



5-2012

Thinking and Reading Among College Undergraduates: An Examination of the Relationship between Critical Thinking Skills and Voluntary Reading

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Recommended Citation

Hawkins, Kimberly Tanner, "Thinking and Reading Among College Undergraduates: An Examination of the Relationship between Critical Thinking Skills and Voluntary Reading." PhD diss., University of Tennessee, 2012.
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I am submitting herewith a dissertation written by Kimberly Tanner Hawkins entitled "Thinking and Reading Among College Undergraduates: An Examination of the Relationship between Critical Thinking Skills and Voluntary Reading." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Higher Education Administration.

Norma T. Mertz, Major Professor

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**Thinking and Reading Among College Undergraduates: An Examination of the
Relationship between Critical Thinking Skills and Voluntary Reading**

A Dissertation Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Kimberly Tanner Hawkins

May 2012

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Dedication

This dissertation is dedicated to the memory of my father-in-law, Dr. Merrill M. Hawkins, Sr., whose family expected him to end his education after the 8th grade to work on their farm. But because of his unyielding sense of curiosity and his love of learning, he refused to drop out of school and persisted in his pursuit of more education. He was a joy to know, a true gentleman and a scholar, and he continues to inspire me, even 10+ years after his passing from this life.

Acknowledgements

Dissertations take a village, and I am most grateful to the people in mine. First, I must thank Dr. Norma T. Mertz, whose high expectations, unwavering honesty, and never ending patience made me a better thinker. “I love you” is not a very academic phrase, but neither is “I’d take a bullet for you,” and although either one applies, I am at a loss for better words so I will simply say thank you. Thank you for the tireless hours you dedicate to your students. You are a model to emulate; if I can give to my students a fraction of what you have given to yours, I will be successful beyond measure. And to the rest of my committee—Dr. Grady Bogue, Dr. Dick Allington, and Dr. Stergios Botzakis (a.k.a. Sterg)—you are, without doubt, the best committee in the history of the institution. Thank you for serving on my committee and for being on my team; you are invaluable mentors, and I am forever grateful.

Thank you, Cary Springer, for helping make sense out of the data. You make statistics more fun and interesting.

Thanks to the Office of Financial Aid for allowing me to serve as your graduate assistant for three years. I learned so much from you and appreciate the friendships I gained and the memories I made; you are a hard-working bunch, and I respect you greatly! Thanks especially to Betty “Boop” Hughes for making countless trips with me to the library and helping me carry tons of books.

To the Quad—Edee, Les, and Sarah—you are arguably the best gift of my graduate school experience. Together we have lost hours of sleep, read and discussed countless pieces of scholarship, and “studied” at various Knoxville establishments. We have been with each other during life-changing events. We have cried together; we have laughed together, and we have

more inside jokes than I can even begin to count. You are the kind of friends that last a lifetime, and I look forward to making more memories with you in the future. I love you, friends!

Thank you to my dear friend, Susan, who practically helped raise my children when I was attending night classes and my husband was teaching at night. I remember discussing the possibility of graduate school, and you said, “Do it, and I will help with your kids!” You have encouraged me every step of the way, and I am thankful for you.

I also want to give a shout-out to Dr. Sharon Teets, my boss, colleague, mentor, and friend. Thank you for suggesting a topic that not only was interesting but was one I could stay married to until the end (and I’m not planning a divorce even now that it’s done; I still find it fascinating). Thank you for giving a fresh set of eyes to parts of my dissertation and for your candid suggestions; you helped me when writer’s block was kicking in. Thank you for your help in data collection, for administering the surveys and the critical thinking test more times than you care to remember. When one person quipped that I owed you a kidney, he was not far off; however, since my kidneys have been overworked with five years of late nights and ungodly amounts of caffeine, I will look for something more valuable to bequeath to you.

Thank you to the English faculty at “Mt. English College.” You know who you are. Thank you for arranging your schedules to accommodate me and for encouraging your students to participate in my study. Your class time is valuable; thank you for sharing it with me.

I want to thank my family. To my parents, Doug and Joyce Tanner—you have believed in me from the time I was a little girl, and this degree was no exception; after all these years, thank you for still being in my corner. Mom, thanks for help with the data entry and for entertaining the heck out of me with your comments! To my sister, Sharla, thanks for listening to me drone on and on about my study and for your insights into the reading process; we know

the value of a “free nights and weekends” cell phone package, don’t we? Thank you to my mother-in-law, Carrie Hawkins—I know you appreciate the process of doctoral work since you typed a dissertation years ago on a manual typewriter—thank you for not ever telling me how easy I had it even though it is probably the truth. Thank you all for your love and support!

Thank you to my brothers and my other family and friends. I am blessed to have too many to name here. Thank you all for your words of encouragement, phone calls, e-mails, and hugs.

Thanks most of all to my three favorite people on planet Earth—my children, Anna Lee, and Conner, and my husband, Merrill “Mel” Hawkins, Jr. Anna Lee and Conner, you are hands-down, the greatest kids in the world. Thank you for your patience and understanding while I completed graduate school. Guess what? I am done! I pledge to do my best to be at all of your events from this day forward. I am so proud of you, and I love you both more than you will ever know! Mel, you are a scholar in your own right. Thank you for your love, encouragement, support, and for everything you have done to help. From reading, editing, and giving feedback, to listening to me think aloud, to playing the role of counselor and friend, to being the best “Mr. Mom” in the world, you have done it all. You have been my biggest supporter, encourager, and friend. To say that I could not have done it without you is an understatement. Thank you for loving me unconditionally. I love you!

Abstract

Many scholars have weighed in on what it means to think critically. Although there has not been agreement on a clear definition for the term “critical thinking,” scholars have agreed on some common skills involved in critical thinking. These skills—inductive reasoning, deductive reasoning, analysis, evaluation, and inference are the same ones involved in the ability to read and read well. While many studies have involved critical thinking in college students, none has examined critical thinking and its relationship to reading. Thus, the purpose of this study was to determine the relationship among voluntary reading, academic achievement (as measured by GPA), and critical thinking skills among undergraduate students.

A quantitative research design involved 119 students at a private, denominationally-affiliated liberal arts college in the South. Students in seven sections of undergraduate English completed the *Survey of Recreational Reading Habits, Revised* as well as the *California Critical Thinking Skills Test (CCTST)*.

Critical thinking was operationally defined by the total score on the *CCTST*, and it was studied more closely by examining scores on its five sub-scales. Voluntary reading involved four variables: 1) the number of hours spent per week on voluntary reading while college classes are in session, 2) the number of hours spent per week on voluntary reading during vacation breaks from college, 3) the frequency of reading books, and 4) the frequency of reading non-book items.

Statistical analyses yielded the following results: 1) there was a significant, positive relationship between critical thinking and voluntary reading; 2) gender and class standing did not make a significant difference in critical thinking score; 3) there was a significant, positive relationship between college GPA and each score on the *CCTST* (total score and all five sub-

scores); and 4) there was a significant, positive relationship between voluntary reading and college GPA.

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Chapter One

Background and Context

American businessman and publisher, Malcolm S. Forbes said, “Education’s purpose is to replace an empty mind with an open one” (Foundation for Critical Thinking, 2009). While leaders in higher education may argue the true purpose of education, most, if not all, agree that a college graduate should be able to think. Thinking in and of itself is not enough; however, the ability to think critically has become crucially important. In a world of global competition and an age of scams, identity theft, and the information highway, critical thinking has become important for life success (Huitt, 1999; Thomas & Smoot, 1994). Technological advances in this new information age require individuals with flexible intellectual skills, and “good critical thinking . . . is very important in the fast-changing workplace” (Lau & Chan, 2004, p.1). Supporting this, the Partnership for 21st Century Skills (2004), a national organization that provides resources to the U.S. education system, has identified critical thinking as a necessary skill for all students.

In addition to critical thinking, the unique character of the information age has sparked concern about other aspects of student life. In this fast-paced age—where students’ lives revolve with the rhythm of the World Wide Web, where the Internet (Facebook, Twitter, blogs, etc.), television, and various electronic devices seem to be the leisure activities of choice—concern has been raised that students no longer choose to read as a pastime (NEA, 2007; Stewart, 2008). Students choosing not to read for pleasure is alarming because many respected scholars in the field of literacy (e.g., Allington, 2009b; Cunningham & Allington, 2010; Heibert & Martin,

2009; Krashen 2004) have affirmed a relationship between the reading skills of students and the amount of independent reading in which they engage.

While students' reading skills and habits are important at all stages of the development from pre-kindergarten to college and beyond, recent discussion has focused on college students' reading habits (e.g., Gallik, 1999; Marra & Witteveen, 2005; NEA, 2007). Further, employers hiring college graduates rank reading as a necessary skill for the workplace; however, they have expressed concern because it is among the top deficiencies of new hires (Casner-Lotto & Barrington, 2006).

This chapter looks at the background of critical thinking and explores its relationship to reading, two important skills for college students in the new millennium. Additionally, it considers the importance of reading by college students and the interplay of voluntary reading (also referred to as reading for pleasure) and critical thinking. This chapter also outlines the basic components of the proposed study: the problem, the purpose of the study, and the research questions, and addresses the theoretical framework for and significance of the study, defines terms, and lays out the organizational structure of the study.

Critical Thinking – Necessary for Global Competition

For years, educators have discussed critical thinking extensively (e.g., AACU, 2008; Arons, 1985; Bloom 1987; Dressel & Lehmann, 1965; Ennis, 1962; Frederickson & Mayer, 1977; Gallik, 1999; Paul, 1997; Sternberg, 1987; Terenzini, Springer, Pascarella, & Nora, 1995), and scholarly discussion regarding critical thinking in American higher education has continued unabated since the 1980s. Although educators have failed to agree on exactly what it means, there is widespread agreement that students should be able to do it. For example, over 25 years ago, the National Institute of Education (1984) suggested that the best college education is one

that “enable[s] students to adapt to a changing world” (p. 43), and “successful adaptation to change requires the ability to think critically...” (p. 43). Following this pronouncement, scholarly discussion regarding critical thinking escalated. The *National Forum* devoted an issue (vol. 65, no. 1) to critical thinking and *Educational Leadership* devoted three issues to the topic (vol. 42, no. 1; vol. 42, no. 3; & vol. 42, no. 8). And over the next five years, many scholars discussed the need and importance for critical thinking among college students (e.g. Arons, 1985; Garver, 1986; Paul, 1989; Pintrich, 1988; Sherman, Armistead, Fowler, Barksdale, & Reif, 1987). The failure to agree on a single definition of what it means to think critically (e.g., Ennis, 1989; McPeck, 1990; Sternberg, 1987) amid the growing importance of critical thinking, led Peter Facione to bring together an international team of 46 educators in 1990, to develop an expert consensus regarding critical thinking, and the results of this Delphi panel will be discussed in Chapter Two.

The importance of critical thinking has steadily grown over time, but why such concern for critical thinking, and what led to its continuous discussion? While the notion of critical thinking dates back to the Greek philosophers, many educators agree that Robert Ennis reignited the interest in critical thinking in his 1962 article in the *Harvard Educational Review* (Thayer-Bacon, 2000). In this article, Ennis (1962) explained that he was writing to fill a gap in the literature regarding thinking. Where the fields of education and psychology had given attention to thinking itself, the concept of *critical thinking* had been neglected; hence, he attempted to conceptualize critical thinking. He proposed 12 aspects of critical thinking and went on to describe an elaborate system of applying criteria to each of these 12 areas. Although the ideas proposed by Ennis seem innocuous enough, Thayer-Bacon (2000) suggested that the Ennis article resonated strongly because it premiered against the backdrop of the Communist threat,

and many Americans at the time viewed critical thinking as “an invaluable tool necessary to protect us from indoctrination and help us determine truth and justice” (p. 1).

To fully comprehend the impact of Ennis’ article in the academic world requires a brief look at what was going on in the United States at the time. When Ennis’ article appeared, the United States was engaged in the Space Race with the Soviet Union; each of these countries wanted to be the first nation to successfully land a person on the moon. Five years before the Ennis article, the Soviets had launched Sputnik, which brought to Americans the sobering possibility of a nuclear missile attack (Randall, 1961). Suddenly, the United States felt vulnerable; students must be educated to their fullest potential as it was a matter of national defense. As a direct result of the nation’s feelings after Sputnik, Congress passed The National Defense Education Act (Flemming, 1960). Better educated students would be a weapon to defend the nation: “The Congress hereby finds and declares that the security of the Nation requires the fullest development of the mental resources... of its young men and women...” (NDEA, Section 101). The federal government allocated \$21 million (NDEA, 1958) in an effort to ensure that American students would use their mental resources to compete globally and resist totalitarianism (Flemming, 1960). Thus, the idea of “mental resources” was fresh when the Ennis article appeared regarding critical thinking; good students—more specifically, students who were good thinkers—would ensure the United States as a sound contender in global competition.

The United States was determined to produce students who could use their mental resources to compete globally, and scholars have noted throughout decades since (e.g., Dressel & Lehmann, 1965; Giroux, 1994; Marshall & Tucker, 1993; Newell & Davis, 1988), that the best education is one that incites good thinking. The notion of mental resources and global

competition did not end after the National Defense Education Act nor when the United States won the race to the moon. In fact, the idea and concern for global competition extended into the following decades. For example, *A Nation at Risk* (National Commission on Excellence in Education, 1983) pointed to academic underachievement on a national scale; students from other countries were increasingly outperforming American students. Also, because of increasing globalization, the National Center for Education Statistics (NCES) started collecting data in 1988 to examine how students in the U.S. compare to students in other countries (Salganik, Phelps, Bianchi, & Nohara, 1993). Year after year, American students failed to measure up to their peers in other countries (e.g., Baldi, Khalaf, Perie, & Sherman, 2000; NCES, 1996; NCES, 2004; Phelps, Smith, & Alsalam, 1996; Salganik, et al., 1993). Not only was the United States lagging with regard to quality, they also failed to measure up with respect to quantity; for example, in 2004 over 20 million students in China were enrolled in college (Center for International Studies, 2010) compared to some 17 million students in the United States (NCES, 2009). In every respect, it appeared that American students were not measuring up; hence, the ever important need for better thinkers.

Not only has the idea of global competition caused the United States to recognize the importance of mental resources, scholars (e.g., Casner-Lotto & Barrington, 2006; Halpern, 1999; Wagner 2008) have explained that raw knowledge is not enough when it comes to mental resources; students must be able to think critically, and a focus on thinking has become standard in K-12 curriculum. For example, in the field of mathematics, it is no longer enough for a student to be able to perform calculations and arrive at an accurate answer; critical thinking requiring application and multi-step problem solving has become a central focus of mathematics

education, and global competition is cited as the catalyst (NCES, 1996). Our students must be able to think critically, it is perceived, in order for our country to compete on a global scale.

Critical Thinking – The Skills Involved

While scholars fail to agree on a single definition of what it means to think critically, there is some agreement with regard to what skills are involved in critical thinking. For example, consider the four most widely used tests of critical thinking in higher education: Two of the *Cornell Critical Thinking Test, Level X* (Ennis & Millman, 1985a) and *Level Z* (Ennis & Millman, 1985b), *The California Critical Thinking Skills Test, College Level* (Facione, 1990a), and the *Watson-Glaser Critical Thinking Appraisal* (Watson & Glaser, 1980). Each of these tests is commonly used to assess critical thinking skills in college students.

The writers of these four commonly used tests agree upon some of the skills involved in critical thinking. Each of these four critical thinking assessments measures inductive and deductive reasoning, and each test involves analysis and evaluation (Ennis, Millman, & Tomko, 2005; Facione, 1990a; Watson & Glaser, 1980). The *California* (Facione, 1990a) and *Watson Glaser* (Watson & Glaser, 1980) tests require inference, while the authors of the *Cornell* state that their approach to critical thinking involves three types of inferences (Ennis et al., 2005). And although these skills are explicitly stated in these tests, it is likely that the test-makers further agree regarding other skills that are involved in critical thinking. Facione (1990a) pointed out that critical thinking skills function interactively with one another—for example, someone might employ analysis in order to infer—implying that it is difficult to separate and label skills individually. In addition to being tested in the most commonly used critical thinking tests, these five skills occur

repeatedly throughout the critical thinking literature (e.g., AACU 1985; Cottrell, 2005; Ennis, 1962; Facione, 1990c; NIE, 1984). While scholars' beliefs about what is involved in critical thinking will be more fully explored in chapter two, it is easy to see that they clearly agree on at least five skills—inductive reasoning, deductive reasoning, analysis, evaluation, and inference.

Reading Skills

The five skills on which critical thinking researchers agree also commonly appear in the literature regarding reading. What is relevant to this study is that these critical thinking skills—inductive reasoning, deductive reasoning, analysis, evaluation, and inference—are related to what we know about some of the skills underlying reading. More discussion of reading skills will follow in Chapter Two, but clearly, these two different bodies of scholarship, critical thinking and reading, share several common skills with one another. Thinkers use these skills interchangeably in order to think critically, much in the same way that good readers use them in order to comprehend. But are these two phenomena related to another? Are good readers necessarily critical thinkers, or are critical thinkers necessarily good readers? These questions speak to the larger, more overarching question; and that is, what does the research say about the correlates of critical thinking? And it is to that discussion which we now turn.

Critical Thinking – Correlates

Critical thinking has been found to correlate with SAT scores and college GPA. Several studies (Ennis et al., 2005; Tiessen, 1987) have found a positive relationship between critical thinking and SAT math scores of nursing students, while Jacobs (1995) found a positive relationship between SAT verbal scores and critical thinking skills of first year students. In

addition, several studies found a positive relationship between college GPA and critical thinking skills (Bataineh & Zghoul, 2006; Facione, 1990a; Facione & Facione, 1997; Tiessen, 1987).

In an examination of learning styles, Myers and Dyer (2006) determined that students who were abstract sequential learners scored significantly higher on critical thinking than students with other learning styles. Sequential learners are those who organize their materials. They employ some type of filing system, whether they file materials alphabetically or stack them in neat piles. Abstract learners, Myers and Dyer explained, do not live in a world where everything is black and white. Abstract learners possess the ability to see things in shades of gray.

Terenzini et al. (1995) determined that attending college and its attendant experiences were positively correlated with critical thinking, and this included both in class and out of class experiences. In addition, they found a positive correlation between critical thinking and the amount of time spent studying.

The amount of college a person completes is related to his or her critical thinking skills. McMillan (1987) examined students who had graduated and found that college graduates scored higher in critical thinking than non-college graduates. While an undergraduate degree makes a difference in critical thinking, a graduate degree has an even greater impact. In a study by Onwuegbuzie (2001), doctoral students scored significantly higher than master's students on critical thinking tests.

Not only is critical thinking correlated with various aspects of academic life, it is also correlated with social aspects of student life in higher education. Gellin (2003) identified a relationship between student involvement and critical thinking. He examined the effect of Greek life, clubs and organizations, faculty interaction, peer interaction, living on campus, and

employment on critical thinking. When he combined all of these activities, Gellin found that students involved in these activities scored higher on critical thinking than those not involved.

In addition to these aspects of higher education—entrance exams, college GPA, learning style, college experience, time spent studying, amount of college completed, and social involvement in college—several researchers conducted studies regarding college students and reading. Farley and Elmore (1992) reported a relationship between college students' critical thinking and reasoning in reading. In addition to establishing a relationship between critical thinking and reasoning in reading, a positive relationship has been found between critical thinking and the number of non-assigned books read (Terenzini et al., 1995). That is, the more non-assigned books college students choose to read, the higher the critical thinking score.

Well-Rounded Students

In addition to producing graduates who can think critically and read with comprehension, colleges and universities are expected to produce well-rounded individuals (AACU, 2008; Humphreys, 2009). While leaders in higher education may debate the necessary characteristics required for well-roundedness, most would agree that one who reads for pleasure is a desirable attribute of well-roundedness. Institutions of higher learning engage in many activities that point to the fact that voluntary reading is valued. For example, many colleges and universities have begun book clubs. Princeton University (2010) explains that it has “joined Oprah and just about everybody else” (p. 1) in creating a book club. And at the University of Tennessee Knoxville, incoming students are encouraged to read a common book before arriving on campus and come together for discussions, lectures, movies, and exhibits throughout their first year related to the book (UT Knoxville, 2010).

Not only does reading for pleasure contribute to forming a well-rounded college graduate, reading has long been considered part of a liberal arts education (Lagemann, 2003). Although course offerings vary at individual campuses, reading remains at the heart of a college education. Reading is the common strand that ties together the various disciplines; it is the skill through which students can engage in lifelong learning. Schneider (2005) explained that where liberal education formerly followed a model of depth and breadth, the new vision focuses on “intellectual practice, engagement, and integration across the entire curriculum” (p. 15). Again, reading itself is the common skill found in each area of the curriculum and a key player in integration across the curriculum.

Voluntary Reading

Reading has long been considered a scholarly pastime and recent discussion has focused on students’ reading habits (e.g., Gallik, 1999; Marra & Witteveen, 2005; NEA, 2007). In a technological age, where television and Internet seem to be the leisure activities of choice, concern has been raised that students are no longer choosing to read as a pastime (NEA, 2007; Stewart, 2008). Parents and teachers can ensure leisure reading by younger students; however, pleasure reading has declined significantly among college students in recent years (NEA, 2007).

Voluntary reading among college students has been shown to have a positive relationship to academic achievement in college; that is, the more time college students spend reading in their spare time, the higher their GPA (Gallik, 1999). However, college students have reported that they do not have time to read for pleasure, explaining that the reading load required for coursework allows no extra time for leisure reading (Strauss, 2005). Whether students choose to read, as well as how much and how often they read, is of great concern for a number of reasons. Students who read more possess stronger reading skills, and the opposite holds true; students

who read less have weaker reading skills (Cunningham & Allington, 2010; Hiebert, 2009). A recent report by the National Endowment for the Arts (2007) suggested that voluntary reading powerfully transforms the lives of individuals; those who spend time in recreational reading are much more likely to be successful both academically and economically. Reading comprehension is the number one basic skill desired by employers (Casner-Lotto & Barrington, 2006), and reading for pleasure improves the ability to read for comprehension (Allington, 2009b; Gallagher, 2009; Hiebert, 2009; Krashen, 2004).

Critical Thinking and Voluntary Reading

Critical thinking and reading have five core skills in common, and the research on critical thinking and reading among college students is vitally important to leaders in higher education. With corporate world's high expectations for colleges to produce well-rounded, critical thinkers, scholars have invested a great amount of time researching college students' critical thinking (e.g., Bauwens & Gerhard, 1987; Cook, et al., 1996; Daud & Husin, 2004; Denial, 2008; Fero, Witsberger, Wesmiller, Zullo, & Hoffman, 2009; Gellin, 2003; McMillan, 1987; Myers, & Dyer, 2006; Onwuegbuzie, 2001; Profetto-McGrath, 2003; Quitadamo & Kurtz, 2007; Tiessen, 1987). Not only have scholars spent a great deal of time examining college students' critical thinking, researchers have also been interested in college students' reading and its relationship to critical thinking (e.g., Farley and Elmore, 1992; Terenzini et al., 1995). Although these studies have linked critical thinking to reading, and voluntary reading to comprehension, no one has examined the possible relationship between critical thinking skills and the amount of time spent in voluntary reading

Is it possible that these two—critical thinking and voluntary reading—might be related? Might it be that those who engage more in voluntary reading possess higher critical thinking

skills? Well-known literacy scholar, Stephen Krashen (2004) thinks the answer is yes. In an attempt to make a case for more voluntary reading, he said that “good thinkers, however they are defined, read a great deal and have read a great deal” (p. 36.). If Krashen is correct, that these two are related, a decline in voluntary reading could foretell a decline in critical thinking, a vitally important skill. Further, if voluntary reading is a correlate of critical thinking, then nurturing voluntary reading is a potentially effective way to develop critical thinking skills at all levels of schooling. Allington (2009a) stated that the issue is not that students are illiterate but that they are *aliterate*; that is, they know how to read, but they choose not to.

Statement of the Problem

Higher education is being called upon to increase critical thinking among its graduates. While we know some of the correlates of critical thinking, many remain unidentified. Although a few studies have examined the relationship between critical thinking and reading (e.g. Farley & Elmore, 1992; Terenzini et al., 1995), and one study has examined the relationship between pleasure reading and college GPA (Gallik, 1999), none has examined the relationship between critical thinking and voluntary reading.

Purpose of the Study

The purpose of this study was to determine the relationship among voluntary reading, academic achievement (as measured by GPA), and critical thinking skills among undergraduate students.

Research Questions

1. Is there a relationship between voluntary reading and critical thinking among undergraduate students?
2. Do class standing and gender make a difference in the relationship?

3. Is there a relationship between critical thinking and academic achievement among undergraduate students?
4. Is there a relationship between voluntary reading and academic achievement among undergraduate students?

Conceptual Framework

Opportunity to Read (OTR), a theoretical perspective on reading experience proposed by Hiebert and Martin (2009), provides the conceptual framework for the study. OTR “refers to occasions when students encounter texts and have some form of responsibility (self- or other-imposed) for the encounter” (Heibert & Martin, 2009, p. 4). Students take responsibility for all aspects of their voluntary reading; they decide whether to read, what to read, how long to read, and what thoughts to engage about the reading, if any. This study will examine that aspect of college students’ opportunity to read involving self-imposed responsibility, which occurs when they engage in voluntary reading.

The OTR framework is new and has yet to be used as a framework to guide other studies. Nevertheless, it provides the conception for examining the link among college students’ voluntary reading habits, their critical thinking skills, and their academic achievement (college GPA), thereby providing the link between existing and needed knowledge. The framework contributed to the overall idea of the study, to forming the research questions, and to shaping the survey instrument employed in this study.

Significance of the Study

Given that the relationship between undergraduates’ critical thinking skills and the amount of time spent in voluntary reading has not been examined, this study will provide information that currently does not exist. Gallik (1999) is the only researcher to date who has

examined voluntary reading in college students. She found a relationship between academic achievement and amount of time spent in voluntary reading, which Gallik referred to as reading for pleasure. This study will determine if Gallik's findings regarding college GPA and pleasure reading hold true for a different population. Additionally, the study will address a gap in the literature by including the additional data point concerning critical thinking.

This study will contribute to the literature in critical thinking as well as add to the conversation regarding the decline in voluntary reading. Since higher education is being called on to increase critical thinking among its graduates, this study will provide much needed insights into the concept; these insights will enlighten those who are involved in planning curriculum and setting goals for undergraduate learners. These new insights will equip higher education leaders with additional information regarding the complex concept of critical thinking and will assist those who are charged with the goal of directly teaching these skills to students.

In addition to contributing to the literature regarding voluntary reading and critical thinking, the study will offer additional insights for the OTR framework. Hiebert and Martin (2009) pointed out that more research is needed in order to offer a comprehensive framework for OTR. The findings of this study will offer additional insights for the portion of the model regarding the self-imposed responsibility of reading and its outcomes.

Definitions

Voluntary Reading – This study borrows the definition from Gallik's *Survey of Recreational Reading Habits* (see Appendix A), which is time spent on reading that is not required for classes. Gallik used the terms "pleasure reading" and "recreational reading" interchangeably. For this study, the terms voluntary reading, pleasure reading, reading for pleasure, leisure reading and recreational reading are synonymous.

Critical Thinking – While there are various definitions and dispositions associated with critical thinking, which are discussed in Chapter 2, the definition used in this study is the one developed by a Delphi panel of international experts, who were brought together to develop a consensus definition of critical thinking. This panel defined critical thinking as “purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based” (Facione, 1990c, p. 3). For this study, it is operationally defined by scores on the *California Critical Thinking Skills Test*.

Academic Achievement – For purposes of this study, academic achievement is defined as the student’s cumulative college GPA.

Organization of the Study

The study is presented in five chapters. The first chapter serves as an introduction to the study. It provides a context for the study and explains the rationale behind the study. It states the problem and purpose of the study, identifies the research questions, and explains the theoretical framework guiding the study. Additionally, it explains the significance of the study. The second chapter offers a critical review of the literature relevant to the study. It includes an extensive review of the literature regarding students’ voluntary reading as well as critical thinking and the instruments used to assess critical thinking. Chapter three provides a detailed description of the methods and procedures used in the conduct of the study including the research design, limitations and delimitations, site and population, instrumentation, data collection procedures and analysis. Chapter four outlines the findings, and the final chapter reviews the study, provides a summary and conclusion of the findings, discusses the implications of the findings, and concludes with recommendations for further research.

Chapter Two

Literature Review

The purpose of the proposed study is to determine the relationship among voluntary reading, academic achievement, and critical thinking skills among undergraduate students. Critical thinking has long been a topic of discussion among leaders in higher education and even gained attention at the national level when Congress identified critical thinking as a goal for all students (*Goals 2000*, 1994). While scholars have yet to agree on a clear definition for what it means to think critically, they agree upon some of the skills involved in critical thinking, and these skills are also involved in the ability to read and read well. Reading has long been considered a scholarly pastime, and recent discussion has focused on students' reading habits, especially since reading comprehension has been identified by employers as the number one basic skill desired for college graduates (Casner-Lotto & Barrington, 2006). In a technological age, where television and Internet seem to be the leisure activities of choice, concern has been raised that students are no longer choosing to read for pleasure (NEA, 2007; Stewart, 2008).

This chapter provides a critical review of the literature relevant to the study. The discussion of this literature is organized into four sections: (a) scholars' beliefs about critical thinking, (b) critical thinking among college undergraduates, (c) voluntary reading among college undergraduates, and (d) Opportunity to Read, the contextual framework guiding the study.

Scholars' Beliefs about Critical Thinking

From the ancient Greeks to the writers of modern day critical thinking exams, history is replete with researchers who have weighed in on the topic of critical thinking. A thorough discussion of the many ways in which critical thinking has been conceptualized would be a

volume in and of itself; however, the topic of this study merits a brief examination of ideas from some of the leading scholars in critical thinking. These ideas provide a backdrop for beginning to think about critical thinking as it relates to this study.

A century ago, John Dewey (1910) argued for a model of thinking based on a theory of knowing that is continuous. Dewey used the term “reflective thinking” and explained that each thought determines the next. Each thought grows out of another and supports another, and all of these thoughts connect like a train to form a continuous series of reflections. Following in the vein of pragmatists who went before him, Dewey believed that thinking is connected to individual experiences, which lead to action and the results of that action.

Somewhat like Dewey, philosopher Harvey Siegel (1988) believed that critical thinking resulted in action. Siegel, however, supported the idea of two dimensions of critical thinking, stating that a critical thinker is “one who is appropriately moved by reasons” (p. 32). His definition, then, consists of two dimensions—a reason assessment component and a critical attitude component. The reason assessment component involves the critical thinker being able to understand and put into practice the principles governing the assessment of reasons, where the critical attitude component implies that the critical thinker embodies certain dispositions and habits of the mind. Siegel called it a “critical spirit” (p. 39).

Not completely in disagreement with Siegel but adding another angle is Canadian philosopher John McPeck. With his publication of *Critical Thinking in Education*, McPeck (1981) started a heated debate among critical thinking scholars. He defined critical thinking as “the appropriate use of reflective skepticism that is necessarily linked with specific areas of expertise and knowledge” (p. 19). The controversy in his definition was twofold. First, McPeck’s definition has been criticized for being too negative (Ennis, 1993). Second and more

hotly debated, McPeck argued that critical thinking was subject-specific; in doing so, he singlehandedly instigated the subject-specific/generalist debate. His definition contrasted sharply with that of Robert Ennis, respected scholar and co-author of the *Cornell Critical Thinking Test* (Ennis, Millman, & Tomko, 2005), who argued for a “general approach” to critical thinking; that is, an approach to critical thinking where the focus is on critical thinking abilities and dispositions regardless of the subject matter (Ennis, 1989). McPeck contended that a person who was an excellent critical thinker in one subject might not necessarily be so in another. Not only did he argue for the subject specificity of critical thinking, he asserted that critical thinking cannot be taught because it requires an object. In order for critical thinking to occur, there must be something (an idea or an issue, for example) about which to think; therefore, a class on critical thinking is pointless because it cannot be taught as a general subject. Since it is necessarily linked with specific knowledge, it could only be taught within a specific discipline, and one must be well versed in and knowledgeable of a specific subject before one can be critical of it.

Where McPeck argued that critical thinking required specific knowledge about a particular topic, Goodwin Watson and Edward M. Glaser claimed that critical thinking required much more than content knowledge. Although Watson, Glaser, and McPeck all used the term *critical thinking*, they do not appear to be talking about the same concept. Where McPeck appeared to value discipline-specific knowledge, Watson and Glaser appeared to be talking more about critical thinking as a process. Watson and Glaser (1980) defined critical thinking as a combination of attitudes, knowledge, and skills. For Watson and Glaser, critical thinkers must possess attitudes of inquiry involving the ability to recognize problems and an agreement that evidence is needed to support what is claimed to be true. They must also possess knowledge of

the nature of valid inferences, abstractions, and generalizations. Finally, critical thinkers must be able to utilize skills in applying these attitudes and knowledge. Based on their conception of critical thinking, they developed one of the most widely-used and widely-cited tests of critical thinking, the *Watson-Glaser Critical Thinking Appraisal* (WGCTA).

Like Watson and Glaser, Robert Ennis agreed that critical thinking requires multiple attributes. Decades ago, Ennis (1962) defined critical thinking as “the correct assessing of statements” (p. 83)—a definition which he later admitted was too vague and likely excluded some creative aspects of critical thinking. Not only vague, the definition confused process with product; assessing statements is a process, and correctness is directly tied to the product—the critical thinking itself. He offered a refined definition years later: “Critical thinking is reasonable reflective thinking focused on deciding what to believe or do” (Ennis, 1993, p. 180). Ennis felt that even the refined definition needed elaboration. If a person is going to reasonably and reflectively decide what to believe or do, he or she must be able to do a host of things and must be able to do them interdependently. In explaining this refined definition, he outlined a list of 10 abilities required for critical thinking; Ennis said that critical thinkers must:

- Judge the credibility of sources.
- Identify conclusions, reasons, and assumptions.
- Judge the quality of an argument, including the acceptability of its reasons, assumptions, and evidence.
- Develop and defend a position on an issue.
- Ask appropriate clarifying questions.
- Plan experiments and judge experimental designs.
- Define terms in a way appropriate for the context.

- Be open-minded.
- Try to be well informed.
- Draw conclusions when warranted, but with caution (Ennis, 1993, p. 180).

Ennis noted that some abilities are interrelated. For example, open-mindedness might come into play when judging the credibility of a source. This inter-relatedness of abilities parallels his position that critical thinking is general, not subject specific (Ennis, 1989). Ennis' list of abilities is not to be confused with the lists of critical thinking dispositions. Other scholars in critical thinking agree that critical thinkers exhibit certain dispositions (e.g., Facione, 1990c; Paul 1993), and while the two are similar, Ennis distinguished between abilities and dispositions.

Like Ennis, Richard Paul (1993) subscribed to the notion that critical thinking is a general skill that can be applied across all disciplines. Paul, founder and director of the Center for Critical Thinking, is the person most credited with bringing to light the idea of dispositions in critical thinkers (Siegel, 1988). Many researchers agree with Paul that critical thinkers have certain dispositions to use their skills to think critically (e.g., Ennis, 1993; Facione, 2009; McPeck, 1981; Siegel, 1988).

Paul has been hesitant to pinpoint one particular definition of critical thinking, stating that the various dimensions of critical thinking cannot be pigeonholed into a single definition (Paul, Binker, Martin, & Adamson, 1989). Nonetheless, after 13 years of research at the Center of Critical Thinking and Moral Critique, Paul combined a multitude of research and outlined a complex definition. He said that he found critical thinking to be

a unique kind of purposeful thinking in which the thinker systematically and habitually imposes criteria and intellectual standards upon the thinking, taking charge of the construction of thinking, guiding the construction of the thinking according to the

standards, and assessing the effectiveness for the thinking according to the purpose, the criteria and the standards (p. 21).

Peter Facione, author of the *California Critical Thinking Skills Test*, also hesitated to define critical thinking. Like other scholars, Facione agrees that critical thinking involves a complex cognitive process and is associated with certain dispositions. When asked for a specific definition, he responded, “You do not really want a definition plopped on the page for you to memorize, do you? That would be silly, almost counterproductive. The goal here is to help you sharpen your critical thinking skills and cultivate your critical thinking spirit” (Facione, 2009, p. 3).

In 1993, however, he brought together an international team of educators to develop an expert consensus regarding critical thinking. The Delphi panel’s final “expert consensus statement regarding critical thinking and the ideal critical thinker” follows:

We understand critical thinking to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based. CT is essential as a tool of inquiry. As such, CT is a liberating force in education and a powerful resource in one’s personal and civic life. While not synonymous with good thinking, CT is a pervasive and self-rectifying human phenomenon. The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, openminded [sic], 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. Thus, educating good critical thinkers means working toward this ideal. It combines developing CT skills with nurturing those dispositions which consistently yield useful insights and which are the basis of a rational and democratic society (Facione, 1990c, p. 3).

The Delphi panel's definition contains more than a cognitive definition; it also contains characteristics of a critical thinker.

As explained in Chapter One, even though the concept of critical thinking varies, there is some agreement with regard to the individual skills involved. Five skills are tested in four commonly used tests of critical thinking in college students—two of the *Cornell Critical Thinking Test, Level X* (Ennis & Millman, 1985a) and *Level Z* (Ennis & Millman, 1985b), *The California Critical Thinking Skills Test, College Level* (Facione, 1990a), and the *Watson-Glaser Critical Thinking Appraisal* (Watson & Glaser, 1980). The five skills in these tests include inductive and deductive reasoning, analysis, evaluation, and inference.

The test used in this study, *The California Critical Thinking Skills Test, College Level* (Facione, 1990a), generates a sub score for each of these five skills and an overall score for critical thinking. Additionally, the construct of the *CCTST* is grounded in the consensus statement of the Delphi Panel.

Reading Skills

The five skills on which critical thinking researchers agree also commonly appear in the literature regarding reading. What is relevant to this study is that these critical thinking skills are related to what we know about some of the skills underlying reading. Similar to the way that critical thinking scholars do not agree on a clear definition of what it means to think critically, literacy scholars rarely agree on a clear definition of what it means to read;

however, they all seem to agree that reading requires thinking. For example, Snow, Burns, and Griffin (1998) implied that reading requires thinking when they depicted it as a cognitive activity. Similarly, Harris and Hodges (1981) described reading as a set of decoding and thinking skills necessary to understand text, and Cunningham and Allington (2010) explained that thinking is the goal of reading. More recent definitions involve advances in technology and claim that reading includes thinking skills necessary to acquire information from various forms of technological mediums (Hobbs, 2005; Messaris, 2005).

Not only do literacy scholars agree that reading requires thinking, but they agree that the goal of reading is understanding—to gain meaning from the printed word (Harris & Hodges, 1981). The same skills commonly found in critical thinking— evaluation, analysis, inference, inductive reasoning, and deductive reasoning—are used by the reader in a cognitive balancing act in order to comprehend printed information.

Evaluation. In this orchestration of skills called comprehension, Pressley (2002) noted that good readers employ the skill of evaluation in a variety of ways. First, good readers make predictions and hypothesize about the text both before and during their reading. As they proceed through the text, they evaluate these hypotheses as they come to understand the written word. Second, good readers apply evaluation in another way; they form opinions about the text based on their evaluations, and they evaluate arguments in the text, determining if these arguments are plausible. Third, good readers evaluate the quality of the writing in the text as well as the content.

Analysis. In addition to evaluating, good readers make use of the skill of analysis. For example, readers analyze the text, working to put together the ideas presented in the text in order to gain the main idea of the author’s message (Pressley, 2002). Additionally, a

great deal of literacy research refers to analysis in word-attack strategies; that is, analyzing parts of words in order to determine the meaning of individual words. For example, readers can analyze words by segmenting them into syllables and sounds (Lie, 1991), or they can analyze the meaningful parts of words and use context clues in order to infer meaning (Nagy & Anderson, 1984). Similar to the way that critical thinking skills overlap and are used interchangeably (Facione, 1990a), so too are the skills involved in reading; hence the combination of analyzing and inferring—the use of word analysis in order to infer meaning.

Inference. Like critical thinking, literacy scholarship is replete with discussions about and references to the skill of inference, or inferencing as it is commonly referred to in the field of literacy (e.g., Dennis, 2009; Dunston, 2007; Schiff & Calif; 2004). In fact, the ability to infer is considered a fundamental element of reading, and the skill of inferencing is so imbedded in reading that it is rare to find a discussion about reading that does not mention the ability to infer. The most recent National Assessment of Adult Literacy (Baer, Kutner, & Sabatini, 2009) sought to measure functional literacy in the United States; that is, the ability to use printed information to function in society. When reporting the results of this study, researchers made it a point to distinguish between the main literacy assessment and various core literacy tasks, such as underlining a sentence in a paragraph. Researchers noted that the core tasks “required little or no inference on the part of the respondent” (p. 2). In other words, the main literacy assessment—the part involving actual reading—was the part that required inference. Simply stated, reading involves inferring; readers make inferences as they identify information in a text (Pressley, 2002).

Inductive and deductive reasoning. Not only does reading involve evaluating, analyzing, and inferring, it involves reasoning. In fact, nearly four decades ago, R. L. Thorndike

(1973) argued that reading ability was an indicator of an individual's thinking and reasoning processes, an idea proposed by his father, E. L. Thorndike, 56 years earlier. The senior Thorndike (1917) stated that reading "includes all the features characteristic of typical reasoning" (p. 323). Where inductive and deductive reasoning are described as separate skills in critical thinking (Ennis et al., 2005; Facione, 1990a; Watson & Glaser, 1980), literacy scholars tend to discuss reasoning in general without separating it into sub skills. Much like inference, literacy scholarship is flooded with references to reasoning (e.g., Alexander & Jetton, 2000; Davis, 1972; Duffy, et al., 1987; Garnham & Oakhill, 1996; Kavale & Schreiner, 1979).

Critical Thinking Among College Undergraduates

Sub skills notwithstanding, critical thinking has been identified as a goal for college graduates (*Goals 2000*, 1994). And regardless of how this phenomenon has been defined, a multitude of research has examined the relationship of critical thinking and various aspects of higher education. Although the literature regarding critical thinking in higher education is vast and much too large to cite here, the findings of some of the studies are salient to the focus of this study. For instance, this study seeks to determine the relationship between voluntary reading, academic achievement (as measured by GPA), and critical thinking skills; therefore, the literature that follows involves the studies that have examined these particular variables.

GPA and critical thinking. Several studies have reported the relationship between college GPA and critical thinking skills. These studies have included undergraduates as well as graduate students, and students in the United States as well as students in other countries. The findings point to a relationship between GPA and critical thinking regardless of the status of the student (graduate or undergraduate), regardless of the test used for critical thinking, and regardless of geographical location.

Facione and Facione. Critical thinking researchers Facione and Facione (1997) found a positive correlation between college GPA and critical thinking skills. These researchers collected data over a five-year period from 7,962 students in 50 nursing education programs in the United States. In comparing students' GPAs to their scores on the *California Critical Thinking Skills Test*, they discovered the higher the GPA, the greater the critical thinking skills.

Tiessen. In her study of undergraduate nursing students, Tiessen (1987) found similar results. She examined data from 150 students in a large metropolitan baccalaureate nursing program in the Midwest and also found a positive correlation between critical thinking skills and GPA. In her study, students who scored higher on the *Watson-Glaser Critical Thinking Appraisal* were the students with the higher GPAs.

Bataineh and Zghoul. A study in another country yielded similar results. Bataineh & Zghoul (2006) examined the critical thinking skills of Jordanian TEFL graduate students and also found a positive correlation between GPA and critical thinking skills. In this study of 50 students, the students with the higher GPAs scored better on the *Cornell Critical Thinking Test*.

Critical thinking and reading. In addition to the relationship between GPA and critical thinking, two studies—Farley and Elmore (1992) and Terenzini et al. (1995)—have examined the relationship between critical thinking and various aspects of reading. Part of the study by Farley and Elmore examined the relationship of reading comprehension and critical thinking, while Terenzini et al. examined the number of non-assigned books that students read as part of their study on the impact of various aspects of the first year college experience on critical thinking.

Farley and Elmore. Two decades ago, Farley and Elmore (1992) examined the relationship of reading comprehension to undergraduates' critical thinking skills, vocabulary, and

cognitive ability. This study involved 165 underachieving college freshmen at a large Midwestern state university who were identified as underachieving by virtue of their standardized reading test scores—they had scored below the 50th percentile on either the Nelson Denny Reading Test (Brown, Bennett, & Hanna, 1981) or the Iowa Silent Reading Test (Farr, 1973).

After administering a round of tests, Farley and Elmore used multiple regression analysis to determine relationships among the various sub-scores (the variables in their study) of the tests. Each of the 165 students took three tests—the *Cornell Critical Thinking Test*, Level Z (Ennis & Millman, 1985b), the *Developing Cognitive Abilities Test* (Beggs, Hawley, & Mouw, 1980), and the *Iowa Silent Reading Test* (Farr, 1973).

Among their findings, Farley and Elmore found a strong relationship between reasoning in reading, a subscale of the *Iowa Silent Reading Test (ISRT)*, and planning experiments, a subscale of the *Cornell Critical Thinking Test (CCTT)*. The test items for planning experiments required respondents to select a problem statement and reorganize it so that additional features were added. Farley and Elmore believed that the type of thinking required to score well on this section of the *CCTT* was parallel to the ability to recognize the main idea, a common reading skill that requires complex thinking (Brown & Day, 1983).

Terenzini et al. A study conducted by Terenzini et al. (1995) sought to examine the relationship of undergraduates' critical thinking skills to three different aspects of college life: curricular exposure, classroom and instructional experiences, and out-of-class experiences. One of the out-of-class experiences that was examined involved the number of non-assigned books that students read.

These researchers collected data as part of a national investigation of “the factors that influence learning, cognitive development and orientations toward learning in college” (Terenzini et al., 1995, p. 27) and surveyed roughly 4,500 first-semester students at a large, urban, Research I university in the Midwest. Students were recruited for the study via mail and in person at the pre-college orientation sessions. Those who participated received a stipend for four hours of testing in the fall and three and one-half hours of follow-up testing in the spring; although this study represented approximately 4,500 students, data were collected from a representative sample of 210 students.

In the fall, participants were surveyed regarding demographic data, and Form 88B of the *Collegiate Assessment of Academic Proficiency* (ACT, 1989) was administered. The following spring Form 88A of the *Collegiate Assessment of Academic Proficiency* (CAAP) and the *College Student Experiences Questionnaire* (Pace, 1984) were administered as well as an additional survey that aimed at assessing certain aspects of the first year of college that were not covered by the *College Student Experiences Questionnaire* (CSEQ).

The purpose of the study was to determine the extent to which critical thinking was shaped by students’ out-of-class experiences as well as their academic activities. The dependent variable, critical thinking, was determined by using the critical thinking module of the CAAP. After multiple regression analysis, only the variables that appeared to be statistically related to critical thinking were retained for further analysis. As a result, only two out-of-class experiences remained in the model: the number of non-assigned books read (during the first year of college) and relationships with other students. In the final analysis, relationship with other students actually showed a negative impact on critical thinking; however, the number of non-assigned

books read was “significantly and positively related to first-year gains in critical thinking” (Terenzini et al., 1995, p. 34).

While Terenzini et al. (1995) did not refer to the number of non-assigned books read as “voluntary reading” or “reading for pleasure,” reading non-assigned books would meet the definition of voluntary reading as defined by other researchers that have examined reading for pleasure (e.g., Blackwood, Flowers, Rogers, & Staik, 1991; Gallik, 1999; NEA, 2007). These studies have classified any non-assigned reading as reading for pleasure.

Voluntary Reading Among College Undergraduates

Little scholarship in higher education has examined voluntary reading; however two particular studies sought to address this issue. At the Mid-South meeting of the Educational Research Association in 1991, Blackwood et al. presented a paper entitled, “Pleasure Reading by College Students: Fact or Fiction?” and seven years later, Gallik (1999) asked a similar question when her research, entitled “Do they read for pleasure?” was published in the *Journal of Adolescent & Adult literacy*. After 1999, research regarding college students’ pleasure reading habits did not appear again in the literature until 2007, when the National Endowment for the Arts examined the nation’s reading habits.

Blackwood et al. In 1991, Blackwood and a group of her colleagues examined the voluntary reading habits of college students. Specifically, they sought to determine how much time college students spent reading for pleasure, when their pleasure reading occurred, and if parental encouragement had an influence on undergraduates’ voluntary reading habits. This study involved 333 students at a small public liberal arts university, who were surveyed as part of their institution’s outcomes assessment program.

The results of the survey indicated that roughly 88% of the students read for pleasure, and that the women read slightly more than the men. Not surprising, students indicated that they spent more time in recreational reading during vacation breaks than during the term when they were enrolled in classes. Newspapers were the medium reported as being read most often, with 80% of the respondents indicating they read the newspaper at least once a week. While Blackwood et al. (1991) commented on the types of books that students preferred, they did not report any numbers, so it is not possible to tell how many students read books. They did state, however, “that most seniors do read for pleasure and that their choices tend toward current events and literature” (p.7). While the researchers thought that encouragement on the part of parents would have an effect on the undergraduates’ reading habits, the results indicated that parental encouragement had no significant effect on the amount of time that college students spent in recreational reading, either during the term or during vacation.

Gallik. In 1999, Jude Gallik also examined pleasure reading in college students. She surveyed 151 students at a small, church-affiliated, private liberal arts college in an effort to determine how much time they spent reading for pleasure, if there was a relationship between their GPA and the amount of time they spent pleasure reading, what kind of group differences might exist with regard to the amount of time spent pleasure reading, and what type of materials were the preferred pleasure reading medium.

Like Blackwood et al. (1991), Gallik (1999) found that students spent more time reading for pleasure during breaks from college than during the term. For example, 13% of the students in the sample reported that they spent six hours or more per week reading for pleasure while classes were in session, where 25% of the students spent six hours or more per week in pleasure reading during vacation time away from college.

In her quest to determine the relationship between academic achievement (as measured by cumulative college GPA) and pleasure reading, Gallik performed Pearson product-moment correlations. She determined that there was a “weak but statistically significant correlation ($r = .275, p = .01$) between cumulative grade-point average and time spent reading for pleasure during vacations” (p. 484). She concluded that pleasure reading alone was “not a strong predictor of achievement in college” (p. 486).

With regard to group differences, Gallik examined the data in terms of gender, student classification, age, participation in the honors program, and participation in the college’s support for students with learning disabilities. The only statistically significant difference she found was a weak one ($r = .313, p = .01$) between age and the amount of pleasure reading during vacations. The older the student, the more time spent reading for pleasure during vacations.

The college students in this study preferred magazines above any other pleasure reading materials. However, the next two highest items both involved technology. The second most preferred medium for pleasure reading involved letters, email, and chat rooms, where the third most preferred medium was simply classified as “Internet.” In the previously discussed study by Blackwood et al. (1991), pleasure reading involving technology was not examined; however, the two studies found similar preferences for pleasure reading of “hard copy” materials.

The NEA study. Eight years passed before pleasure reading appeared again in the literature. A 2007 study by the National Endowment for the Arts (NEA) examined reading trends in the United States. In an attempt to “provide a reliable and comprehensive overview of American reading,” (p. 5), this study combined large amounts of national data collected from federal agencies with survey results from academic, foundation, and business entities. This study reported reading patterns for families, youth, college students, teens and young adults, and

although an overall decline in reading was reported, the NEA stated that a “most alarming” finding was the declining habit of regular reading among college graduates.

In order to get a picture of the pleasure reading habits of undergraduate students, the NEA examined data from two sources: *Your First College Year (YFCY) Survey* and the *College Senior Survey (CSS)*. Although these data sets can be analyzed independently of one another (as in the following paragraphs), the NEA study looked at change over time. Specifically, this study compared data from the 2002 and 2005 surveys so that statistics could be considered for one cohort of undergraduates. These two surveys asked students to report the number of hours they spend each week reading for pleasure. The NEA reported “notable declines” from the first year to the senior year of college, for example, 21% of the students reported that they spent no time reading for pleasure as high school seniors, and by the time they were college seniors, that number had grown to 35% (NEA, 2007).

The NEA (2007) study is cited widely in the field of literacy as it was the most comprehensive look at the pleasure reading habits of our nation; however, only a small portion of the study included information on the pleasure reading habits of college students. Even though a small part of the study involved college students, they included in their summary of findings that were significant for our country something they found alarming and worth mentioning—that the pleasure reading of college graduates appeared to be declining.

Although the NEA (2007) study is cited widely, it has been criticized for its lack of attention to digital forms of voluntary reading. The NEA stated that “results on voluntary reading should be taken as referencing *all* varieties of leisure reading (e.g., magazines, newspapers, online reading), and not books alone” (p. 24), but critics such as Kirschenbaum (2007) have noted that “the report sounds most clumsy and out of touch when referring to new

media” (p. B20). Price (2007), a Harvard professor shared a similar criticism when she said, “It takes some gerrymandering to make a generation logging ever more years in school, and ever more hours on the BlackBerry, look like nonreaders” (p. 1).

HERI surveys. As the NEA pointed out, the results from the two surveys, *Your First College Year (YFCY)* and the *College Senior Survey (CSS)* can be examined independently. Both of these surveys are administered by the Higher Education Research Institute (HERI). The first survey, the *YFCY*, is administered to students in the spring of their first year of college; this survey was designed to glean information about students’ experiences in their first year of college (Hurtado et al., 2007). The second survey, the *CSS*, is administered to college seniors, many times as an exit interview of sorts upon their graduation (Saenz & Barrera, 2007). (This survey was named the *College Student Survey* prior to 2006, but the acronym refers to the same survey regardless of time.) The *CSS* helps track various dimensions of college life as reported by students. As discussed in the NEA study above, the *CSS* can be used in longitudinal research when results are combined with other surveys such as the *YFCY* survey. At the time of this writing, the HERI has made available *YFCY* results for every other year since 2005.

YFCY 2005. In 2005, the *YFCY* survey involved over 38,538 first year students at 144 colleges (Hurtado et al., 2007). In the survey, students were asked to report the amount of time they had spent reading for pleasure. Twenty-seven per cent of the students reported that they had read for pleasure three or more hours per week during their senior year of high school; however, only 15% reported reading the same amount for pleasure during the first year of college, a drop of 12 percentage points. In this same year, 39.7% of the students surveyed reported that they did not read for pleasure at all during their first year of college.

YFCY 2007. In 2007, the amount of pleasure reading reported was even less; just over 31,000 students at 114 institutions completed the *YFCY* survey (Liu, Sharkness, & Pryor, 2008). In this survey, fewer students reported reading three hours or more per week during their senior year of high school, and the decrease was greater during the first year of college; further, a larger percentage of students reported no pleasure reading during the first year of college. Specifically, 26.9% of the students reported that they had read for pleasure three or more hours per week during their senior year of high school, where only 13.2% reported reading the same amount for pleasure during the first year of college, a drop of 13.7 percentage points. In this same year, 40.8% of the students surveyed reported that they did not read for pleasure at all during their first year of college. Unfortunately, the 2009 *YCFY* did not ask students about reading for pleasure.

CSS 2005. The 2005 *CSS* was completed by just over 30,000 students at 116 four-year institutions (Saenz & Barrera, 2007). In this survey, students were asked, “During the past year, how much time did you spend during a typical week . . . reading for pleasure?” (Saenz & Barrera, 2007, p. 31). A large number of students, 28.2%, reported spending less than one hour per week reading for pleasure; however, even more students, 34.2% said that they spent no time at all reading for pleasure. These percentages combined represent 18,837 college students who spent less than one hour a week reading for pleasure during their senior year of college.

CSS 2007. The 2007 *CSS* involved over 26,000 students at 109 colleges and universities (Spinosa, Sharkness, Pryor, & Liu, 2008), and percentage-wise, the amount of pleasure reading dropped from the previous survey. Like the seniors in the previous *CSS*, a large percentage of students reported spending less than one hour per week reading for pleasure, and an even greater percentage reported that they had spent no time reading for pleasure. In this particular year,

29.6% of the students surveyed said that they spent less than one hour per week reading for pleasure, while 34.6% said that they spent no time at all reading for pleasure.

CSS 2009. In 2009, the *CSS* involved more than 24,000 students at 111 four-year institutions (Franke, Ruiz, Sharkness, DeAngelo, & Pryor, 2010). As in the previous two survey years, 27%, reported spending less than an hour per week reading for pleasure, and an even greater percentage, 30.7%, reported spending no time reading for pleasure. Although the percentages seem to indicate that possibly more students read for pleasure this year than in the two previously reported years, more data are needed in order to indicate a trend. Regardless, these percentages together represent 14,071 graduating college seniors who said they spent less than one hour per week reading for pleasure.

The results of these surveys provide insight into the pleasure reading habits of college students. Clearly, there is a paucity of research regarding college students' pleasure reading habits, and some of what we know simply involves the answer to one question on an annual survey. Only two studies have examined critical thinking and reading, and no studies have examined the relationship between critical thinking and voluntary reading.

Conceptual Framework: Opportunity to Read

Opportunity to Read (OTR), a theoretical perspective on reading experience proposed by Hiebert and Martin (2009) is a conceptual framework that contributes to the thinking behind this study. OTR "refers to occasions when students encounter texts and have some form of responsibility (self- or other-imposed) for the encounter" (Hiebert & Martin, 2009, p. 4). This study will examine one aspect of college students' opportunity to read, and this particular aspect involves self-imposed responsibility, which occurs with voluntary reading. Students take

responsibility for all aspects of their recreational reading; they decide whether to read, what to read, how long to read, and what thoughts to engage about the reading, if any.

The overarching tenet of OTR is that students who read more achieve at a higher rate, an idea which is the overall inspiration for this study. While multiple studies support the contention that students who read more are also high achievers (e.g., Anderson, Wilson, & Fielding, 1988; Guthrie, 2004; Guthrie, Wigfield, Metsala, & Cox, 1999), research is lacking with regard to the effects of the amount of voluntary reading, hence the particular direction of this study.

In addition to serving as the inspiration for this study, OTR contributes to forming the questions for this study. First, if students who read more achieve at a higher rate, is it possible that students who spend more time in voluntary reading also achieve at a higher rate (where achievement is defined as grade point average)? Rather than presume this relationship, however, this study seeks to determine if there is a relationship. Further, the literature supporting OTR points to differences in reading achievement with regard to gender (Guthrie, Schafer, & Huang, 2001), which prompts this study to examine the findings with regard to gender differences. This same notion—that students who read more achieve at a higher rate—prompts the question regarding the relationship of the amount of voluntary reading to critical thinking. Since the skills involved in reading are also the skills involved in critical thinking, is there a relationship between the two?

Hiebert and Martin (2009) explained that this conceptual framework was incomplete and that more research is needed to complete it. Certainly, the use of an incomplete framework has its limits. As of yet, other studies have not used this framework. The OTR framework, however contributes to the ideas and questions of this study; it does not frame the study in the strictest sense.

Heibert and Martin (2009) proposed six variables as a working foundation for their framework—time, genre, text difficulty, task, student’s engagement, and student’s reading proficiency. It would be difficult, if not impossible, to include all of these variables. For example, there is not a way to determine how deeply a student engages with the text. Although this study does not propose to examine each variable included in OTR, two variables in particular are applicable and will be considered on the survey instrument: time and genre.

Time. Time as a variable involves a body of scholarship on its own. For example, research has examined such topics as time allotted for reading during the school day versus actual time spent reading (e.g., Foorman, et al., 2006) and time spent involved in a task as opposed to time spent engaged in a task (e.g., Fisher, et al., 1980). However, Hiebert and Martin (2009) explain that in general, *time* refers to the amount of time a student spends reading. As a variable, time is important because it “marks the expenditure of a precious commodity—human life” (Jackson, 1968, p. 38). Time is the foundational variable in OTR, for without time, OTR as a concept would not exist. This study will involve time as a variable in that students will be asked to report the amount of time they spend reading voluntarily.

Genre. The term *genre* typically indicates the type of text, usually either expository or narrative. Although *genre* indicates text type, it also involves text difficulty; for example, informational texts (expository texts) often require background knowledge and contain more complex structures than narrative texts (Biber, 1988). Hiebert and Martin (2009) point to genre as an important variable because a student’s preference for one type of genre over another likely influences whether the student will persevere in reading a particular piece. In this study, students will be asked to report the different types of reading in which they choose to engage.

As explained in Chapter one, the ideas behind the concept of OTR have served as the catalyst for this study. OTR contributes to the overall idea of the study, to forming the research questions, and to shaping the survey instrument employed in this study.

Conclusion

This chapter served as a review of the literature and provided a discussion of the following topics: (a) scholars' beliefs about critical thinking, (b) critical thinking among college undergraduates, (c) voluntary reading among college undergraduates, and (d) Opportunity to Read, the contextual framework guiding the study. Critical thinking continues to be a goal of undergraduate education and a topic of discussion, and although scholars' beliefs vary, they seem to agree on some of the skills involved; these are the same skills involved in the ability to read and read well. Research has revealed that there is a relationship between critical thinking and reasoning in reading as well as critical thinking and the number of non-assigned books read. Additionally, the voluntary reading habits of undergraduates continue to be tracked and appear to be in decline. One study has shown that students read for pleasure more during vacations, and another study revealed a significant but weak relationship between reading for pleasure and college GPA. The relationship between critical thinking and voluntary reading remains undetermined. The proposed study seeks to address this gap in the literature and is designed to obtain a better understanding of the relationship of college students' critical thinking to their voluntary reading and academic achievement (as measured by GPA).

Chapter Three

Methods and Procedures

The purpose of this study was to determine the relationship among voluntary reading, academic achievement (as measured by GPA), and critical thinking skills among undergraduate students. The four research questions which guided the study were as follows:

1. Is there a relationship between voluntary reading and critical thinking among undergraduate students?
2. Do class standing and gender make a difference in the relationship?
3. Is there a relationship between critical thinking and academic achievement among undergraduate students?
4. Is there a relationship between voluntary reading and academic achievement among undergraduate students?

This chapter details the methods and procedures used in the conduct of the study. The chapter includes a description of the study design, site and population, and instrumentation selected. Further, it describes procedures that were followed in implementing the study, including data collection methods as well as data analysis methods.

Research Design

This study utilized a quantitative, correlational research design. Creswell (2003) recommends such a design for examining the relationship among variables when the instruments being used provide numerical data that can be analyzed via statistical procedures, as in this study. Specifically, a combination of statistical analyses was employed to examine the relationship between voluntary reading, academic achievement (GPA), and critical thinking

skills among undergraduate students. These analyses involved factor analysis, correlation, step-wise regression, *t*-tests, and ANOVA's.

Site and population. A convenience sample of undergraduate students at Mt. English College, a pseudonym, was used for the study. As Coladarci, Cobb, Minium, and Clarke (2008) noted, convenience samples are commonplace in educational research; random sampling is “more ideal than real” (p. 202), and more often than not, educational researchers “rely on samples that are accessible” (p. 202).

The sample consisted of 119 students enrolled in seven sections of undergraduate English—four sections of sophomore-level English and three sections of junior-level English. These courses are both general education distribution requirements that a majority of students take during their second or third year at Mt. English College. By using students in these courses, an attempt was made to examine a representative cross-section of the student population. Further, these courses provided a sample of students who were at various stages in their undergraduate programs. Two students were omitted from the analyses as they were post-baccalaureate students. The remaining sample of 117 students included 48 males and 69 females.

Mt. English College is a private, denominationally-affiliated liberal arts college in the South with approximately 2,000 undergraduate students. Mt. English also educates approximately 300 graduate students who are enrolled in one of four master's level programs. Much like many other higher education institutions, Mt. English offers a variety of options for student involvement including an honors program, study abroad programs, approximately 50 student organizations, 18 honor societies, 14 varsity sports, and a nationally recognized intramural program. With these various options for students, Mt. English looks like a “typical

college.” The students at Mt. English, therefore, provided a reasonable population from which to choose participants.

Procedures. After receiving IRB approval from both the University of Tennessee, Knoxville and Mt. English College, the researcher made an initial trip to each English class at the College (7 classes) to explain the study, and students received a copy of the *Information for Participants* (see Appendix A). In addition to explaining the purpose of the study; students were invited to participate, and the procedures were explained. Students were informed that they could enter a drawing for a \$50 gift card on the date of the test, which was the primary recruiting tool for the study.

Further, it was explained that participants would be able to find out how they performed on the critical thinking test. Ennis (1993) recommended giving students feedback about their critical thinking; he argued that if students know their strengths and weaknesses, they can better focus their attempts at improvement. Since names were not going to be used in the study, students were informed how test results would be posted—by a randomly assigned number which would appear on their test and their survey. The researcher stressed to students that the only way they would be able to obtain their test results would be to keep up with their number. Additionally, the researcher pointed out her contact information on the *Information for Participants* and welcomed students to make contact if they had questions.

On a date that was determined by the course professor, a proctor returned to administer the data collection instruments. This proctor was neither the researcher nor the course instructor. At the time of data collection, participants were given a number two pencil to use on the critical thinking test and an envelope containing two instruments (a survey and a critical thinking test, both described in the next section), which were labeled with randomly-assigned matching

numbers; no names were used or requested. Both of these instruments were to be completed in the time allotted for one class period. Participants were reminded to keep up with their number if they wanted to know their test results. As a courtesy to participants, a post-it® note was attached to each answer sheet for the critical thinking test since students were asked to clear their desks of all items before receiving their envelopes. The post-it® note served a two-fold purpose; first, it gave students a way to remember their number, and second, it was hoped that a quieter testing environment could be maintained if students were not having to search for paper and find a place to write this number.

The proctor administered the critical thinking exam according to the directions in the test manual, and at the end of the period, participants placed their materials in the accompanying envelope and returned it to the proctor. They were also given the opportunity to enter their name in a drawing for the gift card by putting their name and phone number on a slip of paper and placing it into a box. After data collection was complete and the winner chosen, contacted, and awarded, the remaining names were shredded.

Instrumentation

Two instruments were used to gather data from the participants about their critical thinking skills and their recreational reading habits — the *California Critical Thinking Skills Test (CCTST)* and the *Survey of Recreational Reading Habits, Revised* (see Appendix C). Because the *CCTST* is a copyrighted, secured test, actual test questions cannot be reproduced in this publication; however, Appendix D contains sample questions reproduced with permission from Insight Assessment.

California Critical Thinking Skills Test. The *CCTST* provided a standardized means for collecting data regarding participants' critical thinking skills. The *CCTST* (2002) was

“specifically designed to measure the skills dimension of critical thinking” (p. 2) and is the only test of critical thinking based on the Delphi panel’s (Facione, 1990c) consensus conceptualization of critical thinking. Items in the *CCTST* have been tested over a period of 25 years and were developed by a team of “experts in critical thinking, assessment, psychometrics and measurement, statistics, and decision science” (Facione, Facione, & Winterhalter, 2011, p. 42). Commonly used by colleges to assess critical thinking (Tsui, 1999), the *CCTST* requires 45 minutes to administer. It contains 34 items in a multiple-choice format (See Appendix D for sample questions).

Validity. In order to establish content and experimental validation, four experiments, involving 1169 college students, were conducted in 1989-1990 at California State University, Fullerton (Facione, 1990b). An underlying assumption of these experiments was that the critical thinking courses at Fullerton were effective in increasing students’ critical thinking skills.

In the first experiment, researchers sought to determine if the *CCTST* showed a difference in critical thinking abilities between college students who had or had not completed a college level critical thinking course. If this test was, in fact, a valid measure of critical thinking, then it should be able to show the growth in critical thinking skills that resulted in the completion of a college level course in critical thinking. To conduct this experiment, 480 students completed the test at the beginning of a required critical thinking course, and 465 students completed the test at the end of their critical thinking courses. In order to keep the posttest results from being skewed due to test format familiarity, the researchers used two different sets of students for the pretest/posttest data; that is, the pretest students and the posttest students were from two different semesters. Further, both the pretest sample and the posttest sample were representative of the student population enrolled in these courses.

After scoring the tests, the means of both the pretest and posttest were compared. The posttest students scored higher, with the resulting t-statistic at 2.44, which is statistically significant for the one-tailed t-test ($p < 0.0075$). The experimenters could be more than 99% confident that the *CCTST* succeeded in detecting gains in critical thinking skills as a result of critical thinking instruction.

As a control, the second experiment replicated the procedures above, but this time, only students enrolled in general education courses were tested, not students in critical thinking courses. Once the mean *CCTST* scores of these two independent groups were compared, it was determined that there was no significant difference, therefore retaining the null hypothesis, that there was no significant difference between the two groups, with $P = 0.938$. These results suggest that the gains shown in the first experiment were not merely by chance.

In the third experiment, the pretest students from the first experiment were given the posttest. In this group, the students who took a course in critical thinking, a paired t-test analysis revealed a statistically significant gain ($p < .001$), therefore indicating that the null hypothesis should be rejected. In other words, the *CCTST* once again measured gains in critical thinking skills, which presumably occurred due to one semester of critical thinking instruction.

The fourth experiment involved students from the second experiment (the control group). The pretest students from this group were also given the posttest. The researcher retained the null hypothesis using paired pretest/posttest *CCTST* scores. He stated that there was no significant difference in the mean scores for this group; however, he failed to report the t-statistic as well as the P statistic. Assuming that he correctly interpreted the results of his findings, the results suggest that the gains shown in the third experiment were not merely by chance; students

gained critical thinking by taking a college-level critical thinking course, and the *CCTST* measured those gains.

Reliability. With critical thinking tests, establishing reliability has been somewhat difficult. Many times, the lines drawn between the skills involved in critical thinking are blurry (Facione, 1990c). For example, when answering a test item designed to measure the skill of inference, a respondent might also call upon his/her ability to analyze; therefore, it is difficult to determine exactly how to measure the skill level of a respondent's ability to infer since s/he called upon the ability to analyze in order to arrive at an answer. For this reason, Norris and Ennis (1989) claimed that there should be no theoretical reason for believing that items should correlate highly with one another (as with tests that focus on a single skill). With this idea in mind, they recommended reliability ratings of .65 to .75 be considered sufficient for critical thinking tests. In his technical report, Facione (1990b) noted that the KR20 reliability estimates for the total scores ranged from 0.68 to 0.69, thereby meeting the Norris-Ennis standard of reliability for tests of critical thinking.

Survey of Recreational Reading Habits, Revised. The *Survey of Recreational Reading Habits, Revised* consists of 14 items designed to elicit information about students' voluntary reading habits. This survey was a modified form of Gallik's (1999) *Survey of Recreational Reading Habits (SRRH)*; it was revised with her recommended modifications and a few additional modifications for analytical purposes. For example, the original *SRRH* asked participants for their age and provided boxes where students could check their age range. In order to have a continuous variable with regard to age, this range was omitted and participants were simply asked to write in their age. Additionally, Gallik asked students about their participation in Internet chat rooms; the term "Facebook" was substituted for chat rooms in order

to bring the survey up to date. In addition to these changes, question number five was modified so that the wording of the question matched the wording of the student assistance offered at Mt. English College. Although the survey was altered, every effort was made to maintain the integrity of its original.

Validity. Face validity has been defined as the degree to which the items in an instrument are appropriate to the targeted construct and assessment objectives (Allen & Yen, 1979; Anastasi, 1988; & Nevo, 1985). Several experts in the field of literacy and voluntary reading examined the survey instrument for face validity. The following scholars agreed that the survey instrument contained items appropriate for surveying recreational reading habits of college students: Linda Gambrell, Distinguished Professor of Education at Clemson University, former president of the International Reading Association (IRA), and a member of the IRA Reading Hall of Fame; John T. Guthrie, Professor Emeritus at the University of Maryland and member of the IRA Reading Hall of Fame; and Gregory Schraw, Professor of Educational Psychology at the University of Nevada Las Vegas, who has published widely in the area of metacognition.

Limitations

As with all studies, this one included limitations. The study involved students at a denominationally-affiliated, liberal arts college, and the findings might not hold true for all other types of higher education institutions. Additionally, although reliability and validity for the *CCTST* has been established, every assessment instrument has its criticisms. The *CCTST*'s high correlation with SAT scores has sparked questions about whether it measures verbal and mathematical ability or critical thinking (McMorris, 1995).

The *Survey of Recreational Reading Habits* (Gallik, 1999) was used in only one study prior to this one. Both the original *Survey* and the revised one ask about recreational reading in

various ways. For example, both surveys ask students about the number of hours they spend on recreational reading, and they both ask students about specific reading items. Although the *Survey* was revised to contain up-to-date items (such as e-books), it is still limited in its ability to thoroughly question participants about their recreational reading habits.

Data Analysis

The data were analyzed via SPSS, arguably the most widely used data analysis program in the social sciences (Miller, Acton, Fullerton, & Maltby, 2002). First, descriptive statistics as well as preliminary analyses (correlations) were conducted in order to understand the nature of the data. Correlations provided an initial look at the relationships between the following pairs of variables: voluntary reading and critical thinking; GPA and critical thinking; and GPA and voluntary reading.

The remaining analyses included factor analysis, regression, *t*-tests, and ANOVA's. Table 1 provides a summary of the statistical analyses performed to answer each research question. The columns labeled *Statistical Analysis 1*, *2*, and *3* refer to the order in which the analyses were conducted (i.e., first, second, or third).

Factor Analysis was used in order to determine how the individual reading materials grouped together on the survey. Items in surveys are sometimes related in such a way that responses are partially influenced by underlying common factors (DeCoster, 1998). In this case, factor analysis helped reduce redundancy of the items regarding reading materials; for example, students were asked how often they read novels, e-books, and paperback or hardback books. It is possible that a student was reading an electronic copy of a novel and therefore scored the same response for both e-books and novels; similarly, it is possible that a student was reading a

paperback copy of a novel and scored the same response for both novel and paperback or hardback books. Factor analysis helped mitigate this issue.

Regression gave a finer tuned examination of the following pairs of relationships: voluntary reading and critical thinking; GPA and critical thinking; and GPA and voluntary reading. Full-model regression was used to examine two relationships—the relationship between voluntary reading and critical thinking and the relationship between GPA and voluntary reading. However, step-wise regression was used in examining GPA and critical thinking. Step-wise regression was more appropriate for examining GPA and critical thinking due to the fact that total critical thinking and each of the critical thinking sub-scores were significantly and positively related to GPA.

Table 1

Summary of Research Questions and Statistical Analyses

Research Question	Statistical Analysis 1	Statistical Analysis 2	Statistical Analysis 3
Is there a relationship between voluntary reading and critical thinking among undergraduate students?	Factor Analysis*	Correlation	Regression
Do class standing and gender make a difference in the relationship?	<i>t</i> -test	ANOVA	n/a
Is there a relationship between critical thinking and academic achievement among undergraduate students?	Correlation	Step-wise Regression	n/a
Is there a relationship between voluntary reading and academic achievement among undergraduate students?	Factor Analysis*	Correlation	Regression

*Factor analysis was only performed once but was used to answer both questions involving voluntary reading.

In order to determine group differences in critical thinking, *t*-tests and ANOVA's were used. The *t*-tests compared total critical thinking score means of males and females, and the ANOVA's compared the means of the critical thinking scores according to class standing.

Chapter Four

Findings

The purpose of this study was to determine the relationship among voluntary reading, academic achievement (as measured by GPA), and critical thinking skills among undergraduate students. Undergraduates at a small, denominationally-affiliated liberal arts college in the South completed the *California Critical Thinking Skills Test (CCTST)* and the *Survey of Recreational Reading Habits, Revised (SRRH-R)*. As outlined in Chapter Three, the data were analyzed using a variety of statistical analyses in order to answer the research questions guiding this study:

1. Is there a relationship between voluntary reading and critical thinking among undergraduate students?
2. Do class standing and gender make a difference in the relationship?
3. Is there a relationship between critical thinking and academic achievement among undergraduate students?
4. Is there a relationship between voluntary reading and academic achievement among undergraduate students?

The findings of the study are presented in this chapter. Following a demographic description of the participants in the study and a summary of the critical thinking test scores and voluntary reading data, the findings are presented in terms of the research questions.

Demographic Data

Students in seven sections of undergraduate English courses were invited to participate in the study. Of the 148 students who were enrolled in these courses, 119 chose to participate. The results of two students were removed from the sample because they were not undergraduates; these two students were taking undergraduate English as post baccalaureate students. Data

analysis was done on the sample of 117 students; however, in a few instances some data were missing (due to participants leaving a question blank). Of the 117 students, 48 were male (41%) and 69 were female (59%). As Table 2 shows, 14 students were freshmen (12%), 69 were sophomores (59%), 24 were juniors (20.5%), and 10 were seniors (8.5%). The age of participants ranged from 17 to 28 with a mean of 19.76 ($SD = 1.57$)

Table 2

Class Standing of Participants

	N	%
Freshman	14	12.0
Sophomore	69	59.0
Junior	24	20.5
Senior	10	8.5
Total	117	100.0

Critical Thinking Data

According to the group statistics received from Insight Assessment, the average test-taker in this group scored between the 52nd and the 59th percentile compared to an aggregated sample of four-year college students. The *CCTST* has been given to “hundreds of thousands of test takers representing a wide variety of test populations” (Facione, Facione, & Winterhalter, 2011, p. 33). Insight Assessment compared the scores of the participants in this study to an existing norm group in order to determine percentile ranks for this study. The test results from this sample suggest that students in this study performed as well as or slightly better than undergraduates attending four-year colleges.

Table 3 provides a summary of the scale scores for the participants in this study; it is broken down according to the five sub-scales as well as total critical thinking score. The *CCTST Test Manual* (Facione, Facione, & Winterhalter, 2011) lists cut scores for each sub-scale which are provided in order to estimate strengths or weaknesses for each skill area. Table 3 not only displays the cut score for each sub-scale, but it shows how participants in this study performed by giving the minimum, maximum, mean, and standard deviation. For example, a scale score lower than six on the inductive reasoning subscale is considered low, where a scale score greater than eleven is considered high.

Table 3

Critical Thinking Scale Score Results

	N	Minimum	Maximum	Mean	Std. Deviation
Inductive Reasoning (<6 is low; >11 is high)	117	3	15	9.60	2.764
Deductive Reasoning (<6 is low; >11 is high)	117	1	14	7.56	2.670
Analysis & Interpretation (<3 is low; >4 is high)	117	0	7	3.71	1.451
Inference (<6 is low; >11 is high)	117	3	15	8.67	2.536
Evaluation & Explanation (<4 is low; >9 is high)	117	1	10	4.79	1.938
TOTAL (<13 is low; >23 is high)	117	7	28	17.16	4.661

In this sample of 117 students, the lowest Inductive Reasoning scale score earned by any student was 3 and the highest was 15; the mean for Inductive Reasoning scale score for this group was 9.60 with a standard deviation of 2.764. Since the average Inductive Reasoning score for students in this study was 9.60, it can be assumed that these students scored neither low (<6) nor high (>11) on Inductive Reasoning. In examining the rest of the sub-scores, a similar assumption could be made for each; in this study, students did not score particularly high or low on any portion of the *CCTST*.

Voluntary Reading Data

On the *Survey of Recreational Reading Habits, Revised (SRRH-R)*, voluntary reading was measured in various ways; one way involved estimating hours. Participants were asked to estimate the number of hours per week they spend on recreational reading when school is in session (School RecRead Hrs) as well as the number of hours per week they spend on recreational reading during vacation breaks from college (Vaca RecRead Hrs). These two estimates were counted as separate variables in the analysis. Of the 117 students surveyed, one participant left this answer blank; therefore, Table 4 shows the number of hours spent per week on recreational reading for 116 participants. In this sample of students, the minimum number of hours per week spent on recreational reading was zero; at least one participant said that s/he did not spend any hours per week on recreational reading. On the other hand, the maximum hours listed was 31. At least one participant said that s/he spends 31 hours per week on recreational reading. The mean ($M = 4.95$) and standard deviation ($SD = 6.146$) for school recreational hours indicated that on average, students in this study said that they spend an average of 4.95 hours per week on recreational reading while school is in session. For vacation recreational hours, the mean was 9.42 with a standard deviation of 10.159; therefore, it can be said that students in this

study said they spend an average of 9.42 hours on recreational reading during vacation breaks from college.

Table 4

Number of Hours per week spent on Recreational Reading

	N	Minimum	Maximum	Mean	Std. Deviation
School RecRead Hrs	116	0	31	4.95	6.146
Vaca RecRead Hrs	116	0	50	9.42	10.159

In addition to estimating the number of hours spent per week on recreational reading, participants were asked how often (never, less than once a week, daily, or weekly) they read each of the following: 1) newspaper, 2) magazines, 3) comic books, 4) poetry, 5) letters/e-mail/Facebook, 6) internet, 7) novels, 8) nonfiction books, 9) e-books, 10) paperback or hardback books. In order to be able to confidently group together items for purposes of measuring how often students read various types of text, a factor analysis with Varimax Rotation was run on these 10 types of text. DeCoster (1998) recommends factor analysis in order to determine “what sets of items ‘hang together’ in a questionnaire” (p. 4).

A three-factor solution was found. Two items—comic books and poetry—were dropped in the final matrix because comic books would not load reliably on any factor and poetry double

loaded. It is likely that these two items failed to load reliably due to low response; 76.5% of the participants said they never read comic books, and 47.9% said they never read poetry. The three-factor solution included books, non-book items, and periodicals. The first factor, books, included four items: novels, paperback or hardback books, nonfiction books, and e-books. The second factor, which involved non-book types of text, included two items: letters/email/Facebook, and Internet. The third factor involved periodicals: newspaper and magazines. Table 5 demonstrates how the individual items loaded together on the final factor analysis. As can be seen in this table, the items that are grouped together are highly correlated with each other. The low number for e-books was taken into consideration but was left in for several reasons. First, it loaded with the other book items, and conceptually it made sense to have loaded with book items since it was an electronic version of the same type of text. Second, e-readers provide for a form of voluntary reading in our technologically changing culture and help paint a picture of voluntary reading habits of present-day undergraduates. Third, a Cronbach's Alpha test of reliability was run on this new variable, book; it was run both with the e-book and without, and both times yielded an acceptable level of reliability.

To establish reliability for each of these factors, a Cronbach's Alpha was run. For an acceptable level of reliability, George and Mallery (2003) recommend an alpha value of at least 0.7. The first factor, books, scored an acceptable level of reliability ($\alpha = .709$), and the second factor, non-books, also scored an acceptable level of reliability ($\alpha = .745$). The third factor, periodicals, was unreliable ($\alpha = .387$) and was therefore not included as a part of the analysis involving voluntary reading. The two reliable variables (books and non-books) were included with the other two variables (School RecRead Hrs and Vaca RecRead Hrs) to make a total of four variables that were examined to answer the first research question.

Table 5

Table of Factor Loadings

	Component		
	book	nonbook	periodicals
Novels	.891		
Paperbk or Hardbk books	.872		
Nonfict books	.705		
Ebooks	.287		
Letters/email/Facebook		.879	
Internet		.874	
Newspaper			.835
Magazines			.712

Research Question #1: Is there a relationship between voluntary reading and critical thinking among undergraduate students?

To answer this question, a Pearson r allowed for an examination of correlations among ten variables—six critical thinking variables (*CCTST* total score and its five sub-scales) and four voluntary reading variables (School RecRead Hrs, Vaca RecRead Hrs, books, and non-books). Regarding the total critical thinking score, significant relationships were found with two of the voluntary reading variables—books and number of hours per week spent on recreational reading during vacations. A positive, significant correlation was found ($r = .27, p = .003$) between total critical thinking score and how often participants read books; that is, the more regularly students read books, the higher the total critical thinking score. Similarly, a positive, significant correlation was found ($r = .191, p = .040$) between total critical thinking score and the number of hours spent per week on recreational reading during vacation breaks from college. In

other words, the more time participants spent in recreational reading when school was not in session, the higher the total critical thinking score.

After confirming relationships between these variables, regression analysis allowed for a closer look at the relationship of the variables. Regressions of voluntary reading were run on the total critical thinking score as well as each sub-score of the *CCTST*. A significant regression model for total critical thinking was found ($F(4,110) = 2.887, p = .026$), with an R Square of .095. Table 6 displays the coefficients for this model. Book reading emerged as the only significant predictor of total critical thinking ($p = .038$); that is, the aspect of voluntary reading that best predicted total critical thinking was the frequency of book reading.

Table 6

Coefficients for Regression of Voluntary Reading and Total Critical thinking

	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
(Constant)	9.904	3.597		2.753	.007
Nonbook	.968	.940	.097	1.030	.305
Book	1.669	.795	.229	2.100	.038
School RecReadHrs	-.093	.088	-.122	-1.059	.292
Vaca RecRead Hrs	.055	.058	.120	.951	.344

A regression of voluntary reading was then run on each sub-scale of the *CCTST*—inductive reasoning, deductive reasoning, analysis and interpretation, inference, and evaluation

and explanation. Of these five regressions, two were found to be significant, and these details follow.

A regression of voluntary reading was run on inductive reasoning. A significant model was found ($F(4,110) = 3.667, p = .008$), with an R Square of .118. Table 7 displays the coefficients for this model. Although the number of hours spent on recreational reading while school is in session is close to significant ($p = .056$), the only significant predictor of inductive reasoning was the number of hours spent on recreational reading during vacation ($p = .029$); that is, the aspect of voluntary reading that best predicted inductive reasoning was spending time on recreational reading during vacation breaks from school.

Table 7

Coefficients for Regression of Voluntary Reading and Inductive Reasoning

	Unstandardized		Standardized		Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta	t	
(Constant)	5.588	2.072		2.697	.008
Nonbook	.679	.542	.117	1.253	.213
Book	.592	.458	.139	1.293	.199
School RecReadHrs	-.098	.051	-.221	-1.935	.056
Vaca RecRead Hrs	.074	.034	.276	2.208	.029

A regression of voluntary reading was run on evaluation and explanation. A significant model was found ($F(4,110) = 3.347, p = .013$), with an R Square of .109. Table 8 displays the

coefficients for this model. The only significant predictor of evaluation and explanation was book reading ($p = .010$); that is, the aspect of voluntary reading that best predicted evaluation and explanation was reading books.

Table 8

Coefficients for Regression of Voluntary Reading and Evaluation and Explanation

	Unstandardized		Standardized		Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta	t	
(Constant)	1.830	1.485		1.232	.221
Nonbook	.303	.388	.073	.780	.437
Book	.858	.328	.284	2.616	.010
School RecReadHrs	-.033	.036	-.103	-.901	.370
Vaca RecRead Hrs	.017	.024	.088	.700	.485

The remaining three regressions did not yield significant models, and the results of each follow. For the regression of voluntary reading on deductive reasoning, a significant model was not found ($F(4,110) = 1.805$, $p = .133$), with an R Square of .062. In addition to deductive reasoning, a significant model did not emerge for the regression of voluntary reading on analysis and interpretation ($F(4,110) = 1.051$, $p = .385$), with an R Square of .037. Finally, a regression of voluntary reading was run on inference. A significant model was not found ($F(4,110) = 1.311$, $p = .270$), with an R Square of .046. Given these results, voluntary reading was not found to be a significant predictor of deductive reasoning, analysis and interpretation, or inference.

The simple answer to the first research question, then, is yes; in this study there was a positive, significant relationship between voluntary reading and critical thinking. Book reading emerged as the only significant predictor of total critical thinking; time spent reading during vacations was the only significant predictor of inductive reasoning, and book reading was the only significant predictor of evaluation and explanation.

Research Question #2: Do class standing and gender make a difference in the relationship?

An independent samples t-test was run to determine if critical thinking differed by gender. In this analysis, the mean score of total critical thinking was compared for females and males. For females, the mean of total critical thinking was 17.00 ($SD = 3.846$), and for males, the mean was 17.28 ($SD = 5.672$). There was no significant difference between males and females ($t(115) = .313, p = .755$). In this sample, since there was no significant relationship between gender and critical thinking, it can be said that gender did not make a difference in the relationship of voluntary reading and critical thinking.

A one-way ANOVA was run to determine if critical thinking differed by class standing. Means and standard deviations for each group can be seen in Table 9. At a glance, there does not appear to be a great deal of difference between the groups, and the ANOVA confirmed that there was no significant difference ($F(3,113) = .516, p = .672$). Since no significant relationship was found between class standing and critical thinking, no further investigation appeared necessary.

Table 9

Total Critical Thinking Score by Class Standing

	N	Mean	Std. Deviation	Std. Error
Freshman	14	16.57	4.380	1.171
Sophomore	69	17.45	4.129	.497
Junior	24	16.33	5.939	1.212
Senior	10	18.00	5.437	1.719
Total	117	17.16	4.661	.431

ANOVA showed no significant difference between groups ($F(3,113) = .516, p = .672$)

The second research question asked if gender and class standing made a difference in the relationship. In this study, neither gender nor class standing made a difference with regard to total critical thinking.

Research Question #3: Is there a relationship between critical thinking and academic achievement among undergraduate students?

Correlations were run to examine the relationship between the six critical thinking variables and GPA. As Table 10 shows, there was a positive, significant relationship between college GPA and all six critical thinking variables. That is, the higher a student's GPA, the higher the score for total critical thinking and for each of the five sub-scales.

After this relationship was confirmed, step-wise regression was run to examine the relationship more closely and see which critical thinking sub-scores best predicted GPA. Although inductive reasoning was almost significant ($p = .052$), the stepwise model only moved in deductive reasoning ($F(1,112) = 24.987, p < .001$), with an R Square of .182. For this sample, deductive reasoning was the best predictor of GPA.

Table 10

Correlations between GPA and Critical Thinking Total and Sub-scales

	<i>r</i>	<i>p</i>
Total Critical Thinking	.451	<.001
Inductive Reasoning	.350	<.001
Deductive Reasoning	.427	<.001
Analysis & Interpretation	.381	<.001
Inference	.405	<.001
Evaluation & Explanation	.269	.004

To answer the third research question, yes, there was a positive, significant relationship between critical thinking and academic achievement among undergraduates in this study.

Further, the aspect of critical thinking that best predicted GPA was deductive reasoning.

Research Question #4: Is there a relationship between voluntary reading and academic achievement among undergraduate students?

Correlations were run to examine the relationship between the four voluntary reading variables and GPA. As Table 11 shows, there was a positive, significant relationship between GPA and three of the voluntary reading variables—books, non-books, and vacation recreational reading hours.

After confirming relationships between GPA and voluntary reading, regression analysis allowed for a closer look at this relationship. A regression of voluntary reading was run on GPA. A significant model was found ($F(4,108) = 5.879, p < .001$), with an R Square of .179. Table 12 displays the coefficients for this model. Book and non-book reading were the only ones moved into the model and therefore are significant predictors of college GPA for the group studied.

Table 11

Correlations between GPA and Voluntary Reading

	<i>r</i>	<i>p</i>
Nonbook	.259	.005
Book	.385	<.001
School RecReadHrs	.139	.142
Vaca RecReadHrs	.195	.038

After confirming relationships between GPA and voluntary reading, regression analysis allowed for a closer look at this relationship. A regression of voluntary reading was run on GPA. A significant model was found ($F(4,108) = 5.879, p < .001$), with an R Square of .179. Table 12 displays the coefficients for this model. Book and non-book reading were the only ones moved into the model and therefore are significant predictors of college GPA for the group studied.

Table 12

Coefficients for Regression of Voluntary Reading and GPA

	Unstandardized		Standardized		
	Coefficients		Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	1.806	.403		4.479	.000
Nonbook	.212	.105	.182	2.010	.047
Book	.306	.090	.358	3.412	.001
School RecReadHrs	.001	.010	.014	.126	.900
Vaca RecRead Hrs	-.003	.007	-.044	-.371	.711

The fourth question asked if there was a relationship between voluntary reading and academic achievement. In this study there was a positive, significant relationship between the two. Further, the two aspects of voluntary reading that best predicted GPA in this sample were reading books and non-book items.

Chapter Five

Summary and Conclusions

Many scholars have weighed in on what it means to think critically, and although there has not been agreement on a clear definition for the term “critical thinking,” there has been agreement on some common skills involved in critical thinking. These skills—inductive reasoning, deductive reasoning, analysis, evaluation, and inference—are the same ones involved in the ability to read and read well. While many studies have involved critical thinking in college students, none has examined critical thinking and its relationship to voluntary reading.

The purpose of this study was to determine the relationship among voluntary reading, academic achievement (as measured by GPA), and critical thinking skills among undergraduate students. Students ($N = 119$) enrolled in seven sections of undergraduate English at a private, denominationally-affiliated liberal arts college in the South completed the *California Critical Thinking Skills Test (CCTST)* as well as the *Survey of Recreational Reading Habits, Revised*. The data were analyzed using a variety of analytical procedures including descriptive statistics, correlations, factor analysis, regression, t -tests, and ANOVA's in order to answer the research questions guiding this study:

1. Is there a relationship between voluntary reading and critical thinking among undergraduate students?
2. Do class standing and gender make a difference in the relationship?
3. Is there a relationship between critical thinking and academic achievement among undergraduate students?
4. Is there a relationship between voluntary reading and academic achievement among undergraduate students?

This chapter provides a summary of the findings, discussion of the findings, and conclusions. It also includes implications of the study and recommendations for further research.

Summary of the Findings

1. The findings suggest a positive relationship between voluntary reading and critical thinking. In this study, the more time undergraduates spent reading during their breaks from college, the higher their score for total critical thinking. One aspect of voluntary reading in particular, book reading, was positively correlated with total critical thinking ($r = .27, p = .003$); the more often students read books, the higher their score for total critical thinking.

2. Regression analyses suggested various aspects of voluntary reading might be predictors of critical thinking (which includes total score and each of the five sub-scales: inductive reasoning, deductive reasoning, analysis & interpretation, inference, and evaluation & explanation). The aspect of voluntary reading that best predicted total critical thinking was the frequency of book reading. The aspect of voluntary reading that best predicted inductive reasoning was the number of hours spent on recreational reading during vacation breaks from college. And finally, the aspect of voluntary reading that best predicted evaluation and explanation was the frequency of book reading. There were no aspects of voluntary reading that were significant predictors of deductive reasoning, analysis and interpretation, or inference.

3. For this sample, total critical thinking did not differ with regard to gender or class standing. A t -test revealed no significant difference between males and females with regard to total critical thinking ($t(115) = .313, p = .755$), and an ANOVA confirmed that there was no significant difference in total critical thinking with regard to class standing ($F(3,113) = .516, p = .672$). For example, those with more years of college did not necessarily outperform students with fewer years of college.

4. Findings suggested a relationship between college GPA and critical thinking. In this study, there was a positive, significant relationship between college GPA and each aspect of critical thinking (total critical thinking and each of the five sub-scales). The significance levels were high: for the sub-scale of evaluation and explanation, ($p = .004$); for total critical thinking and the other four sub-scales, ($p < .001$). Step-wise regression suggested that deductive reasoning was the aspect of critical thinking that best predicted college GPA.

5. The findings further suggested a positive relationship between GPA and voluntary reading. Specifically, in this study three aspects of voluntary reading were significantly related to GPA: the frequency that students read books, the frequency that students read non-book items, and the number of hours per week that students spent on voluntary reading during vacation breaks from college. Step-wise regression suggested that reading books and non-book items were the aspects of voluntary reading that were significant predictors of college GPA.

Discussion

This study was undertaken to learn about relationships involving voluntary reading, college GPA, and critical thinking skills. As discussed in chapter two, some studies had examined the relationship between GPA and critical thinking (e.g., Bataineh & Zghoul, 2006; Facione & Facione, 1997; and Tiessen, 1987). And other studies (Farley & Elmore, 1992; and Terenzini et al., 1995) had explored the relationship of critical thinking and various aspects of reading. Only two studies had examined voluntary reading in college students. Blackwood et al. (1991) examined amounts of voluntary reading, and Gallik (1999) looked at the relationship of reading for pleasure and GPA. What had not been investigated previously was the relationship of voluntary reading and critical thinking; this study fills the gap in the literature while providing empirical evidence for a significant, positive relationship between the two.

GPA and critical thinking. Findings in the present study were consistent with previous correlational studies that found a positive relationship between GPA and critical thinking (e.g., Bataineh & Zghoul, 2006; Facione & Facione, 1997; and Tiessen, 2987). In the prior studies, students with higher GPA's scored higher on tests of critical thinking (namely, the *Cornell Critical Thinking Test*, the *California Critical Thinking Skills Test*, and the *Watson-Glaser Critical Thinking Appraisal*, respectively). The same was true for students in the present study; there was a significant, positive relationship between GPA and total critical thinking score on the *CCTST* ($r = .451, p < .001$). Further, there was a significant, positive relationship between GPA and each of the five sub-scales on the *CCTST*. This particular finding makes sense; it seems that students who are more successful in college should be the ones who are better thinkers.

However the question regarding critical thinking tests remains: are critical thinking tests really measuring critical thinking, or are they actually measuring general aptitude? Regardless, it is interesting to note the consistent findings regarding the relationship of GPA to critical thinking.

Voluntary reading and academic achievement. The responses of the undergraduate students in this study contrasted sharply with those of the students in the Blackwood et al. (1991) study. In their study, Blackwood et al. reported that the medium students most preferred for voluntary reading was newspapers. In the present study, the response rate for newspapers was not found reliable on a Cronbach Alpha test for reliability. It is possible that this was due to a low response rate. For example, 34.5% of the students in this sample stated that they never read newspapers, and 42% said they read them less than once a week. In other words, a large majority of the students in this study, 76.5%, rarely or never read newspapers. What cannot be said, however, is that the students in the current study do not read the news. In comparing these students to those of the Blackwood et al. study, it is important to note that the Internet was not as

commonplace two decades ago; when asked about newspapers, students in 1991 most likely assumed the question meant the kind of newspaper that they could hold in their hands. It is possible (maybe even likely) that when asked about newspapers, the present day students visualized the same thing, a traditional, hard-copy, paper that could be held in their hands. Had they been asked about reading news items, either in hard copy or on the Internet, the response might have been very different.

At the same time, the findings of this study were consistent with the findings of Gallik (1999) who found that students who read more on vacation breaks from college had higher GPA's. Gallik concluded that pleasure reading alone was "not a strong predictor of achievement in college" (p. 486) and reported that her findings were statistically significant but weak ($r = .275, p = .01$). The correlation in the present study could also be described as statistically significant but weak ($r = .195, p = .038$). Although at a quick glance the correlation in this study appears to be weaker and less significant, it is important to note that the question on the survey that asked about recreational reading during vacations from college was altered a bit on the revised *Survey*. In Gallik's study, students were asked to put a check next to the range of hours that best described the amount of time they spent reading for pleasure during vacations (e.g., less than 1 hour, 1-2 hours, 3-5 hours, 6-10 hours, or over 10 hours); in the present study, students were asked to write in the number of hours. Further, because of the way this question was asked, there was a large difference in the range of answers. Students in the present study said they read anywhere from zero to 50 hours. While it is difficult to imagine a student reading 50 hours in one week, students were told to consider reading of all types of texts that they encounter. These types would include content on their cell phones, computers, and other electronic devices. Regardless of how the question was asked and of the mathematical differences in the r statistic

and the p values, in examining the results of this portion of the study, the findings of this study affirm the notion that voluntary reading alone was not a strong predictor of college GPA.

Although the only significant relationship Gallik (1999) found to GPA involved the number of hours students read for recreation during vacations from college, in this study, two additional aspects of voluntary reading emerged with a significant relationship to GPA—the frequency that students read both books and non-book materials. Setting aside the obvious possibilities, that the studies took place over a decade apart and involved different students, several possible reasons remain for the difference in findings.

The first possibility involves the fact that the *Survey* was revised. When Gallik polled her sample, students were asked to check how often they read certain items, and they were given three options from which to choose: rarely/never, sometimes, or frequently. The definition for each of these three indicators of frequency was left up to the individual participant. An attempt was made to rectify this issue on the revised *Survey*; instead of choosing rarely/never, sometimes, or frequently, participants were given four choices: never, less than once a week, daily, or weekly.

Second, this researcher looked at the items differently. For this portion of the *Survey* (the part of the survey that asked students how often they read various types of text), a factor analysis was done before running the correlations. Items in surveys are sometimes related in such a way that responses are partially influenced by underlying common factors (DeCoster, 1998). For example, the survey used in this study asked participants how often they read each of the following: novels, paperback or hardback books, non-fiction books, and e-books. It is possible that the answer to one of these influenced another. If a student read a novel on her e-reader, she might have checked the box for both novels and e-books. Similarly, a student who read a non-

fiction book might have also checked the box for paperback or hardback books. A factor analysis helped group together items that likely influenced each other. Because of the factor analysis, these items were examined differently than when Gallik (1999) originally used the *Survey*, and therefore new and interesting insights emerged, specifically, the relationship of GPA to the reading of book and non-book items.

Non-book reading involved two items: one called letters/email/Facebook and the other called Internet. Not surprisingly, responses on these two items were overwhelmingly high—87.4% of the participants said they read letters/email/Facebook daily, and 85.7% said they read on the Internet daily. There was a positive, significant correlation for non-book reading and GPA ($r = .259, p = .005$). It cannot be assumed that students who spend each day reading email and Facebook are also the ones with higher GPA's; since Internet reading is a part of non-book reading, it is possible that students are reading the news or on-line books. It is impossible to determine what types of text students were considering when checking the box for Internet.

Book reading included four items: novels, paperback or hardback books, non-fiction books, and e-books, and book reading was positively and significantly related to GPA ($r = .385, p < .001$). Interestingly, when running the factor analysis, e-books loaded with the other book items even though it had a lower relationship (novels (.891), paperback or hardback books (.872), non-fiction books (.705), and e-books (.287)). (For a complete list of all of the factor loadings, see Chapter 3, Table 4.) It is possible that e-books had a lower relationship due to the fact that only 18 participants said that they owned an e-reader (such as a Kindle[®] or Nook[®]); however, in order to read an e-book, it is not necessary to own an e-reader. Since the relationship was low, correlations were run both with and without e-reader as a part of the book variable. The results were very close to the same with regard to significance level and

correlation; therefore, the decision was made to keep e-books as a part of the book variable. The correlation of book reading and GPA ($r = .385, p < .001$) is particularly interesting. Unlike the non-book variable, where it was impossible to determine what participants were reading, the book variable clearly contains one type of reading, book reading. It can be said that the more that participants in this study read books, the higher their GPA's tended to be.

Voluntary reading and critical thinking. The research question that was at the heart of this study involved a look at the relationship of two concepts that no researcher had previously sought to examine: Is there a relationship between voluntary reading and critical thinking among undergraduate students? Two variables were positively and significantly related to total critical thinking score—the number of hours spent on recreational reading during vacations ($r = .191, p = .040$) and how often participants read books ($r = .27, p = .003$). What is interesting about these two voluntary reading variables is what each represents. The first one is more of a general picture of voluntary reading; it asked students for an approximation but did not ask students what they were reading in particular. The *Survey* stated, “Please indicate the approximate number of hours you spend each week on recreational reading (not required for classes) during vacations.” Students were told to consider all non-required reading; therefore, the hours included here involved everything from reading non-fiction to social networking via the Internet. Although the correlation was significant, it was weak. The fact that there was a significant relationship between voluntary reading and critical thinking, when voluntary reading was broadly defined, raises additional questions and raises the possibility that more information could be found in a future study with a more narrowly defined concept of voluntary reading.

The second variable, books, was one way to narrow the concept of voluntary reading. Participants were asked to indicate how often they read each of the items—novels, paperback or

hardback books, non-fiction books, and e-books. The more often students read books, the higher the number that was entered into the database for purpose of analysis. For example, a one was entered for never reading a novel, a two was entered for less than once a week, a three was entered for weekly, and a four was entered for students who said they read novels every day. Therefore, a higher number on an item indicated that the item was being read with greater frequency. Voluntary reading, defined in this way, yielded a stronger correlation to critical thinking ($r = .27$), and the high level of significance ($p = .003$) is worthy of noting. For this sample of undergraduates, those students who read books more often were the students who scored higher on critical thinking.

Findings, then, point to the importance of the “when” and “what” of voluntary reading. Why might it be that voluntary reading during vacation breaks from school is related to critical thinking but not voluntary reading while school is in session? Possibly, students with superior critical thinking skills use their time while school is in session to study and concentrate on assigned readings; they wait until vacation breaks from school to engage in more voluntary reading. This explanation assumes that better thinkers are better students, a logical assumption given that GPA was positively and significantly related to every aspect of critical thinking for students in this study.

In addition to timing, it is important to examine the “what” of voluntary reading. Although the current generation of students might be constantly reading (or composing) text messages, Facebook statuses, “tweets,” or other types of instant messaging, it is important to note that it is not this type of literacy that is connected to critical thinking. Elementary teachers often tell parents, “It doesn’t matter what your children read; just get them to read!” By the time students get to college, however, it does seem to matter what they read because those who read

books are the ones with higher critical thinking. This finding is not surprising; reading books offers more food for the brain, so to speak. For example, several years ago, Cunningham and Stanovich (2001) pointed out that children's books have "50% more rare words in them than does adult prime-time television and the conversation of college graduates" (p. 140). In addition to helping with vocabulary expansion, books provide various cognitive exercises. For example, a non-fiction book can expand the knowledge base, and a fiction book might allow for stimulation of the imagination. Not surprisingly then, the aspect of voluntary reading that is correlated the strongest with critical thinking is book reading.

Critical thinking is a concept that is difficult to define, and after working closely with the *Survey*, it seems that voluntary reading might be as well. Although an effort was made to measure voluntary reading, it needs to be more narrowly defined so that it can be better examined.

Opportunity to read. The conceptual framework that contributed to the idea behind this study was an idea proposed by Hiebert and Martin (2009). The overarching tenet of Heibert and Martin's theoretical construct, Opportunity to Read (OTR), is that students who read more achieve at a higher rate. Much like Gallik's (1999) study over a decade ago, the findings of this study support the idea behind OTR. In this study, students who read more had higher GPA's and scored higher on critical thinking.

Two of parts of the OTR construct were salient to this study—time and genre. As discussed earlier, two of the voluntary reading variables that involved time gave more of an overall snapshot of the participant's voluntary reading. Time was important because it provided one way to gauge voluntary reading and in fact accounted for two of the variables for voluntary

reading—hours per week spent on recreational reading while school is in session and hours per week spent on recreational reading during vacation breaks from school.

The other part of OTR, genre, was used when students told how often they read particular items. Genre was important to this study as well as two voluntary reading variables—books and non-book items—were born from the portion of the survey regarding different types (genres) of reading. Although this study found that the type of voluntary reading that was related to critical thinking involved book reading, it would be interesting to investigate further and see if the type of book makes a difference. In other words, what is the relationship of critical thinking to various genres of books? In the present study, students were asked to list the type of books—both fiction and non-fiction—they preferred; 39% of these students stated that their non-fiction preference was religious in nature (e.g., students listed “religious,” “religious or inspirational,” “the Bible,” etc.). Their preference for this type of non-fiction was not surprising, given the fact that Mt. English is a denominationally-affiliated college. While their fiction interests varied a great deal, 15% of the students in this study listed young adult novels as their preference for fiction. They listed authors such as J. K. Rowling (*Harry Potter*), Stephanie Meyer (*Twilight*), and Suzanne Collins (*The Hunger Games*). Someone might argue that “feel good” inspirational or religious books and popular teen fiction books are not the types of books that the best thinkers are reading, but at this point, such a claim would be unfounded. Further investigation is necessary before this claim could be reinforced or discarded.

Hiebert and Martin (2009) indicated that their framework was incomplete and that more research is needed in order to offer a comprehensive framework for OTR. The findings of this study offer additional insights for the portion of the model regarding the self-imposed responsibility of reading. That is, the “when” and the “what” of voluntary reading matter.

Students who read on vacation breaks from college are better thinkers as well as those who read books.

Conclusions

Reading matters; those who read more are more successful in college and score higher on critical thinking. Reading has long been considered a scholarly pastime, and although concern has been raised that college students are engaging in less voluntary reading (NEA, 2007; Stewart, 2008), a large majority of the students in this study (89%) said they would read more if they had more time. The problem does not seem to be that students choose not to read, rather the problem lies in the fact that they do not have enough time to do so. Perhaps vacation breaks are the most opportune time for college students to read. Voluntary reading during vacation breaks from college is time well spent. Cunningham and Stanovich (2001) commented on the reciprocal effects of reading; they said that reading increases vocabulary, comprehension, and other cognitive abilities. While it cannot be said that reading increases critical thinking, it can be said that those who read more are better at critical thinking. Simply stated, reading matters.

Implications

As with all correlational studies, a word of caution is in order. It cannot be said that a certain amount of voluntary reading causes greater academic achievement or better critical thinking. However, it is plausible that those who read for pleasure have higher GPA's and higher critical thinking because they also possess the habits of mind that the Delphi panel (Facione, 1990c) discussed over 20 years ago. The experts in critical thinking on the Delphi panel agreed that critical thinkers possess certain dispositions or habits of mind. They explained that ability alone did not make someone a critical thinker. Dispositions come into play because not only must one be able to think but also willing to do so. Those students who are willing to

think—those individuals with curious minds—are perhaps the ones who choose to read in their spare time.

Findings presented in a recent study by Arum, Cho, Kim, and Roska (2012) bring to mind this idea of habits of mind in college students and the choice to read in their spare time. These researchers examined the post-graduate transitions of 1,000 recent college graduates who had been part of an earlier study and found that those who had scored higher on the *Collegiate Learning Assessment* (which purports to test critical thinking and other higher-order skills for college students) were also the students who had read the news and discussed politics in college. Further, these same students demonstrated high academic growth in college and after graduating were more likely to be financially independent from their parents and less likely to be unemployed. While one could argue that reading the news and discussing politics is more a way to gauge civic engagement than a sign of a curious mind, these students did spend time voluntarily reading current events; they were also interested enough to apply their acquired knowledge in conversation with others.

The goal here is not to make an argument that the Arum et al. (2012) study fully supports the findings of the present study but to illustrate the continuing interest in critical thinking of college students and whether their spare time activity is somehow related. Again, it is possible that those students who read the news in their spare time and discussed politics were also the students with curious minds and a willingness to think.

If the most successful students are the ones who read in their spare time and possess a curious mind, students need to be motivated to capitalize upon their curiosities and to read more. Teachers in K-12 should build enthusiasm for learning by sharing their own interests, by modeling for students how adults work to learn more, and by sharing with students what the

ability to read and pursue knowledge has done for them. Enthusiasm is contagious, and students who learn to pursue their curiosities will have a solid foundation of good habits of the mind for their college years.

Teachers should urge students to read more and in fact, they should require them to read more. Sixth grade teacher Donalyn Miller, author of *The Book Whisperer* (2009), requires her students to read 40 books during the school year. While the task might sound overwhelming, her students rise to her expectations. Teachers like Donalyn Miller are helping build a solid reading foundation for their students.

When students with solid reading foundations arrive on college campuses, they will be better prepared to participate in scholarly activities such as book discussions. Leaders in higher education should continue to promote campus-wide activities that encourage good habits of the mind such as reading and thinking. For example, they should continue to promote book clubs and book discussions on their campuses. Reading has long been considered a scholarly pastime, and it likely encourages a certain habit of the mind.

Leaders in higher education who are involved in planning curriculum and setting goals for undergraduate learners should consider creating courses with built-in book choices for students; this idea includes courses in critical thinking. For leaders in higher education, knowing the relationship of voluntary reading and critical thinking adds one more “known” to a sea of unknown with regards to the complex concept of critical thinking.

Recommendations for Further Study

1. This study was conducted at a small, denominationally-affiliated, liberal arts college. It would be informative to repeat this study at different types of colleges and universities in various parts of the country to see if findings remain consistent.

2. In this study, book reading emerged as a predictor of both critical thinking and GPA. Further studies should seek to determine if any particular type of book reading is more associated with critical thinking and/or GPA.

3. Voluntary reading appears to be far more complex than what is assumed in the simple survey that was used in this study; the survey, as it is written, does not allow for exploring the intricacies of voluntary reading. It would be helpful if research was undertaken to build a grounded theory of voluntary reading that allowed for examining its complexity and nuances.

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Appendices

Appendix A: Information for Participants

Thinking and Reading Among College Undergraduates: An Examination of the Relationship between Critical Thinking Skills and Voluntary Reading

INTRODUCTION

You are invited to participate in a study that examines the relationship between critical thinking skills and voluntary reading in college undergraduates. The results of this study will contribute to the body of knowledge regarding critical thinking in higher education. While there has been a great deal of research involving critical thinking, no study has examined the relationship of critical thinking skills and voluntary reading.

INFORMATION ABOUT PARTICIPANTS' INVOLVEMENT IN THE STUDY

In an upcoming class period, you will be given an opportunity to participate in this study. Participation will involve completing two items—a survey about your individual reading habits and the *California Critical Thinking Skills Test*. Both of these items can be completed in the time allotted for this class period. At the end of the period you will be asked to put the materials in an accompanying envelope and seal the envelope before giving it to the proctor.

The survey and test you will receive will be labeled with randomly-assigned matching numbers. The results of the surveys and the critical thinking test scores will be analyzed and aggregated for reporting purposes. Your identity will be protected in that no names will be used, and a pseudonym will be used for the name of the college.

The results will be stored in a locked filing cabinet for three years, after which time they will be shredded.

Participation is strictly voluntary; neither the professor of this class nor the researcher will know whether you chose to participate. If you choose not to participate, simply return the uncompleted forms in the accompanying envelope. By turning in completed forms, you are giving your consent to participate in the study. No names will be asked for in this study; however, when you turn in your envelope, you will have the option to enter a drawing for a \$50 Visa gift card. After the winner is chosen and contacted, the remaining names will be shredded.

As an additional way of thanking you for participating in this study, you will have the opportunity to see how well you scored on the critical thinking test. Since your name will not be used, you will need to keep up with the number assigned to you on the date of the test. Each test will have a Post-it[®] note with the corresponding number. You can remove this note and put it in a place for safe-keeping; if you lose your number, there will be no way to find out your test score. Please remember that no one will have your number but you. The only way to find your results will be if you keep up with your number.

CONTACT INFORMATION

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study) you may contact the researcher, Kim Hawkins at 39 Stokely, by phone: 865-471-3314, or by email: khawkins@cn.edu. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at (865) 974-3466.

Appendix B: Survey of Recreational Reading Habits

1. Please indicate your gender: Male_____ Female_____
2. Please indicate your student status:
Freshman___ Sophomore___ Junior___ Senior___ Other (specify)_____
3. Please indicate your age: 17-20___ 21-24___ 25-29___ 30 or older___
4. Please indicate your cumulative GPA:
Less than 1.5___ 1.6 to 2.0___ 2.1 to 2.5___ 2.6 to 3.0___ Over 3.0___
5. Are you a current or former Learning Support Services (LSS) student? Yes___ No___
6. Are you in the Honors Program? Yes___ No___
7. Please indicate the amount of time you spend each week on recreational reading (not required for classes) when school is in session.
Less than 1 hour___ 1-2 hours___ 3-5 hours___ 6-10 hours___ Over 10 hours___
8. Please indicate the amount of time you spend each week on recreational reading (not required for classes) during vacations.
Less than 1 hour___ 1-2 hours___ 3-5 hours___ 6-10 hours___ Over 10 hours___
9. If you had more free time, would you read more? Yes___ No___
10. Please indicate how often you read each of the following:

	Rarely/never	Sometimes	Frequently
Newspaper	_____	_____	_____
Magazines	_____	_____	_____
Comic books	_____	_____	_____
Poetry	_____	_____	_____
Letters/e-mail/chat rooms	_____	_____	_____
Internet	_____	_____	_____
Novels	_____	_____	_____
(Please specify preference: science fiction, mystery, etc., & favorite author)			
Nonfiction books	_____	_____	_____
(Please specify preference: biography, self-help, religious, etc.)			

Appendix C: Survey of Recreational Reading Habits, Revised

1. Please indicate your gender: Male_____ Female_____
2. Please indicate your student status:
Freshman___ Sophomore___ Junior___ Senior___ Other (specify)_____
3. Please indicate your age: _____
4. Please indicate your cumulative GPA: _____
5. Are you either a current or a former recipient of support services from the disabilities coordinator on campus? Yes___ No___
6. Are you in the Honors Program? Yes___ No___
7. Are you employed? Yes___ No___
8. Please indicate the approximate number of hours you spend each week on recreational reading (not required for classes) when school is in session: _____
9. Please indicate the approximate number of hours you spend each week on recreational reading (not required for classes) during vacations: _____
10. If you had more free time, would you read more? Yes___ No___
11. Please indicate how often you read each of the following:
(Circle your response.)

	Never	Less than once a week	Daily	Weekly
Newspaper	N	L	D	W
Magazines	N	L	D	W
Comic books	N	L	D	W
Poetry	N	L	D	W
Letters/e-mail/Facebook	N	L	D	W
Internet	N	L	D	W
Novels	N	L	D	W
Nonfiction books	N	L	D	W
E-Books	N	L	D	W
Paperback or hardback books	N	L	D	W
12. If you read novels, please specify your preference: science fiction, mystery, etc., & your favorite author: _____
13. If you read nonfiction books, please specify your preference: biography, self-help, religious, etc.

14. Do you own an E-reader (such as a Kindle or Nook)? Yes___ No___

Appendix D: Sample Critical Thinking Test Questions

Instructions: *Form a reflective and reasoned judgment with regard to which choice is the best from among those offered*

For Sample Items 1, 2 and 3 Please consider this information: A scientific study compared two matched groups of college women. The women in both groups were presented with information about the benefits of a healthy diet and regular exercise. The women in one group were paired up with one another and encouraged to work as two-person teams to help each other stick with the recommended healthy regimen of smart eating and regular vigorous exercise. The women in the other group were encouraged to use the same recommended regimen, but they were also advised to work at it individually, rather than with a partner or teammate. After 50 days the physical health and the well-being of all the women in both groups were evaluated. On average the women in the first group (with teammates) showed a 26 point improvement in measures of cardiopulmonary capacity, body strength, body fat reduction, and sense of well-being. On average the women in the other group (encouraged to work as individuals) showed a 17 point improvement on those same measures. Using statistical analyses the researchers determined that the probability that a difference of this size had occurred by chance was less than one in 1000.

Sample Item # 1.

If true, these research findings would tend to support which of the following assertions?

- A = A college woman cannot achieve optimal health functioning without a teammate.
- B = Universities should require all students living in campus residence halls to participate in a health regime of smart eating and regular vigorous exercise.
- C = A healthy diet will cause one to have better mental health and physical strength.
- D = This research study was funded by a corporation that makes exercise apparel.
- E = A regimen of smart eating and regular exercise is related to better health.

Sample Item # 2.

If the information given in the case above were true, which of the following hypotheses would not need to be ruled out in order to confidently claim that for the majority of young adults a regimen of smart eating and regular vigorous exercise will result in significant improvements in one's overall health.

- A = This study was about women, the findings cannot be generalized to include men.
- B = Since the study began to solicit willing participants before the Research Ethics Review Committee of the college gave the research project its formal approval to gather data, the findings are invalid.
- C = Some women in the study over-reported their compliance with the eating and exercise regimen, which led the researchers to underestimate the full impact of the regimen.
- D = Since many of those studied described themselves as overweight or out of shape when the study began, a similar regimen will not benefit people who are healthier to start with.
- E = The measures of health and well-being used to evaluate the women students may not be appropriate for evaluating the health and well-being of male students.

Sample Item # 3.

Consider the claim, "Working with a teammate or partners on a health regimen is better than working individually." Which of the following additional pieces of information would not weaken that claim?

A = Most of the women in the group that was encouraged to work individually actually worked with friends and partners who were not part of the study.

B = Most of the pairings and teams created in the first group (with teammates) fell apart after a few days and the women in that group actually worked individually.

C = There was something about the women in the first group (with teammates) that the researchers overlooked, thus invalidating the intended matching of the two groups.

D = Men are more likely to work alone, so any recommendation that men find a teammate or partner to support them in sticking with the regimen will be ignored.

E = The study was undertaken when there were no exams or major projects due, thus the results about working with a teammate do not apply to more stressful times of the year.

Sample Item # 4

Three graduate school friends, Anna, Barbara, and Carol, graduated successfully. Being in the same program, the three often worked as a team on group assignments. Anna earned the special recognition of "pass with distinction" when she graduated. Carol and Barbara, although receiving their degrees, did not earn this special honor. A fourth student in the same graduate program, Deirdre, often said that the graduate program was poorly designed and not difficult at all. Deirdre did not graduate, instead she was advised by the faculty to withdraw from the program because her work was below acceptable standards. Given this information only, it follows that

A = Carol and Barbara deserved to receive "pass with distinction" like Anna.

B = Barbara's work in the program was superior to Carol's.

C = Barbara was jealous of the academic success her friend, Anna, enjoyed.

D = Deirdre's work in the program was below the quality of Carol's work.

E = Anna, being successful, will decide to enroll in another advanced graduate program

Sample Item #5:

"I've heard many reasons why our nation should reduce its reliance on petroleum vehicle fuels. One is that relying on imported oil makes our economy dependent on the political whims of foreign rulers. Another is that other energy sources, like the possibility of hydrogen based fuels, are less harmful to the environment. And a third is that petroleum is not a renewable resource so when we've used it all up, it will be gone! But I don't think we're likely to use it all up for at least another fifty years. And by then we'll have invented new and better fuels and more fuel-efficient vehicles too. So that argument doesn't worry me. And I don't really believe the stuff about how foreign leaders can force our nation to change its policies simply by decreasing their oil production. Oil companies like Exxon have made record profits precisely in those times when the supply of foreign oil was reduced. I don't see the big oil companies being very interested in policy change when the money is rolling in. And for another, our nation has demonstrated that it is willing to wage war rather than to permit foreign leaders to push us around. So this whole thing about how we have to reduce our reliance on petroleum based gasoline, diesel, and jet fuel is bogus." The speaker's reasoning is best evaluated as

- A = strong. It shows the arguments for reducing petroleum vehicle fuels are weak
- B = strong. The speaker is very clear about what he believes and why he believes it.
- C = weak. The speaker probably owns stock in Exxon or some other oil company.
- D = weak. The speaker ignored the environmental argument entirely.

Sample Item # 6

Using the phone at her desk, Sylvia in Corporate Sales consistently generates a very steady \$1500 per hour in gross revenue for her firm. After all of her firm's costs have been subtracted, Sylvia's sales amount to \$100 in bottom line (net) profits every 15 minutes. At 10:00 a.m. one day the desk phone Sylvia uses to make her sales calls breaks. Without the phone Sylvia cannot make any sales. Assume that Sylvia's regular schedule is to begin making sales calls at 8:00 a.m. Assume she works the phone for four hours, takes a one hour lunch exactly at noon, and then returns promptly to her desk for four more hours of afternoon sales. Sylvia loves her work and the broken phone is keeping her from it. If necessary she will try to repair the phone herself. Which of the following options would be in the best interest of Sylvia's firm to remedy the broken phone problem?

- A = Use Ed's Phone Repair Shop down the street. Ed can replace Sylvia's phone by 10:30 a.m. Ed will charge the firm \$500.
- B = Assign Sylvia to a different project until her phone can be replaced with one from the firm's current inventory. Replacing the phone is handled by the night shift.
- C = Authorize Sylvia to buy a new phone during her lunch hour for \$75 knowing she can plug it in and have it working within a few minutes after she gets back to her desk at 1:00 p.m.
- D = Ask Sylvia to try to repair her phone herself. She will probably complete the repair by 2:00 p.m.; or maybe later.

Vita

Kimberly “Kim” Tanner Hawkins grew up in Channelview, Texas. After high school graduation, she headed to Baylor University, where she received a B.S. in Elementary Education. She taught elementary school in several Texas school districts then returned to Baylor University and earned an M.S. in Curriculum and Instruction. Upon completion of the master’s degree, she also became a certified Reading Specialist. During her teaching career in Texas, she became a certified school librarian as well as a teacher for gifted and talented students.

After teaching six years in Texas, she moved to Tennessee with her husband and was hired to supervise student teachers for Carson-Newman College. She spent four years supervising student teachers then returned to the public school classroom, where she taught middle school reading and language arts for several years.

She took a break in her professional career to be home with her two children. During this time, she volunteered at her children’s elementary school, serving as PTO treasurer, vice-president, and president. She was also involved in her home county’s unit of the American Cancer Society.

When the younger of her two children started kindergarten, Kim entered the Ph.D. program at the University of Tennessee and was hired by Carson-Newman College’s School of Education, where she currently serves as Instructor of Education. She teaches courses in literacy methods and middle school methods. She is a member of the Mossy Creek Literacy Council, the Tennessee Reading Association, the International Reading Association, and the Association for Middle Level Education.

Kim is an active member of the Steele Ringers, an adult hand bell choir at her church in Jefferson City, TN. She lives in Dandridge, TN with her husband of 23 years and their two children.