Critical-Thinking Experiences of Chinese and U.S. College Students: A Comparative Analysis Using Phenomenology

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Abstract

In this study, I investigated the critical-thinking experiences of seven Chinese international and five U.S. students attending a large public university in the United States. I conducted a comparative analysis of these groups' different experiences with critical thinking in this context, while closely following the twin methods of epoché and reduction in phenomenology to remain attuned to any personal biases. My results indicated that Chinese and U.S. students experienced critical thinking differently on the basis of the four universal existentials noted by van Manen (2016): lived experiences of relation (self–other), materiality (things), time, and space/place. Specifically, the Chinese students tended to view themselves as outsiders and/or newcomers to the United States and found that they learned to think critically by interacting with others (e.g., professors, peers, and teaching assistants). By contrast, the U.S. students developed and practiced their critical thinking mainly by completing homework assignments that were hands-on and practical. These findings suggest that familiarity with linguistic and educational practices may be a strong predictor for experiential differences between groups of students in a university setting.

Keywords

critical thinking, college students, phenomenology, epoché, reduction

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Critical thinking is listed as an essential goal of American higher education (van Gelder, 2005); consequently, colleges and universities have increasingly emphasized the importance of teaching and learning critical thinking (American Philosophical Association (APA), 1990; Duron et al., 2006; Lloyd & Bahr, 2010). Literature on critical thinking falls primarily into the following three categories: (a) assessments of students' performances on critical-thinking (standardized) tests (e.g., Samawi, 2007; Burbach et al., 2004; Butler, 2012; Wheeler & Collins, 2003), (b) analyses of the complicated and robust nature of critical thinking (e.g., Facione, 2000, 2015; Halonen, 1995; Paul & Elder, 2006), and (c) examinations of students' perceptions/opinions of critical thinking (e.g., Lloyd & Bahr, 2010; Yan, 2018). Much of the literature is, however, "constructed around the fundamental assumption that, while (critical thinking is) regarded as essential, (it) is neither clearly nor commonly understood" (Lloyd & Bahr, 2010, p. 9). Scholars have paid insufficient attention to critical thinking as perceived through the lens of student experience, even though students are the ones being asked to learn how to think critically. The current study investigates the experiences of students with respect to critical thinking in an attempt to add to the understanding of the needs of Chinese international students (and perhaps other international students seeking post-secondary education in the United States).

To this end, I conducted a comparative analysis of the critical-thinking experiences of junior and senior Chinese international and U.S. students at a large public research university in the United States, attending to each cohort separately so as to understand the phenomenon in many different ways. As I explain in the next section, previous literature has indicated that

Chinese students, or even Asian students in general, are less "competent" than their Western peers are in the context of critical-thinking tests, and so I was anxious to examine the nature of these putative differences. Because I organized and initiated this study anticipating differences between these groups, I was especially careful to recognize and mitigate biases or preunderstandings that could cloud my judgment or skew my evaluation of the data—steps that I detail more in the "Trustworthiness" section below. And so, with a focus on students' lived experiences in thinking critically, I analyzed the two groups independently and with attention to three primary research questions:

1. How do the two groups perceive the process of thinking critically?
2. What are the differences between the two groups' experiences with critical thinking?
3. Considering any differences between groups, how can educators and administrators meet the needs of, and cultivate critical thinking among, a diverse student body?

Literature Review

Critical thinking is famously associated with ancient Greek philosophers (e.g., Socrates, Plato, and Aristotle), who believed truth/knowledge should be drawn from logical probing and questioning (Paul et al., 1997), and eventually became an educational goal in the U.S. (Hitchcock, 2018). John Dewey (1910) famously urged that education should help students develop a scientific attitude of mind: what he referred to as "reflective thinking." Since that point, fostering critical thinking among college students has been integral to both curriculum and assessment across disciplines and class levels: a goal to be reached by all stakeholders (e.g., institutions, instructors, and students) within American higher education (Halpern, 1998; Pithers & Soden, 2000).

But critical thinking is only one method of thorough and time-tested inquiry. Yin Yang thinking – an ancient Chinese philosophical principle resembling Western dialectical thinking – has powerfully and pervasively influenced the Chinese worldview, as well as its culture(s) and all levels of education (Fang, 2012). Naturally then, the Chinese "have had an enduring reputation for being dialectical thinkers" (Peng & Nisbett, 1999, p. 6), adopting a middle position by which truth and reality can be found in each of two competing propositions (e.g., Fang, 2012; Peng & Nisbett, 1999). That is, dialectical thinkers tend to emphasize the reconciliation aspect of contradictions; they are more inclined to highlight the unity of opposites. Even though dialectical thinking is similar to critical thinking in certain respects, it has more in common with the Golden Mean in Confucianism (*4erce yong*), which represents not overdoing and not falling short, and reaching the moderation, balance and harmony – the golden mean – with the change of circumstances (Fu, 2005). When dealing with controversy or disagreements, for example, the approach is to take a multi-perspective view and make behavioral decisions that consider both the self and the overall situation at the time of analysis.

But, even for U.S. students – those for whom the concept would be presumptively more familiar – critical thinking can be a nebulous notion susceptible to multiple interpretations and constructions (Vandermensbrugghe, 2004). Scholars such as Hitchcock (2018) have suggested that critical thinking is a careful, goal-directed endeavor, while Ennis presented it as seeking to decide "what to believe and do" (1987, as cited in Chiu, 2009). Even more, others (e.g., Bailin & Siegel, 2002; Facione, 2000) have described critical thinking as an experience processed through both actions and beliefs. With respect to college students in particular, William Perry's (1970) theory of intellectual and ethical development has been widely used to explain critical thinking as a cognitive development activity.

Absent consensus over the concept's definition, theorists have typically explained critical thinking in terms of three perspectives (Halonen, 1995): state perspectives (i.e., skills), trait perspectives (i.e., inherent dispositions), and emergent perspectives (i.e., cognitive development). State perspectives emphasize critical thinking as a multidimensional ability that can be learned and improved through formal education and training, trait perspectives stress critical thinking as an inherent distinguishing quality among individuals, and emergent perspectives highlight critical thinking as a cognitive activity that emerges naturally and without formal instruction (Halonen, 1995).

Not surprisingly then, with a term that is neither precisely defined nor consistently construed in the same way (Lloyd & Bahr, 2010), literature has suggested that Chinese (international) students perform differently from their Western peers in critical thinking tests (Carson, 1992; Carson & Nelson, 1996; Ip et al., 2000), and that, "by implication," this difference renders Chinese students "less adequate in a Western setting" (Jones, 2005, p. 340). Scholars have offered three basic arguments to explain these distinctions in performance: Chinese culture, especially the pressure to conform (Atkinson, 1997; Egege & Kutieleh, 2004), the authoritarian education system in China (Ip et al., 2000), and Chinese students' comparatively diminished proficiency with English (Floyd, 2011).

At the same time, other studies (Cheng, 2000; Durkin, 2008; Jones, 2005; Kumaravadivelu, 2003) have cautioned against attributing gaps in interpretive performance on critical thinking tests between Chinese (international) students and their Western peers to culture differences and facility with language. For example, Cheng (2000) argued that it was a "distortion of the Confucian doctrine" (p. 440) for those in the West to assume Confucian culture discouraged critical thinking. To the contrary, Cheng stressed, in Confucian culture, "the action of enquiring and questioning is central to the quest for knowledge" (p. 441). Durkin (2008), too, suggested that Chinese international students were only unfamiliar with a particularly *Western* style of critical thinking, thus encouraging the misperception that these young scholars were poor critical thinkers. For the above reasons, it is especially imperative that scholars pay greater heed to students' own experiences and sensibilities when they have been asked to think critically.

Method

In the words of Jan Hendrik van den Berg, "the phenomenologist is obsessed by the concrete (and) distrusts theoretical and objective observations" (cited in van Manen, 2016, p. 65). While theory "can be a powerful expression of human intellect," van den Berg added, the phenomenologist "must be wary of the appeal of theory and be attentive to the ways that theoretical concepts frame and constrain our understanding of the world and the existential meaning of life as we live it" (van Manen, 2016, p. 66). Phenomenology, he concluded, "does not offer us the possibility of effective theory with which we can now explain and/or control the world" (van Manen, 2016, p. 66).

Rather than adopting a theory from which to offer predictions about participants' critical-thinking experiences in the university setting, this paper describes and assesses those experiences as they unfold in interviews. Because participants' concrete experiences are the ultimate bearers of meaning (van Manen, 2016), I evaluated critical thinking among members of these groups by deploying four universal existential frames (Merleau-Ponty, 2012; van Manen, 2016) as heuristic guides for analyzing data. Although these four frames may have also constrained my analysis in some fashion, in the same way that a theory can have a limiting effect, they afforded me greater space in which to code and categorize interview responses and allowed me to do so with a more open mind by not trying to predict specific differences between the two groups. These frames were (a) relationality (self–other), which explains how

individuals other than the subject are experienced in the studied phenomenon, (b) materiality (lived things), which explores how things/materials are experienced related to the phenomenon being studied, (c) temporality (lived time), which contemplates how time is experienced with regard to the phenomenon being studied, and (d) spatiality (lived space), which considers how space is experienced regarding the phenomenon being studied.

Research Design

As a method, phenomenology – an approach that "aims to express, in rigorous and rich language, phenomena and events as they give themselves" and "aims to investigate the conditions and origins of the self-givenness of these phenomena and events" (van Manen, 2016, p. 61) – is uniquely positioned to investigate and depict students' experiences with critical thinking. By building on interpretative and detailed language, phenomenology can facilitate our understanding of intangible concepts like critical thinking (Greifeneder & Unkelbach, 2013) and can elicit the vividness and presence of a phenomenon (van Manen, 2016). Even more, the twin methods of epoché and reduction in phenomenological research are well-suited to validate qualitative research transparency and rigor (Meyrick, 2006). Epoché, from the Greek (ἐποχή epokhē) for "suspension," means to refrain or stay away from. Husserl (1913/2012) adopted this word in his book *Logical Investigations* to emphasize the importance of suspending and refraining from one's biases, judgments, and familiar notions when accessing the essence or meaning of an experience (van Manen, 2016).

Reduction, for its part, does not refer to reductionism or abstraction as the word might suggest; rather, it means to return to the original presentation of an event rooted in experience (van Manen, 2016). Only after achieving epoché will the researcher, who is also the instrument of qualitative research, be equipped to make this return (Husserl, 1900/1970; Patton, 2002). Over the course of this research, I remained as transparent as possible and reflected on my potential biases (i.e., practicing epoché) (MacBeth, 2001; Miles et al., 2014) to "break through … the taken-for-grantedness and get to the meaning of (students') experience" (van Manen, 2016, p. 215).

Epoché and Reduction as Practiced in this Study

Curiosity inspires ordinary experiences to become phenomenological questions worthy of reflection (van Manen, 2016), and for me this wonder started in 2006 when I was asked to use critical thinking to write a critique paper of a published article in my first semester studying in the U.S. As a Chinese international student who had never before heard this term, I struggled to grasp what was expected of me. My English–Chinese dictionary described critical thinking as akin to judging or evaluating, a translation that confused me for several reasons. For one thing, who was I, a student, to evaluate an article of sufficient quality to be published in a journal? For another, why would my professor be interested in knowing my impression of the work in the first place? And, finally, even if I felt bold enough to "judge" or "evaluate" this work, how would I do that? This experience with trying to understand – and then engage in – critical thinking had a profound impact on me, particularly as the assignment required me to evaluate unfamiliar material by relying on an intellectual technique that was, itself, new to me. This sense of confusion led me to wonder how other students might experience being asked to think critically.

Sharing this experience (i.e., the epoché) is a phenomenological reflection that allows me to direct my attentive attitude toward my own bias – my own lack of familiarity with critical thinking (i.e., the reduction) – so as to clarify and sharpen my data analysis. For example, I might identify more with – and even prefer to emphasize – those participants who found

themselves confused or frustrated, as I had been back in 2006. I might also be ignorant of and unconsciously devalue critical thinking experiences that differed from my own. Staying alert and reflecting on my "taken-for-grantedness," as mentioned above, afforded me greater access as a researcher and allowed me to focus more on discerning the essences of participants' experiences.

Data Source

This study drew on interview transcripts from prior research (Yan, 2018) that primarily examined students' *perceptions* of critical thinking. In spring 2017, upon receiving Iowa State University Institutional Review Board (IRB) approval for the research associated with the study that generated these transcripts, I used purposeful sampling (Patton, 2002) and collected interview data from 25 participants (13 Chinese international and twelve U.S. participants) studying in science, technology, engineering, and math (STEM) fields. STEM participants were chosen for two reasons: first, while all disciplines in higher education encourage critical thinking, STEM fields have given it greater emphasis (Bissell & Lemons, 2006); second, both Chinese international and U.S. students have gravitated increasingly toward majors in STEM fields. Chinese international participants in this study received their K–12 education in mainland China and started their higher education in the U.S. All the U.S. participants received their K–12 education in the United States, and all were native English speakers. The interviews with the Chinese students were conducted in Chinese, after which I translated the transcripts into English and then worked with another doctoral researcher, who was a native speaker of Chinese but also fluent in English, to triangulate the results.

Because the previous research mainly examined students' opinions of critical thinking, whereas the present study focused on students' vivid experiences, the current work includes only those participants who shared detailed stories highlighting their phenomenological experiences with (of) critical thinking. Consequently, 12 of the 25 original transcripts (seven associated with Chinese international students and five involving U.S. participants) met the criteria and were included as data for the current analysis. Scholars (e.g., Bagheri & Ghanizadeh, 2016; Butler, 2012; Shubina & Kulakli, 2019) have argued that individuals could acquire critical-thinking skills irrespective of personal factors like gender, so this paper neither focuses on students' gender nor attends to that characteristic in the analysis. Table 1 shows the field of study for each of these 12 students. Chinese participants' pseudonyms start with a "C," and U.S. participants' pseudonyms start with an "A."

Table 1
Participants and Their Field of Study

Group	Participant	Major
Chinese International	Cody	Mechanical Engineering
Chinese International	Cameron	Food Science
Chinese International	Charles	Mechanical Engineering
Chinese International	Connor	Mechanical Engineering
Chinese International	Cynthia	Computer Engineering
Chinese International	Casey	Food Science
Chinese International	Chad	Electrical Engineering
U.S.	Andrea	Mechanical Engineering
U.S.	Allen	Chemistry and Biology
U.S.	Asher	Computer Science
U.S.	Anthony	Electrical Engineering

| U.S. | Andy | Electrical Engineering |

Data Analysis

Phenomenologists are generally reluctant to prescribe procedural steps in phenomenological data analysis (van Manen, 2016); however, as a researcher who does not have "enough philosophical background to … even know what 'being true to the phenomenon' means" (Hycner, 1985, p. 280), when organizing these transcripts, I used Moustakas's (1994) suggestion that knowledge could be derived through core processes involving horizonalization (step 1), themes/meaning units (step 2), textural and structural descriptions (step 3), and the essence of the phenomenon (step 4). In addition, the four universal existentials mentioned earlier could be used to shed light on participants' experiences. Figure 1 illustrates the process of how I organized and analyzed these data.

Figure 1
Four Existentials Directing Phenomenology Data Analysis
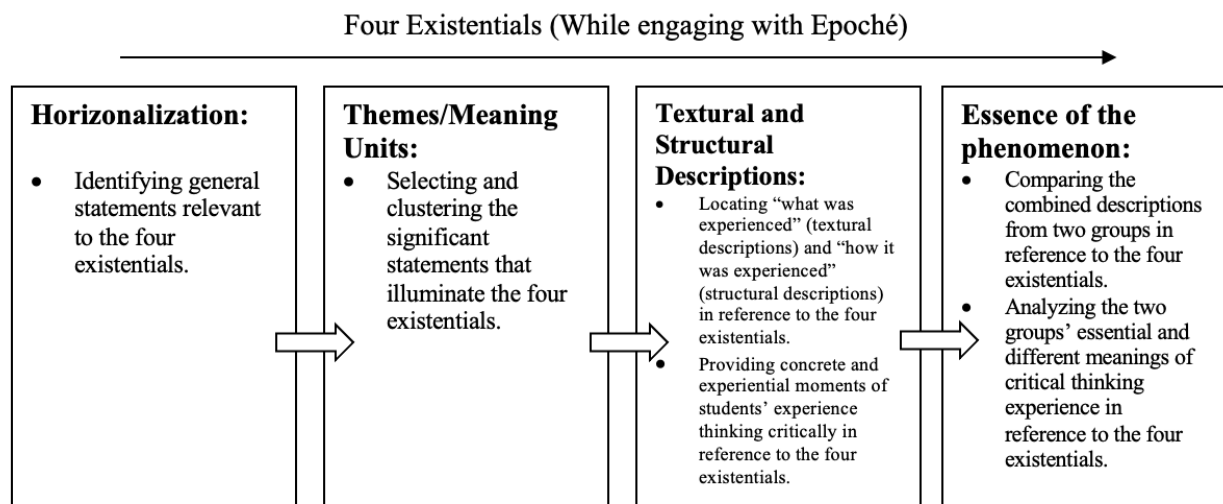
When engaging with the transcripts as openly as possible (Hycner, 1985), in step 1 (horizonalization), I identified and listed the general statements relevant to the four existential themes. For example, as I also discuss in the "Findings" section, multiple Chinese participants shared stories highlighting their relationships with professors, classmates, and teaching assistants (TAs) when they attempted to demonstrate critical thinking. Although some of these relationship statements were duplicated in different participants' stories, in this step I underlined them as self–other relations.

In step 2 (themes/meaning units), I cleaned redundant statements from step 1, selected those highlighting the four existential themes, and grouped the statements into the following universal themes: lived experience of relation, lived experience of materiality, lived experience of time, and lived experience of place/space. As noted above, these existentials served as a framework for categorizing the data and students' responses fit well within them. After pouring over the transcripts, I discerned that U.S. participants tended to use their hands-on homework, exams, and/or projects to exemplify their critical thinking experiences. Specifically, and while I include interviews below, Allen used one final exam from his 400-level genetics class to explain that the solve-the-problem-from-scratch process conveyed his ability to think critically, whereas Asher pointed to the trial-and-error process within his computer science projects as an indication of his success with critical thinking. Meanwhile, Anthony emphasized that, because

critical thinking was stressed so much in his discipline (engineering), it had become, for him, a kind of worldview; his dedication to meeting this expectation – solving problems – was his experience of critical thinking. I grouped together statements such as these and labeled them "self-things" (homework/projects/exams or discipline-specific exercises).

In step 3 (textual and structural descriptions), I looked to the transcripts to discern *what* was experienced and *how* it was experienced with respect to critical thinking. With the Chinese participants' self–other relations as an example, and to determine which critical thinking stories were experienced, I followed two steps: first, drawing on the transcripts, I recognized what specific relation was experienced when students recognized their critical thinking activity (e.g., was it related to their professors, classmates, or TAs?); second, I described what each relation looked like (e.g., did it cause any confusion, arguments, or consternation?). For example, relations with their professors, especially at the beginning, triggered considerable confusion among the Chinese international participants because these students expected the professors to teach them what critical thinking was – and how to do it – rather than simply assume that the students understood the assignment clearly and had the necessary tools. I went back to the transcripts and located the specific contexts to answer how critical-thinking stories were experienced. The analysis in this step was conducted existential-by-existential with each participant. Finally, in step 4, I compared the two groups simply as groups (i.e., Chinese and U.S. students), without attending to intra-group distinctions or, as mentioned above, characteristics such as gender, and analyzed the differences/similarities between the groups.

Trustworthiness

To ensure the soundness of the study and the quality of my analysis, I attended to the following four principles as explained by Lincoln and Guba (1985) and Yin (2018): credibility, confirmability, dependability, and transferability. *Credibility* refers to specific procedures that have been utilized successfully in previous comparable projects and that have been chosen to meet the research purpose (e.g., Lincoln & Guba, 1985; Shenton, 2004). Phenomenology research is about "going back to people's specific experiences and letting the concepts come from there" (Todres & Holloway, 2010, p. 183); as such, it has been used to study the lived experiences of humans and was, in this vein, an apt research method for the current research. In addition to the triangulation measures used during data collection for the study that preceded this one (Yan, 2018), I achieved sufficient triangulation by constantly engaging epoché and reduction. That is, I exercised multiple reductions: avoiding bias (Yin, 2018) and reducing my own prejudgment on what I saw, thought, felt, and perceived when analyzing the transcripts/data.

Confirmability recognizes the degree to which the findings were shaped by the respondents rather than by the researcher's bias, motivation, or interest (Lincoln & Guba, 1985). As mentioned above, by adopting the twin methods of epoché and reduction, I focused on the participants' own experiences and stories of thinking critically. Although I self-identify as a qualitative researcher and have been trained to reflect inwardly and outwardly when conducting a study, self-reflection and self-dialogue were especially paramount in this project. For example, while reading and analyzing students' interviews as openly and honestly as possible, I actively engaged with self-reflection and self-examination on a conscious level regarding my positionality (as a researcher) with respect to those being researched.

More specifically, I had been a Chinese international student who struggled with critical thinking. What's more, by the time I conducted these interviews, I had spent almost a decade in American higher education (as a student and instructor) and had studied critical thinking for my doctoral dissertation. So, the topic of critical thinking is personal and important for me. To the Chinese international students in my study, my positionality made me more of an insider

than an outsider, meaning that my data analysis was well within the cultural context of my own people (Kanuha, 2000). This proximity and shared experience allowed me to analyze these students' interviews in greater depth and with more breadth, although it also required heightened attention to subjectivity within the research process. To the U.S. students, my positionality made me closer to an outsider than an insider, and some of our differences (e.g., native languages, upbringing, culture, education experiences) could have caused me to overlook or undervalue certain subtleties in these students' responses. As such, while analyzing the data and writing, I engaged with epoché and reduction multiple times to remind myself to analyze the data only from the role and perspective of a researcher looking to highlight participants' experiences.

Dependability refers to the findings' consistency and repeatability in a qualitative study (Lincoln & Guba, 1985). Due to the nature of phenomenology research – published lived experiences are often static and frozen (Florio-Ruane, 1991) – it can be challenging to repeat phenomenology research; however, when the observations within the study are reported in detail, it allows readers and future researchers to assess the extent to which proper research practices were followed. Following van Manen's (2016) and Moustakas's (1994) suggestions, I established the findings through systematic and structural procedures; after multiple reductions, the findings were consistent with the data I had collected (i.e., participants' own experiences and stories).

Finally, although the purpose of this qualitative study was not to generalize statistically across populations or universes, the results from this work are generalizable to theoretical propositions (Yin, 2018) and thereby *transferable*. The current study may add a grounded perspective to certain theoretical concepts pertaining to the students' varied critical thinking experiences. Hearing students' own experiences directly rather than measuring their performance in standardized critical-thinking tests, for example, highlighted the following two propositions regarding teaching/learning critical thinking:

1. U.S. students echoed the literature on the importance of using hands-on and real-world projects for their critical thinking; and
2. International (and especially Chinese) students could benefit from clarification and demonstration of critical thinking through *self-other* interactions with, for example, professors, TAs, and peer mentors/tutors.

Results

Anecdotes/stories are powerful and effective in recreating experiences in ways that straightforward explanations or conceptualizations might not muster (van Manen, 2016). The following passages reveal my descriptions and understandings of the participants' anecdotes and stories when they were asked to think critically.

Participants' Lived Experience of Relation (Self–Other)

The relational theme was highlighted to a greater degree and more often in the Chinese international participants' shared anecdotes; "thinking critically," as that notion is conceived of in the West, was for them an unfamiliar academic expectation, even while they were, of course, accustomed to "thinking" their way through problems and delving deeply for solutions. For the Chinese international participants, the relational dynamic with instructors had changed from students being told what to do or think to students being told to first figure out *how* to think (in a certain way), and then apply that novel sort of thinking to solve a problem without much, if any, familiarity with the mode of intellectual engagement undergirding the

assignment. Especially at the beginning, the Chinese international students felt overwhelmed and confused; their descriptions of a reluctant departure from the familiar, illuminated by the following passage from Cody, resembled those of children feeling anxious when separated from their parents:

> This thing (critical thinking) has never been directly asked (of me) in my previous education (in China) … So, the first time my reaction was like, "I just don't know how and where to start." (I was) overwhelmed. After I got the question (asking me to think critically), I thought, "What exactly did the professor ask me to do?"

Another student, Cameron, expressed similar confusion at the outset but came around to the benefits of being asked to think in this new, albeit still-unexplained, way. "I didn't know what … the 'critical thinking' (was) that he asked (me to do)," Cameron explained,

> because education (in China) is better in conditioning (us) to comprehend methods but not the application (aspect), (which) is (taught) better here (in the U.S.) … When classmates ask questions in lectures, he (the professor) does not answer (the questions) right or wrong; instead he encourages us to think independently … One time (we were asked to collect data for) … a homework (assignment, and I assumed that), because there would be so much data collected in my class, my input would not affect (the class results as a whole). So, I made up my data input … (But)… then there came a problem: the variance of the entire class … (became) larger, … (and) my professor talked to me about the data that I (made up, which) became an outlier … (That's when) I realized that my critical thinking has a responsibility (to the whole class).

In a similar vein, Chinese participants recognized their relational change with peers. With students having been instructed to think critically, relationships among classmates became increasingly co-dependent and inevitably more fraught with tension and frustration. "I was 'blacklisted,'" Charles explained,

> by my classmate who is (more) senior than me because my opinion was different from his. I felt disappointed and stressed. The peers who "blacklist" you just because your opinions are different don't think critically. They don't comprehend that what they think (or think they) know cannot be right all the time.

This was, in some sense, an example of learning critical thinking by learning what it was not.
Or, in the words of Connor, who struggled in a related sense in his dealings with peers, "In a group project, when critical thinking was required, the group members propose(d) different ideas. In this way, I constantly (asked myself), "Are their ideas good? Are their ideas bad? Whose idea is better for the current situation?" Broadly speaking, Chinese participants recounted feelings of considerable tension and stress because no longer were their peers on the level of teammates who prioritized harmony in the relationship. To the contrary, alternative explanations became their new norm.
Chinese participants, however, explained having different experiences with their TAs. Specifically, these students felt relieved upon realizing their TAs were accessible authority figures well-positioned to help them work through these challenges. "Because many of my classes are big lectures," Cynthia offered,

I cannot always be one-on-one with my professors, and some students, (like me), are uncomfortable asking questions in the big lectures … I have a TA who is at my age but better at the subjects, so I can communicate more comfortably and easily … So, if I had problems completing the critical thinking assignments, I can just ask the TA.

Cynthia realized her TA was approachable and supportive, and this sense of security colored her impressions of these peers who were often slightly older but still relatable. By contrast, though, others, such as Charles, stressed that, unless TAs demonstrated the same commitment to cultivating critical thinking as did the professors they worked under, they (the assistants) could actually forestall the development of critical thinking. In particular, Charles pointed out that TAs, who were asked to teach sections or cover recitations while still managing their own scholarly agenda, might be inclined to take an easier tack. Having teaching assistants "directly telling me the answer does not help my critical thinking," said Charles. "When my TA does not want to bother,"

He tell(s) me the answer (without me having to figure it out) because he has to do his own research or maybe (because) the question(s) I (might) ask would require him more time. But the (directly given) answer will definitely hinder my critical thinking, and I felt less valued because he (i.e., the TA) doesn't want me to think hard and critically about the question anymore.

Even worse, in the words of Casey, were instances where TAs, themselves, struggled to understand the material and, not surprisingly, struggled to teach it to others. "My TA explained something that he didn't understand in the first place," Casey offered in this regard, but

I don't understand what he wants me to do because he doesn't understand it either … He wouldn't be able to teach it (clearly). The situation would be like: He couldn't get a correct solution, and I couldn't get a correct answer, either. It made me very depressed, very depressed. Getting help from TAs is not always as good as my own learning or even an internet search.

Compared to the Chinese students, U.S. participants did not emphasize their relational experience when reflecting on having been asked to think critically. In the few shared anecdotes touching on this variety of experience, they stressed the quality of interaction with their professors (rather than with their peers and TAs). When professors modeled the critical thinking process and provided them with details, this relational experience was regarded as beneficial, albeit not essential, for nurturing their critical thinking. As Andrea expressed this basic sentiment:

Things (that) help me think critically … (are) when a professor walks through step by step (what) he is talking about and why he is doing that way. For example, in my analysis class, my professor is very good at teaching abstract knowledge, and walking (us) through with great details and examples. He would start the problem, like, "I want to show (you) how I do this," … and then he would walk us through all the alternatives. So, showing us how he does it with a great level of detail is important to (fostering) my critical thinking.

By contrast, Allen argued that those teaching him were too transactional – too inclined toward results and not attentive enough to the process of learning. "It does not help (my critical thinking)," he stressed, because my professors pay too much emphasis on helping us do well on exams … (and not enough on) help(ing) me understand the concept and principle to decipher the problems." "I felt (like I was) being spoon-fed," he reasoned. "It's just a copy with a couple of number(s) changed."

In general, the Chinese group highlighted their critical thinking experience as a lived relational (self–other) experience; for them, professors – authority figures who once led students to knowledge – had become facilitators who assisted students in the process of acquiring knowledge. Although this relational change caused confusion and frustration, it nurtured in the Chinese participants a novel sense of independence and responsibility. U.S. participants, for their part, tended to concern themselves with critical thinking only while interacting with tangible class materials; a theme discussed more in the following section.

Participants' Lived Experience of Materiality (Lived Things)

The materiality theme, stressing things and materials, was more established in the shared stories of U.S. participants. Two items these students stressed in their transcripts were (a) everyday academic things such as homework or projects, and (b) macro-level materials like a discipline-specific environment (e.g., emphasizing students' problem-solving skills). When interacting with things and materials, U.S. participants experienced a mixture of reward, enjoyment, accomplishment, responsibility, frustration, challenge, and even self-doubt. As Andrea put it, when describing her manufacturing lab,

> Professors want us to learn it on our own … so that when we finally figure it out, I feel like (getting) a reward … But, sometimes even if I do feel like I am thinking critically, I still do not understand (the question) … I feel really frustrated. Sometimes I doubt myself and question if I were really going to pass the class!

U.S. participants noticed the benefits of thinking critically when interacting with everyday academic things. In particular, they felt that homework and projects that included critical thinking as an essential component could improve their overall learning. Allen spoke to this notion when discussing his 400-level genetics class. "In the final exam," he offered, "we had to, from scratch, create a plasmid insert and insert it into … an organism." But "that question took me at least twenty minutes to complete because it was made from scratch," he continued.

> And that was part of the critical thinking … (because) … you have to combine all the different pieces in the right order in the right instances together to make something function. So, you really have to go through (steps) mentally and determine to see, (for example, if) this (step) would actually function the way you intended it to function … I felt my understanding of the material improved in this way.

Asher echoed this emphasis on "things" when recalling an assignment from his computer science course. "The implementation detail," he noted, "is where you get the most frustrated" because:

> You can write a series of steps on the board and prove that they are correct, but actually putting them into code—java code, that is—there will be a lot of the transactions that you have to worry about … So, that was definitely a time where … (I had to) think critically … through a lot of trial and error in implementing the code.

When experiencing critical thinking in a discipline-specific material sense, U.S. participants shared stories about how they had been taught to internalize this intellectual technique as intrinsic to their field of study. Anthony, for example, relied on critical thinking to meet the expectations of his discipline, electrical engineering. "They (the engineering discipline) never stop asking you to think critically," he offered. "It's just kind of the name of the game. There are different focuses (*sic*) of engineers, (but) they all try to solve problems … So, you have to figure out how … to think critically and solve problems." Making a similar point and underscoring the element of professional training underlying the Western notion of critical thinking, Andrea stressed the significance of this approach for encouraging a kind of independence of thought:

> They (the engineering discipline) do a lot of things on purpose to make us frustrated and struggle with things that would require us to think critically … Rather than just make us … memorize twenty words and move on to the next thing (for example), they (the engineering discipline) get us to think critically and do things on our own …When I finally get the right answer, I know I will remember it better than if I just look (up) the solution first.

By contrast, the Chinese participants emphasized their critical thinking experience in the material sense more in their interactions with everyday academic fixtures such as homework and group or individual projects. Through the trial-and-error process of taking on and completing these assignments, the Chinese participants consistently emphasized the moral and intellectual growth they had experienced in the process of being asked by their professors to think critically in the university context. Referring to an exercise in his food science class, for example, Casey noted that "We were making a drinkable yogurt, just like a liquid drink." But then his group encountered a problem with probiotics, Casey added, "because we wanted to sterilize the milk,"

> and the traditional way to do so is to use a high temperature. With a high temperature, however, probiotics will die; but if we did not sterilize the milk enough, germs would spread through the milk and cause infections and illness … We tried many times … (and), finally, thought of using research/scholarly papers to find inspirations … We found that they (had) used ultra-high pressure to destroy bacteria instead … I mean, you have to really think through and know your responsibility before you just "go ahead and do that.

As the above passages indicate, U.S. participants noticed both concrete and abstract things, whereas Chinese participants only noted the concrete. More specifically, U.S. participants experienced critical thinking through interactions with tangible items such as hands-on assignments and projects, as well as the abstract embrace of disciplinary norms and traditions, while their Chinese counterparts tended to stress their more practical encounters with assignments and projects as a means or vehicle for nurturing their critical thinking over time. Second, and building from the first observation, U.S. participants rested on easily discernible advantages of critical thinking, such as fostering their overall learning while in

college and preparing them to enter the work world, whereas Chinese participants recollected and spoke more to benefits of critical thinking as a broader approach to inquiry exhibiting the potential to cultivate their intellect and inspire their moral growth. While it could be that the U.S. students reflected their individualistic and pragmatic culture and the Chinese students focused on their intellect and moral growth; however, I am not inclined to generalize in such a way based only on the data in this qualitative study. Future studies, however, could explore such potential motivations.

Participants' Lived Experience of Time

Although this lived experience of time was shared less, both groups experienced time with respect to critical thinking as a sense of personal identity development, intellectually and ethically. They viewed their maturation and growth from navigating the demands of critical thinking through their college years – realizing, for example, the potential for growth when critical thinking was regarded as optional in general education classes but mandatory in upper-level classes. In this regard, Allen explained that critical thinking "becomes much heavier as time goes on," pointing to "task-oriented courses" and, in particular, his 400-level courses – the highest level for an undergraduate at this university – which was "pretty heavy with critical thinking." By contrast, Allen said, "in your gen-ed (i.e., general education) time,"

> it is weak in critical thinking … For example, in my junior and senior years, because I have to defend a conclusion, I have to think critically in the process … That is the name of the game in academia: You do your research, write your paper, and you have to appropriately defend your conclusions … But gen-ed-level (learning) is more (about) facts; I do not have to think critically about what is going on, (although) if I do, that will make … life a lot easier … You can (make your) way through gen-ed classes without ever thinking (critically) or learning a principle.

In a similar vein, Chad drew attention to his experiences as a student nearing graduation and entry into the work world. "The homework in my senior year involves real situations often." And, he added, "the problems are very practical." In fact, he continued,

> The more practical (the) problems are, the more I need to think critically … For example, in my class, I have to learn to use the least amount of money from the company (or) customer to provide the most benefits for them. In my situation (for this class), the critical thinking part needed to be applied at its finest.

Participants' Lived Experience of Place/Space

Fourth and finally, both groups experienced spatiality (i.e., lived space/place) with regard to critical thinking, although they did so for different reasons. To the Chinese participants, critical thinking was a constant reminder that they were straddling two worlds: China and the United States. For these students, their previous world might only exist in memory, but it could certainly inform and even strengthen their application of critical thinking. Cameron made this point by saying, "My previous (kindergarten through twelfth grade) education emphasized mastery of content with clear instructions and rationality" but did not "emphasize the execution aspects." "In the current education," he continued,

professors always ask us to apply our ideas, which clearly … (requires us) to think critically about execution steps … But you have to use your content knowledge and rationality to execute well … Even so, you will still encounter unexpected problems. Then, it will require even more of your critical thinking. So, if you can't execute well, your content knowledge and rationality will be useless; but if you can't master the content with clear rationality, your execution will be no use as well.

For the U.S. participants, however, critical thinking was experienced differently in high school versus college, and in lecture halls versus an instructor's office. As Andy put it, "Especially in my freshman year … I thought we would have everything already given to us for assignments … (because) in high school, teachers (would) give us step-by-step instructions for everything we (would) do." In this vein, all that the students had to do, Andy added, was "follow the instructions" in order to "succeed." But in college, he concluded, "we are given an end goal, a start, and you have to think critically in order to find (y)our way to that end, on (y)our own."

Andrea made a similar point but observed the special significance of individual attention available to students who have been asked to think critically in the college environment. "Office hours," she noted, were "probably the most helpful thing for me when I (went) one-on-one with my professor." The professor was, in her estimation, "the expert of what I study" and thus best-suited to "show me their critical thinking steps in detail." "I would rather just come and ask them to show me," she added,

whereas in lecture (halls), … I just sit there taking notes. I can't think through the steps of the problem (that) she (i.e., the professor) is doing and … (understand) why she is doing (it) that way. I am too busy focusing on writing my notes and getting all the information down before she scrolls up the page … I just (get) caught up copying notes … and I don't know what the notes mean, nor (do I) think critically in any way.

In this final example from the findings, both groups were asked to think critically in their studies, but the Chinese and U.S. participants experienced spatial distinctions of the physical, conceptual, emotional, and intellectual varieties in different ways and for different reasons. In the next section, I offer some additional analysis of these results and explore their larger significance for the study of critical thinking in the university context and especially as it pertains to those students for whom such thinking is a novel and underarticulated concept.

Discussion

At the most basic level, the findings above offer evidence that critical thinking was experienced very differently by the Chinese international participants as compared to their U.S. counterparts. Put simply, the two groups experienced critical thinking (based on their own understanding of it) from different existentials. While both groups experienced time and space similarly when thinking critically, the Chinese participants realized a more relational (self–other) theme, whereas the dominant theme for the U.S. participants was one of materiality (things). Familiarity with linguistic and educational practices within the American context was likely a strong predictor of the two groups' experiential differences; however, it could also be argued that this result was owed more to the 12 participants' different learning strategies (Yenice, 2012). These differences may also apply to their learning experiences in American education in general, but that is beyond the focus of the current study.

The Chinese international participants (coming from a background of predominantly teacher-centered instruction) viewed themselves as outsiders in the U.S. university system and struggled with their limited or in some cases, lack of knowledge of or engagement with critical thinking. Fuhrer (1989) suggested that outsiders seeking help from other people is a pervasive means of learning how to act in an unfamiliar setting and acquiring information on an unfamiliar task. Outsiders, he added, "may not only feel better but may actually increase the effort in matching their behavior to setting-specific standards by asking questions of a knowledgeable member" (pp. 140-141). When the Chinese international participants registered critical thinking – often in its abstract or decontextualized form – as a linguistically and educationally foreign concept, they sought out help from others, such as instructors, peers, and TAs. Relations with others were, in other words, akin to a survival instinct: an essential impulse they developed while adapting to and working to meet the range of novel and underexplained academic expectations. Along the same lines, this effect – the survival instinct of sorts – might also represent a long-standing and habitual continuation of learning strategies cultivated in their previous world, within a teacher-centered K–12 educational setting that emphasized teachers (i.e., knowledgeable others) as being the ones obliged to do things for the learners (Schuh, 2004), with students, for their part, adopting a more passive posture and following instructions in a top-down manner (Ness, 2008).

The U.S. participants, however, who were linguistic and educational insiders in this process (and thus more familiar with student-centered instruction) regarded their critical thinking experiences, for the most part, in material terms. Specifically, they recognized their critical thinking activities mainly through active, collaborative, hands-on, and problem-based investigations such as projects, group work, exams, and homework – a result that accorded with findings from the literature (Freeman et al., 2014; Laal & Ghodsi, 2012; Prince, 2004). Because student-centered instruction, including active-learning exercise and both problem-based and team-based activities, fosters students' higher-order thinking, in the fashion of critical thinking, familiarity with this sort of intellectual approach was necessary to engage with critical thinking. When the U.S. participants encountered the materials/things, however, their critical thinking experience was not simply with the items presented but rather with the cognitive activities with which they actively engaged.

Even more, both groups pointed to critical thinking in their lived experience of space and/or place. They experienced the impact of spatial distinctions on the degree of their involvement in and commitment to critical thinking. U.S. participants experienced more critical thinking engagement in college and in individual interactions with instructors than they had realized in a high school setting or even in larger lecture settings within the university, whereas the Chinese international participants experienced the differences by residing in two worlds – growing up in China, where a certain kind of inquiry had been the norm, and pursuing post-secondary degrees in the United States, where they were compelled to learn a new approach to completing their studies. In the broadest sense, these results indicate that both groups experienced critical thinking as intellectual growth, a result in line with Perry's (1970) theory of intellectual and ethical development, which suggested that cognition plays an important role in encouraging this mode of inquiry, investigation, and resolution over time.

Recommendations

These results reveal that higher education administrators, researchers, and educators can neither assume that critical thinking is common knowledge among all students nor expect that it will be experienced similarly by students from various and varied backgrounds. Universities may consider investing more to support multiple approaches to teaching and learning, recognizing their obligation to accommodate the diverse needs of an increasingly

global student population. In particular, the above findings point to several potential suggestions for improving students' encounters with critical thinking in the university context. First, for students who tend to view themselves as outsiders and/or newcomers (e.g., Eastern Asian/Chinese international students), universities should implement more programs emphasizing relations such as peer-tutoring and peer-mentoring (Grillo & Leist, 2013; Robinson & Niemer, 2010). Second, for students who are relatively more familiar with active-learning strategies (i.e., the U.S. participants in the current study), instructors should assign the reading of research papers in addition to assigning real-world and hands-on projects. Third and finally, seminars and workshops (e.g., a First Year Experience seminar) should be established to familiarize students, especially outsiders/newcomers, with critical thinking and to introduce them to the myriad other expectations attendant to their studies in an American university environment. Expecting students to demonstrate critical thinking by figuring out what critical thinking even *is* in the first place does not seem to be the most inclusive and accommodating approach to pursue in higher education.

Future Research

There are a few different ways the current research could be extended. First, results from the current study were delimited, offering a detailed and illustrative understanding of the two groups' existential experiences when they were asked to think critically within their own field of study. Future research could, in that regard, rely on these conclusions as a starting point for further examination, with special attention to the transferability of these results to other academic contexts (e.g., different student populations, different regions/universities/colleges). Also, the fact that eight of the twelve participants in this study came from within the field of engineering could have overemphasized particular experiences of students within a certain discipline. Additional research could investigate that potential by relying on a better representation of fields of study within the university and could, therefore, infer some general pedagogical implications associated with the tendencies of one discipline versus another. After all, if critical thinking doesn't mean the same thing from one researcher to another, it likely doesn't mean the same thing from one academic field to another – but only further research can help us answer that question.

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