

Critical Thinking Disposition and Library Anxiety: Affective Domains on the Space of Information Seeking and Use in Academic Libraries

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Because both critical thinking and library anxiety have been found to play an important role in determining learning outcomes, it is possible that these two constructs are related in some way. To date, however, this link has not been empirically examined. In the present study, we have attempted to identify the nature of the association between critical thinking disposition and library anxiety among 170 graduate students. Findings revealed a negative multivariate relationship between these two sets of affective variables. Specifically, weak dispositions toward critical thinking were associated with high levels of library anxiety. Implications of the findings were discussed with respect to the approach to teaching information literacy in academic libraries.



frequently reported tendency among students using academic libraries is their fear, confusion, or feeling of inadequacy in using the library. These tendencies, known as library anxiety, represent an affective barrier for students that was first identified formally nearly 20 years ago.¹ As librarians have become more aware of these inadequate feelings, there have been efforts to identify causes and effects of library anxiety. As a result,

library anxiety has been found to be associated with many factors, including students' demographic characteristics such as academic standing, race, gender, age, personality, and behavioral traits associated with perfectionism, self-perception, procrastination, study habits, and academic-related achievements.²

Besides these known factors, it is also conceivable that certain thinking dispositions or tendencies can cause significant fear and inadequacy when students use

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the library resources and facilities.³ For example, some students who want to be better informed ask the library staff for more information when they encounter problems. However, other students are less interested in obtaining more information because they are afraid of asking questions.^{4,6} Some students are more self-confident in their own abilities to think through problems to find what they want in the library, but others lack such confidence.^{7,8} When facing a task to find information in a large academic library system, some students are more open to various possible solutions and try them out, whereas others lack such flexibility and feel lost encountering the seemingly complicated library system. Some students approach the library in a more organized manner by applying analytic thinking skills to make sense of the huge information system, but other students are disorganized.⁹ These differences in information-seeking behaviors could be attributed to students' thinking disposition, specifically disposition toward critical thinking.¹⁰

The disposition toward critical thinking is defined as "the consistent internal motivation to use critical thinking skills to decide what to believe and what to do when one approaches problems, ideas, decisions, or issues."¹¹ Considering the fact that human behaviors are largely governed by what people believe and perceive,¹² students' negative attitudes and mistrust about their own thinking abilities and skills could cause illogical fear and inadequacy in a library where they are supposed to be engaged in intellectual activities. This situation would be even more severe when they encounter a seemingly complex academic library. Researchers have found that anxiety can impede cognitive processes that are essential to their research activities in the library.¹³

Because both critical thinking¹⁴ and library anxiety¹⁵ have been found to play an important role in the learning process, it is possible that these two constructs are related in some way. However, to date, this

link has not been empirically examined. An investigation of this viable link can be particularly important among graduate students for whom critical thinking skills and dispositions are paramount. Therefore, the purpose of this study was to identify the nature of the association between critical thinking disposition and library anxiety among graduate students. It was hoped that the findings of the study would inform academic librarians of the importance of teaching critical thinking disposition in their information literacy curricula in lowering library anxiety and enhancing library use capability.

Literature Review

Critical Thinking Dispositions

Critical thinking has been investigated largely in terms of thinking skills that involve the cognitive domain. However, Edward Glaser pointed out that critical thinking is, in part, the "attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences."¹⁶ This viewpoint was elaborated in a two-year Delphi study, sponsored by the American Philosophical Association, in which 46 experts from many disciplines participated to develop consensus views on critical thinking.¹⁷ Here, an ideal critical thinker was characterized as follows:

An ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit.

A notable outcome of this Delphi study was that critical thinking involves not

only cognitive skills, which most people generally relate to critical thinking, but also affective dispositions. While critical thinking skills relate to a certain set of cognitive skills that involve analysis, inference, evaluation, explanation, interpretation, and self-regulation, critical thinking dispositions relate to consistent willingness, motivation, inclination, and intention to use such critical thinking skills.¹⁸

In fact, many theorists and scholars have delved into the concept of thinking dispositions.¹⁹⁻²² Thinking dispositions generally refer to tendencies toward certain patterns of intellectual behaviors that are consistent or habitually observed in certain circumstances. According to Gavriel Salomon,²³ thinking disposition is a cluster of preferences, attitudes, and intentions, in addition to a set of capabilities, that allows the preferences to become realized in a particular way. These dispositions are thought to be critical spirit, a probing inquisitiveness, and a keenness of mind that weak critical thinkers generally lack.²⁴

Among various aspects of dispositions, a person can be either positively or negatively disposed toward certain thinking skills but not toward all dispositions equally. For example, one might be positively disposed toward using a systematic approach but not much so toward self-confidence in his or her own thinking and reasoning abilities. Moreover, critical thinking is contended to be contextual and domain-specific, while certain aspects of critical thinking are generic.²⁵⁻²⁹ This indicates that there are specific methods and techniques that good critical thinkers utilize to make reasonable judgments about what to believe and how to respond in a particular context. Thus, it would be of interest for the librarians who teach information literacy skills in both formal and informal settings to identify those dispositions toward critical thinking skills that are particularly associated with students having high levels of library anxiety.

Library Anxiety

Library anxiety, a term originally coined by Constance Mellon,³⁰ refers to recurring fear and the feeling of being lost among students who use an academic library for their research. This fear, which is experienced by 75% to 85% of college students,³¹ is attributed to the lack of competence when students feel that other students are competent at library use whereas they alone are incompetent. This feeling is perceived to be shameful; therefore, they tend not to ask questions in order not to reveal their ignorance or incompetence. Students also feel confusion because they are not sure about where items are located in the academic library building—a place that these students believe represents a maze piled up with an overwhelming amount of resources. Thus, students often express feelings of being lost without knowing how to begin and what to do. Anxious students can easily fail to approach the problem logically or effectively.

Library Anxiety and Critical Thinking Disposition

Regarding emotion and beliefs with the affective domain of human psychology, library anxiety could be attributed to students mistrusting their own abilities and failing to apply a systematic approach to find the answer. This feeling of incompetence resembles the tendency among students who do not have positive dispositions toward critical thinking skills. Thus, it is possible that students with negative dispositions toward their own thinking skills would have high anxiety levels when they approach and use the library. This is because the negative dispositions could interfere with critical thinking skills that command systematic, analytic thinking, problem-solving, and decision-making capabilities while using the library.³²

In support of this proposed relationship between library anxiety and critical thinking disposition, empirical findings from both sets of literatures suggest a

negative association between critical thinking and anxiety. Indeed, critical thinking disposition and library anxiety are associated with cognitive performance and academic-related achievements in an opposite direction. Specifically, whereas critical thinking disposition is *positively* related to performance in academic-related activities,³³ library anxiety is *negatively* associated with academic-related achievements, such as research proposal writing,^{34,35} grade point average,³⁶ and performance in research methodology courses.^{37,38}

Moreover, Anthony Onwuegbuzie, Qun Jiao, and Sharon Bostick suggested that library anxiety hinders information search performance by impeding students' ability to receive, to concentrate on, and to encode information necessary for the research proposal writing process.³⁹ They explained this phenomenon by speculating that library anxiety may create cognitive interference by causing the students to shift from task-relevant to task-irrelevant thoughts. This explanation suggests that library anxiety, possibly caused by negative thinking disposition, could, in turn, lower academic achievement by hampering the intention to utilize systematic and analytical thinking skills.

Although the literature reviewed here generally suggests a possible negative relationship between library anxiety and critical thinking disposition, to date, no study has examined this association empirically. Therefore, the purpose of this study was to identify the nature of the association between critical thinking disposition and library anxiety among students using academic libraries. Specifically, this present study attempted to identify further a combination of critical thinking dispositions that might be correlated with a combination of library anxiety dimensions. It was hoped that the findings from this study would add to the body of literature in both the areas of library anxiety and critical thinking.

Method

Participants

Participants were 170 graduate students enrolled in the College of Education at two universities in the southeast United States. All sample members were asked to participate while enrolled in a research methodology course. To participate in the investigation, students were required to sign an informed consent document that was given during the first class session of the semester. To participate in the inquiry, students received three percentage points that formed part of their final course grade averages. No student declined to participate. The majority of the participants was female (76.5%). Ages of the participants ranged from 22 to 62 years ($M = 31.26$, $SD = 8.81$).

Instruments

Participants were administered the California Critical Thinking Disposition Inventory (CCTDI) and Library Anxiety Scale (LAS). The CCTDI was developed by Peter Facione and Noreen Facione to measure a person's disposition to use critical thinking.⁴⁰ This instrument contains 75 items, which are measured using a six-point Likert-type scale anchored by 1 = agree strongly and 6 = disagree strongly. The CCTDI measures the following seven dimensions of critical thinking dispositions: truth-seeking (12 items), open-mindedness (12 items), analyticity (11 items), systematicity (11 items), critical thinking self-confidence (9 items), inquisitiveness (10 items), and maturity (10 items). *Truth-seeking* represents the disposition of being keen to seek the truth, audacious about asking questions, and honest and objective about seeking inquiry even if the findings do not support one's preference or one's preconceived opinions. *Open-mindedness* refers to the disposition of being open-minded and tolerant of divergent opinions and being sensitive to the possibility of one's own bias. *Analyticity* represents the disposition of being cognizant of potentially problematic situations, anticipating possible findings or consequences, and

valuing the application of reason and the use of evidence even if the underlying problem emerges as being difficult or challenging. *Systematicity* is the disposition toward organized, logical, focused, and attentive inquiry. *Critical Thinking Self-confidence* refers to the level of self-assurance one has regarding one's own reasoning processes. Further, individuals who possess critical thinking self-confidence are very comfortable with their own levels of cognitive ability. *Inquisitiveness* represents one's intellectual curiosity. The inquisitive person is one who values being well-informed, wants to know how things work, and values learning even if there are no immediate rewards. Finally, *maturity* denotes how disposed a person is to make reflective decisions. A person who is mature in critical thinking understands that some problems might be ill-structured and that there can be multiple ways to solve a given problem. For the current inquiry, the subscales generated scores for the sample that had a classical theory alpha reliability coefficient of .61 (95% confidence interval [CI] = .52, .69) for truth-seeking, .64 (95% CI = .55, .72) for open-mindedness, .71 (95% CI = .64, .77) for analyticity, .70 (95% CI = .63, .76) for systematicity, .79 (95% CI = .74, .83) for critical thinking self-confidence, .75 (95% CI = .69, .80) for inquisitiveness, and .71 (95% CI = .64, .77) for maturity.

The LAS was developed by Sharon Bostick.⁴¹ This measure contains forty-three 5-point Likert-format items that assess levels of library anxiety experienced by users. The LAS contains the following five subscales or dimensions: (a) barriers with staff; (b) affective barriers; (c) comfort with the library; (d) knowledge of the library; and (e) mechanical barriers. *Barriers with staff* refer to users' perceptions and beliefs that librarians are threatening, frightening, unapproachable, and inaccessible. Further, librarians are perceived as being too busy to provide students with help in conducting library tasks—that is, they assume that librarians have duties that are much more important than helping

them.⁴² *Affective barriers* pertain to users' feelings of inadequacy while performing or attempting to perform library tasks. These feelings of ineptness are exacerbated by the assumption that other library users are more proficient than they are in using the library.⁴³ *Comfort with the library* denotes how comfortable, welcoming, secure, safe, and non-threatening users perceive the library to be. *Knowledge of the library* pertains to the degree to which students believe they are familiar with the library. Finally, *mechanical barriers* refer to anxieties that stem from using mechanical library equipment, including computers, computer printers, and photocopy machines. A high score on any subscale represents high levels of anxiety in that area. For the present study, the subscales generated scores for the sample that had a classical theory alpha reliability coefficient of .90 (95% confidence interval [CI] = .88, .92) for barriers with staff, .85 (95% CI = .81, .88) for affective barriers, .72 (95% CI = .65, .78) for comfort with the library, .74 (95% CI = .67, .80) for knowledge of the library, and .53 (95% CI = .39, .64) for mechanical barriers. The dimensions of both CCTDI and LAS and their reliability scores are recapitulated in Table 1.

Data Analysis

The major analytical procedure used in this study involved canonical correlation analysis. This multivariate analysis is utilized to examine the association between two sets of measures when each set contains two or more variables or subscales.⁴⁴ The canonical correlation analysis was utilized to identify a combination of critical thinking dispositions dimensions that might predict a combination of library anxiety dimensions. The number of canonical functions (i.e., factors) that can be generated for a given dataset is equal to the number of variables in the smaller of the two variable sets.⁵⁰ Because seven critical thinking dispositions dimensions were correlated with five library anxiety dimensions, five canonical functions were generated.

Results

The means and standard deviations pertaining to the critical thinking disposition and the library anxiety subscales are presented in Table 2. According to the developers of the CCTDI,⁵¹ individuals who score below 40 on a given scale are

weak with respect to that critical thinking dispositional component, whereas individuals who score above 50 on a given scale are strong with respect to that critical thinking dispositional component. The proportion of graduate students who scored below 40 on each critical

TABLE 1
Dimensions of Critical Thinking Dispositions and Library Anxiety with Score Reliabilities

Dimensions	Definitions	Reliabilities (α)
<i>CCTDI 7 Dimensions</i>		
Truth-seeking	Keen to seek the truth, audacious about asking questions, and honest and objective in asking questions	.61
Open-mindedness	Open-minded and tolerant of divergent opinions and aware of one's own bias	.64
Analyticity	Cognizant of the potential for problematic situations, values reason and the use of evidence when facing challenging situations	.71
Systematicity	Disposition toward organized, logical, focused, and attentive inquiry	.70
Critical Thinking Self-confidence	Self-assured regarding one's own reasoning processes, very comfortable with own level of cognitive ability	.79
Inquisitiveness	Intellectually curious, values being well-informed and knowing how things work, values learning even without immediate rewards	.75
Maturity	Understands some problems to be ill-structured, therefore multiple ways to solve any given problem	.71
<i>LAS 5 Dimensions</i>		
Barriers with Staff	Believes that librarians are threatening, unapproachable, inaccessible, too busy with duties to help students	.90
Affective Barriers	Feels inadequate or inept in attempting library tasks, which are exacerbated by assuming that other people are more proficient	.85
Comfort with the Library	Perceives the library as a comfortable, welcoming, secure, safe, and nonthreatening place	.72
Knowledge of the Library	Degree to which students believe they are familiar with the library	.74
Mechanical Barriers	Discomfort stemming from using library equipment, including computers, printers, and photocopiers	.53

thinking dispositional dimension for the present study versus a normative sample of graduate students reported by the CCTDI developers⁵² was, respectively, as follows: truth-seeking (57.5% vs. 26%), open-mindedness (31.8% vs. 9%), analyticity (21.6% vs. 15%), systematicity (27.2% vs. 26%), critical thinking self-confidence (19.9% vs. 6%), inquisitiveness (21.5% vs. 1%), and maturity (30.3% vs. 12%). As can be seen, for each of the seven scales, the present sample had a higher proportion of students who were classified weak than did the normative sample, indicating that the sample was characterized by lower-than-average levels of critical thinking dispositions.

The canonical analysis revealed that the five canonical correlations when combined were statistically significant ($p < .05$). However, when the first canonical root was excluded, the remaining canonical root was statistically nonsignificant. Together, these results suggested that the first canonical function was both statistically significant and practically significant, with the first canonical correlation ($R_{c1} = .43$) contributing 18.03% (i.e., R_{c1}^2) to the shared variance.⁵³ However, the remaining canonical correlations were not significant. Consequently, only the first canonical correlation was interpreted.

Data pertaining to the first canonical root are presented in Table 3. This table provides both standardized function coefficients and structure coefficients. Using a cutoff correlation of 0.3,⁵⁴ an examination of the standardized canonical function coefficients revealed that inquisitiveness, systematicity, and critical thinking self-confidence made important contributions to the critical thinking disposition composite, with critical thinking self-confidence playing the biggest role. With respect to the library anxiety variable set, affective barriers and knowledge of the library made important contributions, with affective barriers making a substan-

Measure	M	SD
Truth-seeking	37.26	6.24
Open-mindedness	42.75	6.54
Analyticity	43.74	6.72
Systematicity	43.35	7.01
Critical thinking self-confidence	44.91	7.58
Inquisitiveness	45.19	7.46
Maturity	42.58	7.84
Barriers with staff	29.92	9.54
Affective barriers	23.46	7.13
Comfort with the library	16.99	4.51
Knowledge of the library	7.35	2.79
Mechanical barriers	9.93	2.88

tial contribution to the library anxiety composite.

The structure coefficients pertaining to the first canonical function revealed that all seven critical thinking disposition dimensions made important contributions to the set of critical thinking disposition variables, with critical thinking self-confidence agency again playing the biggest role. The square of the structure coefficient indicated that critical thinking self-confidence explained 85.01% of the variance, respectively. With regard to the library anxiety variable cluster, again, four of the five dimensions, namely, barriers with staff, affective barriers, comfort with the library, and knowledge of the library made important contributions, with affective barriers (i.e., 69.39% of the variance explained) and knowledge of the library (i.e., 51.98% of the variance explained) making the largest contributions to the set of library anxiety variables.

Discussion

This study examined the relationship between critical thinking disposition and library anxiety among graduate students. As predicted, a multivariate relationship was found between these two sets of

constructs. This association was negative, indicating that weak dispositions toward critical thinking are associated with high levels of library anxiety. Indeed, the findings of the present study showed that certain dispositions toward critical thinking are particularly associated with students with high library anxiety especially in the areas of affective barriers and knowledge of the library. These dispositions are critical thinking self-confidence, inquisitiveness, and systematicity.

Critical Thinking Self-confidence

The finding that graduate students with low levels of critical thinking self-confidence tend to report the highest levels of library anxiety is consistent with the results of Qun Jiao and Anthony Onwuegbuzie,⁵⁵ who found a relationship between self-perception and library anxiety. Moreover, the present finding is consistent with Mellon's observation

that students with high levels of library anxiety tend to believe that their peers are adept at using the library, whereas they alone are inadequate, that their incompetence is a source of guilt and shame and consequently should be kept hidden, and that asking librarians questions reveals their ignorance.⁵⁶ Students with low self-competence of their abilities to use the library tend to exhibit actions and inactions that culminate in underachievement.⁵⁷ Thus, interventions aimed at developing students' levels of critical thinking self-confidence from both reference librarians and information literacy instructors might help to reduce levels of library anxiety, which, in turn, might increase levels of academic achievement.

Inquisitiveness

The finding that graduate students with highest levels of inquisitiveness tend to report the lowest levels of library anxiety

TABLE 3
Canonical Solution for First Function: Relationship Between Critical Thinking Dispositions and Library Anxiety Dimension Scores

Variable	Standardized Coefficient	Structure Coefficient	Structure Coefficient ² (%)
<i>Critical Thinking Disposition Dimension:</i>			
Truth-seeking	-0.048	0.436*	19.01
Open-mindedness	0.089	0.571*	32.60
Analyticity	-0.186	0.679*	46.10
Systematicity	0.315*	0.751*	56.40
Critical thinking self-confidence	0.633*	0.922*	85.01
Inquisitiveness	0.315*	0.846*	71.57
Maturity	0.020	0.493*	24.30
<i>Library Anxiety Dimension:</i>			
Barriers with staff	0.192	-0.424*	17.98
Affective barriers	-0.986*	-0.833*	69.39
Comfort with the library	0.197	-0.476*	22.66
Knowledge of the library	-0.571*	-0.721*	51.98
Mechanical barriers	0.289	-0.199	3.96
* Coefficients with effect sizes larger than .3 ⁵⁹ .			

has intuitive appeal because it suggests that students who value being well-informed, want to know how things work, are not afraid of asking questions to seek help, and are motivated to expand their knowledge do not have high levels of anxiety. However, it is not clear what the causal nature of this relationship is. For example, it is possible that initial lower levels of library anxiety induce more inquisitiveness as they perceive that the climate for doing so is a positive one. Conversely, it is also possible that initial high levels of inquisitiveness lead to a reduction in levels of library anxiety. Thus, future research should investigate further the causal nature of this relationship. To the extent that levels of inquisitiveness determine, at least in part, levels of library anxiety, librarians' formal and informal instruction of information literacy skills that stimulates students' intellectual curiosity and encourages information-seeking and exploration behaviors might help them to overcome their affective barriers to use the library and its resources.

Systematicity

That students who are less disposed toward organized, logical, focused, and attentive inquiry (i.e., systematicity) tend to have higher levels of library anxiety is not an unanticipated finding. Students often face tasks to use a complex library service system in which various resources and services are arranged in different locations and different modes. If they are motivated to approach such tasks by applying systematic thinking skills to make sense of the unfamiliar library system, they seem to be less overwhelmed by the experience.

Conclusion

The present study purported to identify the nature of the association between critical thinking dispositions and library anxiety among graduate students. Revealing a negative multivariate relationship between the two, the findings suggest that teaching critical thinking disposi-

tion could reduce library anxiety levels. Because this study is a cross-sectional investigation, the direction of the influence between these two sets of affective variables should be scrutinized further in the future research. Nonetheless, the findings of the present study provide several implications for critical thinking and information literacy education.

First of all, the findings of the present study shed light on critical thinking disposition, a rather overlooked aspect of critical thinking. By documenting that students with weak critical thinking dispositions tend to have high library anxiety levels, the study draws the attention of reference and instructional librarians to the dispositions as an essential component of teaching critical thinking.

Reference and instructional librarians should develop effective teaching strategies to equip students with positive dispositions toward critical thinking. In fact, critical thinking disposition could be effectively taught within the framework of existing conceptual models of information seeking, such as Carol Kuhlthau's Information Search Process (ISP) model.⁵⁸ The ISP model, for example, illustrates information users' cognitive, affective, and behavioral developments over time during the entire information search and library research process. Using this model, librarians could teach students that most library users experience the cognitive uncertainty and emotional ups and downs during their research process. Librarians could also encourage students to approach library and information systems with positive attitudes and with confidence in their own critical thinking abilities, motivate students to apply systematic thinking skills, and stimulate students' intellectual curiosity in the context of information seeking and use. By incorporating these critical thinking dispositions as an important learning component, academic librarians could help to dissipate students' feeling of uncertainty and confusion that are encountered during their library use process.

Nonetheless, our findings and above claims cannot be generalized to undergraduate students because the present study was conducted to graduate students only. Among graduate students, we found that weak critical thinking dispositions in the areas of self-confidence, inquisitiveness, and systematicity were particularly associated with high levels of library anxiety. It would be interest-

ing to learn if the same pattern could be observed among undergraduate students. If not, what would be different sets of dispositions that are associated with library anxiety among the undergraduates? This question can be answered by replicating this study with undergraduate students for whom diverse information literacy education programs are offered by academic libraries.

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