

COUNTERFACTUAL HISTORICAL SCENARIOS  
AS ORGANIZERS OF THE SOURCES OF  
INSIGHTFUL UNDERSTANDING

by

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## ABSTRACT

Researchers have explored history expertise as a model for developing critical thinking in students. However, if students are not interested in history, they may not see any reason to engage in critical reflection in that area. Therefore, this dissertation compares students' reflection in a domain they described as being more interested in and more knowledgeable about, fiction, with their reflection in history. In a pilot study, participants generated more fictional events than historical events but generated an equal number of historical and fictional counterfactuals. These results are interpreted as support for the idea that, while interest can lead to knowledge, by itself knowledge is insufficient for insightful reflection on a topic. To further explore the role of counterfactual scenarios as a context for insightful reflection, a follow up study was conducted with two types of counterfactual scenarios (fictional, historical) as within-subjects factors, two sources for counterfactual scenarios (student, non-student) as within-subjects factors, and presentation order (fictional counterfactuals 1<sup>st</sup>, historical counterfactuals 1<sup>st</sup>) as a between subjects factor. The dependent measures were rated feasibility, interest, and insight quality. The overall purpose of the study is to explore the relationships among counterfactual thinking, interest, and insightful reflection.

## DEDICATION

This dissertation is dedicated to my father, Bill Stewart. He is the man I follow spiritually, academically, and personally.

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I am grateful to the many people who made this dissertation possible. I am grateful to God for sending me on the journey from would be high school history teacher to educational psychology Ph. D. candidate. I am grateful to my parents for being an example to me. I am grateful to Dr. Steve Thoma, my committee chair, for his invaluable guidance toward finishing this dissertation. I am grateful to Dr. Sara Tomek for going above and beyond the call of duty in helping me with the statistical analyses. I am grateful to Dr. Cecil Robinson for always helping me to sharpen my ideas. I am grateful to Dr. Rick Houser for being an encouragement when I encountered difficulties. I am grateful to Dr. Ned Lebow for his research on counterfactual thinking that has served as inspiration for my own work. I am grateful to Dr. Ali Iran-Nejad for pushing me to seek revelations, reflect on them, and encourage others to do likewise. I am grateful to the students who were the participants in my study. Finally I am grateful to David Ainsworth, Edward Terry, Keegan Hesse, and David Johnson for helping me to keep my sense of humor through this process.

## CONTENTS

ABSTRACT.....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENTS.....	iv
LIST OF TABLES.....	vi
LIST OF FIGURES.....	vii
I. INTRODUCTION TO THE PROJECT.....	1
II. LITERATURE REVIEW.....	9
III. METHODOLOGY .....	33
IV. RESULTS.....	49
V. CONCLUSION.....	59
VI. REFERENCES.....	75
VII. APPENDIX .....	88

## LIST OF TABLES

1. Interview Questions.....	35
2. Individual and Group Interview Totals.....	36
3. Event and Counterfactual Totals.....	37
4. Ns for Each Question and Counterfactual.....	40-41
5. Crossed Design of Study Two.....	41
6. Effect of Order on Individual Questions.....	41-42
7. Study Two Counterfactuals.....	43-44
8. Mean Feasibility Ratings.....	50
9. Mean Interestingness Ratings.....	51
10. Mean Insightfulness Ratings.....	53
11. <i>Friends</i> Counterfactual Means.....	54
12. <i>Seinfeld</i> Counterfactual Means.....	55
13. <i>Pretty Little Liars</i> Counterfactual Means.....	56
14. <i>Harry Potter</i> Counterfactual Means.....	56-57
15. Abraham Lincoln Counterfactual Means.....	57
16. Ns for Feeling Knowledgeable.....	58

## LIST OF FIGURES

1. Relationship between plausibility and habitual thinking and insightful reflection.....	7
2. Mean feasibility by type and source.....	50
3. Mean interestingness by type and source.....	52
4. Mean insightfulness by type and source.....	53

## CHAPTER I

### INTRODUCTION TO THE PROJECT

#### **Background**

I know why you're here, Neo. I know what you've been doing. I know why you hardly sleep, why you live alone and why night after night you sit at your computer. You're looking for him. I know because I was once looking for the same thing and, when he found me, he told me I wasn't really looking for him. I was looking for an answer. It's the question that drives us. It's the question that brought you here. You know the question just as I did (Wachowski & Wachowski, 1999).

The above quotation comes from the movie *the Matrix*. *The Matrix* is about a group of people who have come to the realization that what they thought was real is in fact a computer generated world (the matrix) created to enslave humanity. More relevant to education, the movie traces Neo's quest to resolve the conundrum of the nature of the matrix and his place within it. An analogous conundrum may be said to exist with regard to history education's place within the social studies. There is broad agreement that history education should promote critical inquiry (e.g., Levstik & Barton, 2005; Loewen, 1995; Wineburg & Wilson, 1991; Zinn, 2003). One means of achieving this goal has been to develop history experts' practices in students (e.g., Britt & Aglinskas, 2002; Britt, Perfetti, Van Dyke, & Gabrys, 2000; Rouet, Britt, Mason, & Perfetti, 1996; VanSledright, 2002; Voss & Wiley, 1997; Wiley & Voss, 1996, 1999). The conundrum arises because, no matter how much expert knowledge they are taught, students may not want to engage in expert like critical thinking (Stewart, Iran-Nejad, & Robinson, 2008).

Instead of being guided by information processing theory (Atkinson & Shiffrin, 1968; Neisser, 1967, 1976), the present paper is guided by biofunctional theory (Iran-Nejad, 2000; Iran-Nejad & Gregg, 2001; Iran-Nejad & Ortony, 1984). Specifically, this paper explores the assumption that students' own insights and interests are the appropriate starting point for their critical reflection (Iran-Nejad & Gregg, 2001). The biofunctional perspective assumes that interest is created from incongruity resolution (Iran-Nejad, 1987a). As with Neo in *the Matrix* (Wachowski & Wachowski, 1999), students' critical reflection can then be a natural extension of their own insights, interests, and questions (Iran-Nejad & Gregg, 2001). Interest has been found to be an important component in the early development of particularly creative experts (Csikszentmihalyi, 1996). Additionally, passion has been found to be a substantial part of the lives of adult experts (Neumann, 2006). This shift in focus to interest is not intended as a denial of the value of developing students' capacity for critical inquiry. Instead, the aim is to provide multiple meaningful avenues for students to engage in critical inquiry.

Experts' scientific, veridical, conceptions of the world are not always beneficial (Harris, 2001). Specifically, experts tend to interpret counterfactual scenarios in terms of their own prior theoretical and ideological biases (Tetlock & Visser, 2000). This is particularly true when experts have a high cognitive need for closure and simplicity (Tetlock, 1998; Tetlock & Lebow, 2001). By contrast non-experts are willing to consider and be influenced by counterfactual historical events (Tetlock & Visser, 2000). Additionally, while some scholars have suggested including counterfactual thinking in history teaching (Lebow, 2007; Ripley, 2007; Roberts, 2011), an exhaustive search of the literature did not turn up any studies of student learning while engaging in counterfactual historical thinking in the classroom. Similarly, while counterfactuals are a common component of fictional narratives and the subject of discussion in literary criticism

(Dohrn, 2009; Gallagher, 2011; Harding, 2011; Kim & Maslen, 2006), studies of counterfactual thinking have not focused on fictional narratives likely to be meaningful for students (e.g., Trabasso & Bartolone, 2003).

### **Research Questions**

Given these gaps in the literature, more research is needed on the relationships among counterfactual scenarios, interest, and critical reflection. Thus the purpose of this dissertation is to explore the following questions:

- Do fictional versus historical counterfactuals and student versus non-student counterfactuals differ in feasibility?
- Do fictional versus historical counterfactuals and student versus non-student counterfactuals differ in interestingness?
- Do fictional versus historical counterfactuals and student versus non-student counterfactuals differ in the quality of students' insights?

First, these questions are explored via, a series of interviews in which students were asked to generate counterfactual outcomes for historical events they described as memorable or interesting and for scenes from fictional media they described themselves as fans of. The results of this study are interpreted in terms of the relationship between students' critical reflection in responding to the interview questions and their knowledge of and interest in particular historical events or fictional media. Second, these questions are explored via a follow up study in which a different group of students were asked to (a) rate the feasibility and interestingness of counterfactuals from the first study, (b) rate the feasibility and interestingness of counterfactuals drawn from non-student sources, (c) and report any insights they had while reading the scenarios and answering the questions about them.

## Significance

Typically, researchers who study expertise focus on the advantages of expertise relative to novices (Chen, 2009; Chi, Feltovich, & Glaser, 1981; deGroot, 1965; Ericsson, 2003). In general, it is better to be an expert rather than a novice. However, in some domains the problem space can lead experts astray (Kahneman & Klein, 2009). For example, historians tend to focus on explaining why events occurred the way they did rather than why other events did not (Tetlock, Lebow, & Parker, 2006). Additionally, history experts can be more or less receptive to counterfactual possibilities depending on their theoretical commitments and on their need for cognitive closure (Tetlock, 1998; Tetlock & Lebow, 2001). Of course, novices may inappropriately interpret historical events in terms of what they experience in the contemporary world (Wineburg, 1999). Thus, counterfactual thinking is relevant to educational science because it has the potential to reveal the limitations of both expert thinking and everyday reasoning.

Similarly, examining counterfactual thinking in the context of popular media provides a potential point of comparison with counterfactual thinking in history. Specifically, while history novices might be more open to being influenced by counterfactuals than are history experts (Tetlock & Visser, 2000), they may be less willing to be influenced by counterfactuals involving fictional events from popular media (Atwood, 1989). Such a finding would contribute to existing research on counterfactual thinking by applying it to a context that is likely to be personally meaningful for individuals (cf., Ersner-Hershfield, Galinsky, Kray, & King, 2010; Petrocelli & Crysel, 2009). Finally, a stronger research base on students' counterfactual thinking in history and popular fiction would enable teachers to better use counterfactual thinking with their students (Roberts, 2011).

## **Definitions**

### **Expertise**

In the less academic context of role playing games leveling up provides an indication of expertise (Chen, 2009). With respect to domains such as history, obtaining a Ph. D. serves as a marker of expert knowledge (Wineburg, 1991a). More broadly, history expertise can be defined in terms of what history experts do: use evidence to engage in inquiry about what happened in the past and why (Barton, 2005; Lebow, 2010; Rouet, Favart, Britt, & Perfetti, 1997; Tetlock et al., 2006; Wineburg, 1991b, 1998). Analogous to historians' use of evidence, fiction expertise can be defined as spontaneous use of fictional texts in inquiry about those texts. For example, a person could use existing comic books to evaluate a counterfactual in which Superman was raised in the Soviet Union (Millar, 2004).

### **Knowing**

In an everyday sense, knowing is synonymous with familiarity (Iran-Nejad & Stewart, 2010b). Obviously, psychological perspectives must be more precise. Biofunctional theory defines understanding as the ongoing process by which the brain creates transient schemas (Iran-Nejad, 1987b, 1989), knowing as the person's conscious awareness of the schema of the moment (Iran-Nejad & Gregg, 2001; Iran-Nejad & Ortony, 1984), and knowledge is assumed to be external to the person (Iran-Nejad & Stewart, 2010a, 2010b; Stewart et al., 2008). Knowledge is external in the sense that information is neither internalized from the environment nor stored by the brain (Iran-Nejad & Ortony, 1984). Instead, functional regularities in brain subsystems are assumed to provide a basis for the stability of knowing (Bowden & Jung-Beeman, 2003, 2007; Jung-Beeman et al., 2004; Kounios & Beeman, 2009; Kounios et al., 2008; Kounios et al., 2006).

## **Critical Reflection**

Biofunctional theory assumes that interest, incongruity resolution (Iran-Nejad, 1987a), and insights (Iran-Nejad & Gregg, 2001) are the essential components of critical reflection. Hidi and Renninger (2006) define interest as “the psychological state of engaging or the predisposition to reengage with particular classes of objects, events, or ideas over time” (p. 112). Kirchner (2011) describes critical thinking as “a way of framing, responding to, and engaging with the troubles, pleasing and displeasing aspects, and mysteries of the world and of human existence” (p. 73). In light of the preceding quotes, a major goal of education (Iran-Nejad, Watts, Venugopalan, & Xu, 2006; King & Kitchener, 2004; Schön, 1987), critical reflection, could be reframed as developing in students the predisposition to engage and reengage with the troubles, displeasing aspects, and mysteries of the social world (Gutmann, 1987; Howe, 1997; Petrovic, 1999; Young, 1990). Thus, interest provides the personally meaningful reason for critical reflection. Similarly, insightful reflection provides a means of resolving incongruity when mysteries do not appear to have an immediate solution. Generally speaking, an insight is a solution to a problem, or an idea, that suddenly comes to a person’s awareness without effortful thinking (Sternberg & Davidson, 1995).

## **Counterfactual Thinking**

Counterfactual thinking involves an antecedent, the thing that might have been different, and the consequent, the result of that difference (Lebow, 2006b, 2007, 2010; Tetlock, 1998; Tetlock & Lebow, 2001; Tetlock & Visser, 2000). In general, more feasible counterfactuals involve minimal changes to antecedent conditions (Tetlock et al., 2006). Minimal changes are more feasible to the degree that greater and more complicated changes would be easier to

frustrate (Lebow, 2006b). Also, changes that are relatively close to an event are more feasible because there is less time for a change to be derailed (Tetlock et al., 2006).

### Theoretical Foundation

Biofunctional theory suggests that, if teachers want to encourage students to engage in critical reflection, educators should focus on fostering in students the capacity for insights in the students' own domain of creative interest (Iran-Nejad & Stewart, 2010a). As Iran-Nejad and Gregg (2001) noted "the only road toward making a difficult (or complex) problem simple is the one that brings together in a new way the diverse sources that give birth to (insightful) solutions to it" (p. 871). However, as was noted by participants in Neumann's (2006) study of post-tenure faculty development, having "insights" is a somewhat rare occurrence and what initially seems like a promising idea can turn out to be wrong. Thus, one must couple the desire for one's insights to be self-evident with critical reflection that evaluates those insights (Iran-Nejad & Gregg, 2001).

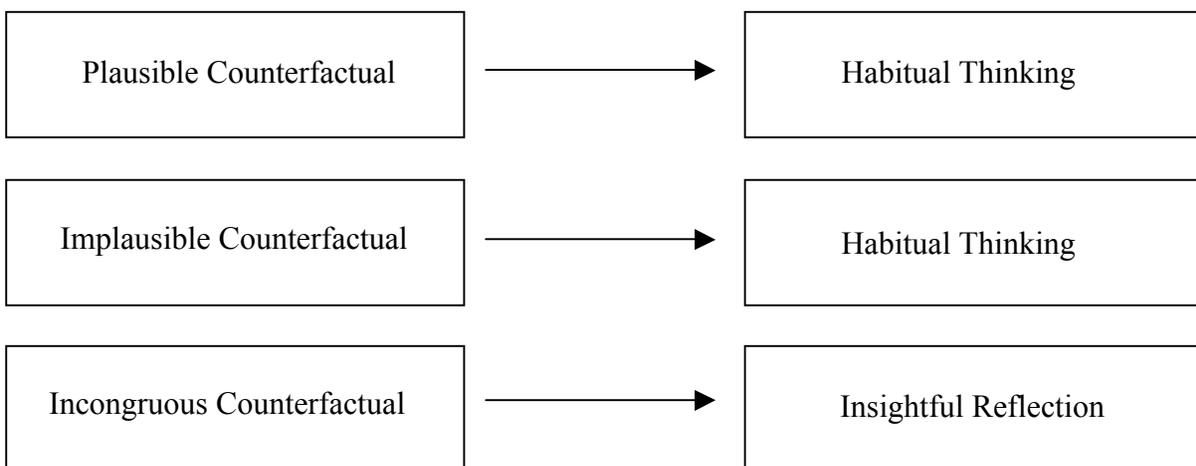


Figure 1. Relationship between plausibility and habitual thinking and insightful reflection.

Focusing on the feasibility of counterfactuals is assumed to lead to habitual thinking and not insightful reflection because feasibility is evaluated relative to knowledge that is outside the

person. This external focus is a barrier to critical reflection because it works against what is interesting to people. While feasibility is certainly important, the most useful counterfactuals for purposes of insightful critical reflection are those that are less feasible to a degree. For example, a counterfactual world, describing what the present would be like had Mozart lived to be 65, is likely to be less feasible to the extent that history after Mozart's death would be difficult to predict. However, such a counterfactual might be rated as somewhat feasible if it described something, such as friends getting together for drinks, that is likely to be relevant for and meaningful to the reader. This mix of elements that are more and less feasible is what makes a counterfactual incongruous. Were incongruity not to lead to insights it would be disconfirming evidence relative to the framework presented in figure one.

Analogously, fictional works' usefulness for insightful reflection can be evaluated by treating fictional works as worlds unto themselves. Feasibility could be evaluated based on fidelity to the source material. As with a historical event, the long term effect of a minor change in the plot of a fictional work would be difficult to specify with certainty. Thus, a fictional counterfactual that did not take this uncertainty into account could be considered not feasible. Finally, a fictional counterfactual could be considered incongruous if less feasible aspects are paired with story elements that are meaningful and relevant for readers.

## CHAPTER II

### LITERATURE REVIEW

#### **Critical Reflection in History Experts and Students**

Researchers have explored the characteristics of experts in domains such as chess (deGroot, 1965), physics (Chi et al., 1981), mathematics (Schoenfeld, 1985), nursing (Easen & Wilcockson, 1996; English, 1993; McCutcheon & Pincombe, 2001), and history (Rouet et al., 1997; Wineburg, 1991a, 1991b, 1998). The findings from this research support the view that expertise is derived from multiple sources such as intuition (Kahneman & Klein, 2009), affective engagement (Csikszentmihalyi, 1990, 1996; Neumann, 1999, 2006), and knowledge (Chi et al., 1981; deGroot, 1965; Ericsson, 2003; Hatano & Inagaki, 1986; Schoenfeld, 1985). However, efforts to develop history experts' practices in students have tended to focus on knowledge (e.g., Britt & Aglinskas, 2002; Britt et al., 2000; Rouet et al., 1996; Voss & Wiley, 1997; Wiley & Voss, 1996, 1999).

#### **History Expertise as Critical Reflection**

Interest in historians as a model for history instruction began in Britain (Booth, 1994). Nonetheless, much of the empirical research on the characteristics of history expertise has been conducted by researchers based in the United States. Within the domain of history, researchers have found that historians consider the source and context of information whereas students do not (e.g., Wineburg, 1991a), historians display adaptive expertise when working with historical materials outside their area of specialization (Hatano & Inagaki, 1986; Wineburg, 1998), and that history experts evaluate historical information differently than experts in other fields (Rouet et

al., 1997). However, history expertise is not primarily about identifying biases in sources of information (Barton, 2005). Being a history expert is primarily about seeking answers to questions that are meaningful for the historian (Grant, Gradwell, & Cimbricz, 2004).

Using a think aloud protocol (Ericsson & Simon, 1984), Wineburg (1991a) studied historians and high school students relative ability to analyze text and pictorial documents about the Battle of Lexington Green during the American Revolutionary War. Consistent with past expert-novice research (e.g., Chi et al., 1981), Wineburg found that students and historians think about history in fundamentally different ways. All of the historians consistently attended to who wrote the sources presented, the context in which they were written, and whether or not the information in sources could be corroborated with information from other sources. In contrast, the student novices rarely displayed any evidence of considering source characteristics and relied heavily on the textbook. However, the students in the study did not come off as completely inept. While experts in American history knew more about the Battle of Lexington than the students, the students knew more about the battle than did historians who were not experts in American history. This finding is relevant to the extent that knowledge of history affects perceptions of contingency and thus of counterfactual possibilities. While knowledge of history might be less of a factor in historians' openness to counterfactual thinking (Tetlock, 1998; Tetlock & Lebow, 2001), that doesn't preclude the possibility that it is a factor in students' willingness to consider counterfactual outcomes for historical events.

Rouet et al. (1997) conducted a study designed to clarify the distinction between knowledge of history and history expertise. Two groups of graduate students, one group of history students and one group of psychology students, read several sources of information about two controversial aspects of the U.S. intervention in Panama at the time of the Panamanian

revolution and wrote opinion essays on the controversies. These findings are consistent with the idea that history expertise “involves both the knowledge of specific forms of discourse and the knowledge of how discourse may be used as evidence when solving problems” (Rouet et al., 1997, p. 104). This is reflected in history graduate students’ greater variety of reasons for source usefulness and their being less willing to take a clear position on the controversies relative to psychology graduate students.

Wineburg (1998) conducted a study that further clarifies aspects of history expertise. Wineburg compared two US history professors, one of whom was a specialist in Abraham Lincoln and one of whom wasn’t, as they read documents about Abraham Lincoln. Wineburg’s results can be explained in light of the difference between “routine expertise” and “adaptive expertise” (see Hatano & Inagaki, 1986). Routine expertise, as with the expert in Abraham Lincoln, enables “the rapid firing and deployment of knowledge” (Wineburg, 1998, p. 321), and allowed much more specificity in placing the documents in historical context. However, adaptive expertise, as with the historian who was not a specialist in Lincoln, consists of “the ability to pick oneself up after a tumble, work through confusion, and reorient oneself to the problem at hand” (Wineburg, 1998, p. 321), and still allowed for placing the events in historical context. While the routine expert would have more knowledge, adaptive expertise has the advantage of being derived from the person’s own questions, interests, and insights.

### **Students’ Awareness and Use of Evidence in Thinking about History**

In contrast to historians’ view that history is based on evidence (Wineburg, 1991a, 1991b, 1998), students tend to view American history as a story of progress and have difficulty making sense of events that do not fit this pattern (Barton & Levstik, 1998). While students are aware that historical information is derived from numerous sources of evidence (Barton, 1997), they

don't necessarily apply this knowledge to their study of history unless they are taught to do so (VanSledright, 2002). Paxton (1997) found that the relatively simple act of making visible the fact that a textbook has an author prompted students to think critically about the textbook content. Additionally, researchers have demonstrated that students will create arguments somewhat similar to those of historians when primed appropriately (Voss & Wiley, 1997; Wiley & Voss, 1996, 1999).

Barton (1997) observed two classrooms for a one year period and interviewed some of the students from the classes. In the interviews students were asked questions about their understanding of history and were asked to put a series of pictures from history in chronological order. The results of this study are somewhat mixed. Students were aware that sources can be biased and that there are multiple potential sources from which one could construct an account of the past. However, they failed to apply this knowledge to the history they were studying in school. Interestingly, Barton suggested that the events studied in history may not provide significant incentive for students to use evidence to form conclusions about the past.

Barton and Levstik (1998) conducted a related study in which they asked students in grades five through eight to choose from among twenty photographs eight that represented significant aspects of American history over the past 500 years. Participants were also interviewed in a semi-structured format. The interview questions focused on issues of historical significance and involved asking participants questions such as why they chose particular photographs, which photographs others might choose, and which photographs no one would choose. Barton found that students tended to view American history as the story of continual progress. This progress was described both in terms of the expansion of rights and in terms of advances in technology. Second, students had difficulty integrating incongruous events that

might be thought to reflect badly on the U.S. into this framework. Third, students saw events that represented progress as significant but not events that only represented change in a fairly neutral sense of the word. Fourth, students had some difficulty figuring out where events such as the Vietnam War fit because, as a war, it was significant but not easily placed into a narrative of progress. Finally, their school experiences thus far had given them a somewhat limited ability to draw on their own interests and questions about history, explored outside of school, and apply them to the history they learned in school.

Paxton (1997) conducted a study inspired by the observations that history textbooks are often perceived as dull and that history textbooks are also rather different from what historians write for themselves. Students also develop unrealistic ideas about historical evidence and historical uncertainty as a result of what they read in textbooks. Specifically, students have little idea about where historians get what they know about history. Finally, students tend to accept what textbooks say uncritically. In order to address some of these shortcomings Paxton manipulated whether students read a textbook like passage with either an author who wrote using the first person and injected an opinion into the narrative or a traditional textbook account. Paxton found that participants who read the text with the “visible author” were more likely to think critically about the text they read and to display behavior that was more like that of historians. Students likely responded to the textbook with the visible author in this way because they recognized the author as a person who has interests and questions analogous to their own.

Rather than focusing on textbooks, Rouet et al. (1996) examined the effects of primary source documents, which are used by historians as evidence when reasoning about the past, on students’ learning. In this study, the Panamanian Revolution of 1903 was the focus of students’ reasoning about history. Whether or not students received primary source documents as part of

the document sets they read was varied by the researchers. Rouet et al. found that most students were able to use evidence from the documents to express and support their opinion. Specifically, the finding that students used evidence to support their opinions was most pronounced in the primary source documents condition.

Britt et al. (2000) developed *Sourcer's Apprentice*, a web-based computer program designed to support the development of historical thinking in students. Britt and Aglinskas (2002) reported findings from several studies that used *Sourcer's Apprentice* to teach students the expert practices identified by Wineburg (1991a). As with other similar studies (e.g., Rouet et al., 1996), students read a set of documents about a historical controversy and wrote an essay. Britt and Aglinskas found that, in contrast to students who used textbooks, *Sourcer's Apprentice* fostered significantly more use of the sourcing heuristic. Wineburg defined the sourcing heuristic as “the act of looking first to the source of the document before reading the body of the text” (Wineburg, 1991a, p. 77).

Rather than focusing specifically on expert practices, Wiley and Voss conducted several studies designed to promote historical understanding in students (Voss & Wiley, 1997; Wiley & Voss, 1996, 1999). Voss and Wiley (1997) made the following distinction between learning information about history and historical understanding:

Thus, what and how much one remembers from the contents of a history chapter would define what a person has learned. However, understanding is taken to refer to the knowledge a person has about the underlying conceptual relations of a given topic, the relations often including the interpretation of the presented material. (p. 256)

Thus, for Voss and Wiley, history understanding is synonymous with knowledge transformation (Scardamalia & Bereiter, 1987). Voss and Wiley used experimental procedures

in which students wrote argument essays from multiple historical documents as a means to promote deeper processing and more knowledge transformation (Voss & Wiley, 1997; Wiley & Voss, 1996, 1999). In describing what knowledge transformation meant in the context of history, Wiley and Voss defined added sentences as those that “contained only novel information”; borrowed sentences as those that “were taken directly or paraphrased from the presented material”; and transformed sentences as those that “contained some presented information in combination with a new (not from the text) claim or fact” or “combined two or more pieces of presented information that were not connected in the text” (1999, p. 303). In general, Wiley and Voss’s (1996, 1999) findings support the notion that history understanding is synonymous with knowledge transformation and that argument writing from multiple documents is an effective means to achieve history understanding in students.

VanSledright (2002) provides a model for how history experts practices might be taught to students in an actual classroom (Wineburg, 1991a, 1991b). Contrary to the assumption that elementary students would be too young to engage in critical reflection analogous to that of history experts, VanSledright’s study consisted of him teaching fifth grade US history for four months. Results indicate that VanSledright was effective at making the students more aware of why and how to interpret evidence as part of the process of historical inquiry. While these results are remarkable, the average teacher is not likely to be as much of an expert in the historical thinking literature as is VanSledright.

Rather than teach a history class, Barton (2001) compared students in the United States and Northern Ireland relative to their beliefs about the sources of historical knowledge. Consistent with previous findings that students rely on textbooks for historical information (Wineburg, 1991a), and researchers’ efforts to break them of that habit (Britt & Aglinskias,

2002), Barton found that students in the United States tended to see knowledge of history as coming from oral reports or from books. As is not entirely a surprise, students in Northern Ireland tended to see knowledge of history as coming from the remains of historic sites that, relative to students in the United States, they are more likely to encounter in their daily lives. Additionally, in contrast to students in the United States, learning about historical evidence is a normal part of the curriculum for students in Northern Ireland.

As Floden (1981) observed, “It is common to think that educational objectives established using some psychological (or other scientific) theory are justified by the theory’s acceptance, and somehow objective. Thus, for example, some teachers may think that the omission of cognitive objectives was demanded by the acceptance of behaviorism” (p. 85). Similarly, information processing theory’s focus on processing information may be responsible for researchers’ decision to focus on developing history experts’ cognitive processes in students despite other possible avenues for developing expertise (e.g., Britt & Aglinskias, 2002; Britt et al., 2000). Just as a rejection of behaviorism need not involve denying the importance of behavior, a rejection of definitions of expertise focused on information processing need not deny that people do, in a sense, process information. Instead this paper argues that, by focusing on information processing, educational researchers may miss important aspects of human nature (Floden, 1981).

### **Limitations of the History Education Research and Practice**

While progress has been made in developing expert practices in students (e.g., Britt & Aglinskias, 2002; Voss & Wiley, 1997; Wiley & Voss, 1996, 1999), students still tend to be unwilling to revise their initial viewpoints based on new information. For example, as Wineburg (1999) said of one of his participants who was given a fairly standard task asking him to analyze

a number of historical sources, “These documents did not spur Derek to ask himself new questions or to consider new dimensions of human experience. Instead, his existing beliefs shaped the information he encountered, so that the new conformed to the shape of the already known” (p. 492). Nonetheless, Derek’s lack of insightfulness is itself nothing new. Indeed, like Derek, social studies students, teachers, and researchers often ignore issues of gender (see Crocco, 2008). Also, some white students lack empathy for African-Americans that fought for Civil Rights (Foster, Hoge, & Rosch, 1999). Finally, while models of successful history teaching have existed for decades (e.g., Wineburg & Wilson, 1991), turning students into truly reflective democratic citizens has proven to be an almost insurmountable challenge (cf., Parker, 2008).

Fournier and Wineburg (1997) conducted a study addressing the question: how do boys and girls differ (or not) in their depiction of historical figures? The participants in this study were in the 5<sup>th</sup> and 8<sup>th</sup> grades. This study asked participants to draw one of three figures from American history: a pilgrim, a western settler, or a hippie. The participants were presented with a two part questionnaire. The first part asked them to draw a single figure of one of the three types above. The second part asked participants either to draw pilgrims farming the land, settlers in a wagon, or hippies at a protest in response to a textbook like passage describing one of those three events. Participants drew the same type of historical figure in each part. The only hypothesis that the researchers formulated prior to the study was that participants would be likely to draw people of their own gender. Results did not confirm this hypothesis. Boys drew almost exclusively men but girls drew a combination of women and men. Girls often drew families. The greatest percentage of figures drawn by girls in part 2 were of men only. This study is

relevant to students' insightful reflection in history to the extent that it reveals their lack thereof with respect to how gender stereotypes are reflected in history learning.

Similar to the study by Fournier and Wineburg (1997), Foster et al. (1999) conducted a study that examine students' historical reasoning with respect to photographs. Participants in this study were third sixth, and ninth grade students. Participants were asked to interpret three of nine historical photographs. All photographs dealt with African American history. The photos spanned a time frame of about 100 years. With respect to the photographs participants were asked the following questions: When do you think this photograph was taken?, Why do you think this photograph was taken?, and What does this photograph tell you about these peoples' lives? The results of this study indicate that students' ability to date photographs and explain why they were taken progressed with age. No gender and race differences were noted for these measures. However African American students were more likely to display empathy with respect to the people in the photographs.

Rather than focusing on students, Yeager and Davis (1994) explored the historical thinking of fifteen secondary school history teachers. The authors identified three categories of teachers in their study: history as constructing meaning (n = 3), history as entertainment (n = 8), and history as a search for accuracy (n = 8). Given that slightly over half of the teachers in this study saw history in terms of facts, it is not surprising that the students in Wineburg's (1991a) study also saw history in this way. Also, given that only a minority of teachers displayed anything the critical reflection of history experts, it is not surprising that students would have trouble with expert like thinking in history.

Barton (2005) articulated several more specific problems with historical thinking research and teaching literature. First, he pointed out that primary sources are more than just evidence

about the past. Second, he noted that accuracy or bias is not necessarily the most important thing to know about primary sources. Finally, he argued that much of the research and teaching based on the presumed characteristics of history experts is inauthentic for students. Grant et al. (2004) made a similar point regarding the authenticity of document-based questions (DBQs).

Document-based questions are the primary teaching and assessment tools used during historical thinking tasks. While they represent a positive step towards authentic disciplinary practices, their examination of DBQs also indicates that they are far from authentic because students are *presented* with questions; the document set used to answer those questions, and must work alone. By contrast, history experts choose the questions, sources used to answer the questions, and whether or not to collaborate with others. Furthermore, historians' explorations of history are derived from their own interests and passions (Iran-Nejad, 1994; Neumann, 2006; Wineburg, Mosborg, Porat, & Duncan, 2007).

### **The Biofunctional Perspective on Knowing, Understanding, and their Relationship**

As Floden (1981) pointed out, cognitive psychologists, in the information processing tradition, have a tendency to conflate the structure of knowledge with the structure of the brain (Kintsch, 1988, 1998; McClelland & Rumelhart, 1986; Rumelhart & McClelland, 1986). For example, memory is often described in terms of a storage and retrieval metaphor (J. R. Anderson, 1983; Atkinson & Shiffrin, 1968; Collins & Quillian, 1969; Perlman & Tzelgov, 2006). However, when interpreted too literally, the metaphor can confuse more than it clarifies (N. Cowan, 2003). Biofunctional theory attempts to overcome this problem by using multiple metaphors, such as a light bulb constellation (Iran-Nejad, 1980), a figure ground navigation system (Iran-Nejad, Marsh, & Clements, 1992), and fountain (Iran-Nejad, Clore, & Vondruska, 1984), to describe memory. The unifying theme in these metaphors is that functional

permanence, rather than structural permanence, accounts for the stable aspects of knowing (Iran-Nejad et al., 1984). Moreover, biofunctional theory has the advantage of shifting research attention from somewhat artificial concerns, such as recall (Bransford & Johnson, 1972), to the survival problems confronted by the brain in the course of evolution (Iran-Nejad et al., 1992). Finally, this shift in focus is broadly compatible with recent evidence suggesting that memory processes are a function of the same brain systems responsible for perception (Jonides, Lacey, & Nee, 2005).

### **Knowing as Static and Flexible**

Bransford and Johnson (1972) tested the hypothesis that prior knowledge is a prerequisite for understanding. The participants in Bransford and Johnson's study read and recalled sentences from passages about serenading a woman in a high rise or washing clothes. The researchers varied whether or not participants received contextual information regarding what the passage was about prior to reading it. The finding that, without appropriate context, participants are unable to understand the passage or remember topic relevant information is an important one.

Iran-Nejad (1987a, 1989) used several experiments, consisting of participants reading and rating surprise-ending stories, to test, the functional hypothesis that schemas are transient patterns. Iran-Nejad (1987a) manipulated the degree of surprise participants experienced when reading a story about a woman named Marilyn who visits a gas station run by a man named Gabriel (adapted from, Thurmond, 1978). Participants either read a no surprise version of the story, in which Gabriel was consistently depicted as a villain, or a surprising version of the story in which the last paragraph revealed that Gabriel's apparently threatening actions, i.e. pulling a gun, were actually helpful. The results indicated that participant interest was a function of high

surprise in situations where incongruity was resolved, stories where Gabriel was initially depicted as a villain but where his actions were later seen to have been helpful. In a follow-up study Iran-Nejad (1989) tested participants ability to switch between two incompatible versions of the story (Gabriel-bad, Gabriel-good). Both sets of participants agreed that the story stem depicted Gabriel as a bad guy. However, participants in the surprise ending condition were able to change their view of Gabriel to good guy following their reading of the last paragraph. This change in perspective is illustrated by the finding that participants who read the surprising ending rated as related to the story statements describing Gabriel as a good guy and unrelated to the story statements depicting Gabriel as a bad guy. This pattern of results occurred even for statements not actually in the story and even though participants had read the story stem in which Gabriel was clearly depicted as a bad guy.

### **Theory and Research on Multiple Sources of Understanding**

Rather than being derived from the single source of external information, true understanding is derived from multiple internal and external sources (Iran-Nejad & Ortony, 1984). Understanding is derived from multiple sources in, roughly, the same sense as plant growth is dependent on multiple sources. For plants the multiple sources that contribute to their growth are the soil, water, air, and sunlight among others. Additionally, was one to focus on trying to grow plants based on just a single source it would be much more difficult and less effective than the natural, multiple source, method. Similarly, for people, understanding is derived from multiple internal and external sources such as the systems for visual, auditory, and proprioceptive awareness (Stewart, Iran-Nejad, & Robinson, 2008). While broadly similar to Piaget's (1961) theory, biofunctional theory is explicit in rejecting the notion of internalization (Iran-Nejad & Ortony, 1984). Additionally, within biofunctional theory, sources of

understanding are defined in terms of the functioning of the nervous system rather than the structure of knowledge in the world. Moreover, knowledge is itself symbolic but the sources of understanding literally cannot be symbolic because they are subsystems of the physical brain.

Thompson and Iran-Nejad (1994) compared two methods for reducing bias against Mexican culture in girls from the southeastern United States. As noted by Thompson and Iran-Nejad, participants' prior beliefs are often difficult to alter (C. A. Anderson, Lepper, & Ross, 1980). Two-hundred four girls participated in this study. Participants were between the ages of eight and seventeen. Participants either took part in a simulation of life in a Mexican village or were taught about Mexican village culture using traditional teaching methods. Participants' knowledge of and cultural bias with respect to Mexican culture was measured before and after the main part of the experiment. Participants who took part in the simulation of life in a Mexican village lived in a recreation of a typical Mexican village and participated in all the activities that are a normal part of life in a Mexican village. Participants had different roles within the village and their roles determined what they participated in while they were part of the simulation. Participants spoke only Spanish while taking part in the simulation. Participants who took part in the traditional teaching condition were taught about Mexican culture through lectures and hands on activities such as building a model of a Mexican village. Participants also learned Mexican songs and dances.

In the Thompson and Iran-Nejad (1994) study, participants' cultural bias was assessed using a questionnaire that depicted children of various races in both positive and negative circumstances. Participants were asked who was responsible for the positive or negative event. Participants were also asked to choose to play an unfamiliar game either from American culture or from another culture and to choose to have either an American girl join their cabin for a week

or a girl from another culture. Participants were given a cultural knowledge test developed specifically for this study to test their knowledge of Mexican culture. At the end of the experiment both groups knew the same amount of information about Mexican culture. However, the group that participated in the cultural simulation had reduced its' cultural bias and the group that was taught using traditional methods had increased in cultural bias. This study provides evidence that bias can be reduced through authentic experiences which take advantage of multiple sources. While studies conducted from a sociocultural perspective are broadly consistent with this point (Barton, 2001), biofunctional theory has the advantage of addressing the nonsymbolic, functional, ground of symbolic, cultural, sources (Harnad, 1990; Iran-Nejad, 2000; Prawat, 2000).

### **Theory and Research on Nonsymbolic Understanding**

In biofunctional theory the most important outcomes of education are learner insights, which result from wholetheme reorganization of a person's intuitive self-awareness. Shifting from informing to insights goes a long way toward solving the problem of inert knowledge (Bereiter & Scardamalia, 1985; Renkl, Mandl, & Gruber, 1996). This is because, in a brain-mind cycle of reflection (Iran-Nejad & Gregg, 2001), involving interest (Hidi, 1990; Hidi & Renninger, 2006), incongruity resolution (Kirchner, 2011), and insights (Bowden & Jung-Beeman, 2003; Jung-Beeman et al., 2004; Kounios et al., 2008), the concept of inert knowledge is itself meaningless. This is because the self-evident nature of insights is logically incompatible with the concept of being inert (Iran-Nejad & Gregg, 2001).

Iran-Nejad and Chissom (1992) conducted a study that illustrates the biofunctional perspective on the nature of understanding. They examined the correlation between active self-regulation, synonymous with executive functioning (Barkley, 2001), and learning,

operationalized as grade point average. The correlation between grade point average and dynamic self-regulation was also examined. Dynamic self-regulation refers to the processes that give rise to experiences such as insights. Iran-Nejad and Chissom found that the correlation between learning and dynamic self-regulation, controlling for active self-regulation, was statistically significant. While the correlation between active self-regulation and learning was initially significant, controlling for the contribution of dynamic self-regulation eliminated the significant result.

Given the substantial scholarly interest in learning strategies by researchers from multiple perspectives (Ausubel, 1978; Baumann, 1984; Bloom, 1984; Bransford, Brown, & Cocking, 2000; Clark & Graves, 2005; Donovan & Bransford, 2005; Harvey & Goudvis, 2007; Mayer & Jackson, 2005; Pintrich, 2002; Schmeck, 1988; Shulman, 1986), it would be premature to suggest that active self-regulation, executive control and learning strategies, are unimportant to learning. Nonetheless, Iran-Nejad and Chissom's results are consistent with a number of findings regarding insights. First, Auble, Franks, and Soraci (1979) found that participants who had insights learned sentences more effectively than participants that did not. Second, researchers in neuroscience have identified brain regions associated with problem solving by insights and brain activity that occurs prior to the occurrence of insights (Bowden, 1997; Bowden & Jung-Beeman, 2003, 2007; Bowden, Jung-Beeman, Fleck, & Kounios, 2005; Jung-Beeman et al., 2004; Kounios & Beeman, 2009; Kounios et al., 2008; Kounios et al., 2006). While these researchers did not adopt a biofunctional perspective, the brain activity that occurs prior to and during and insight could be identified with dynamic self-regulation (Iran-Nejad, 1990, 2000; Iran-Nejad & Gregg, 2001).

## **Counterfactual Thinking in Everyday Life, Fiction, and History**

There are several reasons why counterfactual scenarios are likely to be educationally beneficial for students. First, as a well-established part of popular fiction, counterfactual scenarios are likely to be something that students can relate to (Bixby & Daniels, 1967; R. Cowan et al., 2004; Douglas & Taylor, 1980; Fox, 1964; Sussman & Conway, 2005; Sussman & Rush, 2005). Second, counterfactual reflection can influence individuals' behavior (Ersner-Hershfield et al., 2010; Petrocelli & Crysel, 2009). Third, counterfactuals can go beyond text to include images, sounds, textures, and even smells (Sussman & Conway, 2005; Sussman & Rush, 2005). Finally, while many educational activities rely on the fact that humans perceive the world via multiple sensory modalities (e.g., Mayer, Fennell, Farmer, & Campbell, 2004; Mayer & Moreno, 2003), counterfactual scenarios provide a unique opportunity to consider what may be while considering what might have been (Boninger, Gleicher, & Strathman, 1994). For example, students in a United States history class might find reason to develop humility about the United States' role in the world by considering counterfactual scenarios in which western civilization did not come to dominate the planet (Cook, 2001; Lebow, 2007; Tetlock et al., 2006).

### **Counterfactual Thinking in Everyday Contexts**

While there is some disagreement about the specifics, there is a consensus that young children are capable of understanding and using counterfactual thinking (e.g., Beck & Guthrie, 2011; Harris, 1997, 2001; Harris, German, & Mills, 1996). Additionally, a substantial portion of the research on counterfactual thinking focuses on participants' feelings of regret associated with past decisions and counterfactual choices they could have made (e.g., Boninger et al., 1994; Rye, Calhoun, Ali, & Daftary, 2008). Finally, counterfactual thinking can lead individuals to develop erroneous self-perceptions (Petrocelli & Crysel, 2009).

Harris, German, and Mills (1996) conducted three studies of three to five year olds' ability to engage in counterfactual thinking. These studies involved several scenarios such as a doll with dirty shoes or a person who gets black ink on their hands as a result of using a pen rather than a pencil. Harris et al. found that the children in their study were able to engage in counterfactual thinking to the extent that they could recognize that if an available alternative action had been taken the observed consequences would not have occurred. Beck and Guthrie (2011), explored alternative possible explanations for Harris' (1997) finding that children as young as two years old interpret as counterfactual the observation that one of two model horses almost fell off a table. Beck and Guthrie observed that only one of the two horses used in Harris' study was actually fell off the table and that the other horse was not close to doing so. Thus, Beck and Guthrie explored children's capacity for counterfactual thinking when the horse that did not fall off the table was reasonable close to doing so. Beck and Guthrie found that, under these conditions, accurate reasoning about near counterfactuals does not consistently occur until around age seven. They explained their results by referring to the distinction between prospective thinking, what almost happened but has not yet happened, and counterfactual thinking, what did not occur in the past but could have.

Boninger, Gleicher, and Strathman (1994) conducted two studies of how students' counterfactual thinking influenced their regret of past decisions that were apparently mistaken. In the first study students were asked to imagine that they had taken a course from a particularly difficult professor. In the second study participants were asked to imagine that they were track athletes who had sprained their ankle prior to an important national meet. The participants were further asked to imagine that they had taken a well-known painkiller whose side effects wound up costing them a race rather than a newer painkiller with unknown side effects. The salience of

these counterfactuals for the future was manipulated in both experiments. In experiment one, participants were told either that the course they did not take was as hard as the one they did take or that it was easier. In experiment two the newer painkiller either had the same side effects as the well-known painkiller or it did not. Results indicated that participants' tendency to consider the future consequences of their actions moderated the regret inducing effect of the counterfactuals.

Rye Calhoun, Ali, and Daftray (2008) conducted a study that was somewhat similar to the one conducted by Boninger et al. (1994). Rye et al. asked participants about negative events that they had actually experienced. Their primary purpose was to validate the Counterfactual Thinking for Negative Events Scale (CTNES). The scale is intended to be an easy to use measure of counterfactual thinking that is easy to score. The results of the study supported the validity of the CTNES. For example, when participants recalled a negative event that was largely their fault they generated counterfactuals involving something they could have done to make the situation better. When participants recalled a negative event that was largely someone else's fault they generated counterfactuals involving something the other person could have done to make the situation better.

Petrocelli and Crysel (2009) conducted a study of counterfactual thinking in the context of blackjack. After losing a game, participants either listed evaluative counterfactuals, what they might have done differently, reflective counterfactuals, what if they had won, or any thoughts that came to mind. Petrocelli and Crysel found that reflective counterfactuals induced in participants an overestimation of how often they had won. This finding is important because it highlights that counterfactuals do not always lead to insights. Presumably the reflective counterfactuals were plausible for participants. However, the counterfactuals had the effect of

producing habitual thinking regarding participants' skill at blackjack (Iran-Nejad & Gregg, 2001).

### **Counterfactual Historical Thinking by History Experts**

Despite the existence of notable examples of counterfactual historical essays by history scholars (e.g., Cook, 2001; Cowley, 2001; Tetlock et al., 2006), historians have proven resistant to admitting the validity of counterfactual thinking as a method of historical inquiry (see Bulhof, 1999; Tucker, 1999). However, the actual level of resistance to counterfactual historical thinking varies based on participants' need for cognitive closure and on their theoretical commitments (Tetlock, 1998; Tetlock & Lebow, 2001). For example, Tetlock (1998) asked history experts to answer questions about their theoretical commitments, complete a measure of cognitive style, and to evaluate the likelihood of various counterfactuals involving the two world wars. Tetlock found that, particularly when experts had a high need for cognitive closure, they rejected close-call, it almost happened, counterfactuals when those counterfactuals contradicted their theoretical commitments and accepted close-call counterfactuals that supported their theoretical commitments. Tetlock and Visser (2000) conducted a somewhat related study that compared foreign policy experts and non-experts in their judgments of the plausibility of several counterfactuals involving Soviet nuclear weapons control systems and US policy toward the Soviet Union. Tetlock and Visser found that non-experts' policy perspectives, such as on Reagan's stance toward the Soviet Union, were more likely to be influenced by the counterfactuals than were foreign policy experts.

Tetlock and Lebow (2001) expanded on previous research that explored experts counterfactual thinking (Tetlock, 1998; Tetlock & Visser, 2000), by exploring conditions under which experts might be induced to accept the validity of counterfactual possibilities. First,

Tetlock and Lebow conducted a correlational study that replicated Tetlock's results. Then, they conducted three experiments. The first two focused on the Cuban Missile Crisis. Participants were asked to complete probability curves of when a peaceful resolution of the crisis became inevitable and the probabilities at various points that peace could have been averted. Participants were also asked to complete a probability curve for the counterfactual possibility that the Cuban Missile Crisis was resolved violently and to determine at what point such a violent resolution would have become inevitable. The third experiment involved the same procedure but focused on the rise of Western civilization. For all three studies there was some indication of inconsistency in experts' judgments of probability such that the target event, Cuban Missile Crisis or rise of Western civilization, was thought to be inevitable at the same time as possibilities contradicting this inevitability were considered to have nonzero probability. However, this result was only statistically significant in the third experiment.

Lebow (2010) conducted an experiment that examined the relationship between counterfactual unpacking and judgments of historical contingency with respect to World War I. As is not entirely surprising, participants who read a passage that extensively discussed counterfactual possibilities for preventing World War I judged the conflict to be more contingent than did participants who read a shorter discussion of counterfactual possibilities for preventing World War I. Interestingly, historians judged World War I as more contingent than did international relations scholars. In a second, experiment Lebow asked historians and international relations scholars to generate their own counterfactuals for World War I. He found that only a third of the counterfactuals generated by the participants were close-call, almost happened, minimal rewrites, small change rather than a large one. However, in a third experiment, the vividness of a long shot counterfactual involving Mozart's survival to age 65 and

preventing World War I was judged as implausible by historians and international relations scholars. A fourth experiment found that college students and history experts were similar in their judgments of the plausibility of sixteen counterfactual scenarios. Historians and students gave statistically significant plausibility ratings on nine scenarios, a slight majority. Historians judged five of the scenarios as more plausible and four as less plausible relative to the students. No differences were found with respect to the content of the counterfactual itself (created triumph, created tragedy, unmade triumph, unmade tragedy).

### **Counterfactuals and Counterfactual Thinking in Fictional Media**

As Lebow (2007) notes, even otherwise implausible counterfactual scenarios can be useful for evaluating existing interpretations of historical events. Furthermore, counterfactual scenarios may have educational benefits beyond “history”. For example, a story by Niven (2001) describes the psychological consequences of knowing that there are an infinite number of versions of yourself each of which made choices you didn’t. Typically, counterfactual fictional scenarios either describe evil versions of characters from an established work of fiction or circumstances in which they are somehow worse off than they are in the standard storylines (e.g., Bixby & Daniels, 1967; R. Cowan et al., 2004; Fox, 1964; Sussman & Conway, 2005; Sussman & Rush, 2005). Alternatively, counterfactual fictional scenarios can present characters in circumstances that are better than those of the standard storylines (e.g., Rhimes & Harper, 2012). Whichever option is chosen, counterfactual scenarios will tend to reinforce the immutability of the standard story circumstances, such as by having the same characters interacting in the counterfactual context as in the factual one (e.g., Fox, 1964).

While not concerned with fiction, Tetlock, Kirstel, Elson, Green, and Lerner (2000) conducted a series of studies that relate to aspects of counterfactual fictional thinking. For

example, Tetlock et al. found that liberal participants were unwilling to consider racial characteristics of neighborhoods when majority African-American neighborhoods were presented as being less safe. This finding was interpreted as liberal participants acting to preserve their self-perception that they are committed to liberal political ideals of equality. In a similar, but somewhat opposite, example there is no reason why a story couldn't be written in which Lancelot, of Arthurian legend, is gay (cf., Clegg, 2007), but someone might reject such a possibility on ideological grounds while being untroubled by historical anachronisms in other aspects of the work.

Tetlock et al. (2000) also address the intersection between counterfactuals and ideology more directly. Specifically, they found that fundamentalist Christians rejected counterfactual scenarios such as one in which Joseph does not believe Mary's account of being impregnated by the Holy Ghost and as such leaves her to raise Jesus alone. Obviously, an ordinary person's personality would be expected to be somewhat different were they raised by two parents versus one but fundamentalist Christians were unwilling to apply this expectation to Jesus. While not included in the studies conducted by Tetlock et al., fundamentalist Christians could be asked to consider how counterfactual changes in their own family might have affected their religious beliefs, such as if the person had been raised by a more religious mother versus a less religious father. While judgments of historical contingency are certainly important, having the insight that one's own beliefs are historically contingent is an equally valuable lesson.

In the Niven (2001) story mentioned above the characters were essentially the same across the counterfactual scenarios he presented. The only difference was that knowing there are infinite versions of you led some characters to make particularly disastrous choices (e.g., committing a crime). One example of a context in which alternate versions of a character are

fundamentally different is Star Trek's mirror universe (Bixby & Daniels, 1967). The basic premise of the mirror universe is that it presents evil versions of characters such as Spock and Captain Kirk. Star Trek's mirror universe is relevant to for counterfactual history for two reasons. First, because it involves different versions of the characters, Star Trek's mirror universe suggests that identity is historically contingent. In other words, if history had been different I might have been a different person. Second, Star Trek's mirror universe has the potential to shed some light on vividness as it relates to counterfactual scenarios. Specifically, two episodes feature the mirror universe without reference to the main Star Trek universe (Sussman & Conway, 2005; Sussman & Rush, 2005). This makes it possible to incorporate the multiple sources of the real world into the counterfactual and imagine watching Star Trek in an analogous counterfactual version of the real world that might give rise to an evil version of Star Trek. Thus, fictional counterfactuals, historical counterfactuals, and self-perceptions can be connected in the act of watching a television show. Students' considerations of how their lives might have been different need not be as fanciful as that found in fiction (e.g., Bixby & Daniels, 1967; Niven, 2001). Nonetheless, it is not unreasonable to expect that students should experience reconceptualizations of their own self-understanding (Iran-Nejad, 1994; Iran-Nejad & Gregg, 2001; Jersild, 1951; Rogers, Kell, & McNeil, 1948).

CHAPTER III  
METHODOLOGY

**Pilot Study**

The following study uses focus group interviews (e.g., Wijnia, Loyens, & Deros, 2011), to explore undergraduate college students' ability to generate counterfactual outcomes for historical events and for scenes from popular fiction. Specifically, participants were asked about historical events they found to be memorable and about scenes from fiction they were a fan of. The study is intended as a first step in exploring the possible scientific and educational benefits of asking students to generate counterfactual scenarios. The present study bears on the educational benefits of counterfactual scenarios in that it examines conditions under which students might be resistant to generating such scenarios. I approached conducting the interviews with the following assumptions:

- Focus groups will enable participants to benefit from each other's ideas and generate more events and counterfactuals than they might individually.
- Students will generate more fictional than historical events.
- Students' knowledge of the fiction they watch or read has predisposed them to expect certain outcomes from stories and to resist outcomes that do not fit those expectations (Atwood, 1989).
- Participants will generate more counterfactual scenarios for historical events than for fictional events.

Given the goal of qualitative exploration, I am only looking for general trends or possible patterns in the data.

### **Participants**

The participants in this study were eighteen undergraduate students in education, human development, psychology, and history classes taught at a major university in the southeastern United States. Participants from the educational psychology, human development, and history classes were recruited during their regular class. Participants in the psychology classes were recruited via a website set up to allow the students to sign up for studies including but not limited to this one. All participants received course credit for their participation. Fourteen of the participants were female and four were male. Thirteen participants were white, three were African-American, and two were of mixed ethnicity. Participants ranged in age from nineteen to twenty-eight years old.

### **Design, Materials, and Procedure**

This study consisted of seven semi-structured focus group interviews. The interviews were conducted in a conference room that the researcher reserved for that purpose. The interviews were filmed using the researcher's laptop. One interview consisted of the researcher and four participants. Two interviews consisted of the researcher and five participants. Four of the interviews consisted of the researcher and one other person.

Given that the present study was a pilot study and the overall goal was to elicit counterfactual scenarios from participants, the interview sessions departed from the questions listed in Table 1 in a number of respects. First, the historical and fictional counterfactual generation portions of the interviews initially began with example counterfactuals involving the Battle of Lexington from the American Revolution and the Battle of Hogwarts from the seventh

Harry Potter book respectively (Rowling, 2007), but this seemed to confuse participants more than it did clarify the procedures so this aspect was dropped. Second, with respect to the historical events it proved to be more effective to simply ask participants about which historical events they found to be most memorable and why than to ask more specific questions about historical events and people. Third, follow up questions were based more on responses given by participants than on a predetermined set or order of questions. Finally, participants were asked to complete a brief sheet of demographic questions.

Table 1

*Interview Questions*

<b>History Questions</b>	<b>Fiction Questions</b>
1. What have you studied in the history courses you have taken?	1. What are some of your favorite television shows, movies, or books?
2. What are some of the key events you have studied about in history classes you have taken?	2. What are some of the key events in these stories?
3. Who are some of the major historical figures you have studied about?	3. Who are some of the main characters in these stories?
4. What roles did they play in key historical events?	4. How might the lives of the main characters have been different had some of the key events in the story had happened differently?
5. How might the lives of major historical figures have turned out differently had key historical events turned out differently?	5. What sorts of things would need to happen for key events in the stories you mentioned to have a different outcome?
6. What sorts of things would need to happen for key historical events to turn out differently	

**Data Analysis**

All but one of the interviews was transcribed following filming. The fourth interview was not transcribed because the recording was accidentally not saved. However, notes were recorded on the same day as the interview. Once all interviews had been conducted and transcribed, the transcripts were coded for patterns in participants' responses to the questions about fictional and historical scenarios. In analyzing the data I was very much aware that my

interpretation of participants' comments was filtered through my own prior experiences.

Counterfactual scenarios appear in contexts as varied as history (Cowley, 2001), law (Strassfield, 1992), quantum physics (Pessoa, 2000), everyday reasoning (Boninger et al., 1994), and popular fiction (Fox, 1964). Nonetheless, counterfactual thinking does vary by context and who is doing the thinking (Lebow, 2010). My analysis had the following specific goals:

- Compare the frequency with which participants generated historical versus fictional events. This was intended as an indirect measure of participants' knowledge of history relative to popular fiction and the degree to which such knowledge affected students' ability to generate counterfactual scenarios.
- Compare the frequency with which participants generated historical versus fictional counterfactuals. This was intended as a measure of participants' views of whether fictional events are more contingent than historical events, less contingent, or equally contingent.

## Results

Table 2 summarizes several findings regarding participants' ability to generate events and counterfactuals for those events. First, contrary to what was predicted a  $\chi^2$  test revealed that there was not a significant difference between events and counterfactuals generated by participants in single interviews versus group interviews,  $\chi^2(3) = 5.66, p > .05$ . This finding indicates that there were equal proportions of events and counterfactuals, though overall there were more events and counterfactuals in the group interviews.

Table 2

*Individual and Group Interview Totals*

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	<b>Historical Events</b>	<b>Historical Counterfactuals</b>	<b>Fictional Events</b>	<b>Fictional Counterfactuals</b>	<b>Row Total</b>
<b>Individual Interview</b>	13 (34%)	12 (33%)	22 (36%)	16 (59%)	63 (39%)
<b>Group Interview</b>	25 (66%)	24 (67%)	39 (64%)	11 (41%)	99 (61%)
<b>Column Total</b>	38	36	61	27	162

In order to test for possible differences between number of historical events and fictional events, a chi-square was calculated based on the totals for each type of event or counterfactual (see Table 3),  $\chi^2 (1) = 10.96, p < .01$ . Consistent with what was hypothesized; participants generated a higher percentage of fictional events than historical events.

Table 3

*Event and Counterfactual Totals*

	<b>Event</b>	<b>Counterfactual</b>	<b>Row Total</b>
<b>Historical</b>	38 (38%)	36 (57%)	74 (46%)
<b>Fictional</b>	61 (62%)	27 (43%)	88 (54%)
<b>Column Total</b>	99	63	162

It was hypothesized that participants would more often express the view that fictional events were inevitable as compared to historical events. The basis for this hypothesis was the idea that being a fan of a particular television show, movie, or book entails a commitment to particular storylines and patterns of character interactions. However, with the exception of interview six, participants viewed historical and fictional events as equally inevitable.

### **Discussion**

To the extent that fictional events should logically have more counterfactual outcomes than historical events, the similar frequencies for historical and fictional counterfactuals is a sign that participants had difficulty generating counterfactuals for fictional events from works they were fans of. This finding provides support for the idea that becoming a fan of something can

involve committing to the “factual” plotlines of stories as written and resistance to changing those stories (Atwood, 1989). The finding that participants generated more fictional events than historical events but not more fictional counterfactuals than fictional events is evidence for the idea that knowledge can hinder insightful reflection.

### **Limitations**

The primary limitation of this study was the relatively small number of participants. This meant that it was only possible to identify suggestions of possible trends rather than definite interrelationships among variables. The limitations of the small sample size for the interviews can be illustrated via the findings regarding personal relevance or interest. These themes showed up as a theme several times in participant interviews (see Iran-Nejad et al., 2006). Five out of the nine times that participants mentioned reasons for studying history they mentioned personal relevance. However, session six was the only interview session where participants discussed reasons for watching fiction. Thus, due to the small sample size, it is impossible to tell how important personal relevance or interest might be in explaining why students study history. Similarly, because interview six was the only one in which participants discussed reasons for watching fiction, it is impossible to tell how motivation for studying history might relate to motivation for engaging with fiction.

### **Primary Study**

Study two explored college students’ evaluations of two types of counterfactual scenarios (fictional, historical) that were drawn from two distinct sources (student, non-student).

Specifically, this study tests the following hypotheses:

- The student and historical counterfactuals will be rated as more feasible than the non-student and fictional counterfactuals.

- The student and historical counterfactuals will be rated as more interesting than the non-student and fictional counterfactuals.
- The student and historical counterfactuals will yield higher quality insights than the non-student and fictional counterfactuals.
- Participants who report feeling knowledgeable will have higher quality insights than those who do not report feeling knowledgeable.

### **Participants**

Data were collected from 45 undergraduate students in the college of arts and sciences and the college of education at a major university in the southeastern United States. Data were collected during the summer of 2012. Over twenty instructors were contacted about using their students in this study. Of those instructors contacted, four decided to allow their students to participate in the study. The four classes from which participants were recruited were educational psychology, human development, English literature, and American literature. The sample included 20 males, 9 females, and 16 people who did not report their gender. There were 22 white participants, 7 ethnic minority participants, and 16 participants of unknown ethnicity. The majority of participants were between 19 and 22 years of age. Fifteen participants did not report their age. Finally, there were 5 sophomores, 13 juniors, 12 seniors, and 15 participants who did not report their student level. The use of undergraduates is intended to provide a baseline before future studies explore counterfactual historical thinking with grade school students. Participants were recruited both from their regular class period and through the Internet. Participants received course credit for their participation. Each individual teacher determined the exact amount of extra credit.

Prior to conducting the data analysis itself, the dataset was examined to identify and remove duplicate responses or participants who had missing responses to questions. Additionally, there were large amounts of missing data in our sample. The resulting sample sizes for each question are reported in Table 4. The discrepancy between the low Ns in Table 4 and the fact that data was collected from 45 participants is most likely due to selective responding by participants. In order to correct for the missingness and keep the sample size as high as possible, means for feasibility, interestingness, and insights were calculated across the four subsets of counterfactuals: student-fictional, non-student fictional, student historical, and non-student historical. Thus, in order to recover some of the missing data, the value for the item a participant did respond to was used in place of the mean. These values were used in all subsequent analyses of the four subsets of the counterfactuals. Also, to improve power, results are considered significant if  $p < .10$ .

Table 4

*Ns for Each Question and Counterfactual*

<b>Question</b>	<i>Friends</i>	<i>Seinfeld</i>	<i>Pretty Little Liars</i>	<i>Harry Potter</i>	<i>Brown</i>	<b>Abraham Lincoln</b>	<b>9/11</b>	<b>April 27<sup>th</sup></b>
How feasible is this counterfactual?	32	21	24	24	34	26	31	26
How interesting was this counterfactual for you?	31	21	22	27	37	27	34	28
Please briefly explain why you think this counterfactual is or is not	31	23	26	27	34	24	31	28

feasible:

## Design

The analyses used to assess the primary hypotheses of study two employed a within subjects repeated measures design (see Table 5). Prior to the repeated measures ANOVA study order was assessed using t-tests on presentation order (fictional counterfactuals 1<sup>st</sup>, historical counterfactuals 1<sup>st</sup>) on participants' feasibility ratings, interesting ratings, and insights for the eight counterfactuals, and reported insights after reading the fictional and historical counterfactuals respectively. For this analysis, presentation order was the grouping variable and the individual items were dependent variables. The results are reported in Table 6. Despite the significant result for *Harry Potter*, due to the small sample sizes, reported results are collapsed across orders. For the ANOVAs, type of counterfactual scenario (fictional, historical) and source of counterfactual (student, non-student) were within subjects' factors. Feasibility, interestingness, and the quality of participants' insights were repeated measures.

Table 5

### *Crossed Design of Study Two*

<b>Source/Type</b>	4 Fictional Counterfactuals	4 Historical Counterfactuals
4 Student Counterfactuals	2 Student Fictional Counterfactuals	2 Student Historical Counterfactuals
4 Non-Student Counterfactuals	2 Non-Student Fictional Counterfactuals	2 Non-Student Historical Counterfactuals

Table 6

### *Effect of Order on Individual Questions*

<b>Question</b>	<b>T</b>	<b>Df</b>	<b>Sig.</b>	<b>Fictional Counterfactuals 1<sup>st</sup></b>		<b>Historical Counterfactuals 1<sup>st</sup></b>	
				<b>M</b>	<b>SD</b>	<b>M</b>	<b>SD</b>
<i>Friends</i>	-1.10	30	.28	3.92	1.66	4.71	1.80

Feasibility							
<i>Friends</i>	1.20	29	.24	4.63	1.53	3.86	1.34
Interestingness							
<i>Friends</i> Insights	.48	29	.63	1.65	1.86	1.29	1.38
<i>Pretty Little Liars</i>	-.51	22	.62	3.72	1.71	4.17	2.32
Feasibility							
<i>Pretty Little Liars</i>	.15	20	.57	3.88	2.19	4.50	2.51
Interestingness							
<i>Pretty Little Liars</i>	.20	24	.21	.95	1.13	1.57	.98
Insights							
<i>Seinfeld</i>	-.17	19	.87	3.87	1.46	4.00	2.00
Feasibility							
<i>Seinfeld</i>	1.42	19	.17	4.00	1.51	2.83	2.14
Interestingness							
<i>Seinfeld</i> Insights	.52	12	.61	.78	1.00	.60	.59
<i>Harry Potter</i>	.32	22	.75	4.64	1.65	4.40	2.07
Feasibility							
<i>Harry Potter</i>	-.72	25	.48	5.06	1.68	5.50	1.27
Interestingness							
<i>Harry Potter</i>	-2.47	25	.02	1.32	1.26	2.55	1.21
Insights							
Fiction Insights	.63	23	.53	2.03	1.72	1.58	1.50
<i>Brown v. Board</i>	-.43	32	.67	4.56	1.26	4.78	1.63
Feasibility							
<i>Brown v. Board</i>	.26	35	.80	4.78	1.70	4.63	1.71
Interestingness							
<i>Brown v. Board</i>	-.88	32	.39	1.38	1.14	1.75	1.33
Insights							
September 11 <sup>th</sup>	-1.74	29	.09	3.82	1.81	5.00	1.96
Feasibility							
September 11 <sup>th</sup>	-.53	32	.60	4.94	1.51	5.25	1.84
Interestingness							
September 11 <sup>th</sup>	-.64	29	.53	1.73	.98	1.96	1.05
Insights							
Abraham Lincoln	.31	24	.76	4.50	1.09	4.33	1.61
Feasibility							
Abraham Lincoln	.22	25	.83	4.44	1.79	4.27	2.10
Interestingness							
Abraham Lincoln	2.01	18	.06	2.15	1.68	1.09	.83
Insights							
April 27 <sup>th</sup> Tornado	1.64	13	.12	6.27	1.16	5.00	2.37
Feasibility							
April 27 <sup>th</sup> Tornado	.24	26	.81	5.31	1.19	5.17	1.95
Interestingness							

April 27 <sup>th</sup> Tornado Insights	1.01	26	.32	1.83	1.07	1.42	1.08
History Insights	.57	26	.57	1.61	1.51	1.30	1.27

## Materials

See the Appendix for a complete set of the materials used in this study. The student-generated counterfactuals were adapted from counterfactual scenarios mentioned by participants in study one. The non-student historical counterfactuals were taken from Lebow (2010). See Table 7 for the specific counterfactuals used. The non-student fictional counterfactuals were taken from the television programs *Friends* and *Seinfeld*, both of which are still highly popular, seen on television, and readily available for purchase. The *Friends* counterfactual is a summary of a two part episode in which the main characters imagine how their lives might have been different (Crane & Kauffman, 2000; Malins & Chase, 2000). The *Seinfeld* example is drawn from an episode in which one of the main characters, Elaine, meets several characters who physically resemble the other characters but are opposite in personality (Mandel, 1996).

Table 7

### *Study Two Counterfactuals*

	<b>Fictional</b>	<b>Historical</b>
<b>Student</b>	On the show <i>Pretty Little Liars</i> , Allison does not die. As a result, the friends gradually drift apart.	The April 27th, 2011 tornado does not hit Tuscaloosa. As a result, the University of Alabama has a May graduation.
	In the <i>Harry Potter</i> book series, Voldemort decides to attack Neville Longbottom's parents instead of Harry's. As a result, Harry is an average wizard and Neville is the one who ultimately defeats Voldemort.	During the September 11th, 2001 terrorist attacks the passengers on the third plane are unsuccessful preventing the plane from crashing into the White House. As a result, Al Qaeda boasts of their success in weakening the United States. Later they

<b>Non-Student</b>	On the show <i>Friends</i> , Monica never lost her teenage weight and is still fat as an adult, Joey is a famous and wealthy soap opera star, Pheobe is a stockbroker, and Chandler works unsuccessfully as a writer.	successfully attack the United States with a nuclear weapon. Frederick Vinson does not die in September of 1953. Earl Warren is not appointed to replace him as Chief Justice of the Supreme Court. In the <i>Brown v. Board</i> decision, the Supreme Court reaffirms “separate but equal” by a vote of 5-4. Segregation continues in public schools across the country. The Civil Rights Movement becomes more radical and violent due to a lack of progress. Race relations remain polarized and African-Americans continue to be second class citizens.
	On the show <i>Seinfeld</i> , Jerry is reliable and kind. George is responsible and well dressed. Kramer is neat and has good ideas. Postal worker Newman is good friends with Jerry.	On the night of November 7, 1862, President Lincoln relieved General George McClellan of command of the Union Army of the Potomac and its 100,00 troops. Not wishing any more of his men to die in battle, McClellan marches on Washington with his army. The semioccupation of Washington compels Lincoln to seek a diplomatic solution to the Civil War. Lincoln recognizes the independence of the Confederate States of America.

**Measures**

**Feasibility of the Counterfactual Scenarios.** Similar to Lebow (2010), after each of the 8 counterfactual, participants were asked “How feasible is this counterfactual?” and responded using a 7 point Likert-type scale, that -3 equaled not feasible and 3 equaled very feasible. Prior

to data analysis, the -3 to 3 scale was recoded into a 1 to 7 scale. To address the missingness, values were averaged across the four subgroups and these averages were used in the analyses.

**Interestingness of the Counterfactual Scenarios.** After each of the counterfactuals, participants were asked “How interesting was this counterfactual for you?” and responded using a 7 point Likert-type scale, anchored such that -3 equaled not interesting and 3 equaled very interesting. Prior to data analysis, the -3 to 3 scale was recoded into a 1 to 7 scale. To address the missingness, values were averaged across the four subgroups and these averages were used in the analyses.

**Insight Quality.** In addition to asking participants to rate the feasibility of each counterfactual, participants were asked to briefly explain their rating using an open-ended response format. Following the rating, and after reading all four of the fictional counterfactuals, participants were asked to provide their biggest insight on the fictional and historical counterfactuals respectively. Insights were also assessed using an open-ended response format.

Students’ feasibility explanations and reported insights were evaluated for quality by two independent raters using the rubric developed by Iran-Nejad, Stewart, Robinson, and Liu (2011). Expanding upon earlier distinctions among added, borrowed, and transformed sentences in students’ writing (Scardamalia & Bereiter, 1987; Voss & Wiley, 1997; Wiley & Voss, 1996, 1999), Iran-Nejad et al. distinguished among “insights” that added irrelevant information (coded as 0), borrowed relevant information (1 or 2), transformed information (3 or 4), or extended beyond given information while still clearly being relevant (5 to 7). To assist in the rating process, hypothetical examples were provided for each possible individual rating. After a period of training on one half of the sample, the other half of the sample was rated yielding a raw agreement of 86.2%. The primary investigator’s ratings were used in subsequent analyses.

**Event Knowledge.** The knowledge measure was coded such that 1 equaled no and 2 equaled yes. An example knowledge question is: “Do you feel knowledgeable enough about *Pretty Little Liars* to answer questions about events from the show?”

**Demographic Variables.**

*Age.* For age, participants were asked to type their current age.

*Gender.* For gender, participants were asked to click either male or female.

*Ethnicity.* For ethnicity, participants were asked to click either “Asian or Asian American, including Chinese, Japanese, and others”, “Hispanic or Latino, including Mexican American, Central American, and others”, “Black or African American”, “White, Caucasian, Anglo, European Americans; not Hispanic”, “American Indian/ Native American”, “Mixed; Parents are from two different groups”, or “Other”.

*Student Level.* For student level, participants were asked to click either freshman, sophomore, junior, or senior.

*Number of History Courses.* Participants were asked to type how many history courses they had taken.

*Political Views.* Participants’ were asked “In terms of your political views, how would you characterize yourself?” and responded using a seven point Likert-type scale anchored such that -3 equaled very liberal and 3 equaled very conservative.

*World Views.* Similar to Lebow (2010), participants were asked “Imagine a spectrum of views about the nature of the world. It is anchored on one end by the belief that the world is ordered and predictable, and on the other by the belief that it is utterly chaotic and unpredictable. Where would you place yourself along this continuum?” and responded using a 7 point Likert-type scale anchored such that -3 equaled predictable/ordered and 3 equaled unpredictable/chaotic.

## **Procedure**

Participants were sent a web- link to the study through an email invitation. When they clicked on the link they were directed to the website for the study. First, participants read and filled out the informed consent form and provided information so that their teachers could be notified of their participation. As was noted above, the counterfactuals were randomized such that some participants received the fictional counterfactuals first (26 participants) and some participants received the historical counterfactuals first (19 participants). For the fictional counterfactuals, participants indicated whether or not they were a fan of the series that was the subject of the counterfactual, indicated whether or not they felt knowledgeable enough about the series to answer questions on it, rated the feasibility of the counterfactual, briefly explained why they thought the counterfactual was or was not feasible, and rated the interestingness of the counterfactual. After reading and responding to all the fictional counterfactuals, participants were asked to record their insights on the counterfactuals.

For the historical counterfactuals, participants indicated whether or not they felt knowledgeable enough about the subject of the counterfactual to answer questions on it, rated the feasibility of the counterfactual, briefly explained why they thought the counterfactual was or was not feasible, and rated the interestingness of the counterfactual. After reading and responding to all the historical counterfactuals, participants were asked to record their insights on the counterfactuals. Finally, participants were asked their age, gender, ethnicity, student level, how many history courses they had taken, what makes a historical event worth studying, their political views, and worldview. The entire study took participants 20 to 50 minutes.

## **Data Analysis**

**Do fictional versus historical counterfactuals and student versus non-student counterfactuals differ in feasibility?** Mean feasibility ratings were calculated for each of the four subsets of counterfactual (student fictional, non-student fictional, student historical, non-student historical). A 2X2 repeated measures ANOVA with type (fictional, historical) and source (student, non-student) as within subjects' factors.

**Do fictional versus historical counterfactuals and student versus non-student counterfactuals differ in interestingness?** Mean interestingness ratings were calculated for each of the four subsets of counterfactual (student fictional, non-student fictional, student historical, non-student historical). A 2X2 repeated measures ANOVA with type (fictional, historical) and source (student, non-student) as within subjects' factors.

**Do fictional versus historical counterfactuals and student versus non-student counterfactuals differ in the quality of students' insights?**

Mean insightfulness ratings were calculated for each of the four subsets of counterfactual (student fictional, non-student fictional, student historical, non-student historical). A 2X2 repeated measures ANOVA with type (fictional, historical) and source (student, non-student) as within subjects' factors. Finally, a paired samples t-test was conducted on the means for the fictional and historical insights.

**Effect of Knowledge on Feasibility Ratings, Interestingness Ratings, and Feasibility Explanations.** In order to test for the effect of knowledge, of the event or series that served as the basis for a counterfactual, a multivariate ANOVAs for each counterfactual were conducted with knowledge as a between subjects factor and rated feasibility, rated interestingness, and insightfulness of participants' feasibility explanations as dependent variables.

All analyses were conducted using the Statistical Package for the Social Sciences (SPSS).

## CHAPTER IV

### RESULTS

The primary dependent variables for this study were the degree to which participants thought that a given counterfactual was feasible, the rated insightfulness of participants' explanations of why a counterfactual was, or was not, feasible, the interestingness of a given counterfactual, and participants' reported insights. Presentation order (fictional counterfactuals 1<sup>st</sup>, historical counterfactuals 1<sup>st</sup>) was a between subjects factor. These data were analyzed using analysis of variance and paired samples *t*-tests.

#### **Do fictional versus historical counterfactuals and student versus non-student counterfactuals differ in feasibility?**

A 2X2 repeated measures ANOVA was conducted with type of counterfactual (fictional, historical) and source (student, non-student) as within subjects' factors. The assumption of sphericity was tested for but not met so corrected *F*-values are used. Results revealed no significant differences between type of counterfactual,  $F(1, 20) = 1.59, p > .10, \eta^2 = .26$ , observed power = .34, the source of the counterfactual,  $F(1, 20) = .47, p > .10, \eta^2 = .14$ , observed power = .17, or the interaction between these two variables,  $F(1, 20) = .25, p > .10, \eta^2 = .10$ , observed power = .14. Means are reported in Table 8. While not statistically significant, the plot of the means in Figure 2 suggests that, directionally, participants thought the student counterfactuals were more feasible than the non-student counterfactuals and the historical counterfactuals were more feasible than the fictional counterfactuals, both of which are consistent with the study hypothesis.

Table 8

*Mean Feasibility Ratings*

	Fictional		Historical		Overall	
	M	SD	M	SD	M	SD
<b>Student</b>	4.45	1.66	4.69	1.86	4.57	.17
<b>Non-student</b>	4.12	1.27	4.64	.85	4.38	.37
<b>Mean</b>	4.28	.23	4.66	.04	4.47	.27

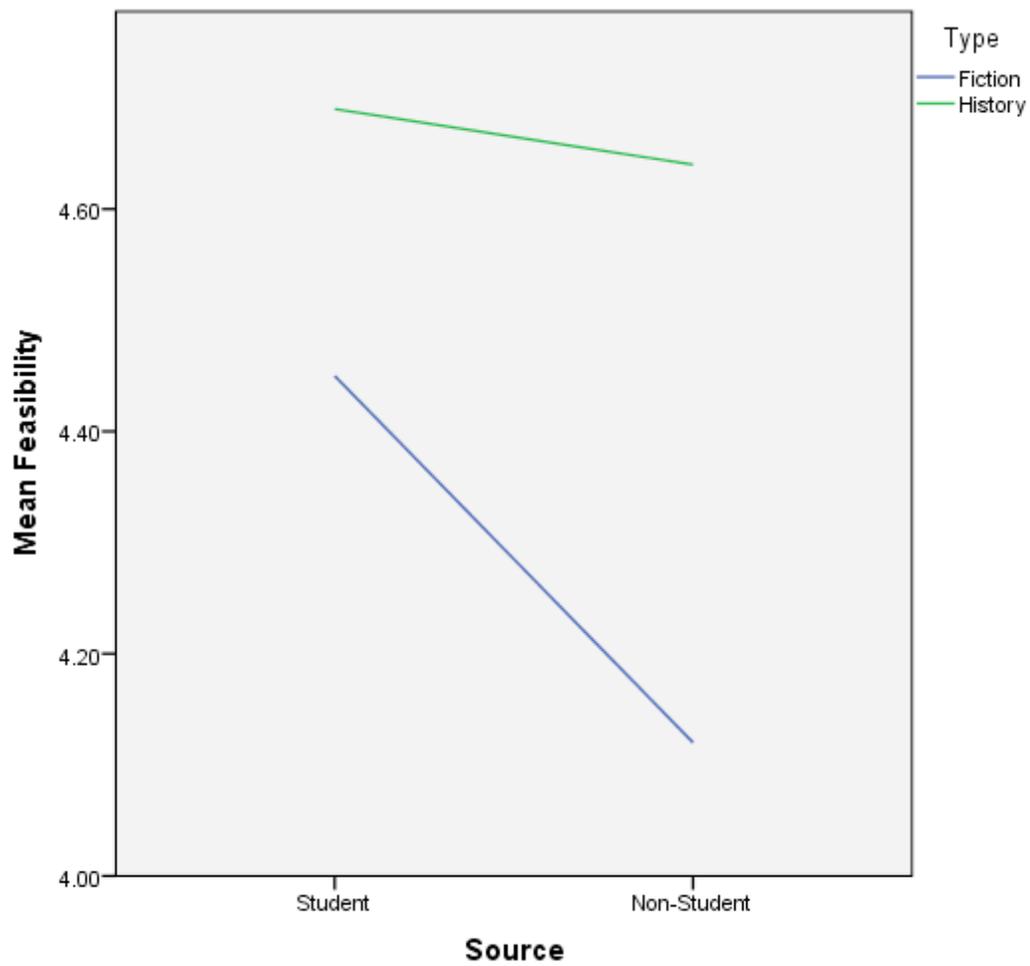


Figure 2. Mean feasibility by type and source.

**Do fictional versus historical counterfactuals and student versus non-student counterfactuals differ in interestingness?**

A 2X2 repeated measures ANOVA was conducted with type of counterfactual (fictional, historical) and source (student, non-student) as within subjects' factors. The assumption of sphericity was tested for but not met so corrected  $F$ -values are used. Results revealed a significant mean difference in the type of counterfactual,  $F(1, 22) = 3.55, p < .10, \eta = .37$ , observed power = .57. These results indicated that participants rated the historical counterfactuals as more interesting than the fictional counterfactuals, which is consistent with the study hypotheses. Additionally, mean difference for the source of counterfactual was also found,  $F(1, 22) = 17.38, p < .01, \eta = .66$ , observed power = .94. These results indicate that participants rated the student counterfactuals as more interesting, by about one point on the seven point scale, than the non-student counterfactuals, which is consistent with the study hypotheses. All were rated as highly interesting to the participants. Results did not reveal a statistically significant interaction between type and source  $F(1, 22) = .04, p > .10, \eta = .04$ , observed power = .11. Means for the counterfactual subsets are reported in Table 9 and plotted in Figure 3.

Table 9

*Mean Interestingness Ratings*

	<b>Fictional</b>		<b>Historical</b>		<b>Overall</b>	
	<b>M</b>	<b>SD</b>	<b>M</b>	<b>SD</b>	<b>M</b>	<b>SD</b>
<b>Student</b>	4.96	1.62	5.48	1.11	5.22	.37
<b>Non-student</b>	4.22	1.48	4.70	1.54	4.46	.34
<b>Mean</b>	4.59	.52	5.09	.55	4.79	.35

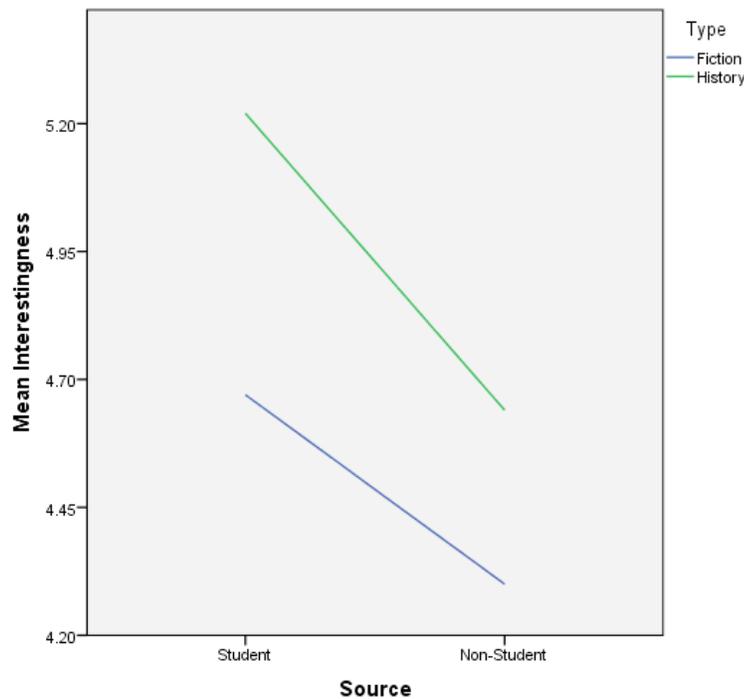


Figure 3. Mean interestingness by type and source.

**Do fictional versus historical counterfactuals and student versus non-student counterfactuals differ in the quality of students' insights?**

A 2X2 repeated measures ANOVA was conducted with type of counterfactual (fictional, historical) and source (student, non-student) as within subjects' factors. The assumption of sphericity was tested for but not met so corrected  $F$ -values are used. Results did not reveal significant mean differences based on counterfactual type,  $F(1, 22) = .84, p > .10, \eta^2 = .20$ , observed power = .23, counterfactual source,  $F(1, 22) = .82, p > .10, \eta^2 = .20$ , observed power = .23, or their interaction,  $F(1, 22) = .01, p > .10, \eta^2 = .03$ , observed power = .10. Means are reported in Table 9. These results indicate that there were no differences in the quality of participants' insights as reflected in their feasibility explanations across the counterfactuals. All means were very low, indicating that none of the subjects were very insightful overall. However, the means plotted in Figure 4 suggest that, had the sample size been larger, there might have

been a significant trend whereby student counterfactuals produced more insights than non-student counterfactuals. Additionally, historical counterfactuals may produce more insights than fictional counterfactuals. Finally, a paired samples *t*-test was conducted, comparing the quality of participants' insights for the fictional and historical counterfactuals  $t(23) = .43, p > .10$ . This result indicates that there were no differences in the quality of participants' reported insights across the fictional and historical counterfactuals.

Table 10

*Mean Insightfulness Ratings*

	Fictional		Historical		Overall	
	M	SD	M	SD	M	SD
<b>Student</b>	1.53	1.00	1.71	.99	1.62	.13
<b>Non-student</b>	1.34	1.07	1.56	1.24	1.45	.16
<b>Mean</b>	1.43	.13	1.63	.11	1.53	.14

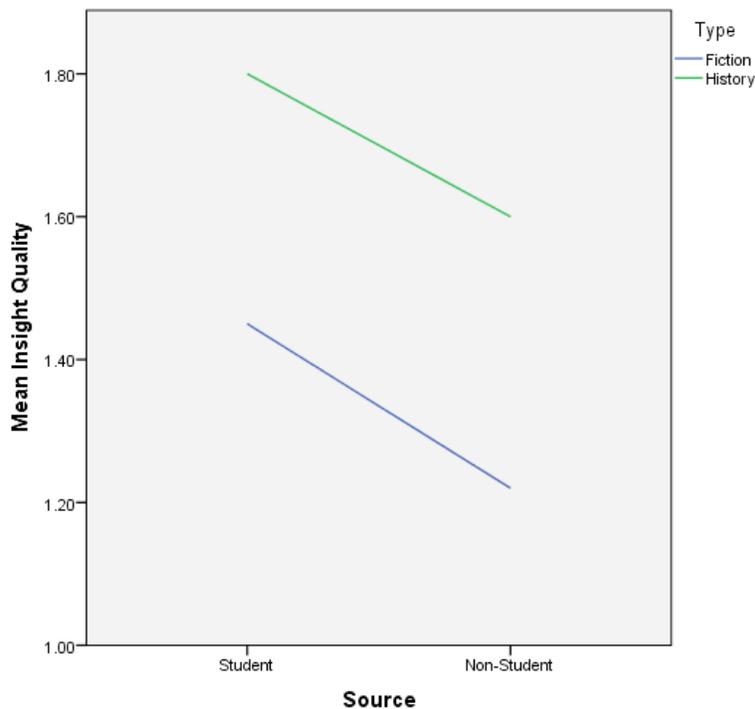


Figure 4. Mean insightfulness by type and source.

## Effect of Knowledge on Feasibility Ratings, Interestingness Ratings, and Insight Quality

### Fictional Counterfactuals

*Friends.* A multivariate ANOVA was conducted to test whether or not there were differences between participants who felt knowledgeable enough about *Friends* to answer questions on it and those who did not on feasibility rating, interestingness rating, and insight quality. An overall effect of knowledge was found,  $F(3, 22) = 2.90, p < .10, \eta = .53$ , observed power = .61. Means are reported in Table 11. Follow up univariate ANOVAs indicate those knowledgeable about *Friends* had higher interestingness ratings and more insightful feasibility explanations,  $F(1, 24) = 5.32, p < .05, \eta = .42$ , observed power = .60 and  $F(1, 24) = 3.85, p < .10, \eta = .37$ , observed power = .47, respectively. No mean differences were found for feasibility. These results indicate that knowledgeable participants were more likely to find the counterfactual interesting and more likely to have insightful feasibility explanations.

Table 11

#### *Friends Counterfactual Means*

Dependent Variable	Knowledgeable	M	SD	N (%)
Feasibility Rating	No	3.78	1.20	9 (35%)
	Yes	4.24	1.89	17 (65%)
	Total	4.08	1.67	26 (100%)
Interestingness Rating	No	3.56	1.59	9 (35%)
	Yes	4.82	1.18	17 (65%)
	Total	4.38	1.44	26 (100%)
Insight Quality	No	.89	1.76	9 (35%)
	Yes	2.28	1.69	17 (65%)
	Total	1.80	1.81	26 (100%)

*Seinfeld.* A multivariate ANOVA was conducted to test whether or not there were differences between participants who felt knowledgeable enough about *Seinfeld* to answer questions on it and those who did not on feasibility rating, interestingness rating, and insight

quality. An overall effect of knowledge was not found  $F(3, 10) = 1.14, p > .10, \eta = .50$ , observed power = .22. Means for the dependent variables are reported in Table 11. However, a follow up univariate ANOVA indicated that those knowledgeable about *Seinfeld* were more likely to find the counterfactual interesting,  $F(1, 12) = 3.43, p < .10, \eta = .47$ , observed power = .40. No mean differences were found for feasibility or insights. These results indicate that knowledgeable participants were more likely to find the counterfactual interesting.

Table 12

*Seinfeld Counterfactual Means*

<b>Dependent Variable</b>	<b>Knowledgeable</b>	<b>M</b>	<b>SD</b>	<b>N (%)</b>
Feasibility Rating	No	4.33	1.32	9 (64%)
	Yes	4.00	2.00	5 (36%)
	Total	4.21	1.53	14 (100%)
Interestingness Rating	No	3.67	1.32	9 (64%)
	Yes	5.00	1.22	5 (36%)
	Total	4.14	1.41	14 (100%)
Insight Quality	No	.56	1.13	9 (64%)
	Yes	1.20	.84	5 (36%)
	Total	.79	1.05	14 (100%)

***Pretty Little Liars.*** A multivariate ANOVA was conducted to test whether or not there were differences between participants who felt knowledgeable enough about *Pretty Little Liars* to answer questions on it and those who did not on feasibility rating, interestingness rating, and insight quality. An overall effect of knowledge was found  $F(3, 9) = 5.20, p < .05, \eta = .80$ , observed power = .76. Means for the dependent variables are reported in Table 13. Follow up univariate ANOVAs indicate those interested in *Pretty Little Liars* had higher interestingness ratings and more insightful feasibility explanations,  $F(1, 11) = 16.58, p < .01, \eta = .77$ , observed power = .96 and  $F(1, 11) = 9.06, p < .05, \eta = .67$ , observed power = .78, respectively. No mean differences were found for feasibility. These results indicate that knowledgeable

participants were more likely to find the counterfactual interesting and more likely to have insightful feasibility explanations.

Table 13

Pretty Little Liars *Counterfactual Means*

<b>Dependent Variable</b>	<b>Knowledgeable</b>	<b>M</b>	<b>SD</b>	<b>N (%)</b>
Feasibility Rating	No	3.88	1.81	8 (61%)
	Yes	5.00	2.34	5 (39%)
	Total	4.31	2.02	13 (100%)
Interestingness Rating	No	2.75	1.67	8 (61%)
	Yes	6.20	1.09	5 (39%)
	Total	4.08	2.25	13 (100%)
Insight Quality	No	.50	1.07	8 (61%)
	Yes	2.20	.84	5 (39%)
	Total	1.15	1.28	13 (100%)

**Harry Potter.** A multivariate ANOVA was conducted to test whether or not there were differences between participants who felt knowledgeable enough about *Harry Potter* to answer questions on it and those who did not on feasibility rating, interestingness rating, and insight quality. An overall effect of knowledge was found  $F(3, 16) = 8.93, p < .01, \eta^2 = .79$ , observed power = .98. Means for the dependent variables are reported in Table 14. Follow up univariate ANOVAs indicate those knowledgeable about *Harry Potter* had higher interestingness ratings and more insightful feasibility explanations,  $F(1, 18) = 4.67, p < .05, \eta^2 = .45$ , observed power = .53 and  $F(1, 18) = 18.60, p < .01, \eta^2 = .71$ , observed power = .98, respectively. These results indicate that knowledgeable participants were more likely to find the counterfactuals interesting and more likely to have insightful feasibility explanations.

Table 14

Harry Potter *Counterfactual Means*

<b>Dependent Variable</b>	<b>Knowledgeable</b>	<b>M</b>	<b>SD</b>	<b>N (%)</b>
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Feasibility Rating	No	4.20	.45	5 (25%)
	Yes	4.33	2.06	15 (75%)
	Total	4.30	1.78	20 (100%)
Interestingness Rating	No	4.40	.55	5 (25%)
	Yes	5.60	1.18	15 (75%)
	Total	5.30	1.17	20 (100%)
Insight Quality	No	.20	.45	5 (25%)
	Yes	2.37	1.08	15 (75%)
	Total	1.83	1.35	20 (100%)

### Historical Counterfactuals

**Abraham Lincoln.** A multivariate ANOVA was conducted to test whether or not there were differences between participants who felt knowledgeable enough about the Civil War to answer questions on it and those who did not on feasibility rating, interestingness rating, and insight quality. An overall effect of knowledge was not found  $F(3, 16) = 8.93, p > .10, \eta^2 = .33$ , observed power = .16. Means for the dependent variables are reported in Table 15. Follow up univariate ANOVAs were not significant. These results indicate that knowledgeable participants were no more or less likely to rate the counterfactuals as feasible or interesting or to have insightful feasibility explanations.

Table 15

#### *Abraham Lincoln Counterfactual Means*

Dependent Variable	Knowledgeable	M	SD	N (%)
Feasibility Rating	No	4.40	.89	5 (25%)
	Yes	4.33	1.54	15 (75%)
	Total	4.35	1.39	20 (100%)
Interestingness Rating	No	4.40	2.19	5 (25%)
	Yes	4.53	1.85	15 (75%)
	Total	4.50	1.88	20 (100%)
Insight Quality	No	1.00	1.73	5 (25%)
	Yes	2.07	1.28	15 (75%)
	Total	1.80	1.44	20 (100%)

***Brown v. Board, September 11<sup>th</sup>, April 27<sup>th</sup> Tornado.*** ANOVAs for the *Brown v. Board*, September 11th, and April 27th Tornado counterfactuals are not reported because an overwhelming number of participants reported feeling knowledgeable about those events (see Table 16).

Table 16

*Ns for Feeling Knowledgeable*

<b>Counterfactual</b>	<b>Knowledgeable</b>	<b>N (%)</b>
<i>Brown v. Board</i>	No	3 (10%)
	Yes	26 (90%)
	Total	29 (100%)
September 11th	No	1 (4%)
	Yes	25 (96%)
	Total	26 (100%)
April 27th Tornado	No	2 (9%)
	Yes	20 (91%)
	Total	22 (100%)

## CHAPTER V

### CONCLUSIONS

This chapter discusses the results presented in chapter four and their implications for future research in history education, counterfactual thinking, and biofunctional cognition. The overall purpose of the study is to explore the relationships among counterfactual thinking, interest, and insightful reflection.

#### **Findings**

This study uniquely contributed to the literature on counterfactual thinking by comparing participants' responses to historical counterfactuals with their responses to fictional counterfactuals, comparing their responses to student counterfactuals with their responses to non-student counterfactuals and by exploring rated interest. Interpretation of the findings focuses on possible effects of the familiarity of the topics used for the scenarios and the characteristics of the sample.

#### **Do fictional versus historical counterfactuals and student versus non-student counterfactuals differ in feasibility?**

The hypothesis that stated student counterfactuals would be rated as more feasible than the non-student counterfactuals was contradicted somewhat by the data reported in chapter four. The data showed no statistically significant differences, yet we predicted the student counterfactuals would be rated as significantly more feasible than the non-student counterfactuals. Additionally, the hypothesis that historical counterfactuals would be rated as more feasible than the fictional counterfactuals was not entirely supported by the data reported in

chapter four. There were no significant differences in feasibility between historical and fictional, but, overall, the means show a trend in the predicted direction. While the mean ratings for the counterfactuals are consistent with the hypothesized trend, the low power and small sample size indicate that caution is warranted. The hypotheses were based on biofunctional theory's emphasis on personally meaningful thinking (Iran-Nejad, 1994; Iran-Nejad & Gregg, 2001; Iran-Nejad & Stewart, 2010a, 2010b; Stewart et al., 2008). History can be seen as more personally meaningful to the extent that it is more literally real than fiction. However, there is a possible confound in that both of the student historical counterfactuals were about much more recent events than the non-student counterfactuals and both of the student fictional counterfactuals were about more recent series' than the non-student fictional counterfactuals. Subjects will more likely be knowledgeable about recent events and series than less recent events and series.

Additionally, the mean feasibility ratings suggest that all of the counterfactuals were seen as minimally feasible, just above the neutral point of the scale. Given these mean values, a statistically significant result would not necessarily have been practically significant. One possible reason for the lack of clear distinction between feasible and not feasible counterfactuals is that, while participants had likely encountered counterfactuals before (Beck & Guthrie, 2011; Harris, 1997, 2001; Harris et al., 1996; Petrocelli & Crysel, 2009; Rye et al., 2008), they were likely not experts at evaluating the feasibility of counterfactual scenarios and were not given training on counterfactuals and feasibility as part of the current study. Similarly, because every effort was made to ensure that the fictional and historical counterfactuals would refer to topics likely to be known to students, it is possible that the feasibility ratings are due to participants being familiar with the topics and not with the actual characteristics of the counterfactuals themselves.

### **Do fictional versus historical counterfactuals and student versus non-student counterfactuals differ in interestingness?**

The hypothesis that the student counterfactuals would be rated as more interesting than the non-student counterfactuals was supported by the results reported in chapter four. Results showed statistically significantly higher interestingness ratings for the student counterfactuals as compared to the non-student counterfactuals. Additionally, the hypothesis that the historical counterfactuals would be rated as more interesting than the fictional counterfactuals were supported by the results reported in chapter four. Results found statistically significantly higher interestingness ratings for the historical counterfactuals. These two results are consistent with the notion that history experts engage in inquiry that is personally meaningful for them (Barton, 2005). That is, the subjects respond similar to history experts when evaluating the counterfactuals. Our results found significantly greater interest for counterfactuals that were both student generated and historical. The student generated counterfactuals came from their peers, which makes the topics more relevant to their generation. As such, it has been shown that people are interested in history that is directly relevant to their lives (Rosenzweig, 2000). For example, students are more likely to attend to original historical sources if those sources are part of the everyday environment (Barton, 2001). In the current study, the events and counterfactuals were drawn from students and their everyday environment, which led to high rated interest. Students typically do not understand why they should study historical events that are not relevant to their lives (VanSledright, 1997). Perhaps by engaging students in a topic, they will find it more interesting. Then, if students find history interesting, they will be more engaged when studying it. Additionally, the high interest ratings are inconsistent with efforts to develop historian like practices in students (Britt & Aglinskias, 2002; VanSledright, 2002; Voss & Wiley,

1997; Wiley & Voss, 1996, 1999; Wineburg, 1999). For example, students that engage in historian like practices might identify the biases of authors of written documents relating to a historical event (Barton, 2005). The inconsistency arises because efforts at developing historian like practices are typically based on what is meaningful to historians, rather than the students themselves. For example, students are often asked to respond to documents based questions for which they do not get to pick the topic or documents (Grant et al., 2004). While not chosen specifically by the students, the topics in this study were selected by their peers, and the events and counterfactuals were chosen based on familiarity to and interest expressed by other students. This student centeredness likely contributed to the high interest ratings across all the counterfactuals.

### **Do fictional versus historical counterfactuals and student versus non-student counterfactuals differ in the quality of students' insights?**

Results from our study were inconsistent with our hypothesis. Results showed no statistically significant differences for insights, while we predicted differences favoring student and historical counterfactuals. While not statistically significant for insights, the pattern is the same as that for feasibility, and interestingness. The direction of the mean is in the predicted direction. Specifically, student counterfactuals produced higher quality insights than non-student counterfactuals. Additionally, historical counterfactuals produced higher quality insights than fictional counterfactuals. Overall, the mean insight quality was extremely low, suggesting that participants were only able to come up with minimal insights for each problem. There are two main reasons why the lack of variability and low quality might have occurred. First, a single hour long activity may not have allowed enough time for insights to occur. Theory suggests that insight is the result of an incubation period (Segal, 2004). Perhaps if subjects were given more

time, or asked to return, they may have produced more insight. Additionally, participants might have had higher quality insights if they were told throughout to focus on having an insight. In a study conducted by Iran-Nejad et al. (2011), participants had a semester long course in which to learn to value, focus on, and explore their insights (Iran-Nejad & Gregg, 2001). This resulted in students having higher quality insights than was the case for the present study. Second, it is possible that, in attempting to include counterfactuals about topics likely to be familiar to students, the familiarity of the topics was more salient for participants than the incongruity present in the counterfactuals (Iran-Nejad, 1987a; Iran-Nejad & Gregg, 2001). In other words, it is possible that participants' responses were based more on their own preconceptions than on the characteristics of the counterfactuals themselves (Lebow, 2010; Tetlock, 1998; Tetlock & Lebow, 2001).

### **Effect of Knowledge on Feasibility Ratings, Interestingness Ratings, and Insight Quality**

Our hypothesis was that participants who reported feeling knowledgeable would have higher quality insights. However, our results found no effect of knowledge on the ratings of feasibility or insight on the counterfactuals. However, knowledgeable participants did find the counterfactuals more interesting than those participants with less knowledge. This finding is not surprising, as being interested in something will likely lead to becoming knowledgeable about it (Chen, 2009; Csikszentmihalyi, 1996; Neumann, 2006). Results also indicated that subjects were more knowledgeable about historical events in general. This finding is not entirely surprising, given that history is relatively more grounded in the real world (Iran-Nejad, 2000; Prawat, 2000; Thompson & Iran-Nejad, 1994). This should mean that subjects will be more likely to have exposure to historical events, rather than fictional events. Consistent with this theory, subjects in general showed more knowledge of historical events.

Results were inconsistent with the prediction that knowledgeable participants would have higher quality insights. Not only were there not significant differences, the quality of the insights were also uniformly low. The low quality of the insights may have been caused by participants responding based on their own preconceptions rather than on the characteristics of the counterfactuals that contradicted what they were familiar with. Again, this point leads back to the lack of training and definition of feasibility. Without definition, the students were unable to define a feasible insight on their own. This low insight quality is consistent with findings from prior research by Tetlock et al. (2000). This study found that some Christians were reluctant to consider how growing up without a father might have affected Jesus' personality (Tetlock et al., 2000). Presumably, Christians would be knowledgeable about Jesus. However, in the Tetlock et al. study, knowledge proved to be a barrier to having "insights". While the insights provided in this study may not have been as powerful, it is possible that a similar situation occurred for students in the present study. Knowledge could still be related to having insights. Specifically, biofunctional theory would assume that interest provides the personally meaningful reason to seek knowledge (Iran-Nejad, 1994; Iran-Nejad et al., 2006). This would mean that interest in history would provide a reason for students to want to learn about a historical event. While not always the case, this process of seeking knowledge likely involves having insights (Neumann, 2006). For example, adaptive experts have been found to be able to apply their expertise to new areas revising their thinking in the process (Wineburg, 1998). It was anticipated that the participants in this study would be fiction "experts" and would be able to revise their thinking based on the counterfactuals but this was not the case. Rather, we found that participants were unable to have insights about the counterfactuals.

## **Limitations of the Current Study**

### **Sample Size/Missing Data**

The generalizability of the sample is limited, as a majority of the sample was white and female. The limited diversity means that other samples of differing ethnic and gender compositions might have different ratings of the counterfactuals and the results of this study might not be representative of college or grade school students as a whole. Second, the small sample size and generally low power leaves open the possibility of differences that were not detected. The low power was compensated for by setting the alpha level at .10. However, doing so increases the chance of committing a type I error. A power analysis conducted post hoc indicates that, with a correlation among the repeated measures of  $r = .3$ , a sample size of about 50 would have been enough to detect an effect at  $\eta = .25$  with a power of 95%. Clearly, if all 45 participants were included, an effect size similar to this number would have been able to be detected. However, the main reason for the small sample size was due to missing data. While data was collected from 45 participants, the Ns for the individual questions ranged from 21 to 34. This discrepancy indicates that participants selectively responded to the questions. Specifically, the missing data could have been avoided by requiring participants to answer all questions. Given that participants were able to skip questions they only answered the ones they wanted. Finally, the study could have included a sample counterfactual as a form of training. Questions about feasibility and interestingness could have been included along with a definition of what makes a counterfactual feasible. The training would have given participants a better idea what to expect over the course of the study. Had this training been provided participants might not have skipped questions even if it was possible to do so.

### **Online Data Collection**

The primary reason for conducting the present study online is that data collection would be more accessible to participants. While there were sampling problems, this does not seem to have been the result of the study being internet based as such. Indeed, these problems could have been avoided had the survey tools been used to their fullest potential. In contrast to online communities organized around specific interests (Wright, 2005), population composition in terms of gender, ethnicity, and even worldview are relatively well known. Additionally, given that the participants in this study were college students, it is unlikely that they were unfamiliar with doing activities online as such. I would expect that studying counterfactual thinking using the internet should be feasible so long as a survey methodology is employed, population demographics are well known, and the participants are likely to be familiar with using the internet. Finally, I do not see a reason to conduct an academic course based study of counterfactual thinking using the internet unless the course is itself online.

### **Counterfactual Scenarios**

The decision to focus on including counterfactuals for topics likely to be familiar to participants may have reduced variability, particularly as relates to feasibility and insights (Iran-Nejad, 1987a, 1989). Specifically, an overwhelming number of participants reported being knowledgeable about three of the four historical events. The relatively small number of not knowledgeable participants made it difficult to test for knowledge differences in feasibility and insights. A different method of generating the counterfactual scenarios might have yielded more variability. Specifically, asking participants about series or events that they are familiar with is not the only way of finding out what they know or are interested in. Ratings of television series' are regularly collected as are lists of the top selling books. These might have been useful in generating a list of fictional series or even historical events likely to be interesting to students.

Finally, while counterfactual scenarios are assumed to have educational advantages relative to presenting factual accounts, this study did not actually compare counterfactual scenarios and factual accounts. This limitation leaves open the possibility that participants' might not be able to distinguish between a factual account and a counterfactual one if they aren't familiar with the underlying event. Also, it is possible that factual accounts presented from multiple perspectives might yield equal or greater interest and insights than counterfactual scenarios (e.g., Loewen, 1995; Robinson & McKnight, 2006; Robinson, Raineri, Converse, Stewart, & Rose, 2006; Robinson, Stewart, & McCarthy, 2006; Zinn, 2003; Zinn & Arnone, 2004).

### **Dependent Variables**

First, participants seemed to have some difficulty in distinguishing among feasible and not feasible counterfactuals. The averages for all scenarios were very similar, indicating that all the counterfactuals were rated as, at least minimally, feasible and none were rated as not being feasible. While researchers have found differences in history experts' evaluations of counterfactual scenarios (Tetlock, 1998; Tetlock & Lebow, 2001), the need to develop expertise in evaluating counterfactuals was not anticipated because counterfactuals are common in everyday contexts (Harris, 1997, 2001; Harris et al., 1996). Training could have aided participants by giving them an example counterfactual and explaining to them that a feasible counterfactual is one that makes a minor change close to an event. This change would have allowed for an examination of the degree to which students' own feasibility explanations were borrowed from the instructions versus being the product of an insight.

Second, the present study included a relatively weak measure of student interest. While the study was not intended to produce findings on sustained interest (Hidi & Renninger, 2006),

more could have been done to assess the interestingness of the counterfactuals as compared to each other or as compared to factual scenarios. Specifically, because counterfactuals were not compared to other kinds of scenarios, it is not clear from the results of this study that adding a counterfactual element increases the interestingness of an otherwise uninteresting historical event or fictional series. Including factual scenarios would have allowed for the direct comparison of the interestingness of factual and counterfactual scenarios.

Third, the relatively insignificant practical differences in participants' insights make it difficult to test for relationships between insights and other variables. It is possible that students' insights might have been of higher quality had they been presented with the distinction between non-insight problem solving as being the result of searching for a solution and insight problem solving as resulting from sudden knowing (Gunnells, 2011). Additionally, it is possible that the counterfactuals themselves were too familiar to students for them to have insights. This familiarity is logically incompatible with having insights to the degree that problems solved with insight are typically, at least somewhat, new to the participants, even if the problem domain is not (Gunnells, 2011). Finally, as was mentioned above, it is possible that the study was not long enough for participants to have insights (Iran-Nejad et al., 2011). Given the general familiarity of the materials, it is possible that participants approached the counterfactuals the same way they habitually do the underlying counterfactuals and did not have enough time to shift to a more creative, insightful, view of the counterfactuals (Iran-Nejad & Gregg, 2001).

Fourth, the present study inadequately assessed the relationship between feasibility, interestingness, insights and variables that might mediate or moderate these ratings. Obviously, the connections this study was designed to address do not operate in isolation. For example, ratings may be moderated by factors such as need for cognitive closure (e.g., Kruglanski, 1989;

Kruglanski & Webster, 1996), political ideology (Tetlock et al., 2000), or moral judgment development (Narvaez & Gleason, 2007). The primary problem is that I was overly rigid in adapting the work done by Lebow and colleagues (Lebow, 2010; Tetlock, 1998; Tetlock & Lebow, 2001). Specifically, political ideology, worldview, and importance of American identity were included in the present study on the assumption that conservatives that view the world as ordered and place a high degree of importance on their American identity might be less likely to view the counterfactuals as feasible (Lebow, 2010). Obviously, it is important to maintain continuity with prior research, but I would have been better able to explore relationships among the variables had I focused on a single construct such as need for closure (Kruglanski & Webster, 1996). Specifically, participants high in need for cognitive closure might be expected to be low on the feasibility, interestingness, and insightfulness measures. Need for cognitive closure could then be included as a covariate in subsequent statistical analyses.

### **Connection to Current Theories**

#### **Interest, Intuition, and Expertise**

While conducted from a biofunctional perspective, the present study has connections to a number of other theories and lines of research. First, the present study can be interpreted as supporting the idea that interest is the appropriate foundation for developing expertise (Chen, 2009; Csikszentmihalyi, 1996; Neumann, 2006). According to theory, those who have greater interest will also develop expertise. Knowledgeable participants rated the counterfactuals as more interesting than participants who were not knowledgeable, verifying this statement. Additionally, subjects were overwhelmingly more knowledgeable of the historical scenarios, which had significantly higher interestingness ratings. While the undergraduates in this study could not be characterized as history experts, their interest does suggest that they might be

willing to learn more about the subjects of the counterfactuals in the future. Additionally, subjects were overwhelmingly more knowledgeable of the historical scenarios, which had significantly higher interestingness ratings.

This study is also broadly consistent with research on expert intuitions (English, 1993; Kahneman & Klein, 2009; McCutcheon & Pincombe, 2001), which says that experts can make decisions based on their ability to notice patterns in the environment while not necessarily being able to describe the process of coming to a decision. In the current study, knowledgeable participants had higher quality insights than participants that were not knowledgeable. One possible reason for this difference is that knowledgeable participants' intuitions might be better developed than those of participants that were not knowledgeable. This suggestion is broadly consistent with the notion that creativity requires substantial knowledge of a given domain (Csikszentmihalyi, 1996). Creativity and knowledge are both required to provide insight. In a sense, creativity favors the prepared and knowledgeable participants were better prepared to respond creatively to the counterfactuals than were the not knowledgeable participants.

### **Moral Development**

The present study is broadly consistent with developmental perspectives on moral reasoning (Narvaez & Gleason, 2007; Rest, Narvaez, Thoma, & Bebeau, 2000). Counterfactual scenarios are, in a sense, dilemmas. The source of the dilemma is the dissonance between the scenario and known events. The dilemma would be moral to the extent that it explicitly describes or implies different social norms than are operative in the participant's own culture (e.g., Lebow, 2006a). I would expect that participants transitioning from primary reliance on one developmental schema to reliance on another would be most likely to have an insight. This expectation is based on the theory that, in contrast to Kohlberg (1984), individuals can shift from

using one moral schema to another without negating the idea that individuals have a particular moral schema that they typically use (e.g., Derryberry & Thoma, 2005). Regarding counterfactuals, the present argument is that insights are a means, but not the only one, by which a shift among moral schemas might occur (Iran-Nejad & Gregg, 2001).

Given the definition of the Personal Interest schema as viewing morality in terms of how a situation benefits the individual (Rest et al., 2000), people operating from a Personal Interest schema could agree that a counterfactual is feasible but would not necessarily have insights in that it is relatively easy to generate self-serving counterfactuals (e.g., Petrocelli & Crysel, 2009). For these participants, an insight would consist in recognizing that the rules of society have value beyond their benefits for the individual (Rest et al., 2000). Participants in the present study would, most likely, approach moral dilemmas in terms of a Maintaining Norms schema. The Maintaining Norms schema defines morality in terms of preserving the existing social order (Rest et al., 2000). In the context of counterfactual scenarios, operating largely from the perspective of a Maintaining Norms schema would likely limit the number and quality of participants' insights to the degree that counterfactual scenarios explicitly and implicitly challenge the existing social order by suggesting that norms are not self-evident and could have been different (e.g., Cook, 2001; R. Cowan et al., 2004; Lebow, 2006a). Individuals operating from a Postconventional schema might be particularly likely to have insights in that the Postconventional schema involves, by definition, the idea that norms are open to revision (Rest et al., 2000). However, it is not necessarily openness to counterfactuals that defines the insight. Instead an insight could be identified in terms of a combination of the subjective experience of sudden knowing (Gunnells, 2011), moral schema (Rest et al., 2000), and relative consolidation of that schema (Derryberry & Thoma, 2005). For example, a consolidated Postconventional

participant would be regarded as having an insight if they report that their response to a counterfactual came to them as a result of sudden knowing.

Finally, the present study is relevant to efforts aimed at encouraging students to reflectively reconsider the political systems in the United States and elsewhere (Ladson-Billings, 2003; Petrovic, 1999; Zinn, 2003). Obviously, counterfactuals can be used to demonstrate that political systems could have been otherwise. For example, political systems could have found a way to work together harmoniously enough to prevent World War I. Such counterfactuals could then serve as an example of how society could be different in the present. However, efforts at social change should be careful not to ignore the issue of why alternatives would be more personally meaningful, satisfying, or better and why individuals should give up their commitments to current systems (Floden, 1981).

Overall, the goal is to increase insightfulness in history education. We can use the results of our study to recommend identifying which historical events participants are most interested in and knowledgeable about. Exposing students to counterfactuals about those events may then be a method of developing in students the capacity to have insights about history. Furthermore, if a student is interested in, but not knowledgeable about, a historical event, this interest could be used as a basis for developing the capacity for insights and for acquiring knowledge.

### **Directions for Future Research**

The most immediate goal for future research would be to address the limitations of the current study. The first step in this process would be to identify a broader sample of events and counterfactuals. The purpose of this search would be to create a corpus of materials that could be used for both research and teaching. Second, a study could be conducted that asks students to rate the interestingness of paired items consisting of two historical events, two historical

counterfactuals, or one of each. The purpose of this study would be to more precisely examine the interestingness of counterfactuals relative to other kinds of materials than was the case in the present study. Third, a similar study could be conducted that examines participants' ratings of the feasibility of counterfactuals and of minority perspectives on historical events. Again the purpose of this study would be to more precisely examine feasibility than was the case in the present study. For both of these studies, cluster analyses could be used to examine structural relationships among counterfactuals, events, interestingness, and feasibility.

Next, a study could be conducted that examines the relationship between moral development and insights in the context of fictional events, fictional counterfactuals, historical events, and historical counterfactuals. The purpose of this study would be to more precisely examine possible moderators of participants' insights in the context of counterfactual and factual scenarios. Prior to participants reading the events and counterfactuals, the distinction between sudden knowing and searching for a solution. This would be included as a possible means of overcoming the low quality of insights in the current study. After reading each individual event or counterfactual, participants would be asked to record their insights. Need for cognitive closure would be included as a covariate (Kruglanski, 1989; Kruglanski & Webster, 1996). My hypothesis would be that conventional participants with a high need for closure would have particularly few insights and insights of the lowest quality. A follow up study could focus specifically on individuals with high need for cognitive closure in that need for cognitive closure likely would moderate the degree to which interest might lead to insightful knowledge. The goal of this study would be to assess the usefulness of counterfactuals and events presented from minority perspectives for fostering openness to changing one's beliefs. This study might be particularly beneficial in clarifying the limitations of counterfactuals (Bixby & Daniels, 1967;

Clegg, 2007; Cook, 2001; R. Cowan et al., 2004; Lebow, 2006a; Niven, 2001; Tetlock et al., 2006), relative to other materials (Loewen, 1995; Zinn, 2003; Zinn & Arno, 2004), for fostering insights.

The final step in assessing the full model would be to explore the relationships among knowledge, interest, and insights over longer periods than a study of an hour or so. For example, students in a history class could be given the opportunity to write a report on a historical event. Options for writing this report could include creating an argument based on counterfactual accounts of the event, minority perspectives on the event, or on more traditional accounts of the event. Prior to doing the report, students' knowledge of the event could be assessed. Participants' knowledge and insights could then be assessed after doing the report. Such a study would be important because biofunctional theory assumes that interest leading to insights is a long term process (Chen, 2009; Iran-Nejad, 1994; Iran-Nejad et al., 2011; Iran-Nejad et al., 2006; Neumann, 1999, 2006; Stewart et al., 2008).

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## APPENDIX

### **Historical Counterfactuals**

On the following pages you will see scenarios that alter the outcomes of various historical events. For each event, you will be asked to rate the plausibility of the counterfactual.

Frederick Vinson does not die in September of 1953. Earl Warren is not appointed to replace him as Chief Justice of the Supreme Court. In the *Brown v. Board* decision, the Supreme Court reaffirms “separate but equal” by a vote of 5-4. Segregation continues in public schools across the country. The Civil Rights Movement becomes more radical and violent due to a lack of progress. Race relations remain polarized and African-Americans continue to be second class citizens.

1. Do you feel knowledgeable enough about the *Brown v. Board* decision to answer questions on it?

Yes

No

2. How feasible is this counterfactual?

3. Please briefly explain why you think this counterfactual is or is not feasible:

4. How interesting was this counterfactual for you?

During the September 11<sup>th</sup>, 2001 terrorist attacks the passengers on the third plane are unsuccessful preventing the plane from crashing into the White House. As a result, Al Qaeda boasts of their success in weakening the United States. Later they successfully attack the United States with a nuclear weapon.

1. Do you feel knowledgeable enough about the September 11<sup>th</sup> attacks to answer questions on them?

Yes

No

2. How feasible is this counterfactual?

3. Please briefly explain why you think this counterfactual is or is not feasible:

4. How interesting was this counterfactual for you?

On the night of November 7, 1862, President Lincoln relieved General George McClellan of command of the Union Army of the Potomac and its 100,000 troops. Not wishing any more of his men to die in battle, McClellan marches on Washington with his army. The semioccupation of Washington compels Lincoln to seek a diplomatic solution to the Civil War. Lincoln recognizes the independence of the Confederate States of America.

1. Do you feel knowledgeable enough about the Civil War to answer questions on it?

Yes

No

2. How feasible is this counterfactual?

3. Please briefly explain why you think this counterfactual is or is not feasible:

4. How interesting was this counterfactual for you?

The April 27<sup>th</sup>, 2011 tornado does not hit Tuscaloosa. As a result, the University of Alabama has a May graduation.

1. Do you feel knowledgeable enough about the April 27<sup>th</sup> tornado to answer questions on it?

Yes

No

2. How feasible is this counterfactual?

3. Please briefly explain why you think this counterfactual is or is not feasible:

4. How interesting was this counterfactual for you?

### **History Counterfactual Insights**

In the spaces below please write one simple sentence (12 words max) that expresses your biggest insight while reading the above historical counterfactuals and then in a brief paragraph (120 words max) describe your reflections on that insight.

## **Fictional Counterfactuals**

On the following pages you will see scenarios that alter the outcomes of various fictional events from popular media. For each event, you will be asked to rate the plausibility of the counterfactual.

On the show *Friends*, Monica never lost her teenage weight and is still fat as an adult, Joey is a famous and wealthy soap opera star, Pheobe is a stockbroker, and Chandler works unsuccessfully as a writer.

1. Would you consider yourself a fan of *Friends*?

Yes

No

2. Do you feel knowledgeable enough about *Friends* to answer questions about events from the show?

Yes

No

3. How feasible is this counterfactual?

4. Please briefly explain why you think this counterfactual is or is not feasible:

5. How interesting was this counterfactual for you?

On the show *Pretty Little Liars*, Allison does not die. As a result, her friends gradually drift apart.

1. Would you consider yourself a fan of *Pretty Little Liars*?

Yes

No

2. Do you feel knowledgeable enough about *Pretty Little Liars* to answer questions about events from the show?

Yes

No

3. How feasible is this counterfactual?

4. Please briefly explain why you think this counterfactual is or is not feasible:

5. How interesting was this counterfactual for you?

On the show *Seinfeld*, Jerry is reliable and kind. George is responsible and well dressed. Kramer is neat and has good ideas. Postal worker Newman is good friends with Jerry.

1. Would you consider yourself a fan of *Seinfeld*?

Yes

No

2. Do you feel knowledgeable enough about *Seinfeld* to answer questions about events from the show?

Yes

No

3. How feasible is this counterfactual?

4. Please briefly explain why you think this counterfactual is or is not feasible:

5. How interesting was this counterfactual for you?

In the *Harry Potter* book series, Voldemort decides to attack Neville Longbottom's parents instead of Harry's. As a result, Harry is an average wizard and Neville is the one who ultimately defeats Voldemort.

1. Would you consider yourself a fan of *the Harry Potter* series?

Yes

No

2. Do you feel knowledgeable enough about the *Harry Potter* series to answer questions about specific events from the books?

Yes

No

3. How feasible is this counterfactual?

4. Please briefly explain why you think this counterfactual is or is not feasible:

5. How interesting was this counterfactual for you?

### **Fictional Counterfactual Insights**

In the spaces below please write one simple sentence (12 words max) that expresses your biggest insight while reading the above fictional counterfactuals and then in a brief paragraph (120 words max) describe your reflections on that insight.

## Demographic Questions (Identical for all conditions)

Please answer the following questions.

1. How old are you?
2. What is your ethnicity?
  - Asian or Asian American, including Chinese, Japanese, and others.
  - Hispanic or Latino, including Mexican American, Central American, and others.
  - Black or African American.
  - White, Caucasian, Anglo, European Americans; not Hispanic.
  - American Indian/ Native American
  - Mixed; Parents are from two different groups.
  - Other
3. What is your gender?
  - Male
  - Female
4. What is your student level?
  - Freshman
  - Sophomore
  - Junior
  - Senior
5. How many history courses have you taken? \_\_\_\_\_
6. Briefly describe what makes a historical event worth studying:
7. In terms of your political views, how would you characterize yourself?
8. Imagine a spectrum of views about the nature of the world. It is anchored on one end by the belief that the world is ordered and predictable, and on the other by the belief that it is utterly chaotic and unpredictable. Where would you place yourself along this continuum?
9. How important is being an American to your identity?

June 6, 2011

Office for Research  
Office of the Director of  
Research Compliance

William Stewart  
Educational Studies  
College of Education  
Box 870231

THE UNIVERSITY OF  
**ALABAMA**  
R E S E A R C H

Re: IRB # 11-OR-194: "Counterfactual Historical Scenarios as Organizers of the Sources of Insightful Understanding"

Dear Mr. Stewart:

The University of Alabama Institutional Review Board has granted approval for your proposed research.

Your application has been given expedited approval according to 45 CFR part 46. Approval has been given under expedited review category 7 as outlined below:

*(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.*

Your application will expire on June 5, 2012. If the study continues beyond that date, you must complete the IRB Renewal Application. If you modify the application, please complete the Modification of an Approved Protocol form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, please complete the Request for Study Closure form.

Should you need to submit any further correspondence regarding this application, please include the assigned IRB application number.

Good luck with your research.

Sincerely,



Carpanato T. Myles, MSM/CIM  
Director & Research Compliance Officer  
Office for Research Compliance  
The University of Alabama

152 Rose Administration Building  
Box 870104  
Tuscaloosa, Alabama 35487-0104  
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Office for Research  
Institutional Review Board for the  
Protection of Human Subjects



June 26, 2012

William Stewart  
Dept. of Educational Studies  
College of Education  
Box 870231

Re: IRB#: 11-OR-194-R1 "Counterfactual Historical Scenarios as Organizers of the Sources of Insightful Understanding"

Dear Mr. Stewart:

The University of Alabama Institutional Review Board has granted approval for your renewal application.

Your protocol has been given expedited approval according to 45 CFR part 46. Approval has been given under expedited review category 7 as outlined below:

*(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.*

Your application will expire on June 24, 2013. If your research will continue beyond this date, complete the relevant portions of the IRB Renewal Application. If you wish to modify the application, complete the Modification of an Approved Protocol Form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, complete the appropriate portions of the IRB Request for Study Closure Form.

Should you need to submit any further correspondence regarding this proposal, please include the above application number.

Good luck with your research.

Sincerely,

Carpaneto T. Myles, MSM, CIM  
Director & Research Compliance Officer  
Office of Research Compliance  
The University of Alabama



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Office for Research  
Institutional Review Board for the  
Protection of Human Subjects

THE UNIVERSITY OF  
**ALABAMA**  
R E S E A R C H

June 29, 2012

William Stewart  
ESPRMC  
College of Education  
Box 870231

Re: IRB # 12-OR-232, "Counterfactual Thinking Study"

Dear Mr. Stewart:

The University of Alabama Institutional Review Board has granted approval for your proposed research.

Your application has been given expedited approval according to 45 CFR part 46. You have also been granted the requested waiver of written documentation of informed consent. Approval has been given under expedited review category 7 as outlined below:

*(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.*

Your application will expire on June 28, 2013. If the study continues beyond that date, you must complete the IRB Renewal Application. If you modify the application, please complete the Modification of an Approved Protocol form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, please complete the Request for Study Closure form.

Should you need to submit any further correspondence regarding this application, please include the assigned IRB application number.

Good luck with your research.

Sincerely,



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