


5-26-2017

# Synthesis, Including Microwave Promotion, of Selected Cyclopropyl Derivatives as Stereochemically Rigid Probes of Certain Pharmacological Receptors

Grace Hohn

*Olivet Nazarene University*, [gracehohn@gmail.com](mailto:gracehohn@gmail.com)

Follow this and additional works at: [https://digitalcommons.olivet.edu/honr\\_proj](https://digitalcommons.olivet.edu/honr_proj)

 Part of the [Medicinal and Pharmaceutical Chemistry Commons](#), [Mental and Social Health Commons](#), and the [Pharmaceutical Preparations Commons](#)

---

## Recommended Citation

Hohn, Grace, "Synthesis, Including Microwave Promotion, of Selected Cyclopropyl Derivatives as Stereochemically Rigid Probes of Certain Pharmacological Receptors" (2017). *Honors Program Projects*. 65.  
[https://digitalcommons.olivet.edu/honr\\_proj/65](https://digitalcommons.olivet.edu/honr_proj/65)

This Article is brought to you for free and open access by the Honors Program at Digital Commons @ Olivet. It has been accepted for inclusion in Honors Program Projects by an authorized administrator of Digital Commons @ Olivet. For more information, please contact [digitalcommons@olivet.edu](mailto:digitalcommons@olivet.edu).

THE EFFECT OF WEBSITE DESIGN, NEED FOR COGNITION, AND ARGUMENT  
QUALITY ON INFORMATION ASSESSMENT

By

Luke David Salomone

Honors Scholarship Project

Submitted to the Faculty of

Olivet Nazarene University

for partial fulfillment of the requirements for

GRADUATION WITH UNIVERSITY HONORS

March, 2017

BACHELOR OF SCIENCE

in

Psychology

\_\_\_\_\_  
Scholarship Project Advisor (printed) SignatureDate

\_\_\_\_\_  
Honors Council Chair (printed) SignatureDate

\_\_\_\_\_  
Honors Council Member (printed) SignatureDate

## ACKNOWLEDGEMENTS

I would like to thank my research mentor, Dr. Alison Young-Reusser, for her excellent mentorship through this project. Dr. Young-Reusser provided guidance as I developed the study design and variable. She also provided expert counsel when running an analysis on the results. I would also like to thank the 165 participants who sacrificed their time to make this study possible. I am also thankful for the support and assistance offered to me by the University Honors Program. Without this program, I may have never completed research of this caliber during my undergraduate time at Olivet. Finally, I would like to thank you, the reader.

## TABLE OF CONTENTS

<b>ACKNOWLEDGEMENTS.....</b>	<b>ii</b>
<b>LIST OF TABLES.....</b>	<b>v</b>
<b>LIST OF FIGURES .....</b>	<b>vi</b>
<b>ABSTRACT .....</b>	<b>vii</b>
<b>INTRODUCTION.....</b>	<b>1</b>
<b>REVIEW OF LITERATURE .....</b>	<b>2</b>
Understanding Attitudes .....	2
Trust Relationships .....	2
Perception of Information .....	7
Hypotheses.....	8
<b>METHOD .....</b>	<b>10</b>
Participants .....	10
Materials .....	10
Procedure.....	13
<b>RESULTS .....</b>	<b>15</b>
Descriptive Statistics .....	15
Inferential Statistics .....	15
<b>DISCUSSION .....</b>	<b>22</b>
<b>REFERENCES.....</b>	<b>24</b>
<b>APPENDIX .....</b>	<b>26</b>

**Website Examples.....26**

**Questionnaire.....27**

**Strong Argument (Petty and Cacioppo, 1984).....30**

**Weak Argument (Petty and Cacioppo, 1984).....33**

LIST OF TABLES

Table 1 All predictors included in the ANCOVA model predicting article  
evaluation ..... 18

Table 2 Questionnaire..... 30

## LIST OF FIGURES

Figure 1 Predicted article evaluation for High NFC individuals (*p < .05) .....	18
Figure 2 Predicted article evaluation for Low NFC individuals (**p < .01) .....	19
Figure 3 Predicted article evaluation for High NFC individuals (**p < .01) .....	19
Figure 4 Predicted article evaluation for Low NFC individuals (*p < .05) .....	20
Figure 5 Predicted article evaluation for interaction of NFC X Argument quality (**p < .01) .....	20
Figure 6 Predicted article evaluation for interaction of NFC X Disposition to Trust, (**p < .01) .....	21
Figure 7 Good Website Example .....	26
Figure 8 Bad Website Example .....	26

## ABSTRACT

When evaluating information online or offline, two important aspects are considered by readers: the credibility of the source and the quality of the argument. It is well known that strong arguments are more persuasive than weak arguments of the same length (Petty and Cacioppo, 1984), and recent research has shown that in an online environment source credibility is determined by the reader in part by the design aspects of website (Lowry et al., 2013). Using a 2 (website quality: good vs bad) x 2 (argument quality: strong vs weak) ANCOVA with need for cognition (NFC) and disposition to trust as covariates, I examined which aspects are most important to individuals when evaluating the information found on a website. We observed an interaction between website quality and argument quality, which was moderated by NFC, such that individuals with higher NFC seem to care about the quality of the arguments when evaluating them, whereas those with lower NFC seem to care more about the design of the website. These results demonstrate that assessment of information in an online context occurs differently depending on an individual's NFC.



## INTRODUCTION

With the rise of online news and information sharing through a variety of websites and media platforms, this study seeks to analyze what aspects of online information affect an individual's perception of the source of that information. Visual elements of a website are cues that a viewer uses to determine the level of trust they will put into a website (Lowry et al., 2013). The purpose of this research is to manipulate the level of trust a user will place in a website and the content of the site and then determine if viewers will evaluate the information in each case differently. With the rise of online news and information sharing, knowing exactly how important website design is on information assessment is a useful tool for anyone who communicates a message online.

## REVIEW OF LITERATURE

### **Understanding Attitudes**

To understand the relationship between online information and an individual's attitude toward that information, one must first understand the offline aspects of attitude. Attitudes are a summary of our prior learning with respect to the outcomes produced by a given object (Fazio, 2007). According to Fazio (2007), attitudes help "simplify our day-to-day existence, enabling efficient appraisal of the objects we encounter" (p. 629). If earlier experiences are not available, people still construct attitudes on the spot to respond to unfamiliar situations or attitude objects (Schwarz, 2007). People are able to construct these attitudes based on whatever relevant associations are available at the time (Giesen et al., 2015). Giesen et al. (2015) demonstrated that for objects that are familiar, attitude is predicated by cognition (e.g. is the object useful vs useless). However, for objects that are unfamiliar, affect (e.g. does the object elicit joy vs fear) is more predictive of attitude.

According to Fazio (2007), most of the time attitudes trigger a relatively thoughtless evaluation of the objects and situations that we encounter, but Fazio also believed this automatic evaluation can be overridden. In the presence of motivation and opportunity, individuals consider additional, available knowledge which can either increase the effect of the original attitude or correct for its influence.

### **Trust Relationships**

Another aspect that affects an individual's intentions is their trust perspective (Heijden et al., 2003). Since online interactions require some of the same actions as

offline interactions, we can use the decades of research about offline trust to help better understand the online interactions (Corritore et al., 2003). Online trust is defined as “an attitude of confident expectation in an online situation of risk that one’s vulnerabilities will not be exploited” (Corritore et al., 2003, p. 740). Corritore et al. then explain some of the key dimensions of trust: generality, kind, degree, and stage. Generality refers to the extent of one’s trust. If an individual places trust in news websites to provide accurate information, he has general trust. Specific trust would be observable by an individual trusting mlb.com to provide accurate baseball stats but not to provide up to date stock tips. In this research, it is expected that only general trust will be achieved. The second dimension of trust, kind, refers to the differentiation between trust in long-term interactions and trust in brief exchanges. Corritore et al. (2003) explain that slow trust develops online when a user is a frequent visitor of a specific website, and swift trust develops on a user’s first visit to a site. Participants in this research will only develop swift trust in the site that they are visiting. Stage of trust is similar in that it develops over time. An individual has initial trust after making his or her first purchase on an online website; while someone in the mature stage of trust has already made multiple successful purchases on that site (Corritore et al., 2003). The impact of having users trust a website to a greater degree will affect the perception of the information on that site such that higher levels of trust in a site lead to an increased amount of loyalty to that site. (Flavian et al., 2006).

Khadraoui and Gharbi (2013) also investigated the phases of building trust in an online context. They theorized that initial trust begins at zero and slowly increases with

time. Trust relies on a user's perception of security in a system. The main hypothesis of their study centered around three variables that would predict the level of website trust. The authors also hypothesized that trust propensity (how likely someone is to trust in general) would intensify the influence of satisfaction on trust. Khadraoui and Gharbi (2013) collected 401 questionnaires that measured variables of satisfaction, trust, structural assurance, trust propensity, and perceived value on a website which they had never visited before. Results supported the hypothesis of a direct effect of three variables (perceived value, structural assurance, and satisfaction) on trust in a website. The  $R^2$  value presented in their model is very high (97.9 %.) Therefore, these variables are key components that users use as cues to trust a website. However, these variables may only explain trusting beliefs for a new website. It is also not clear whether the actual content of the site or the design of the site play a role in the perceived value.

Degree is another dimension of trust that is well understood and researched. Degrees of trust can be basic, guarded, or extended (Corritore et al., 2003.) For my research, only a basic degree of trust will be required from participants. These authors go on to argue that just as in offline situations, people look for cues of trustworthiness on a website. These cues include ease of navigation, good use of visual design elements, professional images of products, freedom from small grammatical and typographical errors, an overall professional look of the website, ease of searching, and ease of carrying out transactions. Negative cues also exist, but they are mostly centered around types of advertisements and poor website maintenance.

To understand exactly what visual aspects of a site lead to trusting beliefs, Seckler et al. (2015) identified four website characteristics that encourage trust: graphic design (visual design of the site), structure design (accessibility of users to information), content design (domain name, seals, privacy policy), and social-cue design (customer service agents, chat, photographs of the company). Seckler et al. collected 221 participant surveys that had the user describe either a time they experienced a distrustful experience on a website ( $n = 118$ ) or a time they experienced an especially trustful website ( $n = 103$ ). Stories were then grouped together that had similar website characteristics. Then researchers identified five distrust groups and three trust groups from which to gather data. Results showed that distrust is mostly a result of graphical elements while trust is based on social influences from friends or review sites. Privacy issues also had an effect on distrust and security signs had an effect on trust. Users will notice cues that lead to trust and cues that lead to distrust in a site. Both of these cue types can have an effect on how users will rate the information associated with them.

Risk is a feeling that is present in all online situations, but how much of an effect does it have on actual user interactions? Belanger and Carter (2008) sought to examine the interaction between four constructs that would possibly impact one's intentions to use an e-government system. Those four constructs were trust of the Internet, trust of the government, disposition to trust, and perceived risk. Three of these beliefs were expected to have a positive impact on intention to use e-government, while one (perceived risk) was expected to have a negative impact. The results supported their initial hypothesis that trust of internet and government would predict a user's intent to

use, but perceived risk would negatively impact intent to use. Belanger and Carter created a model that used disposition to trust as a predictor of use. This information demonstrates some of the foundational constructs that impact an individual's use intentions. By employing techniques that are able to increase a user's trust in a website (privacy seals, user testimonials, etc.), one should be able to increase that user's intent to use that site (Lowry et al., 2013).

Since websites are designed in a variety of contexts and with a broad range of background one must understand where individuals attribute the information or flaws they observe in a website. In one study, researchers examined the effect of website flaws on users' perception of an online store's quality and trustworthiness (Everard and McCoy 2010). Specifically, the study sought to determine if the flaw would be attributed internally (action taken by the site developer) or externally (action taken by the site's service provider.) The authors had 259 users view a scenario-based vignette that described some flaw on the website and either attributed that flaw to the site's designer or the service provider. Then, via a questionnaire, Everard and McCoy collected data on a user's perceived quality of the site and trust in the online site. The results showed that when the flaw was attributed internally, the perceived quality for the site was lower. The results also showed that any presence of a flaw, regardless of external or internal attribution, would negatively affect the users' level of trust in the website. Using the information provided by this study, my research centered on the discovery of attribution theory's application in the online environment. Without additional information, participants will likely attribute design flaws in a website to the actual

website/company and not to some external source. An internal attribution of the flaw will lead to a lower level of trust.

Source credibility theory can be related to websites and the interactions they involve. Lowry et al., (2013) examined the effect of logo design on users' perceived credibility. The authors hypothesized, among other things, that logos designed with features that invoke expertise will increase perceived expertise of a firm. Logo design and website interactions had an effect on perceived trustworthiness of a site and intent to use that site such that "expert" logos resulted in a higher level of trust in a website and a greater intent to use that website. This study also measured a participant's disposition to trust which predicted a user's trusting belief in a website, demonstrating that disposition to trust should be controlled in any research regarding trusting intentions or credibility.

### **Perception of Information**

Varying how information is presented will affect to what degree readers rate the information (Jo 2005). Jo's experiment compared negative news and positive news in an online context and in newspaper in terms of which is most credible. The results showed that stories in the newspaper were more credible than stories in an online press releases. But the rating of that information was affected not only by its source but also by the content of the message. There was an interaction such that when the news was negative, it was viewed as less credible online vs in print. If the type of content can affect the rating in an online environment, would users react more strongly to a poorly

designed website if the content of that site was poorly organized? The positive news that was viewed in paper was seen just as credible as the positive news read online.

Individual differences can also affect the degree which a person will evaluate the information they are presented. According to Petty and Cacioppo (1986) the Elaboration Likelihood Model of Persuasion (ELM) could explain what makes people adjust their attitude toward a specific topic. They first defined attitude as “general evaluation that people hold in regard to themselves, other people, objects, and issues.” The study outlines several postulates that support their ELM. The first postulate is that people are motivated to hold correct attitudes. Another postulate is that persuasive arguments, peripheral cues, and issue direction impact attitude change as well. These authors developed a need for cognition scale that measured a participant’s “need to understand and make reasonable the experiential world.” Their research also suggested that those with a high need for cognition enjoy cognitive tasks. In the context of an argument, those with a higher need for cognition scrutinized an argument more than those with a lower need for cognition. This relationship could play a role in the evaluation of the research I conduct on source credibility of a website. If an individual has a higher need for cognition, they may evaluate a website and its contents to a greater degree than an individual with a lower need for cognition.

### **Hypotheses**

Creating two versions of a website, one using good design elements and the other using bad design elements, should lead to participants placing trust in one website more than the other website.



H1: Participants will evaluate information on a well-designed website more favorably than the same information on a poorly designed website.

I will also vary the quality of the content presented on the website. An article that uses strong supportive arguments can affect a reader's evaluation of that article (Petty and Cacioppo, 1984). I will feature two versions of the same article; one will have strong supportive elements, and the other will have weak supportive elements.

H2: Evaluations will favor the article that has strong supportive elements more than the article with weak supportive elements.

With these two variables, I am creating four conditions in which a participant may be categorized. I expect an interaction between these variables since users may be more critical of a site when it is poorly designed or has "distrust" elements.

H3: There will be a greater difference in evaluations of the strong and weak arguments in the poorly designed condition than in the evaluations in the well-designed condition.

Differences in the individual may also affect how that user evaluates the information that he reads. If a participant has a higher need for processing information and evaluating it, he may be more likely to evaluate a well-written article positively than someone with a low need for processing information.

H4: Participants with a high need for cognition will be more critical of the article quality than participants with a low need for cognition.

## METHOD

### Participants

Participants for this research were sampled from a population of undergraduate students at a private college in the Midwest. Some participants were offered extra credit in an undergraduate course as compensation for their time. Participation in this study was not required of any individual to obtain a passing grade in any class. There were 169 total participants (mean age = 20.26, SD = 3.82, 51 men, 115 women, 3 declined to disclose gender).

### Materials

The articles that were featured on the website had two variations. The two variations were developed by Petty et al. (1980) when determining how participants in a group will evaluate information differently than when they are on their own. Both arguments had the same central message: senior comprehensive exams are a benefit to college seniors. In the strong article condition, this central message was supported with rational and convincing arguments like "Data from the University of Virginia, where comprehensive exams were recently instituted, indicate that the average starting salary of graduates increased over \$4000 over the two-year period in which the exams were begun." The weak article features similar statistics and key words, but just altered them to be slightly less convincing, example: "data from the University of Virginia show that some students favor the senior comprehensive exam policy."

To put the participants in either a condition with high source trust or low source trust, two different websites were created. Websites were designed using Stanford

Guidelines for Web Credibility (Fogg 2002). Since the article was related to education, the faux website reflected that of a college. The good website condition used well-formatted pictures and text to elicit a high feeling of source trust for the reader. While the bad website condition had a low contrast background and poor navigation tools to elicit a feeling of low source trust for the reader. See Figure 7 and Figure 8 in the Appendix for the website design differences.

Evaluations of the article were gathered by asking four assessment questions: (a) to what extent do you feel the communication made its point effectively, (b) to what extent did you like the communication, (c) to what extent do you feel that the communication was convincing, and (d) considering both content and style, how well written was the communication? The responses to these questions were recorded on 5-point Likert-type scales from 0 (not at all) to 5 (very much).

The trusting beliefs scale (Lowery et al. 2013) was the next scale directly following the article evaluation. This scale had 11 questions which were answered on a 7 point Likert-type scale from 0 (strongly disagree) to 7 (strongly agree). This scale related back to the article that was read and to what degree the individual trusted the college represented by the website and article (e.g. "I believe that the college would act in my best interest.")

The succeeding scale, distrusting beliefs (Lowery et al. 2013), measured the reverse of the trusting beliefs scale. The distrusting beliefs scale had 7 questions which were answered on a 7 point Likert-type scale from 0 (strongly disagree) to 7 (strongly agree). An individual with a high distrusting belief would also be expected to have a low

trusting beliefs score. It may have been possible to combine these two scales and reverse code the distrusting belief scale, but I chose to follow what was outlined by Lowery et al. and keep them as separate scales.

Source Credibility (Lowery et al. 2013) was determined using a semantic scale with 6 words and their antonym (e.g. trustworthy vs untrustworthy, reliable vs unreliable, reputable vs disreputable, inconsistent vs consistent, untrained vs trained, and unskilled vs skilled). Those who believed website and article as more credible would chose words associated with credibility, while those who believe the website and article as less credible would chose words associated with a lack of credibility.

Disposition to trust (Lowery et al. 2013) was the next scale that individuals encountered. This scale has 12 questions which were answered on a 7 point Likert-type scale from 0 (strongly disagree) to 7 (strongly agree). Disposition to trust measures how likely the individual is to take a position of trust in a given situation. For example, one question on the scale is “I generally give people the benefit of the doubt when I first meet them.” An individual with a high disposition to trust would answer 7 (strongly agree) while an individual with a low disposition to trust would answer 0 (strongly disagree).

Contrasting to disposition to trust, disposition to distrust (Lowery et al. 2013) measures how likely an individual is to form a distrusting stance in a given situation. This scale had 13 questions which were answered on a 7 point Likert-type scale from 0 (strongly disagree) to 7 (strongly agree). Someone with high disposition to distrust

would agree with the statement “I worry that people are usually out for their own good.”

Need for cognition (Cacioppo et al. 1984), which measures an individual’s tendency to engage and enjoy thinking, (e.g. “I find satisfaction in deliberating hard and for long hours”), was the final scale in the questionnaire. This scale included 18 questions (9 that were reverse-worded) which were answered on a 5 point Likert-type scale from 0 (extremely uncharacteristic of me) to 5 (extremely characteristic of me). Full questionnaire, website designs, and argument conditions are available in the Appendix .

### **Procedure**

This experiment had a 2 (website design: good vs. bad) x 2 (argument quality: strong vs. weak) x 2 (need for cognition: high vs. low) factorial design. The survey was constructed using SurveyMonkey. The survey link was deployed through email and participants could complete the survey during their free time. Participants first received informed consent information and were instructed to select “next” to indicate their consent to participate. Participants were randomly assigned to one of four conditions: good website & strong article, good website & weak article, bad website & strong article, and bad website & weak article. These participants were unaware of the manipulation. Participants were told the article they were reading was a draft and they were to read it and expect questions about the article later in the survey. After reading the article, participants filled out the evaluation questions and then continued through the rest of the survey which included scales measuring their disposition to trust,

disposition to distrust, trusting beliefs, distrusting beliefs, trusting intentions, source credibility, need for cognition, computer affinity, and basic demographic information.

The questions on each page were randomized but the page order and scale order remained the same. The estimated time for completion was 30 minutes. After taking the questionnaire, participants were thanked, offered to contact me with any questions, and the survey closed automatically.

## RESULTS

### Descriptive Statistics

I found evidence that the four evaluation questions directly following the article were sufficiently reliable (Cronbach's  $\alpha = 0.91$ ) and were therefore averaged together to form an article evaluation index, with higher numbers indicating more positive evaluations. This article evaluation composite served as the primary dependent variable in my model. The other scales were also reliable and the items on each scale were average to create a trusting belief score (Cronbach's  $\alpha = 0.97$ ), a distrusting belief score (Cronbach's  $\alpha = 0.96$ ), a trusting intention score (Cronbach's  $\alpha = 0.97$ ), and a source credibility score (Cronbach's  $\alpha = 0.94$ ).

### Inferential Statistics

I conducted a full factorial ANCOVA with the following predictors: argument quality, website quality, Need for Cognition, disposition to trust, along with all the two-way and three-way interactions as well as the four-way interaction. The four-way interaction and any three-way interactions that did not reach significance were removed from the model to regain degrees of freedom. The final model is described in Table 1.

Recall that participants in the bad website condition were expected to show a greater argument quality effect. Though this website quality x argument quality interaction was not significant overall,  $F(1, 156) = .07, p = .79, \eta_p^2 = .07$ , the interaction was moderated by need for cognition (NFC),  $F(1, 156) = 6.13, p = .01, \eta_p^2 = .04$ . For participants higher in NFC (defined as one standard deviation above the mean), I found an argument quality X website quality interaction,  $F(1, 156) = 4.92, p = .03, \eta_p^2 = .03$ , such

that these participants preferred a high quality website to a low quality website in the weak argument condition,  $F(1,156) = 7.37, p = .01, \eta_p^2 = .05$ , mean difference = .89, but not in the strong argument condition,  $p = .456$ . See Figure 1 for a depiction of this interaction. For participants lower in NFC (defined as one standard deviation below the mean), I found another argument quality X website quality interaction,  $F(1, 156) = 4.15, p = .04, \eta_p^2 = .03$ , but it displayed a different pattern of simple effects (see Figure 2). For those in the strong argument condition, participants preferred a high quality to a lower quality website,  $F(1, 156) = 14.58, p < .01, \eta_p^2 = .09$ , mean difference = 1.06, but for those in the weak argument condition, website quality did not impact ratings,  $p = .465$ .

Another three way interaction, which was not expected, involved argument quality X NFC X disposition to trust,  $F(1, 156) = 9.85, p < .01, \eta_p^2 = .06$ . Specifically, for participants higher in NFC, I found an argument quality X disposition to trust interaction,  $F(1, 156) = 4.92, p = .03, \eta_p^2 = .03$ . For those with low disposition to trust, the effect of argument quality was significant,  $F(1, 156) = 23.67, p < .01, \eta_p^2 = .13$  but for those with high disposition to trust, the effect of argument quality was not significant ( $p = .12$ ). See Figure 3 for a graph of this interaction. For participants lower in NFC, I also found argument quality X disposition to trust interaction,  $F(1, 156) = 4.47, p = .04, \eta_p^2 = .03$ , but the simple effect of argument quality was not significant for high disposition to trust ( $p = .14$ ) or low disposition to trust ( $p = .14$ ). See figure 4 for a graph of this interaction.

While it was qualified by the higher order interaction, the interaction between need for cognition and argument quality was significant such that those with higher need for cognition, participants favored a strong article to a weak article,  $F(1, 156) =$



22.03,  $p < .01$ ,  $\eta_p^2 = .12$ , mean difference = .93, but for those with lower need for cognition argument quality did not impact evaluations ( $p = .875$ ). See figure 5 for a graph of this interaction.

I found one final qualified interaction between need for cognition and disposition to trust,  $F(1, 156) = 4.80$ ,  $p = .03$ ,  $\eta_p^2 = .03$ , such that for those with higher need for cognition, the higher their disposition to trust the more positive their rating,  $F(1, 156) = 9.88$ ,  $p < .01$ ,  $\eta_p^2 = .06$  mean difference = .67 while those with low need for cognition, disposition to trust did not impact their evaluation, ( $p = .75$ ). See figure 6 for a graph of this interaction.

Finally, I found two qualified main effects. First, the main effect of website design was significant,  $F(1, 156) = 17.80$ ,  $p < .01$ ,  $\eta_p^2 = .10$ . Participants evaluated the high-quality website higher on average ( $M = 3.64$ ,  $SE = .10$ ) than the low quality website ( $M = 3.05$ ,  $SE = .10$ ). Second, there was a main effect of argument quality,  $F(1, 156) = 12.17$ ,  $p < .01$ ,  $\eta_p^2 = .07$ , such that participants who read a strong argument evaluated it favorably ( $M = 3.59$ ,  $SE = .10$ ), that participants who read a weak argument ( $M = 3.11$ ,  $SE = .10$ ).

There were also two interactions, NFC X argument quality and NFC X Disposition to Trust, which were both qualified higher level interactions.

	<b>Beta</b>	<b>Std. Error</b>	<b>t</b>	<b>p</b>
(Constant)	3.348	0.07	47.79	0.0001
ArgQual	0.241	0.069	3.488	0.001
WebQual	0.297	0.07	4.219	0.0001
zNFC	0.102	0.072	1.414	0.159
zDTI	0.181	0.071	2.57	0.011
argQualXwebQual	0.019	0.07	0.268	0.789
argQualXDTI	-0.013	0.074	-0.173	0.863
argQualXNFC	0.225	0.072	3.125	0.002
webQualXDTI	-0.029	0.076	-0.378	0.706
webQualXNFC	-0.025	0.077	-0.319	0.75
NFCXDTI	0.152	0.069	2.19	0.03
argQualXwebQualXNFC	-0.191	0.077	-2.476	0.014
argQualXNFCXDTI	-0.222	0.071	-3.138	0.002

Table 1 All predictors included in the ANCOVA model predicting article evaluation

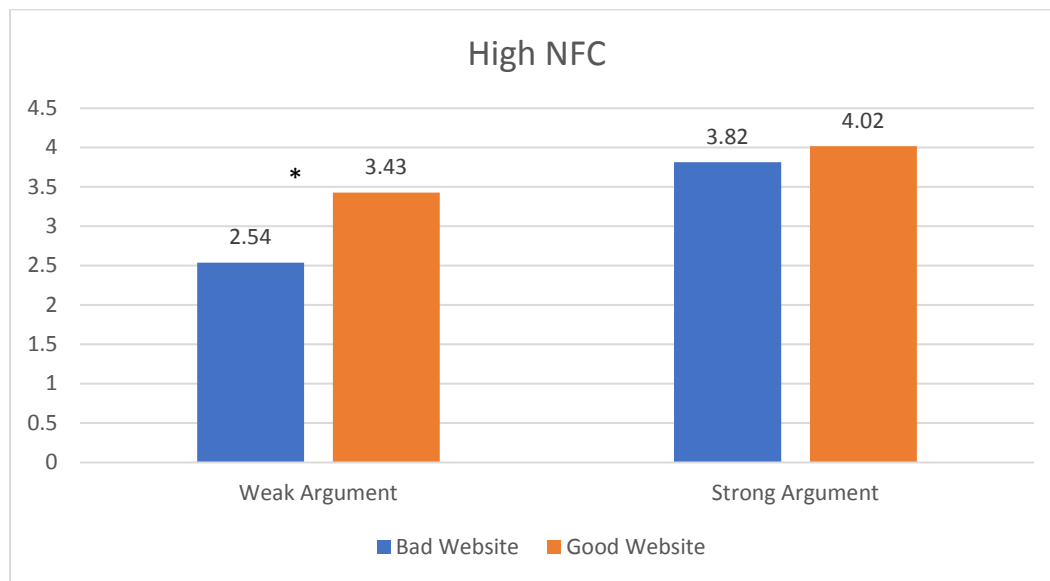


Figure 1 Predicted article evaluation for High NFC individuals (\* $p < .05$ )

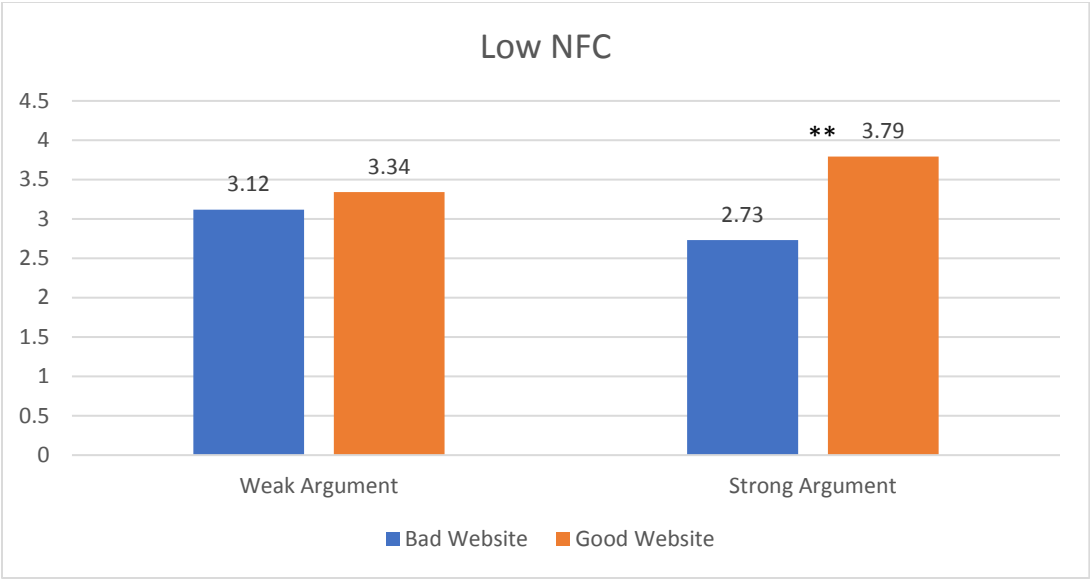


Figure 2 Predicted article evaluation for Low NFC individuals (\*\* $p < .01$ )

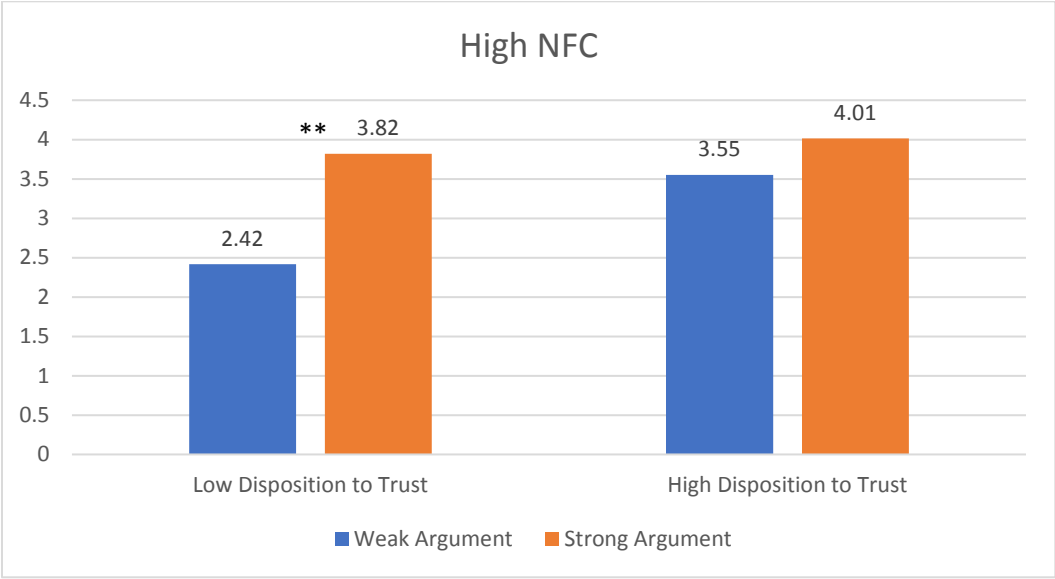


Figure 3 Predicted article evaluation for High NFC individuals (\*\* $p < .01$ )

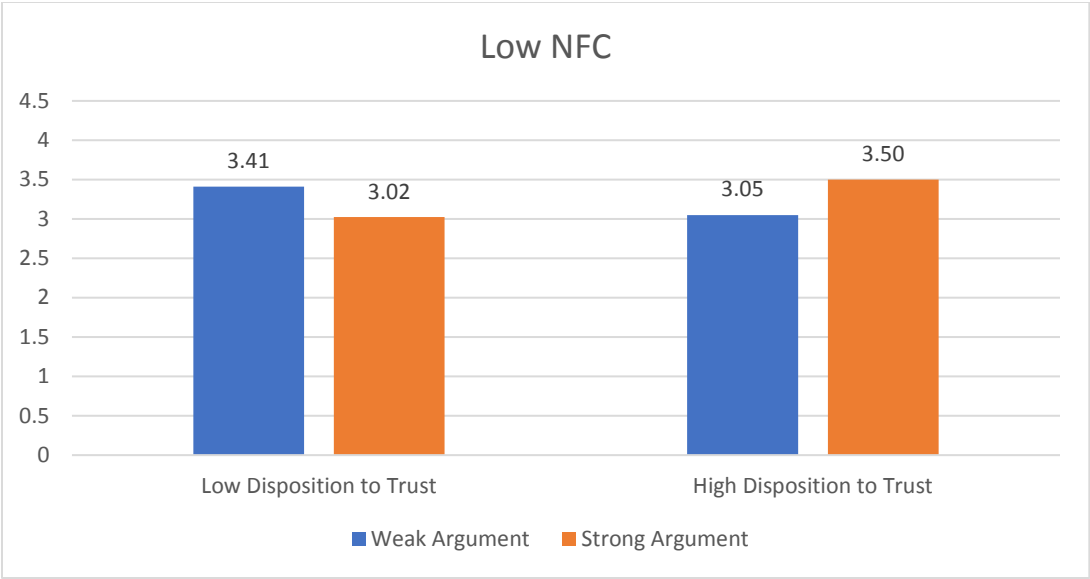


Figure 4 Predicted article evaluation for Low NFC individuals (\* $p < .05$ )

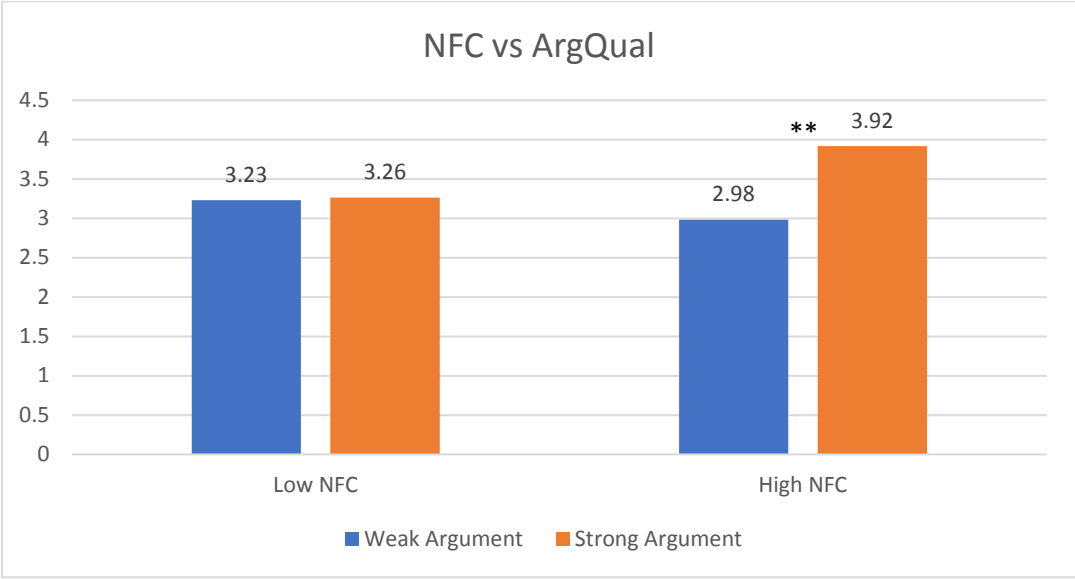


Figure 5 Predicted article evaluation for interaction of NFC X Argument quality (\*\* $p < .01$ )

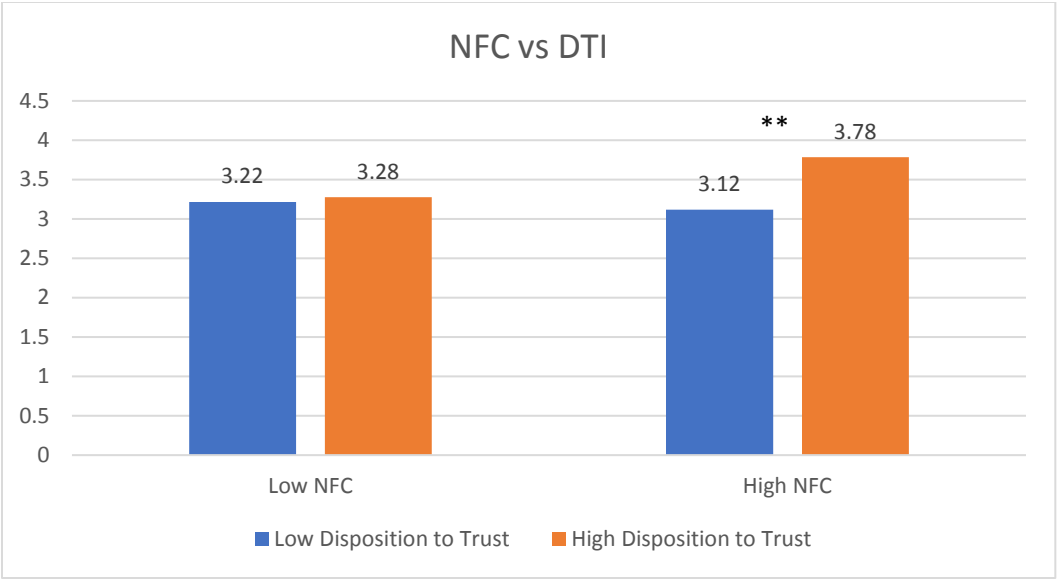


Figure 6 Predicted article evaluation for interaction of NFC X Disposition to Trust, (\*\* $p < .01$ )

## DISCUSSION

These results support the hypothesis of the main effects of website design and argument quality. I am able to reject the null hypothesis of H1 & H2. Individuals will regard information more favorably in a stronger argument than in a weaker argument. Similarly, individuals will rate information on a good website (in terms of visual design cues) more favorably than the same information on a bad website. These relationships have been demonstrated in previous studies and in this case can be considered a replication of the results (Petty and Cacioppo, 1986 & Lowery et al., 2013).

The expected interaction mentioned in H3 was achieved when moderating for individual need for cognition, so I can reject the null hypothesis of H3. Those with higher NFC depend on argument quality to determine their perception of presented information, but when the argument quality is low, they use peripheral cues (website quality) to help determine their evaluation of that information. While those with lower NFC will usually rely on peripheral cues when the argument quality is high. This fits perfectly into the Elaboration Likelihood Model or Persuasion (Petty and Cacioppo, 1986). Higher NFC people pay attention to central features of a persuasive argument, whereas lower NFC people pay attention to peripherals.

These results are useful when considering the target audiences of certain websites. If a targeted user is expected to have a high need for cognition (say someone browsing an academic website), a well-structured argument will be more impactful to that individual than a good-looking argument. Similarly, if the target individual is expected to have a low need for cognition, one should focus on presenting a good-

looking source to that individual. Of course, in both cases it was observed that both a good argument and a good website were the most positively evaluated, but if only one could be chosen, the target audience is important to consider.

## REFERENCES

- Belanger, France, and Lemuria Carter. "Trust and Risk in E-government Adoption." *The Journal of Strategic Information Systems* 17.2 (2008): 165-176. Web.
- Cacioppo, J. T., Petty, R. E., and Kao, C. F. "The efficient assessment of need for cognition." *Journal of Personality Assessment*, 48, (1984): 306–307. Web.
- Corritore, Cynthia L., Beverly Kracher, and Susan Wiedenbeck. "On-line Trust: Concepts, Evolving Themes, a Model." *International Journal of Human-Computer Studies* 58.6 (2003): 737-758. Web.
- Cyr, Dianne, and Carole Bonanni. "Gender and Website Design in E-business." *International Journal of Electronic Business* 3.6 (2005): 565. Web.
- Everard, Andrea, and Scott McCoy. "Effect of Presentation Flaw Attribution on Website Quality, Trust, and Abandonment." *AJIS Australasian Journal of Information Systems* 16.2 (2010): n. pag. Web.
- Fazio, Russell H. "Attitudes as Object Evaluation Associations of Varying Strength." *Social Cognition* 25.5 (2007): 603-37. Web.
- Flavian, Carlos, Miguel Guinaliu, and Raquel Gurrea. "The Role Played by Perceived Usability, Satisfaction and Consumer Trust on Website Loyalty." *Information & Management* 43.1 (2006): 1-14. Web.
- Giesen, Roxanne I. Van, Arnout R. H. Fischer, Heleen Van Dijk, and Hans C. M. Van Trijp. "Affect and Cognition in Attitude Formation toward Familiar and Unfamiliar Attitude Objects." *Plos One* 10.10 (2015): n. pag. Web.



- Heijden, Hans Van Der, Tibert Verhagen, and Marcel Creemers. "Understanding Online Purchase Intentions: Contributions from Technology and Trust Perspectives." *European Journal of Information Systems* 12.1 (2003): 41-48. Web.
- Jo, Samsup. "The Effect of Online Media Credibility on Trust Relationships." *Journal of Website Promotion* 1.2 (2005): 57-78. Web.
- Khadraoui, Manel, and Jamel-Eddine Gharbi. "Initial Trust toward an Unknown Website." *2013 World Congress on Computer and Information Technology (WCCIT)* (2013): 1-6. Web.
- Lowry, Paul Benjamin, David W. Wilson, and William L. Haig. "A Picture Is Worth a Thousand Words: Source Credibility Theory Applied to Logo and Website Design for Heightened Credibility and Consumer Trust." *International Journal of Human-Computer Interaction* 30.1 (2013): 63-93. Web.
- Petty, Richard E., and John T. Cacioppo. "The Effects of Involvement on Responses to Argument Quantity and Quality: Central and Peripheral Routes to Persuasion." *Journal of Personality and Social Psychology* 46.1 (1984): 69-81. Web.
- Petty, Richard E., and John T. Cacioppo. "The Elaboration Likelihood Model of Persuasion." *Communication and Persuasion* (1986): 1-24. Web.
- Schwarz, Norbert. "Attitude Construction: Evaluation in Context." *Social Cognition* 25.5 (2007): 638-56. Web.
- Seckler, Mirjam, Silvia Heinz, Seamus Forde, Alexandre N. Tuch, and Klaus Opwis. "Trust and Distrust on the Web: User Experiences and Website Characteristics." *Computers in Human Behavior* 45 (2015): 39-50. Web.

## APPENDIX

## Website Examples



Figure 7 Good Website Example

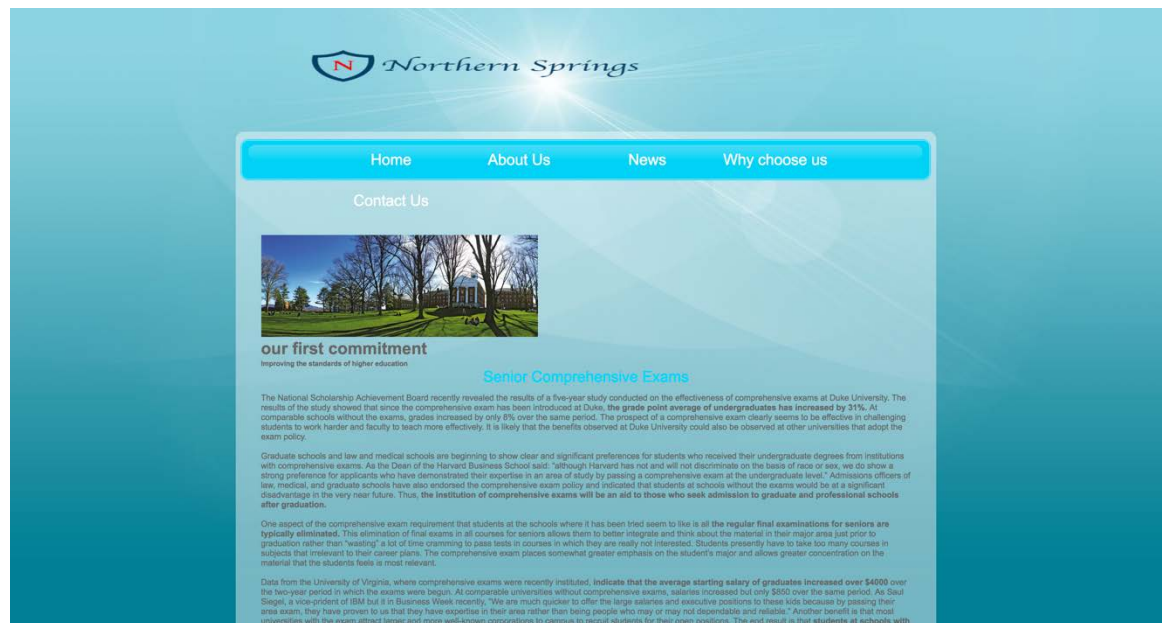


Figure 8 Bad Website Example

**Questionnaire**

<b>Construct</b>	<b>Subconstruct</b>	<b>Question</b>
<b>Article Evaluation</b>	AE-Index(AEI)	To what extent do you feel the communication made its point effectively?
		To what extent did you like the communication?
		To what extent do you feel that the communication was convincing?
		Considering both content and style, how well written was the communication?
<b>Trusting Beliefs</b>	TB-Benevolence(TBB)	I believe that the college would act in my best interest.
		If I required help, the college would do its best to help me.
		The college would be interested in my well being, not just their own.
	TB-Integrity(TBI)	The college would be truthful in its dealings with me.
		I would characterize the college as honest.
		The college would keep its commitments.
		The college is sincere and genuine.
	TB-Competence (TBC)	The college is competent and effective in providing its products or services.
		The college performs its role of providing its products and services very well.
		Overall, the college is capable and proficient in providing its products and services.
		In general, the college is very knowledgeable about its products and services.
<b>Distrusting Beliefs</b>	DB-Benevolence (DBB)	I am not sure that the college would act in my best interest.
		I suspect that the employees of the college are interested in just their own well-being, not in my well-being.
		If I required help, I would feel apprehensive about whether the college would do its best to help me.
	DB-Integrity (DBI)	I would feel cautious about characterizing the college as honest.
		I would be worried about whether the college would be truthful in its dealings with me.
		I would be uneasy about whether the college is sincere and genuine.
		It is uncertain whether the college would keep its commitments.

<b>Trusting Intention</b>	TI-Willingness to depend (TIW)	When an important related opportunity arises, I would feel comfortable depending on the information provided by this website.
		I could always rely on this website in a tough situation.
		I feel that I could count on this website to help with a crucial problem
		Faced with a difficult situation that required me to change plans, I would use this website.
	TI-Follow Advice (TIF)	If I had a challenging problem, I would want to use this website.
		I would feel comfortable acting on the information given to me by this website.
		I would not hesitate to use the information this website supplied me.
		I would confidently act on the advice I was given by this website.
		I would feel secure in using the information from this website.
		Based on the information I just read, I would follow the advice given me by this website.
<b>Source Credibility</b>	SC-Trustworthiness (SCT)	Trustworthy vs Untrustworthy
		Reliable vs Unreliable
		Reputable vs Disreputable
		Inconsistent vs Consistent
		Untrained vs Trained
		Unskilled vs Skilled
<b>Need for Cognition</b>	NC-Index (NCI)	I prefer complex to simple problems.
		I like to have the responsibility of handling a situation that requires a lot of thinking.
		Thinking is not my idea of fun.
		I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.
		I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something.
		I find satisfaction in deliberating hard and for long hours.
		I only think as hard as I have to.
		I prefer to think about small daily projects to long term ones.

		I like tasks that require little thought once I've learned them.
		The idea of relying on thought to make my way to the top appeals to me.
		I really enjoy a task that involves coming up with new solutions to problems.
		Learning new ways to think doesn't excite me very much.
		I prefer my life to be filled with puzzles I must solve.
		The notion of thinking abstractly is appealing to me.
		I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.
		I feel relief rather than satisfaction after completing a task that requires a lot of mental effort.
		It's enough for me that something gets the job done; I don't care how or why it works.
		I usually end up deliberating about issues even when they do not affect me personally.
<b>Disposition to Trust</b>	DT-Benevolence (DTB)	In general, people really do care about the well-being of others.
		The typical person is sincerely concerned about the problems of others.
		Most of the time, people care enough to try to be helpful, rather than just looking out for themselves.
	DT-Integrity (DTI)	In general, most folks keep their promises.
		I think people generally try to back up their words with their actions.
		Most people are honest in their dealings with others.
	DT-Competence (DTC)	I believe that most professional people do a very good job at their work.
		Most professionals are very knowledgeable in their chosen field.
		A large majority of professional people are competent in their area of expertise.
	DT-Stance (DTS)	I usually trust people until they give me a reason to doubt when I first meet them.
		I generally give people the benefit of the doubt when I first meet them.
		My typical approach is to trust new acquaintances until they prove I should not trust them.
<b>Disposition to distrust</b>	DD-Benevolence (DDB)	I worry that people are usually out for their own good.

		It concerns me a lot that people pretend to care more about one another than they really do.
		I fear that most people inwardly dislike putting themselves out to help other people.
	DD-Integrity (DDI)	Unfortunately, most people would tell a lie if they could gain by it.
		It's a troubling fact that people don't always hold to the standard of honesty they claim
		Sadly, most people would cheat on their income tax if they thought they could get away with it.
	DD-Competence (DDC)	I get uncomfortable because many professionals are not as knowledgeable in their field as you would expect.
		I am nervous that most professionals do a haphazard job at what they do.
		Concern is justified, since many professionals are not really competent in their area of expertise.
	DD-Stance (DDS)	I'm usually cautious about relying on people when I first work with them.
		When I first meet people, I tend to watch their actions closely.
		I typically have suspicious feelings towards new acquaintances until they prove to me that I can trust them.
		I am hesitant to trust people until after I have proven them.

*Table 2 Questionnaire***Strong Argument (Petty and Cacioppo, 1984)**

The National Scholarship Achievement Board recently revealed the results of a five-year study conducted on the effectiveness of comprehensive exams at Duke University. The results of the study showed that since the comprehensive exam has been introduced at Duke, the grade point average of undergraduates has increased by 31%. At comparable schools without the exams, grades increased by only 8% over the same period. The prospect of a comprehensive exam clearly seems to be effective in challenging students to work harder and faculty to teach more

effectively. It is likely that the benefits observed at Duke University could also be observed at other universities that adopt the exam policy.

Graduate schools and law and medical schools are beginning to show clear and significant preferences for students who received their undergraduate degrees from institutions with comprehensive exams. As the Dean of the Harvard Business School said: “although Harvard has not and will not discriminate on the basis of race or sex, we do show a strong preference for applicants who have demonstrated their expertise in an area of study by passing a comprehensive exam at the undergraduate level.” Admissions officers of law, medical, and graduate schools have also endorsed the comprehensive exam policy and indicated that students at schools without the exams would be at a significant disadvantage in the very near future. Thus, the institution of comprehensive exams will be an air to those who seek admission to graduate and professional schools after graduation.

One aspect of the comprehensive exam requirement that students at the schools where it has been tried seem to like is all the regular final examinations for seniors are typically eliminated. This elimination of final exams in all courses for seniors allows them to better integrate and think about the material in their major area just prior to graduation rather than “wasting” a lot of time cramming to pass tests in courses in which they are really not interested. Students presently have to take too many courses in subjects that irrelevant to their career plans. The comprehensive exam places somewhat greater emphasis on the student’s major and allows greater concentration on the material that the students feels is most relevant.

Faculty members at universities with the comprehensive exams who were interviewed by researchers from the Carnegie Commission on Higher Education revealed that the comprehensive exams appeared to provide an incentive for students to study the material in their major area. A thorough study undertaken by the Department of Education at the University of Notre Dame showed that universities with comprehensive exams have resisted the national trend of declining score on standardized achievement tests. Average scores on achievement tests for the universities with comprehensive exams have actually risen over the last five years.

Data from the University of Virginia, where comprehensive exams were recently instituted, indicate that the average starting salary of graduates increased over \$4000 over the two-year period in which the exams were begun. At comparable universities without comprehensive exams, salaries increased but only \$850 over the same period. As Saul Siegel, a vice-president of IBM but it in *Business Week* recently, "We are much quicker to offer the large salaries and executive positions to these kids because by passing their area exam, they have proven to us that they have expertise in their area rather than being people who may or may not dependable and reliable." Another benefit is that most universities with the exam attract larger and more well-known corporations to campus to recruit students for their open positions. The end result is that students at schools with comprehensive exams have a 55% greater chance of landing a good job than students at schools without the exams.



A study by the U.S. Department of Education revealed that universities with the comprehensive exam requirement average about 32% more financial aid available to students than comparable universities without the exams. Richard Collings, Director of Financial Aid at the University of Southern California (USC) has written that since the comprehensive exam was instituted at USC five years ago, more individuals and corporations have been willing to donate money for student scholarships.

**Weak Argument (Petty and Cacioppo, 1984)**

The National Scholarship Achievement Board recently revealed the results of a study they conducted on the effectiveness of comprehensive exams at Duke University. One major finding was that student anxiety had increased by 31%. At comparable schools without the exam, anxiety increased by only 8%. The Board reasoned that anxiety over the exams, or fear of failure, would motivate students to study more in their courses while they were taking them. It is likely that this increase in anxiety observed at Duke University would also be observed and be of benefit at other universities that adopt the exam policy.

Graduate students have always had to take a comprehensive exam in their major area before receiving their degrees, and it is fair that undergraduates should have to take them also. As the Dean of the Harvard Business School said, "If a comprehensive exam is considered necessary to demonstrate competence for a masters or doctoral degree, by what logic is it excluded as a requirement for the bachelors degree? What administrators don't realize is that this is discrimination just like discrimination against Blacks or Jews. There would be a lot of trouble if

universities required only white to take comprehensive exams but not Blacks. Yet universities all over the country are getting away with the same thing by requiring graduate students but not undergraduate to take the exams.” Thus, the institution of comprehensive exams could be as useful for undergraduates as they have been for graduate students.

One feature of the comprehensive exam requirement that students at the schools where it has been tried seem to like is that passing the exams provides a very difficult challenge. For example, many students want jobs in business when they graduate and the corporate world is very tough. Yet, most students’ lives are filled with few challenges whatsoever. Everything has been provided for them since the day they were born. It’s not that students are not grateful, but knowing that they had to pass a difficult exam before they graduated would prepare them for the hard and cold realities of life. Students would be nervous about passing the exam and fear that if they did not pass and graduate, four years of time would be wasted. However, that is what life is all about – taking risks and overcoming them. Having to pass a comprehensive exam is a challenge most students would welcome.

Data from the University of Virginia show that some students favor the senior comprehensive exam policy. For example, one faculty member asked his son to survey his fellow students at the school since it recently instituted the exams. Over 55% of his son’s friends agreed that in principle, the exams would be beneficial. Of course, they didn’t all agree but the fact that most did proves that undergraduates want exams. As Saul Siegel, a student whose father is a vice-president of IBM wrote in

the school newspaper: "The history of the exams can be traced to the ancient Greeks. If comprehensive exams were to be instituted, we could feel pleasure at following traditions begun by Plato and Aristotle. Even if there were no other benefits of the exams, it would be worth it to just follow tradition."

A study by the U.S. Department of Education revealed that several national testing companies were developing comprehensive exams for use by universities in the U.S. The tests would be similar to the SAT and ACT tests which currently generate millions of dollars for the companies that make them. Richard Collings, a former Director of Financial Aid at the University of Southern California who now works for the Educational Testing Service, wrote recently in *Business Week*: "At ETS, we are not pushing comprehensive exams simply because of the huge amount of money involved. We are genuinely interested in marketing a good product. Just as our SAT and GRE tests are used to determine who is qualified for college and graduate work, so too should our comprehensive exams be used to determine who should graduate from college. We expect to have 32% of the market in 5 years."