a student writer were to make clear why they selected a source and what they see as its uses and limitations. Another way that open-minded critical thinking might be assessed in student writing is for an instructor to look for critical articulations of source language. This would mean that students don't simply offer quotation and attempt to use that source material at face value; rather, they provide a critical articulation of that quotation and offer a contextualization of that source material for readers. Related to critical articulations, but a distinct move in its own right, is offering fair treatment of source material without eagerness to invalidate. Open-mindedness requires a disposition toward the complexity of material and the contextual dimensions of a text, so when a student writer resists the simpler postures of utter praise or invalidation of source material and instead offers that text a fair and critical assessment, this, too, may be a sign that open-minded critical thinking is taking place. Perhaps a more difficult-to-asses way in which open-mindedness could be observed in student language use and writing performances is the presence of creative and innovative observations. These might be observations about course content or the student's chosen subject that seem original and aren't simply recapitulations of ideas already provided in course reading material or discussions. Creative and innovative observations may be signs that the student has

synthesized and contextualized course material and can therefore think open-mindedly about the subject at hand.

Seeing the Bigger Picture

Another definitional theme (n=9) was an ability to move between the "micro" and the "macro," sometimes described as "seeing the bigger picture"; this ability includes a need to see the "interrelationships" between smaller things in order to understand the whole. This definition was evident in interview transcripts from faculty in accounting, anthropology, chemistry, communication studies, criminal justice, English, geography and planning, health, and management. An accounting professor, for example, explained that auditing requires critical thinking because "you're always trying to find what's wrong. You have to learn to . . . put pieces of information together to see if truth or information is fairly stated . . . it's intuitive, seeing the bigger picture, asking lots of questions, and being able to understand answers; seeing the whole." Likewise, a criminal justice professor explained: "To be critical is to think about what a variable [like truancy] really means. You get different answers if you think the same variable means different things . . . it's finding how two or more variables fit together, and knowing that if I change one or more of them, how does it change my outcome?" In these cases, critical thinking is about the relationship that a single element (accounting errors, perspectives on race) has on a larger system (reporting financials as "fairly stated," researching connections between race and truancy). This view of critical thinking as moving from small to large and attending to a bigger picture does not align with any of the eight definitions observed by Moore.

What's the role of language in seeing the bigger picture?

This view of critical thinking seems to involve a cognition beyond language use in many ways and aligns with what Ennis (2015) described as "tak[ing] into account the total situation" (p. 32). Indeed, there is what we might think of as a *geometry of thought* at work in seeing the picture that entails the packaging of content into component parts among smaller and larger categories so that a thinker can begin to move among these interrelated parts. This is certainly the case in rhetoric and composition course pedagogy, wherein critical thinkers must understand how sentence-level linguistic moves correlate to a broader arrangement and style of a text, and how they more broadly contribute toward a genre that functions in an activity system (e.g., the use of present tense to discuss historic literature). There is language performance at work in this critical thinking definition because the packaging of content in our minds requires performativity—that is, it requires a *naming* of parts in order to understand their relation to each other.

In writing assessment, instructors might look for textual coherence as evidence that a student sees the bigger picture between sentence-level linguistic moves and the macro-moves of a genre. Another move that might be more explicitly observed in a work of writing is the presence of impact statements that express the student writer's awareness of a change's impact on the system or whole. A student whose work of writing proposes a change or adjustment to an issue of concern may not be thinking critically if they don't offer an assessment of the impact of that change on corollary components. The presence in student writing of impact statements, which consider how a proposed change might impact other elements in a myriad of ways, could be a sign that a student is thinking critically in terms of seeing a bigger picture. Another move that student writers might make which could reveal

their critical thinking about the bigger picture would be definitional articulations that complicate the naming work. Because the picture-making that we want students to see requires performativity, student writers who signal that they are thinking about that work of picture-making may reveal their own thinking about a bigger picture. This could be evidenced by writer statements that recognize the sensitivity inherent to defining and naming parts and instead offer operational definitions or nuanced articulations of a category of thought being created by their text. Separate from definitional articulations might be intentionality statements that show the writer's awareness of decisions being made in the writing (defining, naming, picture-making) and reveal an intentional awareness of how the decisions the writer is making impact the bigger picture.

Skepticism Toward the Bigger Picture

A third definitional theme (n=4) among faculty was closely related to this definition of "seeing the bigger picture" but in a way that is decidedly skeptical. That is, some faculty describe critical thinking as avoiding the impulse to conclude a "bigger picture," or to reach a conclusion about the whole based on too little information or without fully understanding interrelationships. This definition of critical thinking was evident in interview transcripts from faculty in history as well as in all three interviews held with faculty in physics. A faculty member from history explained: "Everything has to be rooted in a particular source . . . students have to be cautious not to accept anything as fact . . . we don't think there is much of fact, and everything is relative. The Constitution is one example . . . it was signed, but why did each man sign it?" One physics faculty member explained: "When you're in the stages of inquiry, my theories are too crude, and I can't say anything about it. You may think something, but you have to wait until the data becomes numerous enough and then follow the whole . . . it's all judgment . . . you have to be very honest with yourself; moral, even, representing the information you're about to report, because there is a human tendency to overstate. Some say, 'Look, this planet has water! It could have life!,' and that's a huge jump." In these cases, faculty expect open-mindedness but see the critical element of their discipline as restraining judgment and being highly skeptical of a claim or conclusion (about history, about a planet). This definition aligns with a conclusion of Moore's (2011) study that one critical thinking definition is "a sceptical [sic] and provisional view of knowledge" (p. 72).

What's the role of language in performing skepticism toward the bigger picture?

In writing, skepticism toward the "big picture" might take place when writers are asked to temper claims made with qualifiers. For example, some writers, editors, and instructors prefer qualifications like "might be," "could," and "may" in place of the certainty of "is" and "does." This linguistic preference toward qualifiers helps the writer maintain skepticism about the bigger picture, perhaps keeping them "very honest . . . moral, even." Another move the writers may make to show restraint, open-mindedness, and skepticism toward judgment is the use of conversational questioning. Writers can avoid heavy-handed and *prima facie* conclusions by posing new questions in light of data rather than posing answers. Even without the direct posing of questions, writers activating this "skepticism toward the bigger picture" domain of critical thinking may be tempted (or encouraged by editors and instructors) to make statements relating to insufficiency of data to reach a conclusion. Such statements signal the writer's awareness and willingness to not leap toward a final conclusion. It may be the case that the rules or typified moves of written genres,

methodologies, and other macro-categories of written language use might unfold, in part, out of a need for those writers to pursue the bigger picture. Perhaps genres and methodologies themselves function to help retain skepticism where warranted, such as the "meta-analysis" or "strategic review" research genres and corresponding methodologies. Future research on critical thinking and language might examine this genre for evidence of linguistic moves that activate this domain of skepticism toward the bigger picture.

Situated Content Application

A fourth definitional theme (n=8) among faculty was situated content application, which is an upper-division or even post-graduation ability to activate prior content and theory knowledge in particular professional situations. Thinking critically, for these faculty, is a matter of intelligently recalling knowledge to interpret a situation and perform in that situation. This definition of critical thinking was reflected by faculty in communication disorders, kinesiology, management, music, and education. A faculty member in kinesiology who teaches students in clinical exercise physiology explained: "There's a scientific foundation, but there is an art to being able to put things together for an individual. Every individual is different; you are given a box of rules for them [from disciplinary content], and you have to tailor it and see which tools you'll pull out for a person . . . it's fundamentally critical, because you put an individual in harm's way if you don't know what you're doing." This view was also largely reflected in education, wherein teachers are expected to draw from the lessons and principles of their education but apply them to each student and classroom as they see fit. For these disciplines, to be critical is to be able to recall content and concepts from their disciplinary training as new classrooms, students, and patients are encountered, applying concepts by situational context. The task is not merely a matter of recall but of application to infinitely unique and complex situations. This definition does not align clearly with any of Moore's definitions.

What's the role of language in performing situated content application?

Closely related to the rhetorical canon of memory (the ability for a speaker or writer to draw upon their own memory or the memory of their reader/audience in the process of speaking and writing), this domain of critical thought doesn't neatly fit into a set of linguistic moves that writers may make. This domain may be best understood by examining two modes of situatedness: within the given situation (*in situ*) and beyond the given situation (*ex situ*). In the case of *in situ* critical thought, language plays a definitive role in the thinker's memory as that thinker works to compartmentalize observations made into a previously learned—and thereby named—condition or category. A patient's oral report of an injury, the moment of wincing after a carefully placed touch, and the appearance of skin and muscle tissue are all observations that a physical or occupational therapist must sort in their minds across pre-defined categories, such as a "grade-one ACL strain" or "ACL tear." These categories aren't arbitrary distinctions of the writer's mind in the way that Ennis (1989) described from the generalist view of critical thinking; rather, these categories are names for a much deeper discourse on ligaments in which the practitioner has previously engaged. Years of symbols relating to the ACL, including read texts, examined graphics, and listened-to lectures, all accumulate in the practitioner's memory as the distinction between "strain" and "tear" takes place. This mode of thinking is, no doubt, a language performance.

In the case of *ex situ* critical thought, language plays a more obvious role. This domain, which was valued by faculty in communication disorders, kinesiology, management, music, and education, also clearly involves a degree of note-taking by practitioners. The speech pathologist and physical therapist take careful field notes about patient histories and their own observations *in situ*. The manager scribes personal or internal memoranda for future reference. The musician persistently marks the sheet with performance notes, and the educator is encouraged to note student behavior and reflect personally on the successes and failures of each lesson. In these situations, field notes become a language genre that records aspects of a situation which can later be applied to content *ex situ;* that is, language becomes the means of memory so that the situation can be applied to content at a later date, perhaps more critically than can be done *in situ*.

In an instructional setting a variety of assignments and genres have emerged to help track students' abilities to critically apply content *in situ*, the chief among them being case analysis. In case analysis, students are given a case study that invents or reports on a situation. Student writers must analyze this situation in writing, and, in doing so, should show that they can apply course content to an understanding of that situation. The use and identification of key words and terminology is an important writerly move because it allows faculty to see students doing that application work. Likewise, the writer's acknowledgment of key details in the case helps create this detail-content relationship that reflects a critical ability to do situated content application. Other variations of case analysis are truly hypothetical *in situ* exercises, such as mock interactions, which are often used in health science and education disciplines. In these situations, students role play as clinician and patient, or teacher and student, while others observe the interaction. Sometimes, these interactions are video recorded, and viewers are encouraged to reflect on moments of success and failure in the situated content application. A faculty member might use these interactions to point students toward course content that they could have applied to that situation. This is an oral means of training critical thinkers in situated content application.

Metacognition and Self-Awareness

A fifth definitional theme (n=7) among faculty was self-awareness, self-reflection, or an ability to think about one's own thinking ("metacognition"). This definition perhaps most closely aligns with Moore's (2011) general definition of critical thinking as an "extra edge of consciousness," but this consciousness is explicitly about the thinker's ability to be conscious of their own thinking processes. This definition of critical thinking was reflected by faculty in athletic training, counselor education, English, literacy, special education, and social work. An athletic training professor, for example, explained: "We call critical thinking clinical reasoning, which is the metacognitive level . . . [that includes] hypothetical deductive hypotheses based on what the patient/clinician says, and case pattern recognition . . . [which, with some injuries,] they'll know it when they see it . . . [you trainers have to] think about your thinking! Don't just ask the questions, ask them [patients] with the intent for how they are going to respond in relation to the overall case." An English professor similarly explained: "A key element [in textual analysis] is being curious and having a sense of inquiry questions that will get the process going; having a good sense of self-awareness to self-edit as you go down a path to recognize when evidence isn't going where it should be going." Like definitions of critical thinking that are defined by skepticism, the views of critical thinking represented in this definition are applied to skepticism of one's self and one's thinking

through a metacognitive process, whether that be in the diagnosis of a patient's injury or in the analysis of a text. This definition of critical thinking aligns with two of Moore's eight definitions. The first alignment is with Moore's definition of critical thinking "as the adopting of an ethical or activist stance" (p. 94) because ethical action requires deep self-awareness and metacognitive thinking. The second alignment with Moore's definition of critical thinking is more explicit: "Critical thinking as a form of self-reflexiveness" in which "the particular type of thinking identified is not one directed at a form of knowledge . . . but rather turned back at the originator of these thoughts—the thinking self" (p. 105).

What's the role of language in performing metacognition and self-awareness?

As we begin to consider the role of writing in metacognitive critical thinking, we find that the conversation inevitably progresses toward theories of linguistic relativity. Whether or not the structure of language is the basis of all conceptualization is a debate we choose to table for another conversation. Arguably, however, language is central to metacognition in the uptake of content during the process of learning, in the recall of that knowledge in given situations, and in the assessment of those infinitely unique situations. To recognize varying levels of pain in a patient's wince requires symbolic interaction that is beyond language for an athletic trainer, but the mental work of synthesizing the patient's oral account of the injury, the prior content knowledge (from course work), and the evolving conversation between trainer and patient represent a system of language exchange that is central to thinking critically in this work.

In the assessment of writing, there may be several moves a student writer could make to signal that metacognitive critical thinking is at work. Journaling and reflective writing is one genre-based approach that instructors might take in order to observe whether or not a student is thinking about their thinking processes. For example, many educators encourage their students to journal immediately after a student teaching experience so that they can record how they were approaching a given situation in the moment and reflect back on that teaching. In more standard academic prose, another writing move that might signal metacognitive critical thinking would be a student writer's methodological critique. Because the writing of a methodology is an articulation of the process of reasoning that the student believes can be used to conduct the inquiry at hand, a student writer's critique of their own methodology indicates their thinking about the process of reasoning they have devised. For example, a student who pursues a method of inquiry that has been devised but who presumes that method to be sound without interrogation may not be thinking about that process as just one deliberate choice. A student who critiques their own method of inquiry, however, has clearly critiqued the choices that they have made, thereby revealing a metacognitive process at work. Beyond a methodology critique, writing assessment might look for subjectivist statements throughout a work of student writing. The moments wherein a student writer switches toward a subjectivist voice should signify that internal reflection and perhaps critique are at work.

Conclusion

While these five definitional themes for critical thinking across the curriculum are not exhaustive of the full range of definitions offered in critical thinking scholarship, they do offer scholars in writing studies some insight into a) how critical thinking gets taken up differently by different disciplines and b) how those differing definitions for critical thinking result in

differing expectations in the places where critical thinking is most commonly assessed: student writing. This is an important deviation from the more common generalist approach to critical thinking as espoused by Ennis because it suggests that student writers will be expected to undertake different writing performances depending upon the kinds of critical thinking that their instructor or profession most values.

The results of this study also support some of the thinking outlined by Kathleen Blake Yancey's (2015) "Relationships Between Writing and Critical Thinking, and Their Significance for Curriculum and Pedagogy." Yancey outlined an important project for writing studies and critical thinking by suggesting that we "begin to map both differences and similarities [between academic disciplines] in ways that are helpful as students develop writing knowledge and practices and critical thinking" (p. 2). This is important, Yancey noted, because when we look at models of critical thinking assessment in higher education (at Washington State University, by the AAC&U VALUE rubrics, in the University of Minnesota WAC program) we see that the *general view* of critical thinking meant to cut across all disciplines fractures into many *disciplinary differences* within the assessments of history programs, geography programs, engineering programs etc. In an analysis of the writing and critical thinking expectations for students within these programs at the University of Minnesota, Yancey pointed to "three levels" at which writing is functioning: "very broad, generalized writing practices"; "more specific practices that are . . . shared with other writing cultures"; and "specific" writing practices of that discipline, in this case engineering (p. 10). This conclusion is in line with the findings of the present study (published in Rademaekers, 2018) which concludes "that there may be discipline-specific emphasis on particular critical-thinking skills, but these skills remain general critical-thinking skills available and valuable to all disciplines" (p. 133). As Yancey explained, there may be general agreement that application of knowledge is a critical thinking skill, but that application of engineering knowledge, specifically, in writing, may look different from the application of historical knowledge in writing. To help students analyze critical thinking expectations, Yancey offered a heuristic that involves analysis of language, materials, authorship, platforms/surfaces, and audiences (p. 11). The critical thinking performances outlined in the study above closely resemble the "values" of critical thinking that Yancey described.

"Materials," according to Yancey (2015), are one of the chief drivers of critical thinking differences. She noted: "Highlighting those differences for students and relating them to the epistemologies of the disciplines helps students make sense of the differing kinds of evidence" (p. 13). The present study found that materials may be a more reliable marker for critical thinking expectations than disciplines themselves since materials may cut across disciplines. For example, a physics professor taught a course that heavily emphasized reading and analysis of scholarly articles, leading to a privileging of "text-internal" critical thinking (first outlined by Moore, 2011). Likewise, the need to practice "situated content application," as was described in seemingly divergent disciplines like education, communication disorders, and athletic training in this study, may be explained by what Yancey (2015) might observe as the material of the clinical or performative professional environment of teaching and working with patients.

Hayes, Pasquaretta, and Pritchett's (2018) editors' introduction "Family Resemblances" offered a correction to the tendency to seek a unified definition of critical thinking and offered instead a "genetic" metaphor for organizing disciplinary critical

thinking. Using a "crisscrossing" diagram, Hayes et al. (2018) showed how relations that seem disparate can indeed retain resemblances. The authors noted: "when critical thinking is reconsidered within this genetic organization of meaning, incompatibility and underdetermination, which otherwise interfere with the formation of consensus, are instead part of the evolving nature of critical thinking, around which consensus can form as changing and interrelated areas of agreement about what students need to learn" (p. 3). Perhaps what our study has made more clear in this pursuit of a consensus about critical thinking and writing is that academic disciplines themselves are less important for identifying "family resemblances" in critical thinking than the "materials" with which and through which critical thinking performances are taking place.

The present study further confirms some of the findings by Moore (2011) and is important because it involved disciplines that are traditionally more divergent than the mostly humanities disciplines examined by Moore. The present study confirms Moore's conclusion that neither the generic view of critical thinking nor the discipline-specific view are satisfactory explanations for how critical thinking is taught. As Moore (2011) noted: "The over-application of each approach is liable to produce different types of consequences. In imposing a generic model . . . the risk is that their thinking will lack nuance . . . [and] rely on a template approach . . . [in] distinct disciplinary modes . . . the risk is that students will become insular, and lack the ability . . . to engage effectively with those from other fields" (p. 228). This study, along with Yancey (2015) and Hayes et al. (2018), adds that both generic and discipline specific approaches are also insufficient for classifying critical thinking across the curriculum.

As we begin to understand critical thinking not just as a general concept but also as varying and specific ways of thinking across the curriculum as relates to the material of that thinking, the work of assessing critical thinking in writing will also begin to vary. It would be difficult for a single work of student writing to make all the writing moves described in this article. Instead, instructors should consider what definition of critical thinking is most valuable not necessarily to the academic discipline alone, but also to the material with which and through which students are being asked to work. Faculty should then consider and specify/make explicit what writing moves they will teach and expect from their students. This is quite different from the approach at many universities, where the teaching of critical thinking is a university-wide goal yet presumed to be the same across disciplines. This further indicates a role for writing across the curriculum (WAC) programs, which should play an important role in facilitating these conversations and helping faculty define the kind of critical thinking they value and see what this thinking looks like as they assess student writing.

As demonstrated by the Ennis and McPeck debate, critical thinking scholarship has shown a wariness toward language because context, culture, and interpretation make language an unreliable ally in an effort to catalogue thought, but criticality toward language is central to any and all critical thinking, as well as to the delivery and instruction of critical thinking. Moreover, for a student to demonstrate critical thinking and for an instructor to assess whether critical thinking has in fact taken place, students and instructors are inevitably wedded to language use for that exchange, most especially through writing. Studies of critical thinking and writing must differentiate between the internal act of thinking and the language performances that are at work in those acts, internally and externally. With this view in mind, two rudimentary paths seem worthwhile to explore for writing studies

and critical thinking scholarship. From a generalist standpoint, writing studies scholars should consider not just how the dispositions and abilities Ennis catalogues can be prompted by reading and writing tasks, but how those dispositions and abilities present themselves in written form. For example, how can writing assessment measure that a student has performed the critical thinking disposition of seeking precision? From a specifist standpoint, writing across the curriculum scholars should consider how disciplinary approaches to critical thinking get translated into writing moves that can be assessed in writing-related courses across the curriculum. For example, if health science students need to be good at the specific critical thinking skill of *situated content application*, then we must consider what writing tasks, genres, and language performances help students learn and demonstrate the application of content to situations. These two paths offer us important next steps in rearticulating critical thinking in a way that respects the role of language in the delivery and assessment of critical thought.

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