HARNESSING THE SELECTIVE EFFECTS OF AROUSAL IN THE CONTEXT OF

PERSUASIVE MESSAGE DELIVERY: VIOLENT VIDEO GAMES, REACTANCE,

POST-SCROLL MESSAGING, AND ANTI-VIOLENCE MESSAGES

by

TOBIAS MICHAEL HOPP

A DISSERTATION

Presented to the School Journalism and Communication
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

June 2014

DISSERTATION APPROVAL PAGE

Student: Tobias Michael Hopp

Title: Harnessing the Selective Effects of Arousal in the Context of Persuasive Message Delivery: Violent Video Games, Reactance, Post-Scroll Messaging, and Anti-Violence Messages

This dissertation has been accepted and approved in partial fulfillment of the requirements for the Doctor of Philosophy degree in the School of Journalism and Communication by:

Kim Sheehan	Chair
Harsha Gangadharbatla	Core Member
Tiffany Gallicano	Core Member
Lynn Kahle	Institutional Representative

and

Kimberly Andrews Espy	Vice President for Research and Innovation: Dean of the Graduate School

Original approval signatures are on file with the University of Oregon Graduate School.

Degree awarded June 2014

DISSERTATION ABSTRACT

Tobias M. Hopp

Doctor of Philosophy

School of Journalism and Communication

June 2014

Title: Harnessing the Selective Effects of Arousal in the Context of Persuasive Message Delivery: Violent Video Games, Reactance, Post-Scroll Messaging, and Anti-Violence Messages

The present dissertation explored the effectiveness of inserting anti-violence, pro-social messages into violent video games. In light of previous, inconsistent findings relative to the effectiveness of in-game persuasive message placement, this study introduced the notion of "post-scroll" video game messaging (i.e., insertion of a persuasive message immediately after the end of a game level or sequence). The theoretical framework employed in this work suggested that video game play would be associated with heightened levels of arousal. Subsequently, the expectation was that heightened levels of arousal would influence message processing on a conditional basis. The results indeed suggested that the combination of high arousal and low levels of message induced state reactance was associated with a number of favorable message outcomes. The results also suggested that the ability to detect message reactance potential was markedly compromised in highly stimulating media environments. Specifically, the current findings indicated that highly aroused message evaluators may rely on externally provided cues when assessing a message's reactance potential. Taken as a whole, the current work's findings provided initial evidence that post-scroll messaging can be a fruitful means of persuasive message delivery.

CURRICULUM VITAE

NAME OF AUTHOR: Tobias Michael Hopp

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene, OR
San Diego State University, San Diego, CA
Miami University, Oxford, OH

DEGREES AWARDED:

Doctor of Philosophy, Communication & Society, 2014, University of Oregon
Master of Arts, Communication, 2010, San Diego State University
Bachelor of Arts, Journalism and Political Science, 2006, Miami University

AREAS OF SPECIAL INTEREST:

Strategic Communication
Information Processing

PROFESSIONAL EXPERIENCE:

Co-Owner, Physio Media, 2013 – Present
Graduate Teaching Fellow, University of Oregon, 2010- Present
Teaching Assistant, San Diego State University, 2008 – 2010
Sterling Medical Associates, 2006 – 2012

PUBLICATIONS:

Gallicano, T., Brett, K., & Hopp, T. (2013). Is ghost blogging like speechwriting? A survey of practitioners about the ethics of ghost blogging. *Public Relations Journal, 7*, 1-41.

Hopp, T. (2013). Subjective norms as a driver of mass communications students' intentions to adopt new media production technologies. *Journalism & Mass Communication Educator*, *68*, 348 – 364.

Gangadharbatla, H., Hopp, T., & Sheehan, K. B. (2012). Changing user motivations for social networking site usage: Implications for Internet advertisers. *International Journal of Internet Marketing and Advertising*, *7*, 120-135.

ACKNOWLEDGEMENTS

To Jolene "Lil' Fish" Fisher

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

INTRODUCTION

This introduction chapter outlines the considerations that constituted the foundation of the current dissertation, titled *Harnessing the selective effects of arousal in the context of persuasive message delivery: Violent video games, reactance, post-scroll messaging, and anti-violence messages*. Specifically, this chapter proceeds as follows: first, this chapter describes/illustrates the popularity of video gaming environments as a means of illustrating why, precisely, such environments may serve as a potentially fruitful venue for the delivery of persuasive messages. Second, the overlap between the demographics that play video games, particularly first person shooter video games, and those that commit violent crime in America is described as a means of further illustrating the applied/social rationale for the current study. Third, this chapter briefly discusses to-date research inter-relating persuasion and video games. Fourth, the notion of post-scroll messaging is introduced. Fifth, this chapter concludes by introducing the theoretical perspectives that both underscored and motivated the current work.

The Video Game Market

In 2013, the worldwide gaming industry generated estimated revenues in excess of $66 billion (Reuters, 2013). The video game industry is comparatively larger than either the global film industry or the global music industry (Farrand, 2007; Reuters, 2011; 2012; 2013). In its sum, the video game market encompasses games played on personal computers, consoles (i.e., Xbox, Playstation 3), handheld devices, tablet devices (i.e.,

1

iPad), and mobile phones. In 2013 alone, US-based consumers spent approximately $20.5

billion on video game-related purchases (Newzoo, 2013).

According to the Entertainment Software Association (ESA) (2012; 2013),

approximately half of all US households own at least one dedicated game console,

personal computer, or smartphone. Among households that own a dedicated gaming

device, console gaming, followed closely by PC gaming, is the most popular. Complete

breakdown of popularity by gaming device is provided in Figure 1. Moreover, gamers are

represented in nearly every demographic group. The average age of the typical video

game player is 30 years old. Despite persistent gender clichés, men (53%) and women

(47%) are about equally represented in the video game market.

Figure 1. Distribution of game play environment frequencies among households that
own at least one gaming device (ESA, 2012)
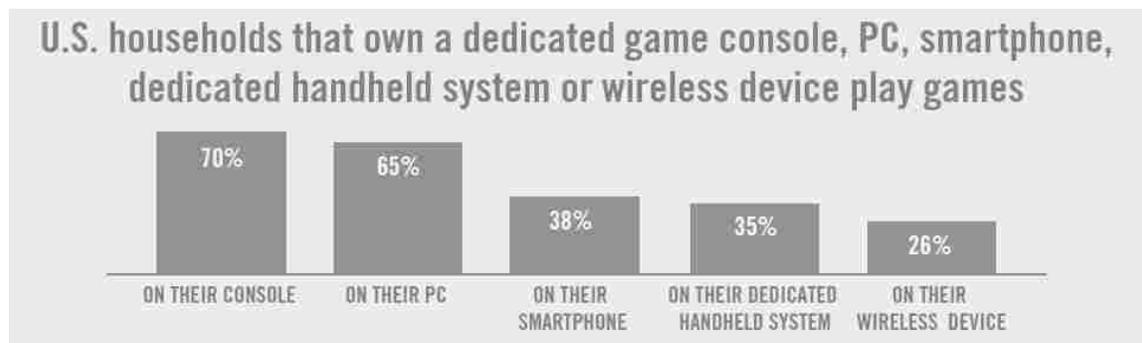
Aided by the general ubiquity of electronic and digital devices, the gaming

industry continues to expand in both size and scope. According to one recent report

(Gartner, 2011), the industry is projected to grow at an annual compound rate of 24% into

the foreseeable future. The increased popularity of video games has, predictably, led to

decreased consumption of other types of media. For instance, the 2013 industry report

issued by ESA indicated that increased levels of video game play was associated with substantial decreases in time spent watching television, going to the movies, and playing board games.

First Person Shooters

According to K. Claypool and M. Claypool (2007), first person shooter (FPS) games can be defined as video games in which "the player looks through the eyes of the avatar (the first person) and engages in combat, typically with ranged weapons" (p. 4). Similarly, Weber and colleagues (2009) defined FPS games as games "designed to closely engage players in violent virtual activities" (p. 1017). FPS games are one of the most popular types of video games (ESA 2012; 2013). In fact, as shown in Table 1, one-fifth of all games sold in the United States are FPS games.

Table 1. Percent of video game sales by genre (2012)

Genre	Percent of Overall Sales
Action	22.3%
First Person Shooter	21.2%
Sports	15.3%
Family Entertainment	8.6%
Adventure	8.3%
Role-Playing	6.5%
Racing	5.8%
Fighting	3.9%
Strategy	2.3%
Other/Compilations	1.7%
Children's Entertainment	0.5%
Flight Simulation	0.3%
Arcade	0.2%

Given their inherently violent nature, FPS games have incurred criticism from advocates, researchers, and special interest groups who fear that anti-social effects are associated with violent game play (e.g., Children Now, 2001; Anderson et al.,., 2004; Barlett, Harris, & Baldassaro, 2007; Bushman & Huesmann, 2006; Carnagey, Anderson, & Bushamn, 2007; National Institute on media and the Family, 2008; Sherry, 2001). Despite a wealth of research (primarily correlative in nature) associating exposure to violent video games with violent, real-world outcomes, the topic remains controversial. One of the more vocal opponents of the proposition that violent video games are a meaningful cause of anti-social behavior is Henry Jenkins, who summarized his view on the topic by stating:

> If there is a consensus emerging around this research, it is that violent video games may be one risk factor - when coupled with other more immediate, real-world influences — which can contribute to anti-social behavior. But no research has found that video games are a primary factor or that violent video game play could turn an otherwise normal person into a killer (2003, para. 2).

Notably, this work does not take a stance on whether video games cause violence or are, instead, merely correlated with violence. Such endeavor is beyond the scope of this study and is likely to persist as an unresolved issue for the foreseeable future. Instead, as further delineated below, this work generally argues that there exists significant overlap between the demographic segment that plays FPS games and the demographic segment that is most likely to commit violent crimes. As such, FPS games are an ideal platform from which to serve socially conscious messages aimed at the reduction of violent behavior.

Perpetrators of Violent Behavior

According to the United States Federal Bureau of Investigations (2009), "violent crime is composed of four offenses: murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault. Violent crimes are defined…as those offenses which involve force or threat of force" (para. 1). Although recent years have seen a reduction of violent crime as a percentage of the population (See Figure 2; Blumstein & Wallman, 2000; Federal Bureau of Investigations, 2012; Federal Bureau of Investigations, 2012; Fischer, 2010; Levitt, 2004), the issue nonetheless remains a significant social concern. For instance, according to Fisher (2010), "Americans kill one another at a much higher rate – double, quadruple, or more – than do residents of comparable western European nations. This gap persists despite a roughly 40 percent drop in our homicide rate in the last 15 years" (para. 4).

Indeed, based upon data released by Bureau of Justice (Snyder & Mulako-Wangota, 2013), males between the ages of 18 and 35 constitute over 50% of arrests for murder, manslaughter, aggravated assault, and forcible rape. Similarly, women between the ages of 18-35 commit the lion's share of within-gender crime. Across both genders, those aged between 18 and 35 commit in excess of 75% of all violent crimes in America (Snyder & Mulako-Wangota, 2013).

Demographic Overlap

FPS games are exceptionally popular among those aged between 15 and 35 (Jansz & Tanis, 2007; Montag et al.,., 2011; Lenhart, 2009). This popularity is especially concentrated among young males. As outlined above, this demographic segment is by far the most likely to violent crime (Snyder & Mulako, 2013). Accordingly, it follows that

FPS games present an ideal platform for the delivery of pro-social anti-violence messages to the members of society that are most at-risk of perpetrating violent crime.

Figure 2. Five-year trend for violent crimes in the United States (FBI, 2012)

Estimated
number of offenses
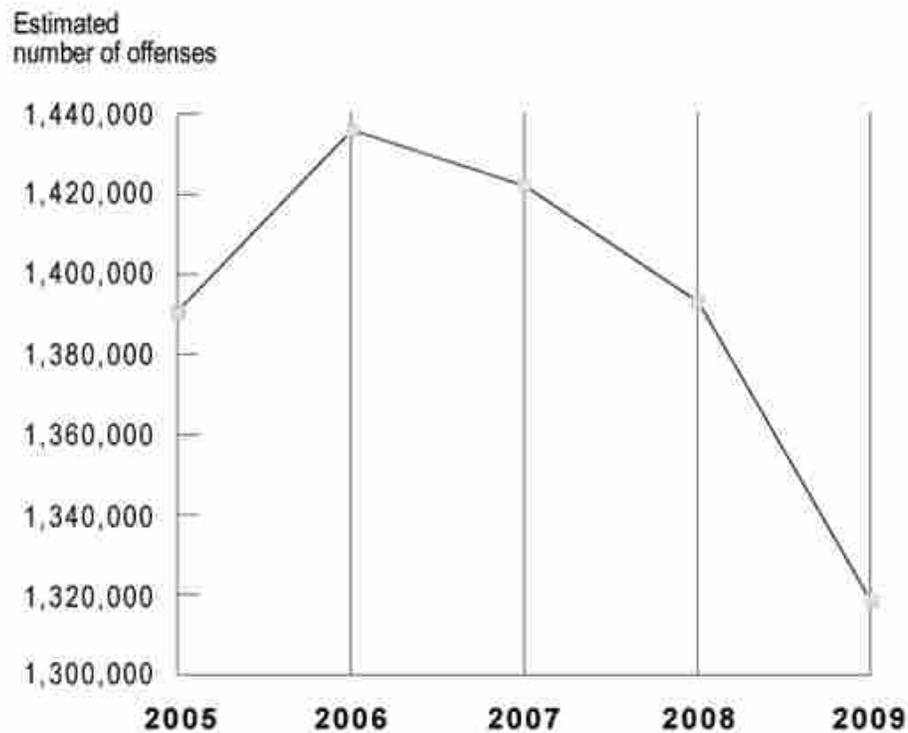
Persuasion and Video Games

To date, most research on persuasion and video games has centered on examination of the efficacy of in-game product placement (e.g., Chaney, Lin, & Chaney, 2004; Lee & Faber, 2007; Nicovich, 2005; Yang, M., Roskos-Ewoldsen, Dinu, & Arpan, 2006; Yang, H. & Wang, 2008; Yoo & Pena, 2008). The results of these studies have, at best, offered mixed support for the notion that in-game advertising has the ability to elicit favorable attitudinal, behavioral, or recall outcomes. One of the earliest in-game product

placement studies was conducted by Chaney, Lin, and Chaney (2004). Here, the authors embedded three different billboards (advertising digital cameras, pizza, and soda) into the FPS game specifically designed for the study. A total of 42 males played the modified game. Afterwards, each participant's unaided recall of the advertised brands was measured. Half the sample could not recall either the product or advertised brand. Only a quarter of the sample could remember any of the presented information and only two people in the sample remembered all the information. Post-game, open-ended follow-up questions seeking to better understand the low recall scores elicited comments such as "I don't look at advertising, especially when I am enjoying myself" (p. 42). This perhaps indicates that the competing stimuli in the video game environment place strain on an individual's cognitive capabilities such that non-goal oriented content receives diminished attention. Similarly, a study by Gangadharbatla (2006) inserted billboard-based advertisements into a racing game. Participants were randomly assigned to either game playing or game viewing treatments. The results indicated that those watching the game were four times as likely as those playing to the game to recall content presented in the billboards. Again, this finding suggests that the goal-oriented nature of gameplay may result in cognitive resources being directly focused on relevant stimuli at the cost of engagement with secondary stimuli such as advertisements.

It should be noted, however, that some research does indicate that in-game product placement has an appreciable impact on post-game recall. For example, M. Yang, Roskos-Ewoldsen, Dinu, and Arpan (2006) used a 2 (soccer game type/racing game type) by 2 (implicit measure/explicit measure) design to examine the effect of brand names placed in video games on memory. The data suggested that participants had very low

levels of explicit recall (", goal-oriented recognition explicitly linked to previous experience) but somewhat higher levels of implicit memory (i.e., recognition that is not linked to specific previous experience). In-game advertising had no discernable impact on attitudinal outcomes. Other research has indicated that favorable message effects relative to in-game advertising may be conditional and/or contextual in nature. For instance. Yoo and Pena (2011) found that violent video games may have a negative effect on both brand recall and attitudinal outcomes. Furthermore, the authors found evidence that these effects were stronger for females than males.

Given the generally inconclusive effects of "traditional" in-game message placement (that is, embedding persuasive content within active game play environment), the current study suggested that *post-scroll* messaging may serve as a more effective means of delivering persuasive content, be it advertising/marketing content or pro-social content.

Post-Scroll Messaging

For the purposes of this work, post-scroll messaging can be understood as messages delivered immediately after the conclusion of a gameplay session. Notably, video games often require loading periods between levels/gameplay segments. During these loading periods, a screen is shown to the user. Usually this screen contains some sort of game-relevant text, pictures, or a combination therein. These screens are also usually accompanied by a status bar that displays the amount of time left before the next level/gameplay session begins. In this work, it was suggested that these inter-game periods are ideal for message delivery. Unlike the dynamic nature of game play, players are not subjected to a myriad of competing stimuli. Moreover, the relatively short loading

8

period (i.e., screens are usually displayed for a minimum of 30 seconds and a maximum of 1 minute) indicates that the audience will be more or less captive (that is, the intermediate loading period generally does not allow players to exit the video game environment in the same way that, for instance, television commercial breaks do).

Notably, a thorough review of the literature failed to identify any scholarly studies that have examined the efficacy of message delivery in a post-scroll context. Thus one of the primary goals of this work was to explore such delivery mechanism from both theoretical and applied perspectives with a propositional understanding that messages presented immediately after the conclusion of arousing media content (i.e., video games) can capitalize on activated user states while simultaneously ameliorating the issues related to individual ability to partition attention between game play tasks and strategic messages placed in the gaming environment.

Summary

Video games are an exceptionally popular form of entertainment. Therein, the FPS genre is especially popular, particularly among young adults aged between 17 and 35. According to the United States Bureau of Justice, this demographic segment is responsible for the vast majority of violent crime committed in the United States. As such, insertion of anti-violence, pro-social messaging in FPS video games has intuitive appeal. However, the presently employed techniques for in-game message delivery have yielded inconsistent results from an effectiveness standpoint. Thus, one of the primary goals of the current work was to introduce and explore the notion of in game, post-scroll message delivery specifically within the context of anti-violence messaging. In light of the notion that persuasive messages are most effective when they are congruent to

evaluators' physiological and emotional states (Lindsey, 1996; Updegraff, Sherman, Luyster, & Mann, 2007; Ziegler, 2010), the following chapter outlines (1) message characteristics that are associated with favorable/unfavorable evaluation of pro-social/health-positive messaging; (2) the influence of video games on players' physiological/emotional states; and (3) the conditional relationship(s) between message characteristics, evaluator state, and evaluator message processing capabilities. This discussion is guided by the theoretical propositions associated with psychological reactance theory (Brehm, J. W., 1966), excitation transfer theory (ETT; e.g., Zillman, 1978), and an amalgam of selective/limited processing theories (e.g., Lang, 2006; Mather & Sutherland, 2012; Petty, Cacioppo, & Schuman, 1983; Pham, 1996).

CHAPTER II

LITERATURE REVIEW

This chapter offers in-depth discussion of the theoretical perspectives that guided the present research. Specifically, this chapter introduces and reviews the following theories/theoretical frameworks: psychological reactance theory, ETT, and a number of selective/condition message processing relevant to the current effort. Upon providing discussion of each theoretical approach relevant to the current research, the chapter concludes by providing an explicit theoretical rationale representing the current effort. From a functional perspective, the goal of this model was to specifically and deliberately discuss (1) the ways in which the previously described theories inter-relate to each other in the present research context and (2) any and all conditional concerns related to the incumbent research. Before, however, discussion of the theoretical framework guiding the current effort, it was deemed both important and necessary to discuss the components of message effectiveness.

The Elements of Message Effectiveness

What criteria are used to determine a persuasive message's effectiveness? Traditionally speaking, message effectiveness has been conceived of as a varied amalgam of attitude toward the message, attitude toward the message source, attitude toward the information presented in the message, message recall, behavioral intentions, and behavior itself (e.g., Albarracin, Johnson, & Zanna, 2005; Dillard & Pfau, 2005; Haugtvedt, Herr, & Kardes, 2008; Hoveland, Janis, & Kelley, 1953, O'Keefe, 1993). In this work, I understood persuasive message effectiveness in the following terms: attitude toward the message and its advocacy object, message-related memory, and behavior-oriented

outcomes (intention and actual behavior). A diagram of the elements constituting

message effectiveness is presented in Figure 3. The following paragraphs detail each of

the proposed elements of message effectiveness in detail.

Figure 3. Elements of Message Effectiveness
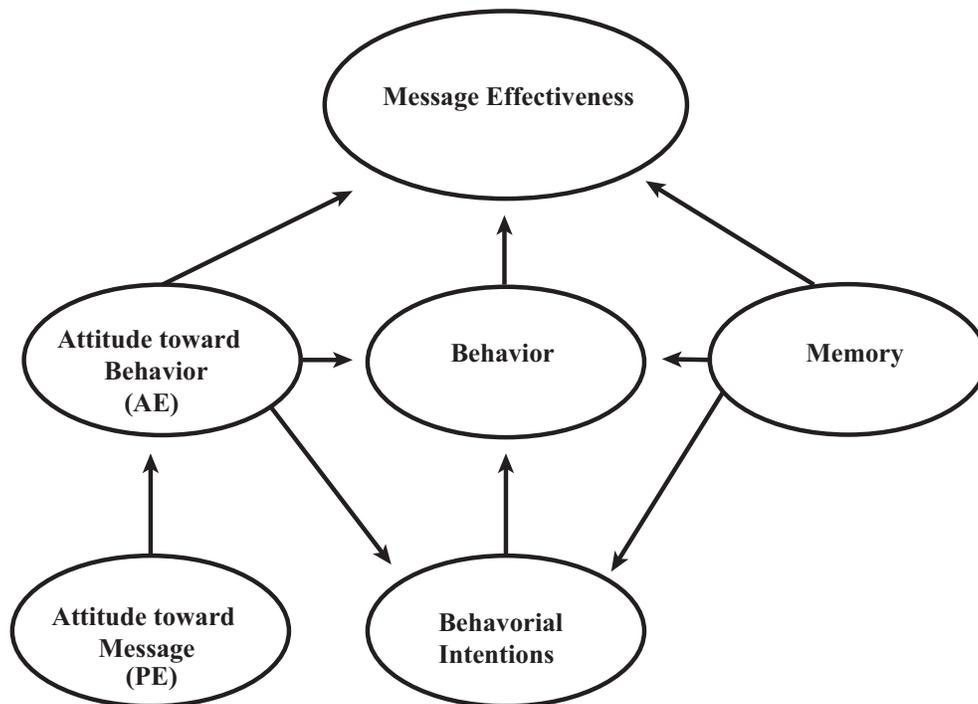
Attitudes as a Component of Message Effectiveness

The social-scientific study of persuasion is, to considerable degree, situated

around the study of attitudes. Attitudes are, as put by Allport (1968), "the most distinctive

and indispensible construct in contemporary American social psychology" (p. 59).

Similarly, Thomas and Znaniecki (1918) described the social sciences as, essentially, the

formalized study of attitudes. Haugtvedt & Kasmer (2008) drew upon Petty and

Cacioppo's (1981) definition to describe attitudes an individual's general impression of objects, issues, or people. Jones and Fazio (2008) defined attitudes as object-evaluation associates. For their part, Fishbein and Ajzen (1975) simply noted that an "attitude represents a person's general feeling of favorableness or unfavorableness toward some stimulus object" (p. 216).

As shown in Figure 3, attitudes are thought to play a determining role in behavioral intentions and outcomes (e.g., Ajzen, 1985; Ajzen, 1991; Ajzen & Fishbein, 1980). According to rational attitudinal perspectives such as the theory of reasoned action (TRA) and theory of planned behavior (TPB), attitudes relative to specific behaviors, along with normative beliefs and internal perceptions of control (in the case of the TPB), are key determinants of behavioral intentions, which, in turn, determine actual behavior. Likewise, the MODE model (e.g., Fazio, 1990; 1995; Fazio & Towles-Schwen, 1999) holds that "general attitudes can influence or bias perception and judgment of information relevant to the attitude object, thus causing individuals who have favorable attitudes toward a given stimulus to "notice, attend to, and process primarily the object's positive attributes" (Ajzen, 2008, p. 535). Such (primarily) automatic biasing of information processing is most likely to occur in cases of highly accessible attitudes. Thus, "readily accessible, automatically attitudes…are likely to bias the definition of the event and hence guide performance of specific behaviors with respect the attitude object" (Ajzen, 2008, p. 535).

Dillard, Shen, and Vail (2007) drew upon Fishbein et al., (2002) to argue that the perceived effectiveness (PE) of a persuasive message is a valid and reliable indicator a message's actual effectiveness (AE). The authors used five different studies to test the

relationship between these two variables. In each study, AE was conceptualized as attitude toward the message advocacy while PE was comprised of indicators tapping audience attitudes toward the message. Across each of the five sub-studies constituting the work, the authors used SEM to show that the PE to AE relationship had better measures of model fit.

Relevant to the current study, some evidence, albeit indirectly, suggests that the provision of educational materials may, at a minimum, "undo" any harmful attitudinal effects associated with exposure to anti-social media content. In Mundorf, D'Alessio, Allen, and Emmrs-Sommer's (2007) meta-analysis on sexually explicit media, the authors identified ten separate studies in which participants were exposed to potentially harmful sexual material (i.e., material demonstrating anti-social attitudes toward women or aggressive behaviors toward women) before being shown educational materials designed to "eradicate any harmful effect of exposure to sexual materials" (p. 191). Examination of these studies, in aggregate, indicated that serving educational content after potentially harmful content not only eliminated harmful effects, but also resulted in participants' holding less anti-social effects than those held before the investigation began. This finding is supportive of the current proposition that delivery of pro-social messaging after a period of anti-social media exposure may elicit desirable, pro-social outcomes.

Memory-based Outcomes as a Component of Message Effectiveness

Tulving (1985) described memory as the capacity that permits humans to benefit from previous experiences. Dudai (2007) saw memory as changes in an individual's behavior as a result of that individual's experience while Moscovitch (2007)

14

conceptulized memory as a "lasting internal representation of past event or experience

that is reflected in thought or behavior" (p.17). According to Mantonakis, Whittlesea, and

Yoon (2008), memory "involves the capacity to learn, to be influenced by prior

experience, and to behave differently in the future as the consequence of an experience"

(p. 77). Common to all of these definitions is the notion that behavior is largely

influenced by prior experiences (Mantonakis, Whittlesea, & Yoon, 2008). That is,

judgments and decisions are driven by the relatively small subset of knowledge available

to the individual at the time of consideration (Wyer, 2008). Miller (1980) described the

purpose of persuasion as encompassing shaping, reinforcing, or changing responses.

Thus, the degree to which characteristics of a given message are committed to memory

will have meaningful implications as they relate to the message's persuasive impact.

Generally speaking, "memory consists of a number of dissociable underlying

forms" (Schater, 2007, p. 24). Little agreement exists on the precise definition of

memory. Tulving (2000) identified four arenas in which memory is normally discussed:

(1) the neurocognitive capacity to encode, store, and retrieve bits of information; (2) a

hypothetical store or holding area for information; (3) the information held in the

aforementioned store; or (4) an individual's phenomenal awareness of remembering

something. Notably, and in light of the foregoing, this work was primarily concerned

with the twin processes of storing and retrieving information.

The notion that the availability of information can and does guide future behavior

is a key assumption of many processing theories, including the limited capacity model

(LC4MP; e.g., Lang, 2000), the elaboration likelihood model (e.g., Petty & Cacioppo,

1986), the heuristic processing model (e.g., Chaiken, 1980) and the perceptual load

theory (e.g., Lavie, 1995). Each of these theories hold that information that is subject to high involvement is more likely to be initially encoded, to be committed to long-term memory, and to be available for retrieval. Once information is stored in memory (i.e., learned), it decays very slowly (Loftus, E. F. & Loftus, G. R., 1980). Information that has been learned is more likely to be available for use in day-to-day decision-making processes (e.g., Keller, 1987).

In social-scientific research, memory is usually considered in either explicit or implicit terms (e.g., Schater, 1987; Shapiro & Krishnan, 2001; Bagozzi & Silk, 1983). Explicit memory is understood as a deliberate effort to remember something. Conversely, implicit memory is "revealed by a change in task performance due to a prior exposure episode without a deliberate attempt to recollect the previously encoded information" (Shapiro & Krishnan, 2001, p. 1). Within the context of explicit memory, recall refers to the retrieval of specific information while recognition can be thought of as matching instant stimuli with previous experience.

Behavioral Intention and Actual Behavior as a Component of Message Effectiveness

Behavioral intent can be though of as the degree to which an individual indicates he or she is sufficiently motivated to perform an object behavior (e.g., Ajzen, 1985; Ajzen, 1991; Park & Smith, 2007). For its part, actual behavior is the functional performance of a given activity. Obviously, behavior is the singularly most desired outcome associated with any persuasive attempt. However, as discussed in this section, behavior is generally understood as the result of fairly complex series of process. Although a complete review of all antecedents to behavior is beyond the scope of the

16

current document, this section discusses the relative impact of both attitudes and memory on behavior/behavioral intentions.

Whether attitudes are approached from a specific, rational basis (i.e., TRA/TPB) or a general, primarily automatic basis (i.e., MODE), they clearly are an essential component underlying behavioral outcomes. Meta-analyses indicate that attitudes toward a specific behavior are a fairly reliable predictor of behavior itself. For example, Glassman and Albarracin's (2006) meta-analysis of the relationship between attitude and actual behavior, the authors surveyed a large number of studies across a substantial body of conditions ($k = 128$, participant $n = 4, 598$). The range of the mean correlations between attitude and behavior was -.20 (Leippe & Elkin, 1987) and .73 (Fazio & Williams, 1986). The sample-wide weighted mean correlation between the attitude and behavior was $r = .52$, slightly higher than the weighted mean correlations of $r = .38$ separately observed by Albarracin, Johnson, Fishbein, & Muellerleile (2001) and Kraus (1995) in earlier meta-analyses.

Despite the relatively strong relationship between attitudes and behavior, many attitude-behavior theories (i.e., the TRA, the TPB, self-efficacy theory, the model of interpersonal behavior, the health belief model) hold that this relationship is, functionally speaking, mediated by behavioral intentions (e.g., Bagozzi, 1981; Bandura, 1986; Bentler & Speckart, 1979; Fishbein & Ajzen, 1975; Kim, M. S. & Hunter, 1993). Behavioral intentions are conceptually distinct from behavioral attitudes. To wit, attitudes are one's general, positive or negative evaluation of performing a behavior (Fishbein & Ajzen, 1975) while the formation of a behavioral intention "signals the end of the deliberation about what one will do and indicates how hard one is prepared to try, or how much effort

17

one will exert, in order to achieve desired outcomes. Intentions thus are assumed to capture the motivational factors that influence a behavior" (Webb & Sheeran, 2006, p. 249). Attitudes have been shown to correlate highly with behavioral intentions. Sheeran and Taylor's (1999) meta-analytic review of 56 studies on condom usage found a weighted mean correlation of .45 between attitudes toward condom use and behavioral intentions to use a condom. Of the 23 demographic and psychosocial variables analyzed, this relationship between attitudes and behavioral intentions was the second strongest, next only to sexual partner norm ($r = .50$). Armitage and Conner's (2001) meta-analytic exploration of the predictive efficacy of the TPB (185 independent samples) similarly found a weighted average correlation between attitudes and behavioral intent of .49. In turn, the authors observed a weighted correlation of .48 between behavioral intentions and behavior.

Perhaps the most widely-cited illustration of the relationship between attitude and behavioral intent is M. S. Kim and Hunter's (1993b) meta-analysis of the attitude-behavioral intent relationship. The study built upon an earlier meta-analysis by the same authors (Kim, M. S. & Hunter, 1993a) that had observed a strong correlation between attitude and behavior ($r = .79$ after elimination of methodological artifacts). Despite the strength of the attitude-behavior relationship, the authors noted that the "trend in A-B research is to conceive of behavioral intentions as a mediator between attitudes and behavior" (p. 331). In support of this notion, five hypotheses were offered: (1) the attitude-behavioral intent correlation would be higher than the attitude-behavior correlation; (2) the behavioral intent- behavior attitude would be higher than attitude-behavior correlation; (3) the attitude-behavioral intent correlation would be higher than

the behavioral intent-behavior correlation; (4) the variation in the behavioral intent-behavior correlations would be greater than the variation in the attitude-behavioral intent correlations; and (5) attitudinal relevance would affect the magnitude of the attitude-behavioral intent relationship. In an analysis of a sample of 139 independent samples ($n = 26, 988$), the authors found support for each hypothesis. After correcting for attenuation due to measurement error and between-study measurement differences, the authors found a mean correlation between attitude and behavioral intent of .87, a mean correlation behavioral intent and behavior of .82, and a mean correlation between attitude and behavior of .79. Subsequent meta-analysis, such as those performed by Armitage and Conner (2001), Godin & Kok (1996), and Hagger, Chatzisarantis, and Biddle (2002), have similarly found evidence of a stable, strong relationship between attitudes and behavioral intent.

Although perhaps less empirically studied than the attitude to behavior link, "information gleaned from learning and memory processes is essential in guiding behavior toward a specific goal" (Goto & Grace, 2008, p. 1407). The link between these variables is intuitive; indeed, the notion that information that has been stored in memory (or "learned") guides future behavioral choices underlies the very notion of persuasion, and more broadly, education. Furthermore, research indicates that memory and attitudes may be guided be different neurophysiological mechanisms (e.g., Cacioppo & Petty, 1989; Easley et al., 2001; Klucharev, Smidts, Fernandez, 2008; Lieberman et al., 2011). For instance, in Petty and Cacioppo's (1989) study on message repetition, the authors found that repeated messages were associated with decreased attitudinal outcomes but increased recall abilities.

Research on pro-social persuasive messaging has consistently indicated that learning information relevant to the prevention of anti-social or harmful individual activities helps shape the behaviors in which an individual chooses to engage in (e.g., Elder, Ayala, & Harris, 1999; Flocke & Stange, 2004; McFarlane & St. Lawrence, 1999). For example, Borland and Hill (1997) and Moodie, Mackintosh, and Hammond (2010) both found that learning encouraged through health warnings on tobacco products resulted in appreciable consumption reductions. On the other side of the coin, Lin, Hang, Yang, and Hung (2011) found significant, positive correlations between accessible knowledge on nutrition and attitudes toward healthy eating ($r = .42$) and healthy eating itself ($r = .27$). Within the specific context of health-oriented persuasive messaging, Kivininiemi and Rothamn (2006) argued that one major reason that prevention efforts are not behaviorally realized is because of a lack of recipient memory of previously delivered health advice. To wit:

> Although the causes of failure to implement suggested behavioral changes are multifaceted, one basic problem is that often patients simply do not recall the advice and recommendations they are given. In general, patients show relatively poor memory for information presented by health professionals – indeed, at times less than 50% of the information presented is later recalled. (p. 248)

Although, of course, violent behavior is likely to have a number of determinants, especially situational ones, it stands to reason that learning information relative to the reduction of violent behavior may have a number of favorable social effects. That is, if it is indeed the contention that violent behavior can be learned through the media, it may also be the case that violent behavior, to some degree, can be unlearned as a function of pro-social message delivery.

Rationale for the comprehensive study of message effectiveness

As outlined in the foregoing sections, message effectiveness can be understood as having three constituent elements: attitude, behavior, and memory. Although the social-scientific literature has generally - for methodological, logistical, and cultural reasons - favored the study of attitudes, it was, in my view, a mistake to hold a given element of effectiveness as either more or less important than the other two elements. Clearly, affecting behavioral outcomes is most desirable to message advocates. However, divorcing behavior from its internal antecedents is akin to separating a car's body from its engine. And, as discussed above, contemporary research increasingly holds that attitudes and memory may be distinct systems (e.g., Cacioppo & Petty, 1989; Easley et al., 2001; Lieberman et al., 2011) and, as such, it possible that a given persuasive treatment may impact one system but not the other (e.g., Jeong, Bohil, Biocca, 2011; Yang, M., Roskos-Ewoldsen, Dinu, Arpan, 2006).

Psychological Reactance Theory

Psychological reactance theory is built around the assumption that people prize their ability to exist as autonomous decision makers (Quick, Scott, & Ledbetter, 2011). When persuasive messaging artifacts threaten one's freedom to choose among alternative choices, psychological reactance theory suggests that individuals tend to succumb to a "motivational state directed toward the re-establishment of threatened or eliminated freedom" (Brehm, J.W., 1966, p. 15). That is, once in a state of reactance, individuals are motivated to reclaim freedom through a variety of means, including source derogation, adoption of a position that is antagonistic to the position advocated for in the message, and/or perceiving the behavior associated with the freedom threat to be comparatively

21

more attractive (e.g., Hammond & Brehm, J. W., 1966; Rains, 2013; Smith, 1977; Worchel & Brehm, J. W., 1970).

Psychological reactance theory was initially formulated by J. W. Brehm and colleagues in the latter part of the 1960s (Brehm, J. W., 1966; Brehem, J. W., & Sensenig, 1966; Hammond & Brehm, J. W., 1966; Worchel & Brehm, J. W., 1970). In somewhat stark contrast to theories designed to explain *successful* attempts at influence, psychological reactance theory is primarily employed as a means of explaining why persuasive messages are *unsuccessful* (e.g., Hornik, Jacobson, Orwin, Piesse, & Kalton, 2008; Miron & Brehm, J. W., 2006; Rains, 2013; Roingold, 2002; Quick, 2005). When positioned on the message evaluation – message response continuum, reactance is a conditional mediator whose presence helps explain adverse reactions to persuasion attempts (e.g., Brehm, J. W., 1966; Brehm, J. W., & Brehm, S. S., 1981; Dillard & Shen, 2005).

Recent years have seen intensified scholarly interest in the explication and development of psychological reactance theory, particularly in terms of describing its antecedents (e.g., Quick, Scott, & Ledbetter, 2008; Quick & Stephenson, 2008) and constituent elements (e.g. Dillard & Shen, 2005; Rains, 2013; Rains & Turner, 2007). In the current work, delineation of the theory was built substantially around J. W. Brehm's (1966) initial specification of psychological reactance as a construct, Quick's (2005) in-depth model of reactance processing, Dillard and Shen's (2005) influential study on the cognitive and affective properties of state-based reactance, and Rains' (2013) exhaustive meta-analytic review of to-date reactance research.

Core Components of Psychological Reactance Theory

Four structurally related components form the bedrock upon which psychological reactance theory is built. Specifically, as outlined by Quick (2005), individual perceptions of (1) *freedom* and (2) *control* frame his or her understanding of (3) *threat*. Threat, in turn, plays a significant role in establishing the parameters and magnitude of (4) *reactance*. Each of these four components, relative to the manifestation of reactance as a motivational state, is discussed below.

Within the psychological reactance theory, freedom is a subjective, individual level variable that is developed over the course of an individual's life experiences (Brehm, J. W. & Brehm, S. S., 1981). As illustrated by Miron and J. W. Brehm (2006), "The classic reactance example is that of parents telling the child to do or not do something, for instance, to wear a particular pair of shoes at school. If the child believes s/he is free to decide what shoes to wear then he or she will experience reactance" (p. 10). Psychological reactance theory asserts that freedoms can only be subjected to threat once they have been established, as freedoms that do not exist cannot be eliminated (Quick, 2005). Such freedom can be absolute or conditional (Brehm, J. W., 1966). Quick (2005) described the difference between absolute and conditional freedom as follows:

> Absolute freedoms are available during the present and future in every situation. For example, an individual's freedom to smoke cigarettes inside his or her home is an absolute freedom. To the contrary, conditional freedoms are context dependent. For instance, an individual's freedom to smoke is restricted in certain environments, such as inside a restaurant and office. (p. 8-9)

In addition to conditional dimensions, the parameters of one's freedom are constrained by logistical/practical boundaries. That is, an individual "must have the relevant physical and psychological abilities" to engage in the behavior and must know

"by experience, general custom, or by formal agreement, that he may engage in them"
(Brehm, J. W., 1966, p. 4). For its part, behavior is cast in very general terms and includes
(1) what one chooses to think or not think; (2) what one chooses to do *or* not do; (3) how
one does something; and (4) when one does or does not do something (Brehm, J. W.,
1966). Wickland (1974), in his summary of psychological reactance theory, described
behaviors by saying that "free behaviors are not just molar instrumental actions. Also
included are emotions, attitudes, and any other feeling states of the organism" (p. 2).

Freedom and control are closely related concepts in psychological reactance
theory. Indeed, according to Quick (2005), in psychological reactance theory, "control
and freedom are equivalent terms" (p. 9). That said, the literature on psychological
reactance theory often uses the notions of control and freedom in a slightly divergent
manner (e.g., Cherulnik & Citrin, 1974) and it is therefore worthwhile to explicitly
discuss and define control as a theoretical concept. Broadly speaking, psychological
reactance theory understands control as a motivational state related to a person's internal
assessment of their ability to affect a specified outcome (Brehm, J. W., 1993; Quick,
2005). J. W. Brehm (1993) asserted that people have two distinct types of control
motivations: *reactive* motivations and *effectance* motivations. A reactive motivational
state emerges when a person is compelled to re-establish a freedom that has been taken
away. Effectance motivations are related to obtaining and holding a wide and diverse
range of freedoms (Brehm, J. W., 1993). Psychological reactance theory is generally, if
not totally, centered on exploration of reactive control motivations (Quick, 2005).

An individual's understanding of his or her ability to exercise control is closely
related to their internal competency perceptions. According to Miron and J. W. Brehm

(2006), "freedoms are bound by what an individual feels capable of doing or having control over" (p. 15). Within psychological reactance theory, conceptions of competency perceptions are mostly, if not completely, identical to Bandura's conception of self-efficacy. A primary part of the broader social cognitive theory (SCT) (e.g., Bandura, 1977; 1986), the theory of self-efficacy specifically refers to "beliefs in one's capabilities to mobilize the motivation, cognitive resources, and courses of action to meet one's situational demands" (Bandura & Wood, 1989, p. 260). Self-efficacy is a measure of one's internal beliefs regarding what they can accomplish (Eastin & LaRose, 2000) and can be succinctly understood as "a differentiated set of self-beliefs linked to distinct realms of functioning" (Bandura, 2006, p.307). In extension, then, free behaviors (i.e., freedom) can be understood both in terms of external and internal capabilities; in other words, one's ability to believe him or herself free to engage in a given behavior is first dependent upon their ability to exert control over both internal and external forces.

When a person believes they are free to hold an attitude or perform a behavior, such freedom becomes threatened whenever he or she is exposed to external pressures that attempt to persuasively advocate for an alternative or contrary attitude or behavior (Wicklund, 1974). J. W. Brehm and S. S. Brehm (1981) described a threat as "any force on the individual that makes it more difficult for him or her to exercise the freedom constitutes a threat to it" (p. 30). The nature, strength, and duration of threats experienced by individual in day-to-day life vary. Dilliard and Shen (2005) noted that even mundane, impersonal events such as poor weather can be perceived as threats as long as they render the exercise of freedom more difficult. Generally speaking, however, psychological reactance theory is usually applied to social influence exercised through deliberate

persuasion attempts. In fact, J. W. Brehm (1966) saw any persuasion attempt, no matter how weak, as a threat. Reactance, then, is the motivational force that compels individuals to re-establish freedom in the face of a threat (Quick, 2005).

Reactance can be understood both as a motivational state (i.e., state reactance) and as an enduring individual trait (i.e., trait reactance). Although research on persuasive messaging (and, therein, the current project) is, broadly speaking, most interested in state reactance, the present discussion provides description of both dimensions of reactance.

As a motivational state, reactance occurs immediately after a freedom has been threatened (Quick, Scott, & Ledbetter, 2011). In his initial specification of psychological reactance theory, J. W. Brehm (1966) identified three factors that impact the magnitude on the reactance state: (1) the relative importance of the free behavior to the individual; (2) the proportion of the free behavior's subcomponents that are threatened; and (3) the strength of the threat itself. Once in a state of reactance, the person seeks to "regain the lost or threatened freedoms by whatever methods are available and appropriate" (p. 9). Specifically, Wicklund (1974) posited that reactance states result in one of four outcomes: (1) direct reassertion of freedom through behavior; (2) greater liking of the threatened behavior; (3) indirect reassertion of freedom through over-reaction; and (4) aggression towards the source of the threat. As delineated by Quick and Kim (2009), scholars have researched a variety of reactance-related outcomes, including attitudes, behavioral intentions, so-called *boomerang* effects (i.e., acting a manner contrary to the advocated position), perceived message persuasiveness, and source derogation. Traut-Mattausch, Jonas, Forg, Frey, and Heinemann (2008) argued that there are multiple routes along which state reactance can be stimulated. To wit: "Reactance can be aroused

by forcing a desirable object on a person (e.g., pay toll road) as well as by eliminating access to it (e.g., smoking forbidden in a public space)" (p. 219).

In contrast to state reactance, trait reactance is an individual-level variable that describes people who are particularly "prone to experience reactance" (Quick, 2005, p. 13). Systematic, empirical research on trait reactance began in the early 1980's with Merz's (1983) *German-language Questionnaire for the Measurement of Psychological Reactance.* Later efforts were undertaken by Hong (e.g., Hong & Page, 1989; Hong, 1992) to translate, update, and refine the scale. Full discussion of the measurement properties associated with trait reactance are discussed in this chapter's measurement subsection.

The Elicitation of State Reactance

State reactance normally emerges as a result of an encountered persuasive attempt. In this regard, psychological reactance theory is a theory concerned with the *relationship* between the structural aspects of a persuasive effort (i.e., a persuasive message) and an evaluator's subsequent psychological response. Moreover, given J. W. Brehm's (1966) contention that *all* persuasive attempts have the potential to incur some degree of state reactance, review of the textual characteristics that foster one's perception of freedom limitation is instrumental to a holistic understanding of psychological reactance theory. Directly relevant to the study of persuasive messaging, Quick (2005), building upon earlier research by Burgoon, Alvaro, Gradpre, (2002) and Dillard and Shen (2005), identified three message features/characteristics that encourage audience state reactance: (1) threat-to-choice language; (2) vivid language; and (3) explicit language. These characteristics are reviewed below.

According to Quick (2005), threat-to-choice language can be defined as "forceful and pressuring language" (p. 27) found in persuasive messages. Operationalized examples of threat-to-choice language (all cited in Rains, 2013) include the statements provided in Table 2.

Table 2. Previously operationalized examples of threat-to-choice language

Publication Details	Example of Threat-to-Choice Language
Dillard & Shen, 2005	"As any sensible person can see…" (p. 152)
Kim, S. Y. & Levine, 2008a	"Drinking should be banned…" (p. 13)
Kim, S. Y. & Levine, 2008b	"Cell phones must be banned…"(p. 14)
Miller et al., 2007	"You really need to exercise…" (p. 240)
Quick, 2005	"You simply cannot deny…" (p. 150)
Quick & Stephenson, 2008	"You simply cannot deny…" (p. 475)
Roubroeks et al., 2011	"You really have to…" (p. 138)
Zhang & Sapp, 2011	"You must quit…" (p. 33)

As shown, threat-to-choice language constrains an individual's freedom by explicitly prescribing a path of action in which any *reasonable* or *rational* or otherwise *normal* person must follow. Threat-to-choice language attempts to eliminate the audience's ability to choose from a series of alternates in lieu of single, preferred behavioral outcome.

Threat-to-choice language exists on a continuum. For instance, the examples provided in Table 2 can all be considered instances of messages with high threat-to-choice language. Messages with low levels of threat-to-choice language employ comparatively mild behavioral prescriptions. For instance, Quick (2005) previously operationalized low threat-to-choice language as follows:

> There is pretty good evidence that drinking too much alcohol can lead to Aggies flunking out of school. Drinking responsibly is about knowing your own limits when it comes to how much alcohol you are going to consume. Most people would agree that the over-consumption of alcohol

is an important campus problem at Texas A & M that needs to be addressed. It is a sensible conclusion. (Quick, 2005, p. 145)

Vivid language, alternately, is defined as language designed to make it easier for the audience to form mental construals of the information presented in the message (Keller & Block, 1997). Nisbett & Ross (1980) defined vivid language as language "likely to attract and hold our attention and to excite the imagination, to the extent that it is: (a) emotionally interesting, (b) concrete and imagery-provoking, and (c) proximate in a sensory, temporal or spatial way" (p. 45, as cited in Quick, 2005). Vivid language is comparatively more likely induce emotionally-charged responses to persuasive content (Quick, 2005; Zillman & Brosius, 2000). One especially common example of vivid language use is the use of fear appeals. De hoog, Stroebe, and de Wit (2007) define a fear appeal as "communications [that] emphasize the negative consequences of …impairing behaviors to motivate individuals to change these behaviors" (p. 258). Health campaigns for instance, often rely heavily on fear-based vivid language in an effort to scare or negatively motivate people to behave in health conscious ways (e.g., Kohn, Goodstadt, Cook, Sheppard, Chan, 1982; Leshner, Vultee, Bolls, Moore, 2010; Morman, 2000; Skillbeck, Tulips, & Ley, 1977). Often, fear appeals attempt to capitalize on individual fears of victimization (i.e., *you could become a victim of skin cancer* or *your neighborhood might become host to violent crime*). Other forms of vivid language can include appeals that attempt to capitalize on allusions to sadness, empathy, disgust, disdain, and so on.

The third category of message characteristics identified by Quick (2005) is the application of explicit language. Dillard (1997) classified explicitness as the "degree to which a message source makes his or her his intentions transparent" (p. 300) in the

29

message text. Given that any message that is perceived as a threat has the potential to incur audience reactance (Brehm, J. W., 1966), the degree to which a message is explicit in its intent has important ramifications as they relate to the elicitation of reactance.

As illustrated above, threat-to-choice, vividness, and explicitness all exist on a continuum such that persuasive messages employ these characteristics in highly variable manner. Amongst others, Dillard & Shen (2005), Dillard, Kinney, & Cruz (1996), and Quick (2005) have asserted that empirical research into the precise characteristics that differentiate the strength (and thus the impact) of message characteristics is in a nascent state. In differentiating between high and low levels, Dillard and Shen (2005) suggested that messages be considered on the basis of three principles: (1) *explicitness*, or the degree to which the message makes clear the message's persuasive intent; (2) *dominance*, or the extent to which to a source attempts to control the message recipient; and (3) *reason*, or the degree to which the message relies on the recipient to make decisions based on provided, logical evidence.

Measurement

In this section, the measurement of both state and trait reactance is discussed. Notably, a substantial amount of debate has surrounded reactance measurement on both its trait and state levels.

State Reactance

For much of its life as theory, psychological reactance theory has been assumed to be an intervening variable that could not be directly measured (Brehm J. W. & Brehm, S. S., 1981). As such, scholars *inferred* the presence of reactance, generally perceiving its existence on the basis of one's negative response toward a persuasive attempt or

30

advocated behavior (Rains, 2013). The predominate thinking behind the identification

and application of reactance in empirical research was summarized by J. W. Brehm and

S. S. Brehm (1981), who asserted that "we cannot measure reactance directly, but

hypothesizing its existence allows us to predict a variety of behavioral effects" (p. 37).

However, research conducted in recent years has both consistently and

increasingly indicated that reactance can be observed as a latent variable consisting of

cognition and/or affect (e.g., Dillard & Shen, 2005; Kim, S.Y., Levine, & Allen, 2013;

Rains, 2013). As pointed out by Rains (2013), Dillard and Shen's (2005) work was

especially instrumental on development of reactance as a measurable construct.

Specifically, the authors drew upon two theoretical perspectives in order to develop and

test four distinct models of reactance. The first of these theories was Petty, Ostrom, and

Brock's (1981) cognitive response approach (CRA) to persuasion. The CRA is,

essentially, a derivative of the elaboration likelihood model and is marked by the key

assumption that "the impact of a message on attitudes is mediated by cognition" (Rains,

2013, p. 49). After exposure to a persuasive attempt, individuals generate cognitions that

are either favorable or hostile to the message. From this, Dillard and Shen (2005)

reasoned that people might react to freedom threatening messages through

counterarguing, or use of a negatively valenced cognitive process that inhibits agreement

with an advocated position (Rucker & Petty, 2004).

A second proposition used to by Dillard and Shen (2005) for the purposes of

conceptualizing reactance was it might manifest itself in the form of anger. Using extant

theories inter-relating anger and motivational states (e.g., Dillard & Peck, 2001), the

authors presented a framework in which anger towards the character of a given message

31

could energize message recipients in such a way to actively restore lost or threatened freedoms. As summarized by Rains (2013), the "action tendency" (p. 49) of anger is with consistent with J. W. Brehm's (1966) initial description that people experience reactance in the form of hostility toward the message and/or message source. That is, when freedom has been threatened, audience members become negatively oriented toward the message and are subsequently sufficiently motivated to attack and reject the freedom-limiting message in order to re-establish autonomy.

To explore their posited contention that state reactance was comprised of counterarguing (i.e., arguing in a manner contrary to the perspective advocated by the source), anger, or some combination thereof, Dillard and Shen (2005) developed four possible models of reactance: (1) a single process cognitive model; (2) a single process affective model; (3) a dual process cognitive-affective model; and (4) an intertwined process cognitive-affective model. As shown in Figure 4, the single process cognitive employs counterarguing (i.e., cognition, or message-relevant negative thoughts) as the mediator between antecedents to reactance and attitudinal outcomes while the single process affective model uses anger to explain the relationship between exogenous factors and attitudes. Alternately, the dual process model includes both cognition and effect. For its part, the dual process model assumes that "cognition and affect can be discriminated" (p. 149). Finally, the intertwined process cognitive-affective model conceptualizes counterarguing and anger as being so intertwined that they are better considered as "indicators of an underlying concept" (p. 149) than as discriminable phenomena.

To test the models, Dillard and Shen (2005) used an experimental study in which 407 college students were assigned to groups tasked with either evaluating a series of (1)

32

flossing or (2) anti-binge drinking messages. Within each group, participants were assigned to either high or low threat-to-choice message groups. Using structural equation modeling (SEM), the authors found that the intertwined process cognitive-affect model fit the data better than the alternate models in the cases of both the binge-drinking and flossing manipulations. A 2007 study by Rains and Turner further validated the efforts of Dillard and Shen by separately obtaining support for the intertwined model. Additionally, they evaluated a fifth model, the linear affective-cognitive model, in which the relationship between reactance antecedents is mediated by a linear, ordered combination of anger and affect (See Figure 5). Finally, perhaps the most conclusive support for the intertwined model can be found in Rains' (2013) meta-analytic review of to-date reactance literature. Using a sample of 20 research reports, conference papers, and dissertations ($n = 4, 942$), the author employed SEM to examine associations among the variables included in each research report's reactance model. The results indicated that the intertwined model's fit was superior to both the dual process model and the linear affective-cognitive model. Given these findings, Rains concluded that researchers can proceed with confidence in their conceptualization of reactance "as an amalgam of anger and counterarguing" (p. 67).

Figure 4. State Reactance Models

Single Process Cognitive Model

```
( Antecedents  ) ----> ( Cognition ) ----> ( Attitude )
( to Reactance )
```

Single Process Affective Model

```
( Antecedents  ) ----> ( Anger ) ----> ( Attitude )
( to Reactance )
```

Dual Process Cognitive- Affective Model

```
                      ( Anger )
( Antecedents  )  <                      ( Attitude )
( to Reactance )       ( Cognition )
```

Intertwined Process Cognitive-Affective Model

```
( Antecedents  ) ----> ( Reactance ) ----> ( Attitude )
( to Reactance )            ^    ^
                          [ Cognition ] [ Anger ]
```
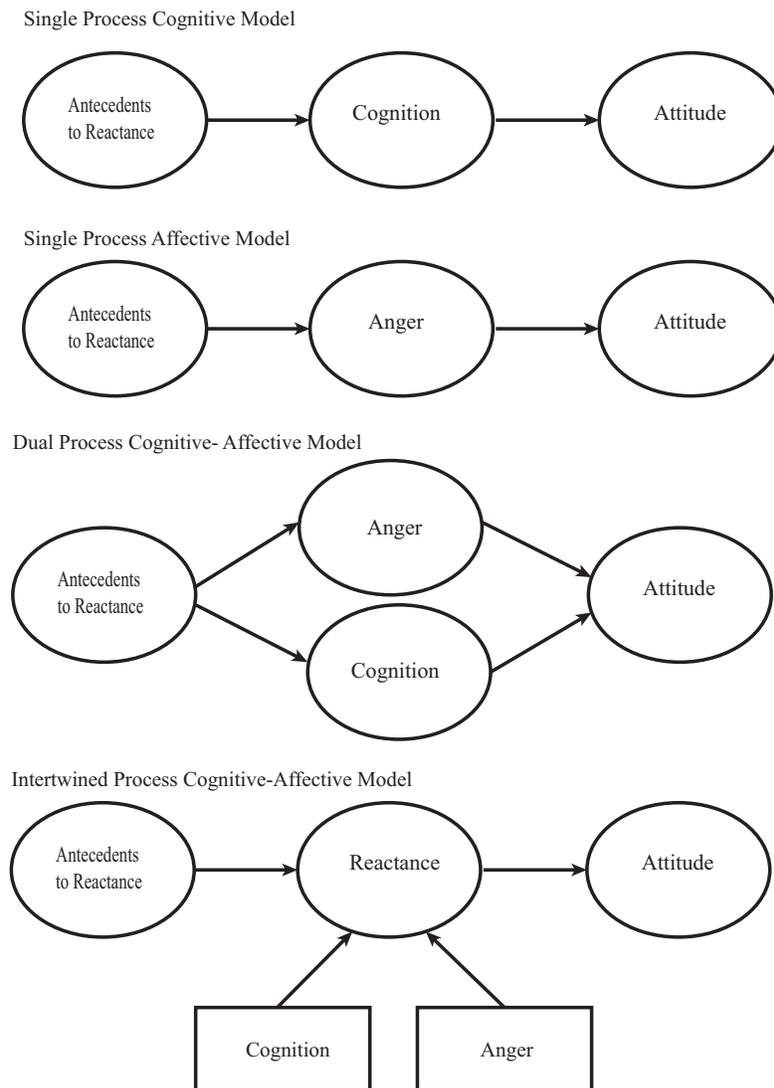
Within the intertwined reactance model, counterarguing is generally assessed using the thought-listing technique described by Petty and Cacioppo (1986). The thought-listing technique is a form of protocol analysis in which an individual is exposed to a stimulus and then asked to list all the thoughts that immediately come to mind. This technique can be understood using an example provided by Cacioppo, von Hippel, and Ernst (1997):

34

> Consider, for instance, a situation in which individuals are presented with behaviors that are somewhat ambiguous with regard to whether they implicate depression, such as, "Did not leave the house the entire weekend." The individuals might then be asked to prepare to explain the reasons for this behavior and, afterwards, to list everything about which they had been thinking. If the individuals are chronologically depressed, the concept of depression should be accessible in memory and should be more likely to be a recurrent element in the stream of feelings and ideas elicited in this assessment context than other possible accounts. (p. 928)

Once a participant has concluded listing his/her thoughts, he or she is instructed to re-read the listed thoughts and label it as either positively or negatively oriented toward the originating stimulus. Finally, the participant is instructed to go back a second time and rate the strength of each thought on a 7-point scale (Miller et al., 2013; Pfau et al., 2009; Quick, 2009). Often, the thought-listing procedure is supplemented with a short series of questions such as "to what degree did you agree with the presented arguments" and/or qualitative data that is subsequently coded for argument relevance, argument position, and so on. This data is then placed on a quantitative scale and tested for intercoder reliability (e.g., Dillard & Shen, 2005; Miller et al., 2013).

Figure 5. Linear affective model of state reactance
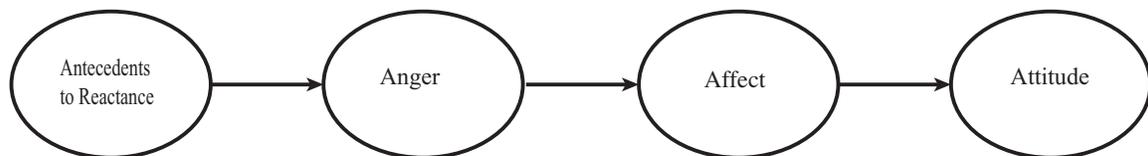
For its part, the anger component of reactance is generally measured using a series of questions placed on 5 or 7-point semantic differential intervals. Dillard and colleagues (e.g., Dillard & Peck, 2000; Dillard & Shen, 2005; Dillard, et al., 1996) used a 5-point

response scale that asked respondents if the message stimuli made them feel irritated, angry, annoyed, and aggravated. Similarly, Quick and colleagues employed the same 4 items anchored on both 11 point (e.g., Quick & Stephenson, 2009) and 7-point scales (e.g., Quick & Bates, 2009; Quick & Kim, 2009; Quick, Scott, & Ledbetter, 2011).

Trait Reactance

Trait reactance is thought to be a stable, trait-like characteristic that represents individual proneness to state reactance onset. As discussed by Quick (2005), Burgoon, Alvaro, and Voloudakis (2002) previously argued that one's proneness to reactance is a product of three individual-level factors: (1) individual autonomy and value placed on independence; (2) individual perception that their values, value systems, and/or behaviors are being attached by the persuasive attempt; and (3) individual competency perceptions. Unsurprisingly, then, trait reactance has been associated with traits such as sensation-seeking, autonomy, self-sufficiency, lack of conformity, interpersonal mistrust, and dominance (e.g., Dowd & Wallbrown, 1993; Dowd, Wallbrown, Sanders, & Yesenosky, 1994; Quick, 2005; Quick & Stephenson, 2008; Seibel & Dowd, 2001).

Building upon an earlier attempt by Merz (1983) to construct a trait reactance scale (titled the *Questionnaire for the Measurement of Psychological Reactance* or QMPR), Hong and colleagues (e.g., Hong & Faedda, 1996; Hong & Page, 1989; Hong, 1992) developed a stable, multi-dimension construct representative of trait reactance. The *Hong Psychological Reactance Scale* (HPRS), introduced by Hong and Page (1989), consisted of 14 items situated across four dimensions: (1) emotional responses related to the restriction of freedom of choice; (2) resistance to compliance/reactance against conformity; (3) resistance to external influence; and (4) resistance to advice and

36

recommendations made by others. Later, Hong and Faedda (1996) found that the 14-item

HPRS could be reduced to 11 items without unduly sacrificing internal reliability or

explained variance. Although, as pointed out by both Quick (2005) and Shen and Dillard

(2005), the psychometric properties of the HPRS have been repeatedly questioned, other

attempts at scale construction (e.g., Donnell, Thomas, & Buboltz, 2001; Dowd, Milne, &

Wise, 1991; Thomas, Donnell, & Buboltz, 2001; Tucker & Byers, 1987) have failed to

provide evidence of internal reliability levels that exceed either the 11 or 14 item versions

of the HPRS. Accordingly, current research on reactance to persuasive messages

generally uses some form of the HPRS, most commonly Hong and Faedda's 1996 version

(e.g., Quick & Bates, 2010; Quick, Scott, & Ledbetter, 2011; Quick & Stephenson,

2008). Both the 14 and 11 item versions of Hong and Faedda's 1996 HPRS are presented

in Table 3.

Excitation Transfer Theory

Developed from the two-factor theory of emotion (Schachter, 1970), the ETT

holds that arousal elicited by one event can be transferred to subsequent activities

(Zillman, 1996). According to Zillman (1971), who is generally seen as ETT's

progenitor, a person's cognitive awareness of the arousal-causing source retreats before

his or her sympathetic arousal decays (Wang & Lang, 2012). Thus, the arousal elicited by

the previous stimuli combines "inseparably with the excitatory stimuli to which the

organism is subsequently exposed" (Zillman, Johnson, & Day, 2000, p. 417). ETT hence

proposes that any stimuli experienced immediately subsequent to an initial, arousal-

inducing stimuli may elicit an involuntarily heightened emotional response.

Table 3. Dimensions and Items in Hong and Faeda's HPRS (1996)

Emotional Response to Restricted Choice
The thought of being dependent on others aggravates me*
I become frustrated when I am unable to make free and independent decisions
It irritates me when someone points out things which are obvious to me
I become angry when my freedom of choice is restricted.
Resistance to Compliance
Regulations trigger a sense of resistance in me
I find contradicting others stimulating
When something is prohibited, I usually think, "That's exactly what I am going to do"
It disappoints me to see others submitting to standards and rules*
Resisting Influence from Others
I am content only when I am acting of my own free will*
I resist the attempts of others to influence me
It makes me angry when another person is held up as a role model for me to follow
When someone forces me to do something, I feel like doing the opposite
Reactance toward Advice and Recommendations
I consider advice from others to be an intrusion
Advice and recommendations usually induce me to do just the opposite

Note: * indicates that the item appears in the 14 item version but not the 11 item version; all items on 5-point scales (1=strongly disagree, 5 = strongly agree)

The ETT is situated within Zillman's (e.g., 1978, 1979) broader notion of emotional behavior. Zillman understood emotional behavior to be the result of three distinct components: the dispositional, the excitatory, and the experiential. The *dispositional* component can be characterized as xa response-guiding system which operates before cognitive consideration of a given stimuli. Therein, this construct may be best described as the "initial skeletal-motor behavior associated with a direct response to emotion-inducing stimuli" (Bunce, Larsen, & Cruz, 1993, p. 508). The second component, the *excitatory* component, is related to stimulation to the sympathetic nervous system (SNS). For its part, the SNS is thought to control the so-called fight or flight mechanism. Like the depositional component, the excitatory component exists outside of volitional control. The third factor, the *experiential* component, can be

understood as the "conscious awareness of emotion" (Cummins, Wise, and Nutting, 2012, p. 422). Here, a person consciously evaluates a stimulus, in the context of their experienced skeletal-motor and excitatory response, as a means of building and assigning meaning.

Zillman (1996) outlined four propositions that serve as the skeleton of ETT. These propositional statements are as follows:

> (1) Given a situation wherein: (a) people respond to emotion-inducing stimuli and assess their responses; (b) levels of sympathetic excitation are excited or aroused from prior stimulation; and (c) individuals are not subject to obtrusive cues that unambiguously link their arousal to prior stimulation, residual excitation from the prior stimulation will combine with present stimuli to intensify emotional behavior and emotional experience.
>
> (2) Emotional behavior and emotional experience will be increased in positive proportion to the magnitude of the transferred excitation.
>
> (3) The period of time during which excitation transfer can occur and the magnitude of any transferred arousal are dependent upon two factors: (a) the magnitude of the preceding reaction and (b) the rate of recovery from the excitatory state.
>
> (4) An individual's potential for excitation transfer is positively proportional to their excitatory responsiveness and negatively proportional to their proficiency to recover from excitatory states.

The above-outlined propositional statements are discussed in greater depth below.

Zillman's first proposition outlines the general contentions of the ETT. Here, he establishes the time-ordered relationship encompassed by the ETT. Prior stimulation in the current context can be understood as excitation arising from either a single stimulus or a series of stimuli. To this point, Zillman stated: "The number of residues that may be integrated depends…on the rapidity instigation in a sequence. The more proximate in time the instigations, the more likely the integration of their excitatory components" (p.

39

251). Arousal transfer from one event to another, it should be noted, is dependent upon a lack of self-focused attention. As Reisenzein and Gattinger (1982) noted, "an individual's attention may be said to be directed either outward (toward the environment) or inward (toward the self)" (p. 318). In the case of the latter, self-focused attention can lead to an increased awareness of "salient self-elements" (p. 318) that result in increased awareness of internal states. Such recognition thereby dilutes the autonomous processes underlying arousal transfer, resulting in the "correct" attribution of arousal to its originating source (Zillman, 1978). Finally, it should be noted that for transfer to occur, the secondary state must be unambiguous in nature. The secondary stimuli must elicit an emotional response that is experientially understood by the receiver.

Zillman's (1996) second proposition is concerned with the strength of relationship between the arousal-inducing event(s) and the secondary stimuli to which the excitation is attributed. ETT does not propose a multiplicative effect; instead, the magnitude of excitation, as it exists at the point of transfer, will be directly applied to the individual's appraisal of the secondary stimulus. After transfer, arousal will diminish on an ongoing basis until it dissipates in entirety.

The third conceptual proposition of the ETT relates explicitly to the transfer period interrelating initial and secondary stimulus conditions. According to Zillman, the period of time that arousal is available for transfer and its strength once transferred is conditional on two factors. First, the magnitude of the excitatory reaction must be considered. Obviously, not all conditions invoke the same degree of arousal. For instance, a television sitcom and an action movie may both encourage arousal within a given individual. However, the amount of arousal invoked is dependent upon a host of

variables, including the amount of interest paid to stimuli, personal likes and dislikes, viewing environment, and individual differences (discussed below). Second, the rate that arousal decays is not fixed (e.g., Cummins, Wise, & Nutting, 2012; Mattes & Cantor, 1982; Zillman, Hoyt, & Day, 1974). Instead, the speed of decay is likely contingent upon the rate in which individual physiological cues (e.g., heartbeat) disappear (e.g., Cantor, Zillman, & Bryant, 1975; Zillman, 1979; Zillman, Johnson, & Day, 2000).

The relationship between individual, physiological characteristics and arousal outcomes is most explicitly handled in Zillman's fourth proposition. Because sympathetic reactivity is a primary driver of emotional intensity, it logically follows that cardiorespiratory fitness both prevents excessive excitatory reactions and encourages timely regulation of arousal. Indeed, Zillman (1996) considered cardiovascular shape as a "trait-like condition" that "exerts a considerable degree of sympathetic activity" (p. 253). In addition to physiological factors, personality factors have also been correlated with the arousal tendencies. Using Eysenck's notion of emotionality (e.g., Eysenck, 1967), Fahrenberg (1975), Eysenck and Eysenck (1985), and Myrtek (1984) have previously identified associations between activation tendencies and neuroticism. Others (e.g., Klonowicz, 1987) have demonstrated a link between trait reactivity and individual proneness to arousal.

Summing up, the ETT explains the conditions in which excitement generated from an antecedent stimulus may be applied to a subsequent stimulus. Drawing on Mattes and Cantor's (1982) formulation, excitation transfer can be understood as a three-phase process. In phase I, people are aroused by an exciting experience and attribute their arousal and are cognizant of the source from which their arousal originates. In phase II,

41

obtrusive physical (also known as *interoceptive*) cues such as elevated heart rate recede.

However, the individual is still physiologically aroused (when compared to normal

functioning), which leads them to lose awareness of the source of their arousal. As such,

reactions to subsequent stimuli are intensified. In the third phase, arousal is gone and the

previously aroused individual correctly recognizes that he or she no longer in a state of

arousal.

Broadly speaking, physiological arousal specifically refers to arousal generated

from activities requiring physical exertion while emotional arousal is generally thought of

as arousal elicited from interaction with interpersonal or media stimuli. In both cases,

arousal has physical effects (as described above). And, as pointed out by Gorn, Pham,

and Sin (2001), emotionally and physiologically derived arousal is thought to impact

interactions with subsequent stimuli in an identical fashion. This notion has been verified

by a number of studies (see Reisenzein, 1983 for review). For instance, White, Fishbein,

and Rutstein (1981) observed that emotional and physiological arousal, in a non-

discriminable fashion, influenced male participants' liking of a female target.

Outcomes of Excitation Transfer in Relation to Media Use

Up to this point, the effects of excitation transfer have been discussed in very

general terms. As illustrated above, the ETT posits that arousal elicited from one source

is transferred to the emotional response attributed to a subsequent stimulus. And, as

delineated, for transfer to occur, the secondary state must be emotionally unambiguous

(i.e., the prevailing circumstances must elicit a specific emotional response). However,

this discussion fails to identify any salient outcomes that can arise due to excitation

transfer. Accordingly, the purpose of the below discussion is twofold: first, previous

42

research, specifically on the use of ETT in mediated contexts, is discussed. Second, upon providing substantial discussion of the ETT as a media effects theory, the relationship between excitation transfer and persuasive messaging is considered.

ETT as a theory of media effects

Although the ETT was originally formulated for the purposes of appraising emotional reactivity in interpersonal interactions (Zillman, 2008), the theory has been applied robustly to the study of the media. Because excitation transfer research developed, in part, to "address concerns about the impact of media violence on users' hostility," (Bryant & Miron, 2000, p. 45), the ETT has often been used to explain anti-social outcomes associated with media exposure. For example, Anderson's general aggression model (GAM) (e.g., e.g., Anderson, Gentile, & Buckley, 2007), arousal serves as an emotional lubricant that helps foster short-term, anti-social effects. However, it should be noted that there is nothing inherent within the ETT that establishes it as a theory of *negative* media effects. In fact, as pointed out by Zillman (2008), the ETT treats excitation to the sympathetic nervous systems "as hedonically neutral" and such that the "function of this excitation is to energize the organism to act on vital conditions. Pleasure or displeasure associated with such actions is determined by cognitive processes" (para. 4).

The ETT has been used to better understand the relationship between mediated texts and emotional outcomes in a diverse array of contexts, including the use of exemplars in journalism (e.g., Brosius, 2000; Brosius, 1999; Gibson & Zillman, 1994; Zillman, Gibson, Sandar, & Perkins, 1996), the cognitive effects of prolonged erotica use (e.g., Zillman, 1984; Zillman, 1989; Zillman & Bryant, 1986; Zillman, Bryant, Comisky,

& Madoff, 1981), enjoyment of music and music videos (e.g., Cantor & Zillman, 1983;

Zillman & Mundorf, 1974), humor appreciation (e.g., Cantor, Bryant, & Zillman, 1974),

advertising effectiveness (Mattes & Cantor, 1982), and the effects of violent media (e.g.,

Anderson, 2004; Carnagey, Anderson, & Bartholow, 2007; Felson, 1996; Zillman,

1971; Zillman, 1979). Common to all of these perspectives is the notion that arousal

originating from a mediated source has the potential to result in disproportionate

responses to one's "current circumstances" (Bryant & Miron, 2003, p. 35), be those

current circumstances subsequent mediated interactions or provocations in the

interpersonal realm.

Previous research has applied ETT to the study of video games, particularly

games that are violent in nature. This robust application of the ETT to video game play is

undoubtedly linked to Anderson's inclusion of ETT in the GAM (e.g., Anderson, Gentile,

& Buckley, 2007; Anderson, et al., 2004; Bushman & Anderson, 2002; Lindsay &

Anderson, 2000). The GAM describes a "cyclical, dynamic pattern of interaction between

a person and the environment or situation in which he or she lives" (Weber, Ritterfeld, &

Kostygina, 2006, p. 353). Although not exclusively designed to describe the effects of

video game play, the GAM is regularly used to explain the effects associated with

gaming. The GAM offers two sub-models of violent effects. The first sub-model, the

single-episode model, describes short-term effects that result from input variables such as

exposure, aggressive cues, provocation, and frustration. The second sub-model, the

multiple-episode model, states that exposure to violent effects via the media cumulatively

and continuously teaches people to think and act in violent ways (Weber, Ritterfeld, &

Kostygina, 2006). The transfer of arousal plays a role in each sub-model. In the case of

the single-exposure model, the GAM holds that violent video game play is an especially realistic form of mediated violence. As such, gameplay initiates arousal, which can be autonomously applied to any social interactions that may occur in the period before full arousal decay. In the multiple episode iteration of the GAM, each individual violent-media episode is a "learning trial" (Anderson & Bushman, 2001, p. 355) in which users are taught to act violently. In the cases of repeated exposure, negative emotional response resulting from media exposure habituates, effectively de-sensitizing users to violence (Bushman & Huesmann, 2006). Once habituated, the GAM holds that misattributions of anger or arousal are more likely to manifest to provocations that occur in day-to-day life (Weber, Ritterfeld, & Kostygina, 2006).

The impact of arousal on persuasive messages

Despite the fact that arousal transfer is often associated with negative outcomes, the ETT's predictive orientation, as outlined above, is context-dependent. Indeed, according to Lloyd and Clancy (1991), researchers studying the misattribution of residual arousal have found evidence of the ETT as both a negative and positive effects hypothesis. For instance, Tavassoli, Schultz, and Fitzsimmons' (1995) used a sample of 86 undergraduate students to experimentally explore the relationship between involvement with television programming and audience memory and attitude toward commercials served immediately after the program's conclusion. The study's results found that memory performance increased as viewer involvement increased from low to moderate levels but decreased when involvement reached high levels. Similarly, Bryant and Comisky (1978) found that high arousal elicited from an antecedent stimulus (television program) was negatively related to recall of a subsequent message. Within the

context of an action-adventure television program, the authors used four treatment

groups: (1) a commercial was placed between two moderately involving portions of the

program; (2) a commercial was placed immediately after a highly involving climax and

immediately before the program's moderately involving resolution; (3) a commercial was

placed immediately subsequent to the program's resolution; and (4) a commercial was

placed between two minimally involving portions of the control communication. The

same commercial content was used in all treatment groups. The results of the study

indicated that recall was diminished when placed immediately after stimulus content with

high excitatory potential.

Conversely, a number of studies have found support for the notion that the

effectiveness of persuasive messages is increased when such messages are delivered

subsequent to a mediated stimulus with high excitatory potential. According to Cantor,

Mody, and Zillman (1974), it may be the case that arousal results internal (i.e.,

psychological) distraction which, in turn, inhibits "assumed covert counterarguing against

the communicator's reasoning" (p. 232). In an experiment consisting of 30

undergraduate students, Mattes and Cantor (1972) exposed half the sample to a highly-

arousing segment of a television program and half the sample to a segment with

comparatively low arousal potential. Afterwards, each respondent was exposed to a series

of five non-controversial television commercials. The authors found that subjects who in

the high-arousal condition were significantly more likely to favorably rate the

commercials than those that were subject to the low excitatory condition. However, in

assessing recall, no differences were found between conditions, suggesting that attitudinal

functions and recall functions may be impacted differentially. In a separate experiment,

Sanbonmatsu and Kardes (1988) tested the effects of physiologically-derived arousal (high vs. moderate levels of arousal elicited by an exercise task) on advertisements with differing levels of endorser status (celebrity vs. non-celebrity) and argument strength (strong vs. weak). The results of the study indicated that celebrity endorsements were more influential under high arousal conditions while argument strength had a comparatively stronger impact under moderate arousal conditions. Using the logic of the elaboration likelihood model, the authors concluded that "high arousal levels reduce the amount of processing capacity available for elaborating…Consequently, peripheral cues that require little processing capacity have a stronger effect…Conversely, information that requires a considerable amount of processing capacity" (p. 383) has a greater effect in moderate arousal conditions.

Adding a further lack of clarity to the issue, a number of studies have failed to identify any discernable relationship between misattributed arousal and persuasive message effectiveness. For example, in Cantor, Mody, and Zillman's (1974) study of 60 female undergraduate students, the authors used a 2 x 2 factorial design to explore residual arousal as an a distractor of persuasion. Subjects were exposed to persuasive communication on gun legislation after being subjected to video clips that varies in terms of (1) excitatory potential and (2) hedonic tone. Analysis of the data failed to find differences in participant recall of the persuasive message on the basis of excitatory potential. The authors did, however, find an un-hypothesized relationship between hedonic tone and message acceptance such that participant attitudes toward the message where higher under conditions of negative hedonic valence.

Given the observed variability in the relationship between arousal and persuasive message effects, the following section introduces the notion that misattribution of arousal generates a specific gravity that encourages *selective* processing of information.

Selective/Limited Processing Models

A number of processing theories either directly or indirectly indicate that an individual in a state of arousal is likely to engage in selective processing. Early hypotheses, such as those extended by Easterbrook (1959), Broadbent (1971), Kahneman (1973), and Hasher and Zacks (1973) generally contended that heightened arousal leads to heightened levels of "attentional selectivity " (Sanbonmatsu & Kardes, 1988, p. 379). This notion was subsequently incorporated into the elaboration likelihood model (ELM). The ELM (e.g., Petty, Cacioppo, & Schuman, 1983; Petty & Cacioppo, 1986a; Petty & Cacioppo, 1986b) holds that individuals who have low abilities to process information are likely to take a peripheral route to persuasion, thereby relying on simple, immediately available cues (i.e., endorser status, visually perceptive information, bold performance claims) to form evaluations. Alternately, individuals with robust capabilities for information processing are more likely to take a central route to persuasion in which they will, theoretically, carefully examine a stimulus for the purposes of evaluation (Pham, 1996). If, as suggested by some of the literature (Eysenck, 1982; Humpreys & Revelle, 1984; Sanbonmatsu & Kardes, 1988), arousal facilitates cognitive *narrowing*, it would thus hold that arousal results in a net reduction of processing capacity which, in turn, should increase the influence of peripheral cues and thus decrease the influence of cues that require in-depth processing (Pham, 1996). This contention was directly explored by Sanbonmatsu and Kardes (1988). The authors randomly assigned 136 participants to one

48

of eight conditions in a 2 (moderate/high arousal) by 2 (weak/strong argument) by 2 (unattractive non-celebrity/attractive celebrity endorser) experimental design. The results of the study indicated that endorser status (conceived of as requiring little processing capacity) had a stronger influence on brand attitudes under high rather than moderate arousal conditions whereas argument strength (conceived of as requiring involved processing) had a stronger influence on brand attitudes under moderate rather than high arousal conditions.

Another processing theory with implications related to the relationship between information processing and arousal is the limited capacity theory of mediated messaging processing (LC4MP) (e.g., Lang, 2006; Lang, 2000; Lang et al., 2007). As described by Lang (2000), the LC4MP has two primary assumptions:

> First, people are information processors. A major task that people engage in is the processing of information. The basic parts of information processing are to perceive stimuli, turn them into mental representations, do mental work on those representations, and reproduce them in the same or in an altered form. Second, a person's ability to process information is limited. Processing messages requires mental resources, and people have only a limited (and perhaps fixed) pool of mental resources. You can think about one thing, or two, or maybe seven, at the same time, but eventually all your resources are being used, and the system cannot think yet another thing without letting a previous thought go. (p. 47)

As it relates to arousal, the LC4MP aligns with predecessor approaches to processing in its prediction that if arousal is elicited, it will necessarily result in the allocation of processing resources to high priority stimuli at the expense of attention to information with lower priority (Lang et al., 2004).

A third perspective that similarly understands arousal as a narrowing force is Pham's (1996) selective processing and representation hypotheses. Here, Pham posited

49

that "aroused consumers first attempt to cope with their impaired capacity by selectively processing certain cues at the expense of others" (p. 374). Specifically, the selective processing hypothesis holds that consumers in aroused states will selectively process cues that have high information value at the expense of cues that are perceived to have comparatively less informational value. The representation hypothesis, for its part, holds that the influence capacity-demanding cues (i.e., complex product claims) will be diluted in favor of less demanding cues. That is, claims that are objectively strong may be encoded as weaker than actually are while claims that weak may be encoded as stronger than they objectively are. Taken together, the selective and representation hypotheses predict that cue processing is determined on the basis of a cue's diagnosticity and its processing demand. Diagnosticity refers to degree to which a cue allows for consumers to readily discriminate it from other bits of information in the message and, secondly, the receiver's processing goals. In his explication of the selective and representation hypotheses, Pham argued that the two dimensions of cue processing (diagnosticity and processing demand) are usually confounded in studies that contrast "peripheral cues and central claims" (p. 375).

Finally, the arousal-based competition theory (ABC) is a recently developed perspective specifically designed in order to address the selective effects on memory (Mather & Sutherland, 2012). In their initial explication of the theory, the authors (Mather & Sutherland, 2011) identified five prominent characterizations of the relationship between arousal and memory: (1) arousal leads to memory narrowing, or prioritization of central details at the cost of peripheral detail; (2) arousal enhances memory for gist but not detail; (3) arousal increases memory of an object's features but

does not enhance memory of associations between items; (4) arousal increases retrograde amnesia such that individuals remember aspects of an event but not the events occurring immediately beforehand; and (5) arousal intensifies memory of emotionally-charged stimuli but not neutral stimuli. Unsurprisingly, these differing assumptions regarding the role of arousal on memory performance have resulted in a literature that is neither conclusive nor consistent.

In light of such inconsistencies, the purpose of ABC was ostensibly to "address the puzzling discrepancies that have been observed across studies" (Mather & Sutherland, 2012, para. 7). The ABC holds that emotional arousal exacerbates competition between stimuli for mental resources. This creates what Mather and Sutherland (2011; 2012) call a *winner-take-more* scenario in that high priority stimuli are awarded increased processing resources while low priority stimuli are allocated only those resources not allocated to high priority stimuli. Placed differently, perception that occurs during a state of arousal is biased in favor of stimuli that are perceptually conspicuous or otherwise goal-relevant (Mather & Sutherland, 2011). This bias subsequently results in enhanced memory consolidation of details relevant to conspicuous stimuli.

The difference between high and low priority stimuli is essential to understanding ABC. Stimuli priority can be ascertained on the primary basis of either (1) bottom-up sensory influences or (2) top-down cognitive factors. Within ABC, bottom-up route to priority is accomplished via perceptual contrast. According to Nothdurft (2000), perceptive contrast is a visual phenomenon that occurs when a target object saliently differs from its context in terms of orientation, motion, luminance, color-contrast, or some pairwise combination of such factors. In the case of top-down stimulation, the ABC

51

predicts that arousal will positively boost perception of a high contrast item while simultaneously inhibiting memory of the surrounding, low-contrast items. The second route that a stimulus can take to priority status is the so-called top-down path. Here, top-down cognition is that cognition associated with goals, expectations, and knowledge. Stimuli that are relevant to current goals are prioritized over less relevant stimuli (Johnson M. R. & Johnson, M.K., 2009; Mathers & Sutherland, 2011; Walther & Koch, 2007). Other, less primary factors that impact the priority assigned to a given stimuli include surprise, emotional relevance, and social relevance. In the current context, emotional relevance is of special importance. Previous research shows that emotional stimuli are more readily recognizable than neutral stimuli (e.g., Brosch, Grandjean, Sander, & Scherer, 2009; Brosch & Van Bavel, 2012; Calvo & Nummenmaa, 2008). In the lens of ABC, arousal further heightens this already-extant tendency to prioritize emotional stimuli (Mathers & Sutherland, 2012).

The above paragraphs delineate ABC's propositions as they relate to the effects of arousal on encoding. In addition to encoding, however, ABC makes a number of predictions related to memory consolidation. According to Dudai (2004), memory consolidation can be understood as the "the progressive postacquisition stabilization of long-term memory" (p. 52). Consolidation can be understood in both synaptic consolidation and systems consolidation. Synaptic consolidation refers to memory stabilization (i.e., committal) in the "first minutes to hours after the encoding has occurred or practice ended" (p. 54). Conversely, systems consolidation is long-term memory that can take weeks, months, or years to consolidate. ABC holds that arousal can actually facilitate post-encoding consolidation, especially for items or events that are

52

emotional in nature. Notably, this work is primarily concerned with ABC's predictions as they relate to encoding process (rather than the consolidation process).

Summary of Study Rationale

       This section describes the core propositions that constitute the rationale underlying the current work. Taken together, these propositions serve as the foundational motivations and principles upon which this work was built. Given the multi-study nature of the current project, individual hypotheses are not described in this section. Instead, localized hypotheses are provided as part of the description of each sub-study provided in Chapter IV. However, each of the hypotheses provided in Chapter IV are resultant of the propositions described below.

Video games are an increasingly popular form of entertainment.

       Comparatively, the video game industry is larger than either the global film industry or the global music industry (Farrand, 2007; Reuters, 2011). In 2010, consumers in the United States spent approximately $25 billion (USD) on game consoles, peripherals, and software (Enterbrain, 2010; NewZoo, 2010). According to a 2011 report released by the technology research firm Gartner Inc., the industry is projected to grow at an annual compound rate of 24%. Quite rightly, marketers, advertisers, and health communicators have identified video games as a fruitful arena for resource allocation. However, and despite the burgeoning allocation of marketing and advertising resources to video game platforms (eMarketer, 2007), relatively little effort has been spent examining video game environments as a means to deliver persuasive messages on matters related to personal health and social well-being.

While much research has been conducted in-game placement of advertisements, research has yet to meaningfully explore the effectiveness of post-scroll messaging.

A substantial body of research has explored the viability of in-game advertising/message delivery as a mechanism to deliver branded and/or persuasive messaging. The results of these studies, at best, have offered mixed support for the notion that in-game advertising's ability to elicit positive attitudinal, behavioral, or recall outcomes. M. Nelson (2002), for instance, found that recall of brands shown during gameplay was contextually dependent on a number of individual and external factors. Gangadharbatla (2006) found that brand name recall was better for people watching video games than it was for those actually playing the game. M. Yang, Roskos-Ewoldsen, Dinu, and Arpan (2006) found that respondents subjected to in-game advertising had low levels of explicit recall and primarily moderate levels of implicit recall. Yoo and Pena's work (2001) suggested that violent video games may inhibit player attitude toward the brand and recall capabilities, and further, that this effect may be especially pronounced in females. Choi and Lee (2012) found that in-game advertisements' ability to persuade was largely dependent on character presence and product type. Van Reijmersdal, Jansz, Peters, and van Noort (2010) used a sample 2,453 girls between the ages of 11 and 17 to test the effect of interactive brand placements in video games. The authors found that interactive brand placement in the game resulted in more favorable attitudes toward the game, higher top of mind awareness of the brand, more favorable brand images, and more favorable behavioral intentions. The strength of this effect, however, diminished with age and prior experience with the brand.

Clearly, as outlined above, to-date research has failed to reach any real consensus on the efficacy of in-game message delivery. And, research that has identified favorable sender-side results has broadly failed to explicitly and concretely describe the conditions and psychological mechanisms that underlie observed outcomes. Thus, there exists cause to explore whether post-scroll message delivery can be a comparatively fruitful means of delivering in-game messages than in-game product placement/message delivery. As discussed above, post-scroll message delivery can be understood as a message, embedded within a given video game environment, which is delivered immediately a gaming session concludes.

> ***FPS games are a particularly popular among individuals (particularly male) aged between 17 and 35. These demographic clusters are also the most likely to engage in violent behaviors.***

Industry statistics indicate that FPS games are the most popular video game genre. In 2012, over 20% of all games sold were FPS games. Of the top 10 best-selling games of 2012, 4 of those games were FPS games (Entertainment Software Association, 2013). Moreover, the largest to-date worldwide *media* launch was a FPS game. Specifically, in late 2011, Activision Blizzard released the latest version in its *Call of Duty* franchise, *Call of Duty: Modern Warfare 3.* The game's sales $775 million dollars in its first five days of releases, shattered the previous record set by *Call of Duty: Black Ops,* which sold more than $650 million in the same timeframe in November of 2010. In his synopsis of *Modern Warfare's* initial week performance, Activision Blizzard Chief Executive Bobby Kotick said that "we believe the launch of Call of Duty: Modern Warfare 3 is the biggest entertainment launch of all time and we achieved this record with sales from only two territories [North America and Europe]" (PRNewswire, 2011).

Although video games are played by nearly every social demographic (in the United States, at least), FPS games are particularly popular among individuals (particularly male) aged between 15 and 35 (e.g., Jansz & Tanis, 2007; Montag et al., 2011; Lenhart, 2009). Moreover, according to the United States Bureau of Justice, the demographic segments most likely to commit violent crimes such as murder, assault, forcible rape, and violent robbery are men between the ages of 17 and 34 (Snyder & Mulako, 2013). Irrespective of the debate regarding whether violent video games cause violent behavior, FPS games present an ideal platform for the delivery of pro-social anti-violence messages to the members of society that are *most* at-risk of perpetrating violent crime.

> ***FPS video game manufacturers have an obvious and inherent interest in exploration of the viability/effectiveness of post-scroll, anti-violence messaging.***

In the wake of the Newton, CT school shooting, NRA executive president Wayne LaPierre issued a statement in which he argued that violent video games were a primary culprit for gun violence in the United States (2013). In perhaps deliberately incendiary terms, LaPierre claimed that "there's another dirty little truth that the media try their best to conceal: There exists in this country a callous, corrupt and *corrupting* shadow industry that sells, and sows, violence against its own people. Through vicious, violent video games with names like *Bulletstorm*, *Grand Theft Auto*, *Mortal Kombat* and *Splatterhouse*" (2012, para. 15). This pattern of assigning blame to media use in the wake of large-scale social tragedies is not new. Bezio (2013) described the tendency to blame emergent media environments, such as video games, in terms of a *cultural lag*. That is,

56

when seeking to explain seemingly unexplainable behavior, blame gets cast on new technologies or media climates. To wit:

> Before video games, society blamed rock 'n' roll for violence and bad behavior among young people. Before rock 'n' roll, we blamed television. Before television, movies. Before movies, mystery novels, which were once known as "penny dreadfuls." Before mystery novels, Shakespeare who repeatedly was accused of producing violent, lecherous, and otherwise improper behavior in his audience. (para. 8)

Given the tendency to blame video games for violent social outcomes, the video game industry has a vested interest in exploring ways to present its product in socially beneficial terms while simultaneously retaining the product characteristics that are desirable to consumers. Post-scroll messages featuring socially responsible content may offer such possibility. Of course, in practical terms, if these messages are too obtrusive in nature, they run the risk of eliciting negative feelings toward the game as a whole. Accordingly, it is of practical interest to this study to explore the impact, if any, that post-scroll messages have on user attitudes to the overall gameplay experience.

Following the propositions established by ETT, there exists the possibility that arousal elicited during gameplay will be transferred to any message served in the period immediately after gameplay concludes.

Previous research has shown that video games generate physiological arousal in video game players (e.g., Anderson & Bushman, 2001; Fleming & Rickwood, 2001; Gangadharbatla, 2008; Jeong & Biocca, 2012; Tafalla, 2008). Moreover, review of the available literature indicates that video games of a violent nature (e.g., FPS games) may result in comparatively higher levels of arousal than non-violent games (e.g., Adachi & Willoughby, 2011; Anderson, 2004; Anderson, Gentile, & Buckley, 2007; Barlett, Branch, Rodeheffer, & Harris, 2009; Barlett, Harris, & Baldassaro, 2007). The excitation

transfer theory holds that arousal elicited from one media stimulus may be transferred to any stimulus experienced in the period directly following initial exposure. Specifically, as posited by Zillman (1996), "any excitatory reaction late in the escalation sequence can be considered to ride the tails of all earlier excitatory reaction" (p. 251). As such, it was the expectation of the current work that message delivery (i.e., post-scroll messaging) would occur while players are in a state of arousal.

> *As in the case of any persuasive message, reactance presents a serious obstacle to successful message delivery. This obstacle is heightened by the presence of arousal, which has been shown to heighten negative reactions to secondary stimuli.*

Reactance can be understood as a motivational state that emerges when a persuasive message threatens to remove or alter a perceived freedom (Brehm, J. W. 1966). According to J. W. Brehm & S. S. Brehm (1981), the degree to which state reactance is experienced depends on the magnitude of the threat, the relative importance of the threatened freedom, and an individual's tendency to experience reactance (i.e., dispositional or trait reactance). Once sufficiently motivated, individuals may seek to restore threatened freedoms through a number of means, including expressing independence behaviorally, cognitively, or emotionally (J. W. Brehm & S. S. Brehm, 1981; Quick, 2005). According to Quick (2005), reactance restoration is generally observed by assessing post-message attitudes, behavioral intentions, and source evaluation as they pertain to the behavior or position advocated for in the persuasive message.

Separately, and as discussed above, the misattribution of previously elicited arousal shown to intensify emotional responses (be they positive or negative) to subsequently experienced stimulus. Given that reactance is thought to be a combination

58

of anger and negative cognitions (Dillard & Shen, 2005), it thus follows that the cumulative effects of arousal and reactance will lead to the heightened likelihood that one feels his or her freedom is threatened and, subsequently, expresses attitudes, behavioral intentions, or emotions contrary to the position advocated by the persuasive message. Notably, and despite the semantic congruity between game content and message content (Cummins, Wise, & Nutting, 2012), the current study assumed - in accordance with ETT- that participants would not *consciously* refer to media-induced arousal when evaluating the message. This assumption was made on the following bases. First, there was the expectation that task disparity between game play and message evaluation would adequately suppress obtrusive cues directly linking residual arousal to the previous, arousal-inducing event (i.e., game involvement). Second, it was assumed that excitatory potential of the game environment, although quite high, would not result in the onset of interoceptive cues obvious to the participant. Third, there was the expectation that even if participants elaborated in such a fashion that they connected attitudes toward the game play environment with attitudes toward the message on the basis of the semantic congruity between the stimuli, such elaboration would not involve consideration of his or her physiological arousal.

> ***Conversely, if reactance can be avoided, latent levels of arousal should help facilitate a number of favorable effects, including increased message involvement, favorable attitudinal outcomes, and increased likelihood of behavioral response.***

This work is underscored by the belief that arousal, in and of itself, is emotionally neutral (e.g., Schachter & Singer, 1962). While predictive frameworks such as the GAM (e.g., Anderson, 2004; Anderson & Bushman, 2001; Anderson, Carnagey, Flanagan, Benjamin, Eubanks, & Valentine, 2004) generally tend to see arousal as lubricant for

either anti-social or polarization (e.g., Brown & Curhan, 2013; Storebeck & Clore, 2008) effects, research in other areas has broadly indicated that arousal can help facilitate a number of desirable sender effects, including fostering favorable advertisement evaluations (Gorn, Pham, & Sin, 2001; Mattes & Cantor, 1972), processing of diagnostic cues in persuasion attempts (Pham, 1996), reduction of counter-arguing (Cantor, Moody, & Zillman, 1974), the increased effectiveness of celebrity endorsements (Sanbonmatsu & Kardes, 1988), quicker decision-making speed (Hackely & Valle-Inclan, 1999), and enhanced long term memory (Storebeck & Clore, 2008; Mather & Sutherland, 2011; 2012).

Central to understanding the effects of arousal on message evaluation is the idea that arousal facilitates the selective processing of information. This notion of arousal-induced selectivity has been articulated in a number of ways. Pham (1996) advanced the idea that high levels of arousal induce the selective processing of diagnostic message cues at the expense of non-diagnostic cues. This so-called *selectivity-processing hypothesis* built upon earlier observations that induced arousal tended to encourage attention narrowing (e.g., Eysenck, 1982). The *selectivity-processing hypothesis* was later updated to include an ad's affective valence as an important contingent factor (Gorn, Pham, & Sin, 2001). Working directly in the realm of memory consolidation, Mather and Sutherland (2011; 2012) similarly proposed the ABC model wherein arousal results in the selective consolidation of information into both short and long term memory. Much like other theoretical perspectives illustrating the selective effects of arousal on message processing/involvement, Mather and Sutherland's model describes a "winner take more, loser take less" scenario in which central detail is committed to memory at the expense of

60

less salient information. It thus follows that persuasive messages that are designed to emphasize central, diagnostic detail in a context that minimizes state reactance can fruitfully capitalize on the receiver's aroused condition to affect persuasive goals related to attitudes, memory, and behavior.

Having introduced, described, and summarized the applied (Chapter I) and theoretical (Chapter II) rationales underlying the current study, the following Chapter III introduces the general methodological approach used to test this work's core propositions.

CHAPTER III

METHOD

This chapter provides a very broad overview of the methodological approach used to test the theoretical assumptions associated with the current project. Given the multi-study nature of the current work, granular detail related to each study's procedure, stimulus development, recruitment/sampling techniques, measurement properties, missing data procedures, analytic strategy, and empirical findings are provided in Chapter IV. This Chapter III is organized as follows. First, detail related to the general methodological approach is provided. Second, the main and associated sub studies are introduced. Third, discussion of the psychometric measures used in this dissertation is provided. Fourth, power estimations, for the purposes of recruitment goals, are reported. Fifth, considerations guiding stimulus development are discussed. The chapter concludes by briefly describing details related to the current work's analytic approach.

General Methodological Approach

As the current study was experimental in nature, the general methodological approach used to guide the current work was taken from Thorson, Wicks, and Leshner (2012). Specifically, the authors outline seven attributes of "well-executed experiments" (p. 113). These seven attributes are:

> 1. Explication of the theory being tested and clear explanation of the proposed interrelationship(s) between variables;
>
> 2. Description of how the experimental design will demonstrate causal relationships between variables;
>
> 3. Clear, precise, and explicit conceptualization of media stimuli;
>
> 4. Clear identification of all relevant hypotheses/research questions;

5. Description of the sample, its characteristics, and limitations;

6. Specification of effect size, power, and number of participants, and selected alpha level(s);

7. Consideration and empirical assessment of alternative explanations.

The above attributes have been integrated into the current document in the following ways. First, relative to the theoretical explication of variable interrelationships, I include, as part of Chapter II, substantive discussion of my expectations relevant to the relationships among variables of interest to the current work. Moreover, these contentions are empirically tested in several of the main and sub-studies described in Chapter IV. Second, as it relates to description of the media and message stimuli used in the current study, I offer explicit discussion of all operationalization decisions/procedures in this chapter (Chapter III), Chapter IV, and in Appendices A through D. Third, as a means of offering the most targeted hypotheses possible, this document contains a broad theoretical rationale in Chapter II; this rationale is clearly explicated in study-specific hypotheses associated with each main and sub-study described in Chapter IV. Fourth, each study described in Chapter IV includes substantive description of recruitment techniques and sample characteristics. Fifth, for each study, power calculations, sample size goals, and alpha levels were specified on an *a priori* basis (Chapter III). Moreover, each significant result reported in Chapter IV is accompanied by an effect size estimate. Sixth, Chapters 4 and 5 together provided empirical assessment and discussion of viably alternative explanations in the case of both supported and null results.

Study Overview

   To test the theoretical assertions underlying the current study, I employed a series

of two fully randomized experiments, each with a number of associated pilot and pre-

tests. Table 4 summarizes the studies employed as part of the present dissertation.

Table 4. Overview of the studies reported in Chapter IV

Study Name	Purpose	Sample Population
Pilot Test 1 (PT1)	The purpose of PT1 was to pilot test the message proposed for use in Main Experiment 1	Participants were recruited from Amazon Mechanical Turk (convenience sample)
Pre Test 1 (PRT1)	The purpose of PRT1 was to confirm that the message tested in PT1 elicited the desired reactance states among respondents sample from the population of interest.	Participants were undergraduate students recruited from the University of Oregon (convenience sample)
Pre Test 2 (PRT2)	The purpose of PRT2 was to further confirm that the message tested in PT1 and PR1 elicited the desired reactance states among a sample drawn from the population of interest. Additionally, PRT2 directly tested the contention that video game play provoked a comparatively aroused state among participants. Finally, PRT2 tested theoretical assumptions related to the combined effects of state reactance and arousal on message evaluation.	Participants were undergraduate students recruited from the University of Oregon (convenience sample)
Main Experiment 1 (ME1)	The primary purpose of ME1 was to test the basic contention that arousal in conjunction with messages containing low reactance potential would result in favorable attitudinal and behavioral outcomes when compared to those who evaluated a high reactance potential message and those who did not evaluate a message.	Participants were undergraduate students recruited from the University of Oregon (convenience sample)

Pilot Test 2 (PT2)	The purpose of PT2 was to pilot test the message proposed for use in Main Experiment 2.	Participants were recruited from Amazon Mechanical Turk (convenience sample)
Pre Test 3 (PRT3)	The purpose of PRT3 was to confirm that the message tested/ in PT2 elicited the theoretically hypothesized effect among a sample drawn from the target population. PRT3 also explored the effects of cue saliency and participant numeracy on reactance formation and participant recall abilities.	Participants were undergraduate students recruited from the University of Oregon (convenience sample)
Main Experiment 2 (ME2)	The purpose of ME2 was to test the individual and combined effects of cue saliency and reactance potential on state reactance formation, message evaluations, message effects, and participant recall. Additionally, the influence of biological sex was explored.	Participants were undergraduate students recruited from the University of Oregon (convenience sample)

Measures

This section introduces the measures used in the above-described studies. Complete wording for each measure/indicator is included in Appendix B. The variables are grouped by the role that they played in the current work (i.e., dependent variables, independent variables, potential confounds/covariates) and are described in alphabetic order.

Dependent Variables

Arousal. Self-reported arousal was measured using six items, adapted/developed from Gorn, Pham, & Sin (2001; alpha not reported). Each item was placed on a seven-point semantic differential scale. Self-reported arousal was measured PRT3 and ME2.

Attitude toward the game. Attitude toward the game was measured using six items, all placed on seven-point semantic differential scales. Attitudes toward the game were measured in ME1 and ME2.

Attitude toward the message. Six semantic differential items, developed from Anghelcev and Star (2011; their alpha = .82) and Goodall and Slater (2010; their alpha = .88), were used to measure attitude toward the message. Attitudes toward the message were measured in PRT2, PRT3, ME1, and ME2.

Attitudes toward the message-advocated behavior. Six semantic differential items were used to test attitudes toward the message advocated behavior (i.e., learning more about ways to reduce violence in the community). All items were placed on seven-point semantic differential scales. The behavioral attitudes measure was developed from previous scales employed by Rains and Turner (2007; their alpha = .87) and Miller et al., (2013; their alpha =.94).
Behavioral attitudes were measured in PRT2, PRT3, ME1, and ME2.

Anger towards the message. The anger component of reactance was measured using a four-item scale previously validated by Dillard and Shen (2005; their alphas = .92 and .94). All items were placed on five-point Likert-type scales in which 1 = strongly disagree and 5 = strongly agree. Message anger was measured in PT1, PT2, PRT1, PRT2, PRT3, ME1, and ME2.

Behavioral intentions. Behavioral intentions to perform activities consistent with those advocated by the message were measured using five items, all placed on seven-point Likert-type scales in which 1 = very unlikely and 7 = very likely. The index was developed from a similar measure used by Slater, Rouner, and Long (2006; their alpha =

66

.92) that contained three items. Behavioral intentions were measured in PRT2, PRT3, ME1, and ME2.

Behavior. A brief task was used to measure behavior. Specifically, participants were presented with the following prompt: *Do you want to join the Eugene Anti-Violence e-mailing list? This mailing list will provide you information about community events related to violence reduction. To join the e-mail list, you will need to provide your name, e-mail address, and local mailing address.* Respondents were instructed to choose from categories labeled *Yes, I am interested* and *No thank you, I'm not interested.* Notably, clicking "Yes" did not actually refer the respondent to a signup page. Behavior was measured in PRT2, PRT3, ME1, and ME2.

Freedom threat. Perceived freedom threat was measured using six items, all on seven-point Likert-type scales where 1 = strongly disagree and 7 = strongly agree. Four of the items were taken from Dillard and Shen (2005; their alphas across multiple studies = .83, .87) while the other two items were developed specifically for this study. Perceived freedom threat was measured in PT1, PT2, PRT1, PRT2, PRT3, ME1, and ME2.

Negative message relevant cognitions. Negative message relevant cognitions were measured using a modified version of the processes described by Cacioppo, von Hippel, and Ernst (1997) and, more recently, by Dillard and Shen (2005), Rains (2013), and Rains and Turner (2007). Specifically, respondents were asked to freely list their thoughts, as they related to the message, in a space provided within the questionnaire. These thoughts were then segmented into individual thought units. Next, affective thoughts were removed from the dataset using a list previously developed by Shaver et al., (1987). After removing the affective thoughts, negative, message-relevant cognitions

67

were identified and summed for each individual. Negative message-relevant cognitions were measured in measured in PRT2, PRT3, ME1, and ME2. To ensure external validity, a randomly selected subset of 20% ($n = 72$) of the total, pooled comments (i.e., all measured cognitions; $n = 361$) were double-coded by a trained coder who was blind to the study's purpose/goals; this double-coding focused specifically on (1) determination of individual thought units and (2) identification of message-relevant negative cognitions. Consistent with previous research (e.g., Dillard & Shen, 2005; Rains, 2013; Rains & Turner, 2007), intercoder reliability was assessed using pairwise agreement and Cohen's Kappa (Cohen, 1960). For number of individual though units, high inter-coder reliability was observed: pairwise agreement = 94.4%, $\kappa = .93$. For number of message-relevant, negative thoughts, acceptable levels of intercoder reliability were also observed: pairwise agreement = 84.5%, $\kappa = .76$.

Recall. A four-item aided memory task was used to measure participants' message recall capabilities. Each item presented participants with six options: the correct answer, four incorrect, albeit feasible, answers, and category labeled "I do not remember." Participants were only allowed to select a single option. Two of the questions asked participants to recall statistical/numeric information while two asked participants to recall text-based information. Participant responses were coded as either correct (1) or incorrect (0). The number of correct responses was then summed to single recall measure. Recall was measured in PRT3 and ME2.

State Reactance. State reactance was measured using the intertwined model (e.g., Rains, 2013). As noted in Chapter II, previous conceptualizations of the intertwined model of state reactance have been primarily, if not totally, estimated in a SEM

environment. However, sample size limitations associated with the current work prevented use of such techniques. As a means of approximating the intertwined model, a factor score using the negative cognitions and anger toward the message measures was computed using principal axis extraction with regression computation (DiStefano, Zhu, & Mindrila, 2009). This method of state reactance modeling was used in PRT2 and ME2.

Potential Confounds/Covariates

Numeracy. Notably, the message used in ME2 used several statistics to support its primary contentions. As current research suggests that individual numeracy levels may color participant responses to message containing numeric information (e.g., Forrow, Taylor, & Arnold, 1992; Hart, 2014; Schwartz, Woloshin, Black, & Welch, 1997), I sought to account for numeracy as a potentially confounding variable. To that end, an eight-item measure of numeracy was constructed using items taken from scales previously validated by Lipkis, Samsa, and Rimer (2001) and Frederick (2005). Respondents were not provided with multiple choices; instead they instructed to enter their answers into a blank space below each question. The number of correct answers was summed to create the measure. Numeracy was measured in PRT3 and ME2.

Presence. Presence was used to measure the degree to which participants were psychologically involved in the video game. Previous research suggests that involvement levels influence how people engage with interactive environments (e.g., Daugherty, Li, & Biocca, 2005; Lombard & Ditton, 1997), including the degree to which presented material is perceived as persuasive (e.g., Lombard & Snyder-Dutch, 2001). Accordingly, I controlled for video game presence as a potential confound. To measure presence, four items, all placed on seven-point Likert-type scales (1 = strongly disagree to 7 = strongly

69

agree) were used. These measures were adapted from previous research (e.g., Daugherty, Li, & Biocca, 2005; Kim, T. & Biocca, 1997; Klein, 2003; Witmer & Singer, 1998). Presence was measured in PRT2, ME1, and ME2.

Perceived game difficulty. Game difficulty was measured using a seven-point scale that asked subjects to indicate the degree to which they found the game challenging. Perceived game difficulty was measured in ME1 and ME2.

Previous experience with Counter-Strike. Participants were asked about how often they played video games. Response categories ranged from 1 = never to 8 = daily. Previous experience with Counter-Strike was measured in ME1 and ME2.

Subjective expertise with video games. The degree to which participants considered themselves experts playing video games was measured using three items, all on seven point sematic differential scales. Subjective video game expertise was measured in ME1 and ME2.

Subjective performance evaluation. Three items, developed specifically for the current study, were used to measure participants' subjective evaluation of their in-game performance. Items were placed on seven-point, semantic differential scales. All items were preceded with the clause "Given your previous experience/inexperience with the video game…". Subjective performance evaluation was measured in ME1 and ME2.

Trait reactance. Trait reactance was measured using 14 items, all taken from Hong and Faedda's (1996) inventory (their alpha = .80). All items were on seven point Likert-type scales such that 1 = strongly disagree and 7 = strongly agree. Trait reactance was measured in PT1, PT2, PRT1, PRT2, PRT3, ME1, and ME2.

Table 5 summarizes the source and previously observed alphas for each measure, as applicable.

Table 5. Summary of measures used across studies

Measure	Taken/Adapted From	Reported α
Arousal	Gorn, Pham, & Sin, 2001	Not reported
	Developed for current study	N/A
Attitudes toward game		
Attitude toward message	Anghelcev & Star, 2011;	.82;
	Goodall & Slater, 2010	.88
Attitude toward behavior	Rains & Turner, 2007	.87
	Miller et al.,	.94
Anger towards message	Dillard & Shen, 2005	.92, .94
Behavioral intentions	Slater, Rouner, & Long, 2006	.92
Freedom threat	Dillard & Shen, 2005	.83, .87
Negative cognitions	Caciopp, von Hippel, & Ernst, 1997	N/A
	Dillard & Shen, 2005	N/A
	Rains & Turner, 2007	N/A
Recall	Developed for current study	N/A
Numeracy	Lipkis, Samsa, & Rimer, 2001	.74
	Hart, 2014	.69
	Frederick, 2005	Not Reported
Presence	Kim, T. & Biocca, 1997	Not Reported
	Klein, 2003	.84
	Witmer & Singer, 1998	.81
Perceived game difficulty	Developed for current study	N/A
Previous *Counter-Strike* exposure	Developed for current study	N/A
Subjective video game expertise	Developed for current study	N/A
Subjective performance evaluation	Developed for current study	N/A
Trait reactance	Hong & Faedda, 1996	.80

Power/Sample-Size Estimations

For all proposed main and sub-studies, *a priori* power estimations were conducted as a means of establishing sample size. These power estimations were conducted using *G Power 3* (Faul, Erdfelder, Lang, & Buchner, 2007). Generally speaking, *a priori* power analyses offer only very rough estimates of ideal sample sizes in multivariate contexts. The assumptions underlying all power calculations were as follows: (1) all dependent measures had weak/moderate correlations; (2) all hypotheses testing would use a two-tailed alpha cutoff of $p < .05$; and (3) power (i.e., $1 - \beta$) was set at .80. Effect size classifications (i.e., small, medium, large) were based off of a composite of previous research probing state reactance effects (e.g., Dillard & Shen, 2005; Kim, S. Y., Levine, & Allen 2013; Rains & Turner, 2007; Quick, Scott, & Ledbetter, 2011) and generalized heuristics for effect size conventions (e.g., Cohen, 1988; Cohen, 1992). For sub-studies PT1, PT2, PRT1, effect size estimations were based upon use of the *t*-test family; for PRT2, PRT3, ME1, and ME2, effect size calculations were generated relative to use of the *F*-test family. The results of these power estimations are provided in Table 6.

Table 6. Power estimations for individual studies

Study Name	Small (Avg. cell *n*)	Medium (Avg. cell *n*)	Large (Avg. cell *n*)
PT1	176 – 64	61 – 25	20 – 14
PRT1	176 – 64	61 – 25	20 – 14
PRT2	123 – 45	42 – 24	23 – 15
ME1	144 – 53	49 – 23	21 – 18
PT2	176 – 61	58 – 22	20 – 14
PRT3	123 – 45	42 – 24	23 – 15
ME2	123 – 45	42 – 24	23 – 15

Based on the foregoing, *a priori* recruitment goals were set at 25 to 40 participants per study cell (i.e., enough participants to identify a medium sized effect).

Obviously, the ability to reach targeted recruitment goals (i.e., final sample sizes for each study) was determined by a number of practical and logistical issues, including but not limited to subject availability, subject no-shows, subject drop out, and technical difficulties. Attempts were made to recruit a similar number of participants across the studies as a means of ensuring that observed effects could be reasonably compared across main and sub-studies. Overall recruitment goals for each study are delineated in Table 7 below.

Table 7. Recruitment goals for each study

Study Name	Number of cells	Total Participants
PT1	2	50 – 80
PRT1	2	50 - 80
PRT2	4	100 – 160
ME1	3	75 – 120
PT2	2	50 - 80
PRT3	4	100 – 160
ME2	4	100 – 160

Stimuli Development

This section discusses the rationale underlying the development of the stimuli used in the current study. To that end, this discussion is broken up into two areas: (1) discussion relevant to the video game stimuli and (2) and discussion relevant to the message stimuli. Notably, the purpose of this discussion is to provide context for subsequent, perhaps more specific, description of the stimuli provided in Chapter IV.

The video game used in the current study was the title *Counter-Strike: Global Offensive*. *Counter-Strike: Global Offensive* was released in 2011 and currently exists as the latest entry into the *Counter-Strike* family of titles. Counter-Strike is available on both

PC and Apple operating systems and is owned by the Valve Corporation. Since the franchise's debut in 1999, *Counter-Strike* has sold well over 25 million units (Makuch, 2011), easily making it one of the most popular FPS titles globally.

Counter-Strike was chosen for this project because the game engine is highly modifiable; as such, I was able to generate unique scripts that allowed for in-game message placement. To accomplish the task of inserting the messages into the game environment for ME1 and ME2, a server-based solution was employed. Specifically, a modified game level (*CS_Office*) was developed and hosted on an online server. This level was modified in the following manner. First, the game was triggered by a remote server command. This allowed me to remotely trigger the game start and, therein, exert maximum levels of experimental control over the testing environment as participants were not required to navigate through the game's setup interface. Second, gun selection was set to random so that users received a different weapon after each death/restart. Third, participants played a 4 on 4 "deathmatch" styled game against AI opponents (referred to as "bots" in the *Counter-Strike* community). These AI opponents were set to "easy" difficulty, which was judged to be a moderate challenge for the majority participants. Fourth, the game length was set to 10 minutes. Fifth, the end-of-game message was modified such that it displayed an anti-violence message. Use of the server-based solution allowed for the ability to swap messages in/out, as required by random assignment procedures.

For ME1 and ME2, the testing environment was identical. Participants were run in individual sessions. The testing room was a windowless, 8 x 10 room. In each study, subjects played the game on a 24-inch high definition (HD) monitor. Screen resolution

74

was set to 1920 x 1200. The local machine used for ME1 and ME2 was a Dell XPS with Windows 8.0. The testing environment and local machines were slightly different for PRT2. In PRT2, subjects were run in groups of 1 – 8. The testing environment was a large computer lab with a number of external windows. Participants played the game on 21.5-inch HD monitors. Screen resolution was set to 1920 x 1200. The local machines used to play the game were Apple Mac i5s. All participants were given noise-cancelling/reducing headphones.

To manipulate message reactance potential, I employed Quick's (2005) guidelines for crafting high reactance potential messages. Specifically, Quick asserted that high reactance potential messages possess the following characteristics: (1) high levels of threat-to-choice language; (2) high levels of vivid language (i.e., fear appeals); and (3) high levels of explicit language. Conversely, the low reactance messages took a substantially more moderate path towards attempted persuasion and were characterized by implicit behavioral recommendations, low threat-to-choice language, and non-vivid depictions of the consequences associated with not engaging in the object behavior.

Manipulations involving cue saliency were guided by previous conceptualizations of perceptual saliency and top-down diagnosticity. As described in Chapter II, perceptual salience refers to the degree to which the features of a stimulus attract attention based on its perceptual properties (Fecteau & Munoz, 2006; Mather & Sutherland, 2012). For example, a brightly lit object will attract more attention (and thus be more perceptively salient) than a comparatively dimmer object (Mathers & Sutherland, 2012). In the current study, perceptual salience was operationalized as text that was set apart from other text in the message through the use of contrast coloring (i.e., bolding) and slightly larger

typeface. Following previous research (e.g., Betttman, 1979; Mathers & Sutherland, 2012; Pham, 1995), cue diagnosticity was operationalized as a fragment of information that is used to make predictions in an environment of uncertainty. According to Pham (1995), a given cue's diagnosticity depends on two antecedents: its typical diagnosticity and the consumer's processing goal(s). Typical diagnosticity refers to the fact that "for a given judgment task, certain inputs are generally considered more useful than others across a variety of contexts" (p. 374). Cue diagnosticity depends on a receiver's processing goals. For example, if a consumer is motivated to evaluate a product for purchase purposes, performance claims/contrasts are likely to be most directly relevant to the on-hand goal and, as such, be more diagnostic in nature than cues relevant to the ad's execution (i.e., stylistic features). Thus, in the current work, diagnosticity was operationalized as language directly relevant to the persuasive message's central logic and route of argumentation. More specifically, I operationalized diagnosticity as message detail related to (1) identification of the problem, (2) description of the solution, and (3) action recommendation. Together, the perceptual emphasis and diagnosticity constituted what is hereafter referred to as "cue saliency." For both the high and low reactance versions of the message, perceptual emphasis was placed on the messages' action recommendation component.

To maintain what Thorson, Wicks, and Leshner (2012) refer to as "message variance " (p. 119), different messages were used in ME1 and ME2. While, generally speaking, Thorson, Wicks, and Leshner (2012) refer to message variance as using multiple messages within each level of an experimental design, it was judged that the relatively similarity of the experimental designs for ME1 and ME2 allowed a broader

application of the concept *across* studies. For ME1, the message focused on the Eugene,

OR metro area. The direct goal of the message was to encourage participants to sign up

for an anti-violence newsletter while the indirect goal was to encourage participants to

learn more about ways they can help suppress community violence. The message in ME2

was explicitly tailored toward the University of Oregon community. As in ME1, focal

goal of the message was to encourage signup for a campus-wide anti-crime newsletter

while the indirect goal was to affect heightened levels of student involvement in campus-

specific anti-crime initiatives. ME2, in contrast to ME1, included statistical information

substantiating its claims. The statistical information directly relevant to the message's

geographical focus (i.e., the University of Oregon Campus) was a rough approximation

of the violent crime statistics reported by the University of Oregon's Campus Safety

Department (University of Oregon 2012; 2013). Additionally, as seen in Appendix A, the

messages used in ME2 had slightly longer word counts than those used in ME1. Finally,

Table 8 shows the Flesch-Kincaid reading ease score (Flesch, n.d.) for each message.

Flesch-Kincaid scores are on a scale of 0 - 100, with higher numbers representing easier

readability. According to Flesch (n.d.), scores between 30 and 50 represent the average

reading level for college students. Accordingly, all messages were judged to be

appropriate, in terms of readability, for the current sample. Further description of the

stimuli used in this work is provided in Chapter IV and Appendices A, C, and D.

Table 8. Flesch-Kincaid reading scores for messages used in ME1 and ME2

Study	High Reactance Potential	Low Reactance Potential
ME1	58.7	43.9
ME2	45.3	51.8

General Plan for Data Analysis

Three basic considerations guided all data analytic procedures associated with the current work. First, before any substantive analyses, data were inspected by evaluating patterns of missingness and the distributional characteristics associated with each variable. Second, given the relatively small sample sizes associated with each study, all alpha levels were fixed at $\alpha = .05$. Third, and as suggested by Thorson, Wilks, & Leshner (2012), all significant models were accompanied by an effect size estimate. Specific details relevant to the analytic procedures used in each main and sub-study are provided in Chapter IV. As a final note, the following statistical packages were used to analyze the data: *R Statistics Package* with *JGR v. 1.7* and *SPSS v. 20.0.* Additionally, I used Hayes' (2013) *PROCESS* macro for *SPSS*.

CHAPTER IV

RESULTS

This chapter reports the results of the primary and secondary studies. Individual write-ups for each study include an overview of the study's purpose, explication of localized hypotheses, a description of the procedure, a description of the sample, the results of missing data analyses, empirical description of the measurement properties, an overview of the applied analytic strategy, a description of the observed results, and a brief conclusion that summarizes the study's findings relative to both previous and subsequent studies. Studies are discussed in the order presented in Table 4. For the purposes of theoretical explication, all theoretical assumptions are posed and tested as hypotheses.

Pilot Test 1

The purpose of PT1 was to test the characteristics of the message proposed for use in ME1 as a means of ensuring that the high reactance version of the proposed message elicited significantly higher levels of state reactance than the low reactance version of the proposed message. The study-specific hypotheses for PT1 were as follows:

> **$H1_{PT1}$: The high reactance potential message will elicit higher levels of freedom threat than the low reactance potential message.**
>
> **$H2_{PT1}$: The high reactance potential message will elicit higher levels of anger than the low reactance potential message.**

Procedure

PT1 was conducted online. The measurement instrument was hosted on Qualrics (https://oregon.qualtrics.com). Using Qualtrics' randomization algorithm, participants

were randomly assigned to the high/low reactance potential conditions. The messages comprising the low reactance and high reactance condition were equal length in words.

A link to the online survey instrument was posted on Amazon Mechanical Turk (AMT; https://www.mturk.com/mturk/). AMT is a "marketplace for work that requires human intelligence" (Amazon, 2013, para. 1). Viability studies have indicated that AMT is approximately representative of the population of U.S. Internet users, generally exceeding the representativeness of convenience samples or student samples (Berinsky, Huber, & Lenz, 2012; Mason & Suri, 2012; Paolacci, Chandler, & Ipeirotis, 2010). The AMT interface allows "requesters" (i.e., those posting intelligence tasks) to post a short description of their project, an estimate of how much time the project will require on the part of "workers" (i.e., those completing the posted intelligence tasks), and the compensation amount. The currently discussed instrument was described as follows:

> Please follow the below link to access the survey. The survey should take you around 2 -3 minutes to complete. Please answer all questions accurately and honestly. Those who fail to answer a significant number of the questions will not receive compensation for their participation.
>
> After completing the survey, you will be provided with a unique SURVEY CONFIRMATION NUMBER. In order to receive compensation for your participation, you MUST provide your unique SURVEY CONFIRMATION NUMBER in the box below. Those who fail to provide this unique SURVEY CONFIRMATION NUMBER will NOT receive credit for their participation.

After completing the questionnaire, respondents were provided with a randomly generated numeric code (this was accomplished by using Qualtrics random number generator). This code was then inserted into the AMT interface as a means of ensuring that all respondents completed the questionnaire. Respondents were compensated $0.08 USD per completed questionnaire. The questionnaire took an average of 3.57 minutes to

complete, resulting in a functional hourly wage of $1.22 USD per hour. Only respondents currently located in the United States were allowed to complete the questionnaire. As a means of ensuring that only those currently located in the US participated, IP addresses were tracked and double-checked using the Geographic IP locater, GeoBytes (http://www.geobytes.com). All IP information was discarded before statistical analyses. The AMT link was set to remain active until 80 responses were recorded.

Given the online nature of AMT, the message was modified so that the geographic location reflected in the message was Chicago, Il. Chicago, IL was chosen as the city was, at the time of the study, in the news for increases gang-related violence and other criminal activity. Because there was a strong likelihood that respondents did not live in the geographic locale discussed in the message, participants were instructed to imagine that the message was written about the city in which they currently reside. Text for each of the messages is included in Appendix A. The text for each message was developed using the guidelines established by Rogers (1983) and previously employed by Dillard and Shen (2005) and Rains and Turner (2007), amongst others. Specifically, the high reactance message "followed the standard format for a fear appeal in that they consisted of a threat-to-health component and an action or recommendation component" (Dillard & Shen, 2005, p. 151).

The questionnaire flow functioned in the following manner. First, respondents were presented with a consent statement. Second, participants were randomly assigned to either the high or low potential reactance condition. Third, after evaluating the messages, respondents answered questions related to the degree to which the message threated their freedom to choose and the degree to which the message inspired negative emotion in the

form of anger. Finally, the respondents provided demographic information related to their gender and age.

Sample

As mentioned above, a total of 80 responses were requested. However, 2 responses were discarded as it was obvious that participants simply "clicked through" the questionnaire. Thus, in the analytic sample, a total of 78 participants were randomly assigned to high/low reactance message conditions (high reactance $n = 37$, low reactance $n = 41$). The sample had an average age of 33.18 years (SD = 11.18) and was 59.0% male ($n = 46$).

Missing Data Analysis

Before testing the stated hypotheses relevant to PT1, missingness patterns in the data were evaluated. Overall, a trivial amount of data was missing. Specifically, 0.11% of the overall data was missing; therein, one case (1.28% of the overall sample) was missing data. Little's Missing Completely at Random (MCAR) test (Little, 1998) indicated that the data was missing completely at random ($\chi^2(10) = 8.67$, $p = .56$). Accordingly, missing data in subsequent analyses were handled using listwise deletion (Harel, Zimmerman, & Dekhytar, 2008).

Measures

In PT1, previously validated measures for freedom threat and anger were employed. These measures are described in full detail in Chapter III and Appendix B. Table 9 displays the means, standard deviations, observed ranges, distributional statistics, and reliability coefficients (α) for each measure. As seen, each measure's internal

reliability coefficient greatly exceeded the heuristic cutoff value of $\geq .70$. Moreover, the

measures' skew and kurtosis values were substantially below the cutoff values

recommended by Kline (2004) (i.e., Skew approximately < 3.00, Kurtosis approximately

< 8.00). Based on this information, the current measures were deemed appropriate for use

in subsequent statistical analyses.

Table 9. Means, standard deviations, ranges, distributional statistics, and reliabilities for continuous measures used in PT1

Variable	M	SD	Range	Skew	Kurtosis	α
Freedom Threat	4.16	1.42	1.00 - 7.00	- 0.36	- 0.32	.91
Anger	1.97	1.97	1.00 - 5.00	1.13	0.79	.94

Analytic Strategy

The analytic strategy for PT1 involved conducting a series of two independent

samples *t*-tests. For each of these tests, the reactance potential manipulation was set as

the fixed factor (i.e., the independent variable). The dependent variables were perceived

freedom threat and anger toward the message, respectively. Effect sizes were evaluated

using Cohen's *d* (Cohen, 1992).

Statistical Results

$H1_{PT1}$ contended that those in the high reactance potential condition would

perceive higher-levels of message induced freedom threat than those in the low reactance

potential condition. Indeed, the results indicated that those in the high reactance potential

condition perceived higher levels of freedom threat ($M_{HIGH} = 4.87$, $SD_{HIGH} = 1.10$) than

those in the low reactance potential condition ($M_{LOW} = 3.51$, $SD_{LOW} = 1.37$), $t(76) =$

4.79, $p < .001$, $d = 1.10$. Thus, $H1_{PT1}$ was supported.

Next, a second independent samples test was used to test the assertion that those in the high reactance potential condition would experience higher levels of anger toward the message than those in the low reactance potential condition ($H1_{PT2}$). As in the case of $H1_{PT1,}$ the results indicated that those in the high reactance potential condition had higher levels of anger toward the message ($M_{HIGH} = 2.26$, $SD_{HIGH} = 1.13$) than those in the low reactance potential condition ($M_{LOW} = 1.71$, $SD_{LOW} = 0.90$), $t(75) = 2.40$, $p < .05$, $d = 0.54$. Thus, $H1_{PT2}$ was supported.

Conclusion

The results from the analyses associated with PT1 broadly indicated that the proposed high and low reactance messages elicited reactance in a manner and function consistent with previous studies investigating state reactance (e.g., Dillard & Shen, 2005; Rains & Turner, 2007; Quick, Scott, & Ledbetter, 2011). Accordingly, the message was deemed appropriate for further testing among the population of interest.

Pre-Test 1

The purpose of PRT1 was to test the message piloted in PT1 within the population of interest (i.e., University of Oregon undergraduate students). As in the case of PT1, the general prediction was that the high reactance version of the proposed message would elicit significantly higher levels of state reactance than the low reactance version of the proposed message. The formal hypotheses guiding PRT1 were:

> **$H1_{PRT1}$: The high reactance potential message will elicit higher levels of freedom threat than the low reactance potential message.**

> **$H2_{PRT1}$: The high reactance potential message will elicit higher levels of anger than the low reactance potential message.**

Procedure

Pilot Test 1 was conducted online. The measurement instrument was hosted on Qualrics. Using Qualrics' randomization algorithm, participants were randomly assigned to either the proposed high reactance condition or the proposed low reactance condition.

Participants were recruited from an introductory media production course at the University of Oregon. Specifically, a hyperlink to the measurement instrument was e-mailed to all students enrolled in the course. A reminder e-mail was sent a week after the initial e-mail. Students received a small amount of extra credit in return for their participation.

The high and low reactance messages used in PRT1 were modified to reflect the Eugene, OR geographic locale. As in the case of PT1, the high reactance message followed the threat-to-health and action recommendation appeal used in previous research (e.g., Dillard & Shen, 2005; Rogers, 1983). Text for each of the messages is included in Appendix A. The high and low reactance potential versions of the message had an equal number of words.

The questionnaire flow functioned in the following manner. First, respondents were presented with a consent statement. Second, participants were randomly assigned to either the high or low reactance condition. Third, after evaluating the messages, respondents answered questions related to the degree to which they perceived the message threatened their freedom to choose between behavioral alternatives and the degree to which the message inspired negative emotion in the form of anger. Finally, the respondents provided demographic information related to their gender and age.

Sample

A total of 60 students were enrolled in the class from which the sample was recruited. In all, 46 responses were received, equaling a response rate of 76.67%. Randomization resulted in 25 participants (54.3% of sample) being assigned to the high threat message condition and 21 (45.7% of sample) participants being assigned to the low reactance condition. The sample had an average age of 21.54 years (SD = 3.61) and was 65.2% female (*n* = 30).

Missing Data Analysis

Before testing the stated hypotheses, missingness patterns in the data were evaluated. Overall, a trivial amount of data was missing. Specifically, 0.91% of the overall data was missing; therein, five cases (10.87% of the overall sample) were missing data. Little's MCAR test indicated that the data was, indeed, missing completely at random, $\chi^2(10) = 11.95$, $p = .29$. Accordingly, in subsequent analyses, missing data in were handled using listwise deletion (Harel, Zimmerman, & Dekhytar, 2008).

Measures

Previously validated measures for freedom threat and anger were employed. These measures are described in full detail in Chapter III and Appendix B of this document. Table 10 displays the means, standard deviations, observed ranges, distributional statistics, and reliability coefficients for each measure. As seen, each measure's internal reliability coefficient exceeded the heuristic cutoff value of .70. Moreover, the measures' skew and kurtosis values were substantially below the cutoff

values recommended by Kline (2004). Based on this information, the current measures were deemed appropriate for subsequent statistical analyses.

Table 10. Means, standard deviations, ranges, distributional statistics, and reliabilities for continuous measures used in PRT1

Variable	M	SD	Range	Skew	Kurtosis	α
Freedom Threat	4.41	1.45	1.00 – 6.83	- 0.36	- 0.52	.93
Anger	2.20	0.91	1.00 - 4.00	1.13	0.19	.84

Analytic Strategy

The analytic strategy used in PRT1 replicated that used in PT1. Specifically, both hypotheses were tested using independent samples t-tests. For each of these tests, the reactance potential manipulation was set as the fixed factor (i.e., independent variable) while perceived freedom threat and anger toward the message were set as the dependent variables of interest. Cohen's d (Cohen, 1992) was used to estimate effect sizes.

Statistical Results

The first independent samples t-test indicated that those in the high reactance potential group perceived higher levels of freedom threat ($M_{HIGH} = 5.25$, $SD_{HIGH} = 0.90$) than those in the low reactance potential condition ($M_{LOW} = 3.41$, $SD_{LOW} = 1.36$), $t(33.53) = 5.31$, $p < .001$, $d = 1.60$. Thus, H1$_{PRT1}$ was supported.

A second independent samples t-test also indicated that those in the high reactance potential condition had higher levels of anger toward the message ($M_{HIGH} = 2.52$, $SD_{HIGH} = 0.90$) than those in the low reactance potential condition ($M_{LOW} = 1.81$, $SD_{LOW} = 0.79$), $t(44) = 2.82$, $p < .01$, $d = 0.84$. These results provided support for H1$_{PRT2}$.

87

Discussion

The goal of PRT1 was to test the message developed in PT1 among the population of interest. The results of PRT1 indicated that the proposed high reactance message, in contrast to the proposed low reactance message, elicited state reactance among members of the population of interest. Accordingly, the message text, in its currently described form, was deemed appropriate for use in further tests within the population of interest.

Pre-Test 2

Pre-Test 2 (PRT2) had four primary goals. First, the study set out to empirically test the contention that video game play would elicit heightened levels of arousal (e.g., Anderson & Bushamn, 2001). Second, the study sought to further validate the high and low reactance potential messages developed in PT1 and PRT1 among the population of interest. Third, the study tested the contention that high levels of arousal coupled with low levels of state reactance would facilitate favorable message effects in the form of message attitudes, behavioral attitudes, and behavioral intentions. Fourth, and finally, the current study set out to explore the degree to which favorable message outcomes (i.e., message attitudes, behavioral attitudes, and behavioral intentions) influenced participant behavior in the form of signing up for the newsletter advocated for by the message. These goals were specifically represented in the following hypotheses:

> **H1$_{PRT2}$: The game play condition will elicit higher levels of state arousal than the non-gameplay condition.**
>
> **H2$_{PRT2}$: The high reactance message potential condition will elicit higher levels of freedom threat than the low reactance potential condition.**

88

H3$_{PRT2}$: **The high reactance message potential condition will elicit higher levels of anger toward the message than the low reactance potential condition.**

H4$_{PRT2}$: **The high reactance message potential condition will elicit more negative cognitions toward the message than the low reactance potential message.**

H5$_{PRT2}$: **High levels of arousal coupled with low levels of state reactance will result in comparatively heightened attitudes toward the message.**

H6$_{PRT2}$: **High levels of arousal coupled with low levels of state reactance will result in comparatively heightened attitudes toward the behavior.**

H7$_{PRT2}$: **High levels of arousal coupled with low levels of state reactance will result in comparatively heightened behavioral intentions.**

H8$_{PRT2}$: Favorable attitudes toward the message (H8$_{PRT2}$a), favorable behavioral attitudes toward the message-advocated behavior (H8$_{PRT2}$b), and favorable behavioral intentions (H8$_{PRT2}$c) will predict likelihood of newsletter signup.

Procedure

PRT2 was a 2 (video game, no video game) x 2 (high reactance message, low reactance message) quasi-experimental, between-subjects design. Because the video game and non-video game conditions could not be administered in the same room simultaneously, assignment to the video game/no video game conditions was done a quasi-random basis – specifically, before the commencement of the experiment, experimental time slots were assigned to game play (i.e., video game, no video game) conditions using a random number generator. Participants were, however, randomly assigned to reactance message conditions using Qualtrics' randomization engine.

The stimulus used for the game condition was a modified level (*CS_Office*) taken from the popular FPS video game, *Counter-Strike*. Those in the video game condition

played a 10-minute deathmatch-styled game. Participants competed against the computer's AI; specifically, participants played with seven other combatants, three of which were on their team and four of which were on the opposing team. The opposing combatants (i.e., "bots") where set to "easy" difficulty. A screen shot showing the game environment is provided in Appendix C.

Before the gameplay session began, participants were given a very brief (i.e., 30 second) introduction on the game, game mode, and the basic controls for navigating the game. With regards to the game objective, participants were told; (1) that the game would last 10 minutes; (2) that they were on a team with three other combatants and they were playing against a team of four; and (3) that the object of the game was to kill the other team as may times as possible in the allotted time period. A postcard providing instructions for how to use the basic functions of the game (i.e., walking forward, backward, shooting the weapon) was affixed to the bottom of the computer monitor. For maximum control over the experimental environment, each participant used two computers. Computer 1 hosted the pre-test and post-test questionnaires. Computer 2, located to each participant's immediate left, had the game loaded, properly configured, and ready to play. Thus, once participants completed the post-test questionnaire, they were instructed to move to their left, whereupon they instructed to click a single radio button that, in turn, initialized the game.

For the non-game condition, participants read a *New York Times* article (Streitfeld & Haughney, 2013) about Amazon founder Jeff Bezos. Specifically, the article was a personality profile that featured discussion on Bezos' acquisition of the *Washington Post*. The article was 2,837 words. Participants were given 10 minutes to read the article. The

article was chosen on the following bases. First, the subject of the article was relevant to students interested in mass communication and technology careers (therefore it was proposed that the article would not artificially elicit boredom/tedium). Second, previous literature suggests that the average reading speed for college students is between 250 - 350 words per minute (e.g., Lewandowski, Codding, Kleinmann, & Tucker, 2003; Nelson, B., 2012; Raynor, White, Johnson, & Liversedge, 2006). Thus, the article's length was judged to be a reasonable approximation for the current sample of students' average reading speed.

The high and low reactance message stimuli were the messages previously validated in PT1 and PRT1 (Appendix A). The reading condition stimulus is provided in Appendix D. Each session had a total duration of approximately 25 minutes.

Procedure

The study was hosted in a multipurpose computer lab on the University of Oregon's campus. Subjects used an online scheduling tool to select from a number of 30-minute experimental time slots. As described above, these time slots were assigned to the video game conditions on a randomized basis. Participants were not aware of whether the session they selected was a game play session or not. Students were recruited from a number of intermediate and advanced classes in the areas of advertising, journalism, and public relations. All participants received a small amount of extra credit in return for their participation. The number of participants in each session ranged between 1 and 8 participants. The number of subjects in each session was recorded.

When participants arrived at the experimental location, they were greeted and seated in assigned seats. The lab was configured so that participants could not easily see

each other screens. Participants were also verbally instructed to refrain from looking at others' screen for the duration of the experiment. After being seated, the participants completed a pre-manipulation questionnaire that asked them questions related to their levels of reactance proneness, their experience playing video games, including *Counter-Strike*, and demographic variables related to age, sex, race, and English as a first language. The questionnaire was hosted on Qualtrics.

After completing the questionnaire, participants were exposed to either the video game or the *New York Times* article. Those exposed to the news article were told to read it at their own pace. Those playing the video game were given basic instructions on how to play the game. Both conditions occupied participants for precisely 10 minutes. For the game play condition, the game was configured to automatically end at the ten-minute mark. For the reading condition, a stopwatch was used to keep track of time; participants were told to stop reading at the ten-minute mark.

Next, participants completed a second questionnaire. To most accurately capture arousal levels, as induced by the video game/reading stimuli, participants completed the arousal instrument. Next, within the Qualtrics document, participants were randomly exposed to either the high or low reactance messages. After being exposed to the messages, participants answered questions relating to message-induced state reactance, attitude toward the message, and behavioral intentions. Participants also completed the thought listing procedure. Finally, after completion of the questionnaire, participants were thanked, debriefed, and released.

Sample

A total of 95 completed or partially completed responses were received. Because the current study asked participants to evaluate an English-language message, those who indicated that English was their second language were removed from the sample. This resulted in the removal of a single response ($n = 1$). Randomization/quasi-randomization procedures resulted in the group assignment frequencies shown in Table 11. The sample had an average age of 21.39 years (SD = 1.45) and was 72.3% female ($n = 68$) female. With regards to race, 88.3% ($n = 83$) identified as White/Caucasian, 4.3% ($n = 4$) identified as Hispanic/Latino, 3.2% ($n = 3$) identified as Asian/Asian-American, 1.1% ($n = 1$) identified as Black/African-American. 3 people (3.2%) did not identify with any of the provided racial/ethnic categories.

Table 11. Distribution of sample organized by manipulation conditions

Cell Conditions	Cell *n*	% of Sample
Video game play, low reactance message	25	26.6%
Video game play, high reactance message	18	19.1%
No video game play, low reactance message	22	23.4%
No video game play, high reactance message	29	30.9%

Missing Data

As a first step, missing data patterns were evaluated among all variables of interest (i.e., demographic, dependent, and covariate indicators). In total, 0.24% of the overall data was missing. In all, seven cases (7.45% of the overall sample) were missing data. Little's MCAR test suggested the data was missing completely at random, $\chi^2(291) = 283.26$, $p = .62$; thus, missing data in subsequent analyses were handled using listwise deletion (Harel, Zimmerman, & Dekhytar, 2008).

Measures

Table 12 displayed the measures that were used in PRT2. Full description of all
measures is provided in Chapter III and Appendix B. Likewise, Table 13 displays the
means, standard deviations, range boundaries, distributional characteristics, and
reliability coefficients for each continuous measure. As seen, two variables, trait
reactance and behavioral intentions, possessed marginal reliability scores. These
assumption violations were relatively minor in nature; thus, the data the judged to be
appropriate for further analysis. Moreover, the single-item measure of previous
experience with *Counter-Strike* was substantially (i.e., extremely) positively skewed. In
light of this deviation from normality, a dichotomous variable (*Counter-Strike* experience
vs. no *Counter-Strike* experience) was generated and subjected to additional non-
parametric testing as part of the PRT2's confound check processes.

Table 12. Measures used in PRT2

Variable	Type	Role
Trait Reactance	Continuous	Covariate/Potential Confound
Subj. Video Game Expertise	Continuous	Covariate/Potential Confound
Counter-Strike Experience	Continuous	Covariate/Potential Confound
Arousal	Continuous	Dependent
Message Anger	Continuous	Dependent
Perceived Freedom Threat	Continuous	Dependent
Negative Cognitions	Continuous	Dependent
Message Attitudes	Continuous	Dependent
Behavioral Attitudes	Continuous	Dependent
Behavioral Intentions	Continuous	Dependent
Newsletter Signup	Binary	Dependent

Table 14 provides mean vectors for each experimental group on the continuous
dependent variables of interest (i.e., message attitudes, behavioral attitudes, and
behavioral intentions). Finally, Table 15 shows the zero-order correlations between the
continuous dependent variables and covariates of interest.

94

Group Equivalency

Before testing the stated hypotheses, a series of tests designed probe group equivalency were conducted. First, a series of discrete one-way ANOVAs in which each of the four cells were set as a fixed (i.e., independent) factor were estimated; this resulted in the use of four fixed factors. The dependent variables were the covariates/potential confounds identified in Table 14. Next, a series of chi-square tests were conducted to examine the degree to which the groups varied on participant sex and race. As in the case of the ANOVA tests, the manipulation cells were treated as four independent factors.

The results of the one-way ANOVAs indicated that the groups did not vary on the basis of trait reactance, $F(3, 88) = 1.91$, $p > .13$, subjective expertise relative to video game play, $F(3, 87) = 1.10$, $p > .35$, or previous experience with *Counter-Strike*, $F(3, 90) = 1.22$, $p > .30$. Similarly, the groups were statistically equivalent in terms of average age, $F(3, 90) = 0.75$, $p > .52$. Chi-square analyses failed to indicate significant group differences in regards to gender, $\chi^2(3) = 2.54$, $p > .46$, race, $\chi^2(12) = 4.23$, $p > .97$, or previous experience with *Counter-Strike*, $\chi^2(3) = 3.68$, $p > .29$

Table 13. Means, standard deviations, ranges, distributional statistics, and reliabilities for continuous measures used in PRT2

Variable	M	SD	Range	Skew.	Kurt.	α
Trait Reactance	4.43	0.69	2.73 - 6.18	0.16	- 0.18	.70
Subj. Video Game Expertise	2.35	1.36	1.00 - 5.50	0.70	-0.70	.92
Counter-Strike Experience	1.07	0.26	1.00 –2.00	3.30	9.05	---
Arousal	4.27	1.37	1.17 –7.00	- 0.33	- 0.94	.92
Message Anger	2.22	0.91	1.00 –4.50	0.23	- 0.90	.90
Perceived Freedom Threat	4.91	1.37	1.00 - 7.00	- 0.85	0.39	.93
Negative Cognitions	3.63	1.12	1.00 -6.67	- 0.14	- 0.10	.88
Message Attitudes	5.60	0.86	2.83–7.00	- 0.38	0.13	.90
Behavioral Attitudes	3.91	1.05	1.60 –6.40	- 0.21	- 0.71	.69

Table 14. Group mean vectors for message attitudes and behavioral intentions

Variable	No Game High Reactance	No Game Low Reactance	Game High Reactance	Game Low Reactance
Message Attitudes	M = 3.05[a] SD = 1.37	M = 3.68 SD = 0.99	M = 3.47[b] SD = 0.96	M = 4.27[a, b] SD = 0.96
Behavioral Attitudes	M = 5.43 SD = 0.97	M = 5.45 SD = 0.84	M = 5.70 SD = 0.79	M = 5.74 SD = 0.92
Behavioral Intentions	M = 3.50[a] SD = 1.08	M = 3.86 SD = 0.99	M = 3.82 SD = 1.03	M = 4.45[a] SD = 0.99

Note: For each variable, means with the same superscripts are significantly different at $p < .05$ (Bonferroni corrected for multiple comparisons)

Table 15. Zero order correlations for continuous measures used in PRT2

Variable	2	3	4	5	6	7	8	9	10
Trait Reactance (1)	.15	.23*	.19	.08	.14	-.04	.19	.11	.20
VG Expertise (2)		.31*	.14	.04	.07	-.14	.01	-.07	-.04
C-S Experience (3)			.27*	.13	.12	-.18	.08	.03	.13
Arousal (4)				-.04	.08	-.06	.21*	.19	.19
Freedom Threat (5)					.56**	.36**	-.38**	-.05	-.03
Message Anger (6)						.32**	-.38**	.02	.04
Neg. Cognitions (7)							-.43**	-.10	-.02
Message Att. (8)								.28**	.37**
Behavioral Att. (9)									.42**
Behavioral Int. (10)									

Note: * $p < .05$, ** $p < .01$

Because the designs underlying ME1 and ME2 both called for running subjects individually, all hypothesis testing and data exploration analyses used number of subjects per session as a covariate/control variable (M = 4.67 subjects, SD = 2.51 subjects).

Analytic Strategy

Hypotheses H1$_{PRT2}$ – H4$_{PRT3}$ were evaluated using a series of independent two-way ANCOVAs. The purpose of these analyses was to confirm that the experimental/quasi-experimental manipulations (i.e., video game play and message reactance potential) elicited the desired psychological states. Effect sizes were evaluated using partial η^2 (Tabachnick & Fidell, 2001). As discussed above, the number of subjects in each session was included as a covariate. Next, hypotheses H5$_{PRT2}$ – H7$_{PRT3}$ were evaluated using a series of discrete OLS regression models. Use of linear modeling techniques, such as OLS regression, is consistent with previous research on reactance (e.g., Dillard & Shen, 2005; Quick & Considine, 2008; Quick & Stephenson, 2007) and methodologically appropriate when testing for interaction effects between two continuous variables (Hayes, 2005; 2013). Effect sizes for the model as a whole were reported using the R^2 statistic. All continuous variables were center-coded before model estimation. Post-hoc probing of all interaction effects was accomplished using the Johnson-Neyman technique (Johnson, P. O. & Fay, 1950). According to Bauer & Curran (2005), the Johnson-Neyman technique presents a number of benefits when contrasted with the "pick-a-point" (e.g., Aiken & West, 1991) approach of interaction decomposition, namely that it provides exact regions of significance for the conditional effect of the predictor of interest. To further demonstrate the nature of all significant interaction effects, the conditional relationships of the variables under consideration were graphically represented (e.g., Aiken & West, 1991). Finally, as Hypotheses H8$_{PRT2}$a – H8$_{PRT3}$c predicted a binary outcome (newsletter signup), binary logistic regression was used (Myers, Gamst, & Gaurin, 2013). Approximation of effect sizes for the model as a whole was provided via the Nagelkerke R^2 statistic.

97

Statistical Results

A two-way ANCOVA identified a significant a main effect for game play condition such that those who played the video game reported being more aroused ($M_{\text{GAME PLAY}} = 4.86$, $SD_{\text{GAME PLAY}} = 1.44$) than those who did not play the video game ($M_{\text{NO GAME PLAY}} = 3.47$, $SD_{\text{NO GAME PLAY}} = 1.25$), $F(1, 89) = 34.02$, $p < .001$, partial $\eta^2 = .28$. This finding supported H1$_{\text{PRT2}}$. Although not hypothesized, the results also suggested that those in the high reactance potential condition experienced lower levels of arousal ($M_{\text{HIGH}} = 4.07$, $SD_{\text{HIGH}} = 1.40$) than those in the low reactance potential condition ($M_{\text{LOW}} = 4.47$, $SD_{\text{LOW}} = 1.33$), $F(1, 89) = 4.31$, $p < .05$, partial $\eta^2 = .05$. The interaction effect between game play condition and message reactance potential was not significant, $F(1, 89) = 0.06$, $p > .80$.

Next, a two-way ANCOVA indicated that those in the low reactance condition perceived significantly lower levels of freedom threat ($M_{\text{LOW}} = 4.18$, $SD_{\text{LOW}} = 1.39$) than those in the high reactance potential condition ($M_{\text{HIGH}} = 5.67$, $SD_{\text{HIGH}} = 0.83$), $F(1, 89) = 37.19$, $p < .001$, partial $\eta^2 = .30$. The ANCOVA test did not identify any main effects for game play condition, $F(1, 89) = 0.09$, $p > .77$, or an interaction effect between reactance condition and game play condition, $F(1, 89) = 0.003$, $p > .95$. These results supported H2$_{\text{PRT2}}$.

Regarding anger toward the message, a two-way ANCOVA again indicated that those in the low reactance potential condition had lower levels of anger toward the message ($M_{\text{LOW}} = 1.93$, $SD_{\text{LOW}} = 0.79$) than those in the high reactance potential condition ($M_{\text{HIGH}} = 2.51$, $SD_{\text{HIGH}} = 0.94$), $F(1, 88) = 9.21$, $p < .01$, partial $\eta^2 = .10$. As in the case of H2$_{\text{PRT2}}$, I did not observe a main effect for game play condition, $F(1, 88) =$

0.07, $p = .76$, or an interaction effect between reactance condition and game play condition, $F(1, 88) = 0.004$, $p > .94$. These results supported H3$_{PRT2}$.

Examination of number of message relevant cognitions indicated that those in the low reactance condition generated fewer negative thoughts (M $_{LOW}$ = 1.19, SD $_{LOW}$ = 1.57) than those in the high reactance condition (M $_{HIGH}$ = 2.15, SD $_{HIGH}$ = 2.23), $F(1, 89)$ = 6.60, $p < .05$, partial η^2 = .07. Neither the main effect for game condition, $F(1, 89)$ = 2.70, $p > .10$, nor the interaction effect, $F(1, 89) = 0.25$, $p = .62$, were significant. These results supported H4$_{PRT2}$

Next, H5$_{PRT2}$, H6$_{PRT}$, and H7$_{PRT}$ together suggested that message effectiveness would be highest when state reactance was low and arousal was high. As discussed in Chapter II, previous treatments of state reactance have conceptualized the variable as an amalgam of anger toward the message and negative, message-relevant cognitions (e.g., Dillard & Shen, 2005; Rains, 2013; Rains & Turner, 2007; Quick & Bates, 2009). These approaches have almost exclusively employed large sample SEM-based techniques with maximum likelihood estimation (MLE). In the current study, the sample size fell well below the recommended number of independent observations generally required for use of SEM (Ding, Belicer, & Harlow, 1995; Kahai & Cooper, 2003; Nunnally, 1967; Tanaka, 1987). Accordingly, I elected to generate a factor score that approximated the intertwined models (e.g., Dillard & Shen, 2005; Rains, 2013) previously used to measure state reactance. Then factor score consisted of the aggregate anger and negative cognition measures and was created using principal axis extraction with regression computation (DiStefano, Zhu, & Mindrila, 2009). Using this state reactance variable, H5$_{PRT2}$, H6$_{PRT}$, and H7$_{PRT}$, as described above, were tested using a series of three OLS regressions. The

first of these models employed message attitudes as the dependent variable. As shown in

Table 16, significant, negative main effects for state reactance (b = - 0.80, p < .001) and

marginally significant positive main effects for arousal (b = 0.14, $p \le .05$ [p =.051]) were

observed; however, the interaction term between state reactance and arousal was not

significant (b = -0.10, p > .30). Nonetheless, examination of the shape (Figure 6) of the

non-significant interaction effect suggested, consistent with expectations, that low state

reactance coupled with high arousal was associated with heightened evaluations of the

message.

Table 16. OLS Moderation Analysis Predicting the Effect of State Reactance and Arousal on Message Evaluations

Predictor	b	b_{se}	t
Intercept	2.18 **	0.72	3.05
No. Subjects	0.03	0.04	0.85
Trait Reactance	0.30 ꓔ	0.15	1.99
State Reactance	- 0.80 ***	0.15	5.50
Arousal	0.14 ꓔ	0.07	1.98
State R. x Arousal	- 0.10	0.15	1.03

*Note: F(5, 85) = 7.53, p < .001, R^2 = .31; *** p < .001, ** p < .01, ꓔp ≤.05 (rounded)*

H5$_{PRT}$ suggested that the combination of low reactance and high arousal would be

associated with enhanced attitudes toward the behavior advocated in the message. The

results of the moderation test supported this contention. As seen in Table 17, a significant

interaction effect between state reactance and arousal was identified, b = -.29, p < .01.

Figure 6. Exploratory plot showing effect of arousal on the relationship between message attitudes and reactance. Error bars calculated at 95% confidence levels. High and low values are +/- 1 SD from the mean.
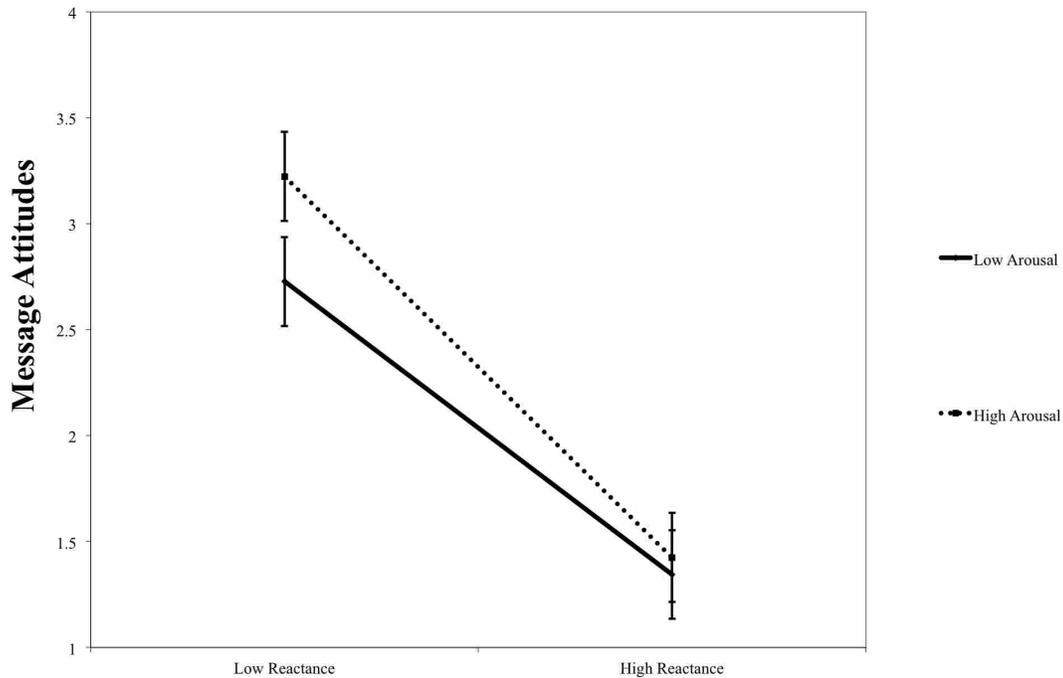
Table 17. OLS Moderation Analysis Predicting the Effect of State Reactance and Arousal on Message Attitudes

Predictor	b	b_{se}	T
Intercept	5.24 ***	0.63	8.24
No. Subjects	- 0.03	0.13	0.53
Trait Reactance	0.10	0.13	0.79
State Reactance	- 0.06	0.13	0.43
Arousal	0.13 ᵀ	0.06	1.96
State R. x Arousal	- 0.29 **	0.09	3.23

*Note: $F(5, 85) = 2.86$, $p < .05$, $R^2 = .14$; *** $p < .001$, ** $p < .01$, ᵀ $p \leq .05$ (rounded)*

Probing of the identified interaction effect indicated that participant attitudes toward the object behavior were heightened when arousal was high and state reactance was low; however, when state reactance was intensified, arousal levels exerted an

101

increasingly negative effect on attitudes toward the object behavior. This effect is depicted in Figure 7.

Figure 7. Plot showing effect of arousal on the relationship between reactance and behavioral attitudes. Error bars calculated at 95% confidence levels. High and low values are +/- 1 SD from the mean.
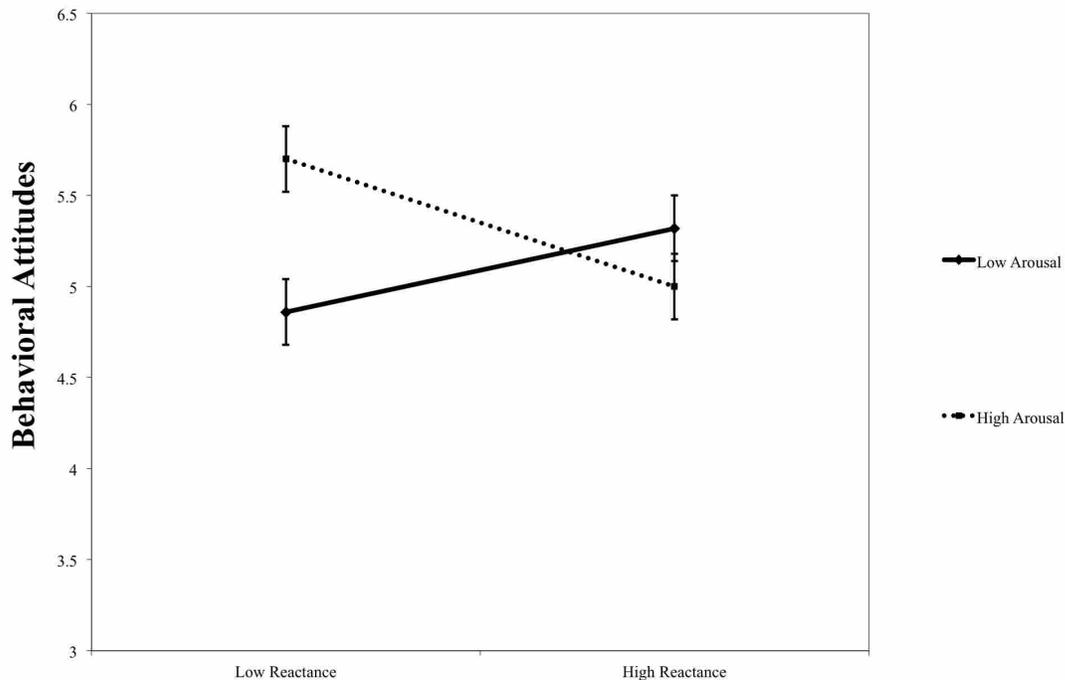
Moreover, as shown in Table 18, the Johnson-Neyman technique (Johnson, P. O. & Fay, 1950) was used to explore the relationship between reactance and behavioral attitudes at various levels of arousal. As seen, the identified effect of arousal on the relationship between state reactance and behavioral intentions (Table 18 and Figure 7) became increasingly strong as participant arousal levels increased.

Table 18. The relationship between state reactance and behavioral intentions at selected low, moderate, and high levels of arousal

Arousal	*Effect (b)*	*se*	*t*
- 3.11 (Lowest Observed Value)	0.84 **	0.31	2.74
- 2.53	0.67 *	0.33	2.59
- 1.95	0.51 *	0.22	2.34
- 1.07	0.25	0.16	1.58
- 0.20	0.002	0.13	0.01
0.97	- 0.34 *	0.15	2.17
1.55	- 0.51 **	0.19	2.67
2.14	- 0.67 **	0.23	2.93
2.43	- 0.76 **	0.25	3.00
2.72 (Highest Observed Value)	- 0.84 **	0.27	3.06

*Note: * $p < .05$, ** $p < .01$*

H7$_{PRT}$ predicted that the combination of high arousal and low levels of state reactance would be associated with heightened participant intentions to perform message-relevant behaviors. Consistent with expectations, the results of the moderation analysis (Table 19) again identified a significant interaction effect between arousal and state reactance ($b = -0.29$, $p < .05$).

Table 19. OLS Moderation Analysis Predicting the Effects of State Reactance and Arousal on Behavioral Intentions

Predictor	*b*	b_{se}	*t*
Intercept	2.37 **	0.78	3.02
No. Subjects	0.04	0.04	0.88
Trait Reactance	0.31	0.16	1.91
State Reactance	0.00	0.16	0.01
Arousal	0.13	0.08	1.66
State R. x Arousal	- 0.29 *	0.11	2.64

*Note: $F(5, 84) = 2.68$, $p < .05$, $R^2 = .14$; ** $p < .01$, * $p < .05$*

Moreover, and as shown in Table 20, examination of the conditional effects of arousal using the Johnson-Neyman technique (Johnson, P. O. & Fay, 1950), indicated that the negative effect of arousal on the relationship between state reactance and

behavioral intentions became increasingly exacerbated at as levels of participant arousal

increased.

Table 20. The relationship between state reactance and behavioral intentions at selected low, moderate, and high levels of arousal

Arousal	*Effect (b)*	se	t
- 3.11 (Lowest Observed Value)	0.91 *	0.38	2.39
- 2.52	0.74 *	0.33	2.29
- 1.94	0.57 *	0.27	2.12
- 1.06	0.31	0.20	1.57
- 0.19	0.06	0.16	0.35
0.98	- 0.28	0.19	1.48
1.56	- 0.45	0.23	1.94
2.14	- 0.63 *	0.28	2.19
2.44	- 0.71 *	0.31	2.27
2.73 (Highest Observed Value)	- 0.79 *	0.34	2.34

*Note: * p < .05*

Translated into the context of the present study, theses results suggest that those with

high levels of arousal and low levels of state reactance were comparatively more likely to

indicate behavioral intentions that aligned with those emphasized by the evaluated

message. This effect is plotted in Figure 8.

Finally, H8$_{PRT}$a, H8$_{PRT}$b, and H8$_{PRT}$c suggested that attitudes toward the message,

behavioral attitudes, and behavioral intentions would, respectively, predict participant

likelihood of actually agreeing to sign up for the newsletter. To test these hypotheses, a

binary logistic regression model was estimated. For this model, signing up for the

newsletter was coded as 1 while refusal was coded as 0. The results, as fully reported in

Table 21, indicated that message attitudes were a positive, marginally significant

predictor of signing up for the newsletter ($b = 0.97, p = .054$). However, neither attitudes

toward the behavior, $b = 0.29, p > .61$, nor behavioral intentions, $b = 0.72, p > .14$,

emerged as significant predictors of signing up for the newsletter. Thus, the current

results marginally supported H8$_{PRT}$a but did not support either H8$_{PRT}$b or H8$_{PRT}$c.

Figure 8. Plot showing effect of arousal on the relationship between reactance and behavioral intentions. Error bars calculated at 95% confidence levels. High and low values are +/- 1 SD from the mean.
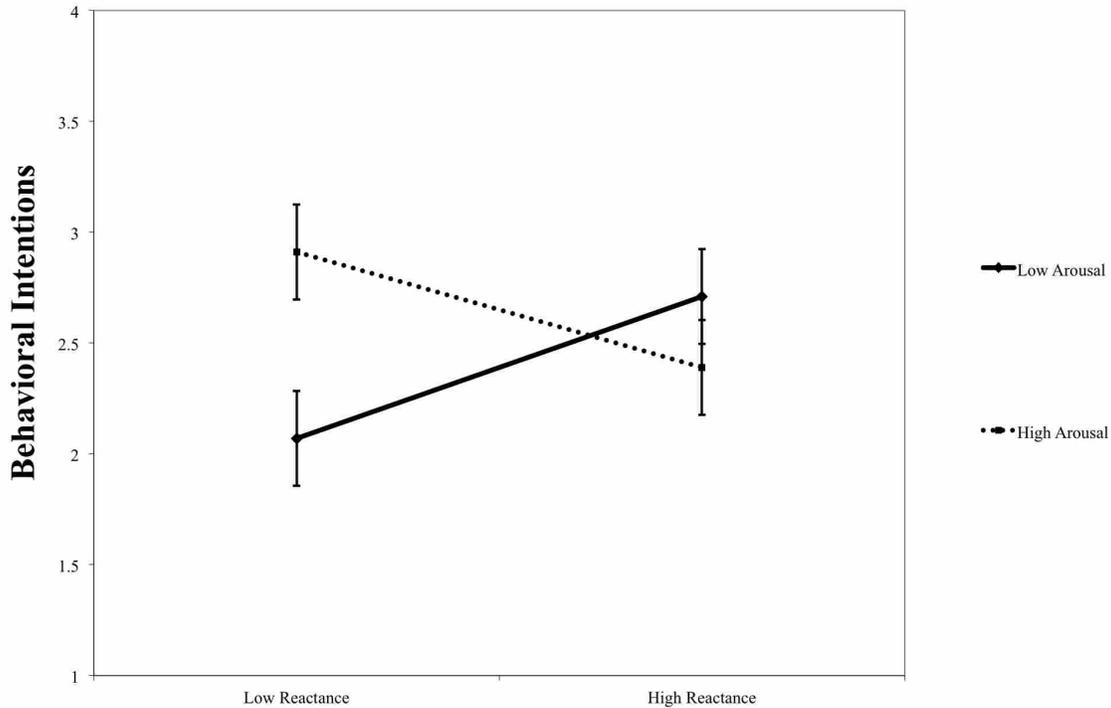
Table 21. Logistic regression predicting likelihood of signing up for anti-violence newsletter (PRT3)

Predictor	*b*	*b*$_{se}$	Wald	Exp(*B*)
No. of Subjects	- 0.22	0.18	1.52	0.80
Trait Reactance	- 0.51	0.65	0.61	0.60
Message Attitudes	0.97 ꜰ	0.50	3.70	2.63
Behavioral Attitudes	0.29	0.58	0.26	1.34
Behavioral Intentions	0.72	0.50	2.09	2.04

Note: Nagelkerke R^2 = .30; ꜰ$p \leq$ .05 (rounded)

Discussion

PRT2 had three primary goals. First, PRT2 empirically tested the contention that video game play elicits significantly heightened levels of arousal. Second, the study set out to further validate the message developed in PT1 and PRT1. Third, PRT2 explored the combined effects of video game play and reactance potential on a message evaluated outside of the video game environment. Consistent with expectations, the results of the current study suggested that engagement with the video game elicited significantly higher levels of self-reported arousal among participants. Second, building upon PT1 and PRT1, the results indicated that the high reactance potential version of the message induced comparatively high levels of state reactance. Third, and perhaps most importantly to this work as a whole, the current study found that heightened arousal levels coupled with diminished levels of state reactance were associated with favorable message-relevant outcomes in the form of behavioral attitudes and behavioral intentions. Moreover, the current findings suggested that arousal exerted a direct (albeit marginally significant), positive effect on message evaluations. Taken together, these findings are compatible with previous research that suggests arousal has a positive, often conditional, influence on both evaluative and behavioral outcomes of interest to message senders (e.g., Cantor, Moody, & Zillman, 1974; Gorn, Pham, & Sin, 2001; Mattes & Cantor, 1972; Pham, 1996).

The results of PRT2 supported a number of key theoretical assumptions underlying the current work. As such, the next step was to examine how participants processed messages presented *within* the game environment. Specifically, and as described in greater depth below, the purpose of ME1 was to test the degree to which in-game messages influence evaluative and behavioral outcomes of interest.

106

Main Experiment 1

Main Experiment 1 (ME1) set out to test several primary contentions associated with the current work. Specifically, ME1 was designed to test the following contentions:

First, following the results of PT1, PRT1, and PRT2, the current study suggested that the subjects evaluating a high reactance potential message in a post-scroll environment would indicate higher levels of state reactance in the form of perceived freedom threat, anger toward the message, and negative, message-relevant cognitions.

Second, and in contrast to the point delineated above, ME1 set out to establish that those evaluating a low reactance potential message in a post-scroll environment would be comparatively less likely to develop state reactance. Furthermore, expounding upon this contention, ME1 suggested that when compared to both those who evaluated a high reactance message *and* those who did not evaluate a message, those who evaluated the low reactance version would be most likely to indicate behavioral intentions to engage in activities advocated for by the message and actually perform a message-relevant behavior.

Third, ME1 set out to establish the inclusion of a post-scroll message did not significantly diminish player attitudes toward the game itself.

In light of the foregoing, ME1 proposed the following hypotheses:

> **H1$_{ME1}$: The high reactance potential message will elicit higher levels of perceived freedom threat than the low reactance potential message.**
>
> **H2$_{ME1}$: The high reactance message potential will elicit higher levels of anger toward the message than the low reactance potential message.**
>
> **H3$_{ME1}$: The high reactance message potential condition will elicit more negative cognitions toward the message than the low reactance potential message.**

107

H4$_{ME1}$: The game play, low reactance potential message condition will elicit higher attitudes toward the message than the game play, high reactance potential condition.

H5$_{ME1}$: The game play, low reactance potential message condition will elicit higher behavioral attitudes than the control condition.

H6$_{ME1}$: The game play, low reactance potential message condition will elicit higher behavioral intentions than the control condition.

H7$_{ME1}$: The game play, low reactance potential message condition will elicit higher respondent probability of agreeing to sign up for the newsletter than the control condition.

Additionally, the following research question was posited:

RQ1$_{ME1}$: Will the inclusion of a post-scroll message negatively influence participant attitudes toward the game?

Procedure

ME1 was a simple experiment containing three cells. Participants were randomly assigned to one of the three experimental conditions. Because administration of the manipulation (i.e., presentation/no presentation of a low/high reactance potential message) required manual input/execution of a unique server command, subjects were run in individual sessions.

For the most part, the game stimulus replicated PRT2. Specifically, ME1 used a *Counter-Strike* map *CS_Office*. Participants played a 10-minute deathmatch-styled game in which they competed against the computer's AI. As in PRT2, participants played with seven other combatants, three of which were on their team and four of which were on the opposing team. The opposing combatants (i.e., bots) where set to "easy" difficulty. Before the gameplay session began, participants were given a very brief (i.e., 30 second) introduction on the game, game mode, and the basic controls for navigating the game. Additionally, a postcard providing instructions for how to use the basic functions of the

game (i.e., walking forward, backward, shooting the weapon) was posted above the computer used to display the game. For maximum control over the experimental environment, each participant used two computers. Computer 1 hosted the pre-test and post-test questionnaires. A computer, located to each participant's immediate right (Computer 2), had the game loaded, properly configured, and ready to play. Once the participants completed the questionnaire, they were instructed to move to Computer 2. As mentioned above, the game was initialized via a remote server command.

In contrast to PRT2, the modified game map used for ME1 displayed the high and low reactance messages *within* the game environment. Specifically, the game engine was modified such that default end of round message was replaced with either the high or low version of the anti-violence message. Those in the control condition simply saw a "game over" message. Participants were given 45 seconds to evaluate the message. Screenshots of these messages appear in Appendix C. Each session had a total duration of approximately 30 minutes.

Sample

In all, 89 responses were received. As in PRT2, those who indicated that English was not their first language ($n = 12$) were removed from the sample, resulting in an analytic sample consisting of 77 responses. Randomization resulted in 30 (39.0%) participants being assigned to the high threat message condition, 25 (32.5%) respondents being assigned to the control condition, and 22 (28.6%) participants being assigned to the low reactance potential condition. The sample had an average age of 20.73 years (SD = 5.14) and was 63.6% female ($n = 49$).

Missing Data Analysis

Before hypotheses testing, missingness patterns in the data were evaluated. Among those participants in the high and low reactance conditions, 0.56% of the overall data was missing. 1.91% of all cases ($n = 1$) were missing data. Little's MCAR test suggested that data was missing completely at random, $\chi^2(35) = 35.10$, $p > .23$. Among participants in the control condition, there were no missing values. In subsequent analyses, all missing data was handled using listwise deletion (Harel, Zimmerman, & Dekhytar, 2008).

Measures

Table 22 displays the measures, as described in Chapter III and Appendix B, which were used in ME1. Notably, because participants in the control condition were not provided a message, the questionnaires were modified such that those in the control condition did not answer items related to message evaluations (perceived freedom threat, message anger, negative message-relevant cognitions, and message attitudes).

Table 23 displays the means, standard deviations, range boundaries, distributional characteristics, and reliability coefficients for each continuous measure. As seen, the previous experience with *Counter-Strike* was substantially non-normal in nature; thus, for the purposes of subsequent analyses, I generated a dichotomous version of the scale representing those with ($n = 7$) and without ($n = 70$) previous *Counter-Strike* experience.

Group Equivalency

As in PRT2, group equivalency was assessed prior to testing/exploring the hypotheses/research questions of interest. First, I estimated a series of discrete one-way

ANOVAs in which the three experimental cells were set as a fixed (i.e., independent) factor. The dependent variables were the covariates/potential confounds identified in Table 22. Additionally, group equivalency related to participant age was examined. Next, a series of chi-square tests were conducted to examine the degree to which the groups varied on participant sex and race.

Table 22. Description of measures used in ME1

Variable	Level	Type	Administered to
Trait Reactance	Continuous	Cov./P. Confound	All Subjects
VG Expertise	Continuous	Cov./P. Confound	All Subjects
C-S Experience	Continuous	Cov./P. Confound	All Subjects
Perceived Game Difficulty	Continuous	Cov./P. Confound	All Subjects
Video Game Presence	Continuous	Cov./P. Confound	All Subjects
Performance Evaluation	Continuous	Cov./P. Confound	All Subjects
Message Anger	Continuous	Dependent	R. Conditions
Perceived Freedom Threat	Continuous	Dependent	R. Conditions
Negative Cognitions	Continuous	Dependent	R. Conditions
Message Attitudes	Continuous	Dependent	R. Conditions
Behavioral Intentions	Continuous	Dependent	All Subjects
Behavioral Attitudes	Continuous	Dependent	All Subjects
Newsletter Signup	Binary	Dependent	All Subjects

Note: Cov. = Covariate; P. Confound = Potential confound

The results of the one-way ANOVAs indicated that the groups did not vary on the basis of reactance proneness, $F(2, 74) = 2.74$, $p > .07$, previous experience with video games, $F(2, 73) = 1.95$, $p = .15$, previous experience with *Counter-Strike*, $F(2, 74) = 0.97$, $p > .38$, perceived game difficulty, $F(2, 74) = 0.72$, $p > .49$, presence, $F(2, 74) = 2.91$, $p > .06$, or subjective performance evaluations, $F(2, 74) = 2.17$, $p > .12$. Likewise, no group differences were observed on the basis of previous experience with Counter-Strike $\chi^2(2) = 1.24$, $p > .54$, gender, $\chi^2(2) = 3.15$, $p > .46$, or race, $\chi^2(8) = 7.70$, $p > .46$.

Table 23. Means, standard deviations, ranges, distributional statistics, and reliabilities for continuous measures used in ME1

Variable	M	SD	Range	Skew.	Kurt.	α
Trait Reactance	4.05	0.76	1.09 – 5.55	-0.94	2.56	.83
VG Experience	2.94	1.69	1.00 – 7.00	0.48	- 1.06	.97
CS Experience	1.31	1.11	1.00-7.00	3.85	14.53	---
Perceived Game Difficulty	3.30	1.36	1.00 -7.00	0.63	-0.35	---
Video Game Presence	4.04	1.51	1.50 -7.00	0.09	-0.77	.84
Performance Evaluation	2.81	1.35	1.00 -6.00	0.39	-0.84	---
Message Anger	3.75	0.82	1.00 –3.75	0.60	-0.77	.88
Perceived Freedom Threat	3.56	1.47	1.00 –6.80	0.12	-0.47	.91
Negative Cognitions	1.73	2.12	0.00 - 8.00	1.35	1.43	---
Message Attitudes	3.91	1.07	1.17-6.17	- 0.25	-0.01	.83
Behavioral Intentions	4.32	1.12	1.20–6.80	- 0.22	-0.01	.75
Behavioral Attitudes	5.71	0.97	2.33-7.00	- 0.95	1.13	.90
Game Attitudes	4.62	1.64	1.20-7.00	- 0.43	-0.78	.97

Note: Statistics reported for message anger, perceived freedom threat, negative cognitions, and message attitudes are only for those in the high/low reactance potential conditions

Analytic Strategy

The following analytic strategy was employed for ME1. First, to ensure that the reactance manipulation functioned as expected, a series of four independent samples t-tests were employed as a means of testing hypotheses $H1_{ME1} - H4_{ME2}$. For each of these tests, effect sizes were evaluated using Cohen's d (Cohen, 1992). Next, to test $H5_{ME1}$ and $H6_{ME1}$, a series of one-way ANOVAs were estimated. The independent (fixed factors) were the three experimental conditions and the dependent factors were behavioral attitudes and behavioral intentions, respectively. Effect sizes were evaluated using partial η^2 (Tabachnick & Fidell, 2001). All significant results were probed using Tukey's HSD post-hoc tests. As $H7_{ME1}$ was interested in predicting a dichotomous variable, binary logistic regression was used (Myers, Gamst, & Gaurin, 2013). Approximation of effect sizes for the model as a whole was provided via the Nagelkerke R^2 statistic. Finally, to

answer RQ1$_{ME1}$, I used a combination of one-way ANOVA/ANCOVAs and correlational analyses.

Statistical Results

To test the contention that the high reactance message would elicit heightened levels of perceived freedom threat (H1$_{ME1}$), group means for the high and low reactance potential conditions were tested using an independent samples *t*-test. The results of this analysis indicated that those in the high reactance condition perceived significantly higher levels of freedom threat (M $_{HIGH}$ = 4.05, SD $_{HIGH}$ = 1.31) than those in the low reactance potential condition (M $_{LOW}$= 2.91, SD $_{LOW}$= 1.44), *t*(49) = 2.95, *p* < .01, *d* = 0.83. H1$_{ME1}$ was therefore supported.

Similarly, an independent samples *t*-test indicated that those in the high reactance condition perceived significantly higher levels of anger toward the message (M $_{HIGH}$ = 2.00, SD $_{HIGH}$ = 0.79) than those in the low reactance potential condition (M $_{LOW}$= 1.36, SD $_{LOW}$= 0.58), *t*(50) = 3.19, *p* < .01, *d* = 1.16. Accordingly, H2$_{ME1}$ was supported.

H3$_{ME1}$ was supported as those in the high reactance potential group generated significantly more negative, message-relevant cognitions (M $_{HIGH}$ = 2.23, SD $_{HIGH}$ = 2.29), than those in the low reactance potential condition (M $_{LOW}$ =1.05, SD $_{LOW}$ = 1.68), *t*(50) = 2.06, *p* < .05, *d* = 0.04.

The prediction underlying H4$_{ME1}$ was that those in the low reactance condition would have significantly higher attitudes toward the message than those in the high reactance condition. As expected, an independent samples *t*-test indicated that those in the high reactance condition had significantly lower attitudes toward the message (M $_{HIGH}$

= 3.55, SD $_{HIGH}$ = 1.05) than those in the low reactance potential condition (M $_{LOW}$ =

4.39, SD $_{LOW}$ = 0.89), $t(49)$ = 3.00, $p < .01$, d = 0.86.

H5$_{ME1}$ suggested that those in the low reactance condition would indicate the

highest attitudes toward the behavior. A one-way ANOVA failed to support this

contention, $F(2, 74)$ = 1.57, $p > .21$. Examination of the mean vector suggested, however,

that the pattern of means was in the direction expected: M $_{HIGH}$ = 5.48, SD $_{HIGH}$ = 0.95; M

$_{CONTROL}$ = 5.77, SD $_{CONTROL}$ = 1.01; M $_{LOW}$ = 5.95, SD $_{LOW}$ = 0.89.

To test the contention that the game play, low reactance message condition would

affect the highest overall intentions to perform behaviors relevant to the message

(H6$_{ME1}$), a one-way ANOVA was estimated in which the independent factors were the

three experimental conditions and the independent variable was the behavioral intentions

measure. The test was significant, $F(2, 74)$ = 4.20, $p < .05$, partial η^2 = .10; Tukey's post-

hoc tests suggested that those in the control condition had higher average behavioral

intentions (M $_{CONTROL}$ = 4.70, SD $_{CONTROL}$ = 1.09) than those in the high reactance

potential condition (M $_{HIGH}$ = 3.89, SD $_{HIGH}$ = 0.99), $p < .05$. Notably, there were not

significant differences between the control condition and those in the low reactance

condition (M $_{LOW}$ = 4.49, SD $_{LOW}$ = 1.12). Accordingly, H6$_{ME1}$ was not supported.

H7$_{ME1}$ suggested that those in the low reactance group would be, comparatively

speaking, the most likely to perform the behavior advocated for by the message. To test

this hypothesis, a series of binary logistic regression models were estimated. All models

were coded such that clicking "Yes" on the newsletter sign up button was coded as 1 and

clicking "No" was coded as 0. The first model contained the two dummy variables

contrasting the manipulation conditions to the control condition. In each case, the control

114

condition was set as the baseline and coded as 0 while the manipulation of interest was coded as 1. Additionally, I statistically controlled for effects of trait reactance. The results of this model suggested that when compared to the control condition, those in the low reactance condition were 5.92 times more likely to agree to sign up for the newsletter than those in the control condition ($b = 1.78$, Wald $= 5.56$, $p < .05$). There were not, however, significant differences between those in the high reactance and control conditions. These results are reported in Table 24. Next, a separate model consisting only of trait reactance and a dummy variable contrasting high (coded as 0) and low (coded as 1) reactance potential conditions was estimated. Again, the effects of reactance proneness were controlled for. For its part, this model suggested that those in the low reactance condition were 11.41 times more likely to sign up for the newsletter than those in the high reactance potential condition ($b = 2.43$, Wald $= 7.83$, $p < .01$; Nagelkerke $R^2 = .29$). These results, taken together, supported H7$_{ME1}$.

Table 24. *Logistic regression predicting relationship between experimental condition and probability of newsletter signup*

Predictor	*b*	b_{se}	Wald	Exp(*B*)
Trait Reactance	0.11	0.40	0.07	1.11
Contrast 1 (Low & Control)	1.78*	0.75	5.56	5.92
Contrast 2 (High & Control)	- 0.73	0.97	0.57	0.48

Note: Nagelkerke $R^2 = .24$; **$p < .01$, * $p < .05$

To further explore the relationship between message outcomes and newsletter signup, I next estimated a binary logistic regression model that employed message attitudes, behavioral attitudes, and behavioral intentions as the independent variables and newsletter signup as the dependent variable. This analysis only included those subjects exposed to a persuasive message ($n = 51$). The results, as reported below in Table 25,

indicated a significant relationship between behavioral intentions and newsletter signup,

$b = 2.58$, Wald $= 6.88$, $p < .01$, Exp(B) $= 13.12$.

Table 25. Logistic regression predicting relationship between message outcomes and probability of newsletter signup (ME1)

Predictor	b	b_{se}	Wald	Exp(B)
Trait Reactance	- 0.18	0.81	0.05	0.84
Message Attitudes	0.40	0.58	0.01	1.04
Behavioral Attitudes	1.18	0.94	1.56	3.25
Behavioral Intentions	2.58**	0.98	6.88	13.12

Note: Nagelkerke $R^2 = .65$; ** $p < .01$)

RQ1$_{ME1}$ examined the relationship between message inclusion and participant

attitudes toward the game. A one-way ANOVA failed to indicate significant differences

between the experimental conditions and participant attitudes toward the game, $F(2, 74)$

$= 2.81$, $p > .06$ [$p = .067$]. Notably, as this result was marginally significant, I explored

the issue further by estimating an ANCOVA model with all game relevant variables (i.e.,

presence, subjective performance evaluation, general game experience, specific

experience with *Counter-Strike,* and perceived game difficulty) set as covariates. The

purpose of this test was to statistically equate the manipulation groups on all individual

factors related to gaming experience and in-game performance as a means of increasing

increase the statistical sensitivity to detect group differences on the basis of manipulation

condition. The results revealed a dramatic reduction of the F value associated with the

experimental treatment conditions, $F(2, 66) = 0.14$, $p > .86$, suggesting that the above-

described marginally significant result was likely due to a combination of game-relevant

variables rather the inclusion/lack thereof of a post-scroll message.

Finally, among those in the high and low reactance conditions ($n = 51$), there were not significant correlations between message attitudes and attitudes toward the game, $r = -.15$, $p > .30$, anger toward the message and game attitudes, $r = .11$, $p > .33$, or perceived freedom threat and game attitudes, $r = .13$, $p > .38$. These results suggested that participants did not attach feelings toward the message to the game as a whole.

Discussion

ME1 set out to explore the relationship between message provision, message characteristics, and evaluative and behavioral outcomes among those who played a violent video game (*Counter-Strike*). The results generally, although not absolutely, supported the hypothesized contentions. As confirmed by H1$_{ME1}$-H4$_{ME1}$, the high reactance potential message elicited state reactance in a manner and function similar to when the message was evaluated outside of the video game environment. Such elicitation of state reactance was subsequently associated with a comparatively lower likelihood of favorably evaluating the message, lower behavioral likelihood of performing behaviors consistent with the message's emphasis, and lower likelihood of actually performing the message-advocated behavior. The contrast most central to the current work, however, was between those who played the game and evaluated the low reactance message and those who played the game but did not evaluate a persuasive message. Here, the expectation was that residual levels of arousal, in conjunction with a low reactance potential message, would effectively spur favorable attitudes toward the behavior, enhance participant behavioral intentions, and, finally, result in an increased likelihood that participant's actually performed the behavior. The current data provided some support for these contentions. Most directly, the current study found that assignment to

117

the low reactance condition was statistically associated with the heightened likelihood of signing up for the message advocated newspaper when compared to both the control and high reactance conditions. Second, the study found some, albeit statistically tenuous, evidence that the low reactance message affected attitudinal gains when compared to the control condition. Specifically, decomposition of a non-hypothesized interaction effect between trait reactance and experimental condition suggested that those who evaluated the low reactance message and had low levels of trait reactance were substantively more likely to indicate elevated, favorable attitudes toward the message advocated behavior. Notably, the current study did not, however, identify any differences between conditions on the behavioral intentions measure.

In addition to investigating the relationship between message provision, message characteristics, and evaluative/behavioral outcomes, this study also set out to explore the relationship between the provision of a post-scroll, in-game message and participant evaluations of the game as a whole. The results of the current analyses suggested that when considered in isolation, there was a marginally significant relationship between experimental condition and game attitudes ($p > .06$ [$p = .067$]). Exploratory post-hoc procedures suggested that the locus of this near-significant effect was the tendency of those in the low reactance condition to indicate less favorable attitudes toward the game than those in the control condition. However, further exploration suggested this groupwise evaluative disparity may have been due to a combination of effects emanating from game relevant variables such pervious experience with video games and subjective evaluation of one's in-game performance.

Taken together, the results of the current study suggested that (1) in-game placement of an anti-violence measure was associated with message-advocated behavior and (2) that inclusion of the message did not substantively influence participant evaluations of the game itself. These factors, cumulatively, suggest that post-scroll messaging is a viable messaging platform. Accordingly, a second series of studies, cumulating in ME2, were designed to more thoroughly investigate the overall effectiveness of in-game, post-scroll messaging.

Pilot Test 2

As described in Chapter III, ME2 used a different message than that used in ME1. Several considerations played a role in this decision. First, as discussed by Thorson, Wicks, and Leshner (2012) use of multiple messages guards against the potentiality that the local, rather than global, message characteristics drive observed effects. Second, use of multiple messages allowed for additional manipulation of message characteristics that could, theoretically, influence participant information processing. As such, a series of validation steps, similar to those executed in support of ME1, were undertaken. The first of these steps was PT2. As in previous studies (i.e., PT1), the goal of PT2 was ensure that the message used in support of ME2 elicited the desired reactance state among message evaluators. The study-specific hypotheses guiding PT2 were:

> **H1$_{PT2}$: The high reactance potential message will elicit higher levels of freedom threat than the low reactance potential message.**
>
> **H2$_{PT2}$: The high reactance potential message will elicit higher levels of anger than the low reactance potential message.**

119

Procedure

Like PT1, PT2 pilot tested the proposed message using AMT. The procedure was identical to the procedure used for PT1. Specifically, the questionnaire document was hosted on the University of Oregon's Qualtrics server. Therein, Qualtrics' randomization engine was used to randomly assign participants to either the high or low reactance conditions. The messages comprising the low reactance and high reactance condition were equal length in words. After completing the questionnaire, respondents were provided with a randomly generated numeric code. This code was then inserted into the AMT interface as a means of ensuring that all respondents completed the questionnaire. Respondents were compensated $0.08 USD per completed questionnaire. The questionnaire took an average of 2.83 minutes to complete, resulting in an hourly wage of $1.82 USD per hour. Only respondents currently located in the United States were allowed to complete the questionnaire. As a means of ensuring that only those currently located in the US participated, IP addresses were tracked and double-checked. All IP information was discarded before statistical analyses. The AMT link was set to remain active until 80 responses were recorded or one calendar week had elapsed.

Similarly to PT1, the message in PT2 was modified to reflect the University of Chicago. As in the case of PT1, the rationale for selection of the University of Chicago was that, at the time of the study, Chicago, IL was in the news for increases gang-related violence and other criminal activity. Because there was a strong likelihood that respondents did not live in the geographic locale discussed in the message, participants were instructed to imagine that the message was written about the university or workplace with which they were currently associated. Text for each of the messages is included in Appendix A. The text for each message was developed using the guidelines

established by Rogers (1983), Dillard and Shen (2005), and Rains and Turner (2007),

amongst others.

The questionnaire flowed as follows: First, respondents were presented with a

consent statement. Second, participants were randomly assigned to either the high or low

reactance condition. Third, after evaluating the messages, respondents answered

questions related to the degree to which the message threated their freedom to choose and

the degree to which the message inspired negative emotion in the form of anger. Finally,

the respondents provided demographic information related to their gender and age.

Sample

A total of 80 valid responses were obtained. Data screening did not suggest that

any participants "clicked through" (i.e., selected the same value in responses to all

questions) the survey questionnaire; as such, no responses were deleted due to

inattentiveness. Randomization resulted in assignment of 38 subjects to the high

reactance potential condition and 42 subjects to the low reactance potential condition.

The sample had an average age of 34.26 years (SD = 12.95) and was 63.7% female (*n* =

51).

Missing Data Analysis

As in all previous studies, patterns of missingness within the data were examined.

Overall, 0.52% of the data was missing. A total of five (6.25% of the overall sample)

cases were missing data. Little's MCAR test suggested that missing data was ignorable,

$\chi^2(30) = 40.58$, $p > .09$; thus, listwise deletion procedures were used in subsequent

analyses (Harel, Zimmerman, & Dekhytar, 2008).

Measures

PT2, as in all previous studies, employed the perceived freedom threat and anger toward the message measures described in Chapter III and Appendix B. The scale means, standard deviations, reliability coefficients, and distributional statistics are provided in Table 26. As seen, each measure's internal reliability coefficient greatly exceeded the heuristic cutoff value of .70. Moreover, the measures' skew and kurtosis values were judged to be indicative of approximately normal distribution. Based on this information, the current measures were deemed appropriate for subsequent statistical analyses.

Table 26. Means, standard deviations, ranges, distributional statistics, and reliabilities for continuous measures used in PT2

Variable	M	SD	Range	Skew	Kurtosis	α
Freedom Threat	3.64	1.56	1.00 – 7.00	- 0.06	- 0.81	.91
Anger	1.62	0.93	1.00 - 5.00	1.66	2.35	.93

Analytic Strategy

The analytic strategy for PT2 involved conducting two discrete independent samples *t*-tests. For both tests, the reactance manipulation was the dependent variable. In the first *t*-test, perceived freedom threat was the dependent variable while in the second *t*-test, anger toward the message was the dependent variable. Cohen's *d* (Cohen, 1992) was used to evaluate effect sizes.

Statistical Results

$H1_{PT2}$ suggested that those in the high reactance condition would perceive higher levels of freedom threat than those in the low reactance condition. This proposition was supported by the data, which indicated that those high reactance potential condition

122

perceived higher levels of freedom threat (M_{HIGH} = 4.05, SD_{HIGH} = 1.48) than those in the low reactance potential condition (M_{LOW} = 3.27, SD_{LOW} = 1.57), $t(78)$ = 2.29, $p <$ .05, d = 0.51.

Second, H2$_{PT2}$ proposed that those in the high reactance potential condition would have higher levels of anger towards the message than those in the low reactance condition. As in the case of H1$_{PT2,}$ an independent samples t-test indicated that those in the high reactance potential condition had higher levels of anger toward the message (M_{HIGH} = 1.85 SD_{HIGH} = 1.11) than those in the low reactance potential condition (M_{LOW} = 1.42, SD_{LOW} = 0.69), $t(56.63)$ = 2.01, $p <$ .05, d = 0.47. Thus, H2$_{PT2}$ was supported.

Conclusion

The results from the analyses associated with PT2 suggested that the high and low reactance potential versions of the proposed message performed as hoped. As such, the message was deemed appropriate for further testing.

Pre-Test 3

PRT3 had two primary goals. First, PRT3 was used to test the contention that the message developed and initially validated in PRT2 would function as expected within a sample drawn from the population of interest. Second, PRT3 set out to explore the effects of cue saliency on reactance formation in a non-interactive environment (i.e., under fixed conditions), specifically as it related to reactance formation and memory performance. The hypotheses and research questions underlying PRT3 were as follows:

> **H1$_{PRT3}$: The high reactance potential message will elicit higher levels of perceived freedom threat than the low reactance potential message.**

123

H2$_{PRT3}$: The high reactance potential message will elicit higher levels of anger toward the message than the low reactance potential message.

H3$_{PRT3}$: The high reactance potential message potential condition will elicit more negative cognitions toward the message than the low reactance potential message.

RQ1$_{PRT3}$: Will cue saliency, either by itself or in conjunction with reactance potential, exert any influence on perceived freedom threat?

RQ2$_{PRT3}$: Will cue saliency, either by itself or in conjunction with reactance potential, exert any influence on anger toward the message?

RQ3$_{PRT3}$: Will cue saliency, either by itself or in conjunction with reactance potential, exert any influence on negative cognitions toward the message?

RQ4$_{PRT3}$: Will reactance condition, cue saliency, or the combined effects of reactance condition and cue saliency exert an influence on explicit recall?

Procedure

PRT3 was a fully randomized 2 (high reactance potential vs. low reactance potential) by 2 (cue saliency vs. no cue saliency) between-subjects design. The study was conducted online; as in previous studies, the questionnaire was hosted on the University of Oregon's *Qualtrics* server. Randomization was achieved using the Qualtrics randomization engine.

Participants were recruited from a variety of introductory and intermediate mass communication and strategic communication courses. Specifically, a hyperlink to the measurement instrument was e-mailed to all students enrolled in the course. A reminder e-mail was sent a week after the initial e-mail. All students received a small amount of extra credit in return for their participation.

The high and low reactance messages used in PT2 were modified to reflect the University of Oregon/Eugene, Oregon location. Reactance potential was operationalized in a manner consistent with previous research through the use of a persuasive attempt involving a threat-to-health component coupled with fear appeal (Dillard & Shen, 2005; Rains & Turner, 2007; Rogers, 1983). As in previous studies, the number of words for each message was approximately equal.

Cue saliency was operationalized by bolding and slightly enlarging selected lines of text relevant to the persuasive message's core purpose/goal. The method of operationalizing perceptual and goal-oriented saliency aligns with Mather and Sutherland's (2011) description of the factors that influence stimulus processing priority amongst aroused individuals. The bolded/enlarged content for each message was the same length of words. Text for each of the messages is included in Appendix A.

The study flow functioned in the following manner. First, respondents were presented with a consent statement. Second, participants were randomly assigned to one of the four experimental conditions. Third, after evaluating the messages, respondents answered questions related to the degree to which the message threated their freedom to choose and the degree to which the message inspired negative emotion in the form of anger. Respondents also completed the thought listing and recall tasks. Finally, the respondents provided demographic information related to their gender and age.

Sample

A total of 120 completed or partially completed responses were received. Because the current study asked participants to evaluate an English-language message, those who indicated that English was their second language were removed from the sample. This

125

resulted in the removal of five responses ($n = 5$). Randomization procedures resulted in the group assignment frequencies shown in Table 27. The sample had an average age of 21.28 years (SD = 1.58) and was 64.3% female ($n = 74$) female. With regards to race, 83.5% ($n = 96$) identified as White/Caucasian, 7.0% ($n = 8$) identified as Asian/Asian American, 5.2% ($n = 6$) identified as Hispanic/Latino, 0.9% ($n = 1$) identified as Black/African-American. 2 people (1.7%) did not identify with any of the provided racial/ethnic categories.

Table 27. Distribution of sample organized by manipulation conditions

Cell Conditions	Cell n	% of Sample
Low reactance message, no saliency	24	20.9%
Low reactance message, saliency	20	17.4%
High reactance message, no saliency	37	32.2%
High reactance message, saliency	34	29.6%

Missing Data Analysis

As in all previous studies, missing data patterns were evaluated among all variables of interest (i.e., demographic, dependent, and covariate indicators). Overall, a trivial amount of data was missing. Specifically, 0.23% of the overall data was missing; therein, 10 cases (8.70% of the overall sample) were missing data. Little's MCAR test indicated that the data was missing completely at random, $\chi^2(171) = 183.50$, $p > .24$; thus, missing data in subsequent analyses were handled using listwise deletion (Harel, Zimmerman, & Dekhytar, 2008).

126

Group Equivalency

As in all previous studies, a series of tests designed probe group equivalency were conducted. A one-way ANOVA including each of the four experimental cells indicated that the groups did not statistically vary on the basis of basis of trait reactance, $F(3, 111)$ = 0.67, $p > .58$, numeracy, $F(3,110) = 1.23$, $p > .30$, or average age, $F(3, 111) = 1.89$, $p > .14$. Similarly, Chi-square analyses failed to indicate significant group differences in regards to either gender, $\chi^2(3) = 2.46$, $p > .48$, or race, $\chi^2(12) = 11.59$, $p > .47$.

Measures

The measures described in Table 28 were used in PRT3. Full description of these measures can be found in Chapter III and Appendix B. Furthermore, the means, standard deviations, range boundaries, distributional characteristics, and reliability coefficients for each variable are reported in Table 29. As seen, the distributional characteristics associated with each variable generally indicated a lack of deviance from approximately normal distribution, although the negative cognitions measure was moderately positively skewed.

Table 28. Description of measures used in PRT3

Variable	Type	Role
Message Anger	Continuous	Dependent
Perceived Freedom Threat	Continuous	Dependent
Negative Cognitions	Continuous	Dependent
Explicit (Aided) Recall	Continuous/Count	Dependent
Trait Reactance	Continuous	Covariate/Potential Confound
Numeracy	Continuous/Count	Covariate/Potential Confound

Moreover, the reliability coefficients for each of the multi-item scales suggested adequate internal reliability. As in previous studies involving recall (e.g., Danaher & Mullarkey,

127

2003; Keller, Heckler, & Houston, 1998; Till & Baack, 2005), I treated the recall

inventory as a performance measure rather than a psychometric scale; for this reason,

alpha reliability was not reported.

Table 29. Means, standard deviations, ranges, distributional statistics, and reliabilities for continuous measures used in PRT3

Variable	M	SD	Range	Skew.	Kurt.	α
Trait Reactance	3.97	0.91	1.44 – 6.67	0.05	0.15	.83
Message Anger	1.73	0.87	1.00 – 5.00	1.15	1.02	.88
Freedom Threat	3.65	1.43	1.00 - 7.00	0.16	- 0.89	.92
Negative Cognitions	1.49	2.56	0.00-11.00	2.21	4.48	--
Numeracy	3.61	1.97	0.00 – 8.00	- 0.07	- 0.75	.73
Explicit Memory	1.74	1.12	0.00 – 4.00	0.14	- 0.95	---

Analytic Strategy

In support of PRT3, the following analytic strategy was employed: First, to test

$H1_{PRT3} - H3_{PRT3}$ and $RQ1_{PRT3} - RQ3_{PRT3}$, a series of three discrete two-way ANOVAs

were estimated. As in all previous studies, effect sizes associated with significant main

and interaction effects were evaluated using partial η^2 (Tabachnick & Fidell, 2001). A

two-way ANOVA was similarly used to probe $RQ4_{PRT3}$.

Statistical Results

$H1_{PRT3}$ suggested that the high reactance potential message would elicit

significantly higher levels of freedom threat than the low reactance potential message.

This assertion was supported as a two-way ANOVA indicated that those in the high

reactance condition (M $_{HIGH}$ = 4.00 SD $_{HIGH}$ = 1.42) perceived higher levels of freedom

threat than those in the low reactance potential condition (M $_{LOW}$ = 2.25 SD $_{LOW}$ = 0.95),

$F(1, 110) = 37.29,\ p < .001$, partial $\eta^2 = .25$. For its part, $RQ1_{PRT3}$ was interested in

exploring the relationship between cue saliency and perceived freedom threat. The ANOVA test failed to identify a main effect for cue saliency, $F(1, 110) = 0.002$, $p > .97$. However, a significant effect was observed for the reactance potential x cue saliency interaction, $F(1,110) = 4.87$, $p < .05$, partial $\eta^2 = .04$. This effect is shown below in Figure 9. Examination of simple effects suggested that those in the high reactance potential, non-salient condition (M $_{HIGH + NO SALIENCY}$ = 4.26, SD $_{HIGH + NO SALIENCY}$ = 1.37) perceived higher levels of freedom threat than those in the high reactance potential, cue saliency condition (M $_{HIGH + SALIENCY}$ = 3.72, SD $_{HIGH + SALIENCY}$ = 1.44), $p < .01$. Further examination of simple effects also indicated that those in the high reactance potential, non-salient condition perceived significantly higher levels of freedom threat than those in the low reactance, cue saliency condition (M $_{LOW + SALIENCY}$ = 2.78, SD $_{LOW + NO SALIENCY}$ = 0.97), $p < .001$. Finally, simple pairwise comparisons also indicated that those high saliency, no cue condition experienced higher levels of perceived freedom threat than those in the low saliency, no cue condition (M $_{LOW + NO SALIENCEY}$ = 2.25, SD $_{LOW + NO SALIENCEY}$ = 0.89), $p < .001$. These results suggested that, among the current sample, cue saliency had a buffering effect on the development of perceived freedom threat.

H2 $_{PRT3}$ suggested that that those in the high reactance potential condition would experience heightened levels of anger toward the message. This prediction was supported by the data, as those in the high reactance condition held higher levels of anger toward the message (M $_{HIGH}$ = 2.02 SD $_{HIGH}$ = 0.91) than those in the low reactance condition (M $_{LOW}$ = 1.26, SD $_{LOW}$ = 0.54), $F(1, 111) = 24.10$, $p < .001$, partial $\eta^2 = .18$. RQ2$_{PRT3}$ sought to explore the relationship between cue saliency and anger toward the message. The ANOVA failed to find an main effect associated with cue saliency, $F(1, 111) = 0.03$,

p > .87. The interaction between reactance potential and cue saliency approached but did not reach significance, $F(1, 111) = 1.77$, *p* > .09. Examination of the shape of the interaction effect (Figure 10) again suggested that cue saliency again as a buffer against the onset of message-relevant anger.

Figure 9. Plot showing interaction effect of reactance potential and cue saliency on perceived freedom threat (PRT3).
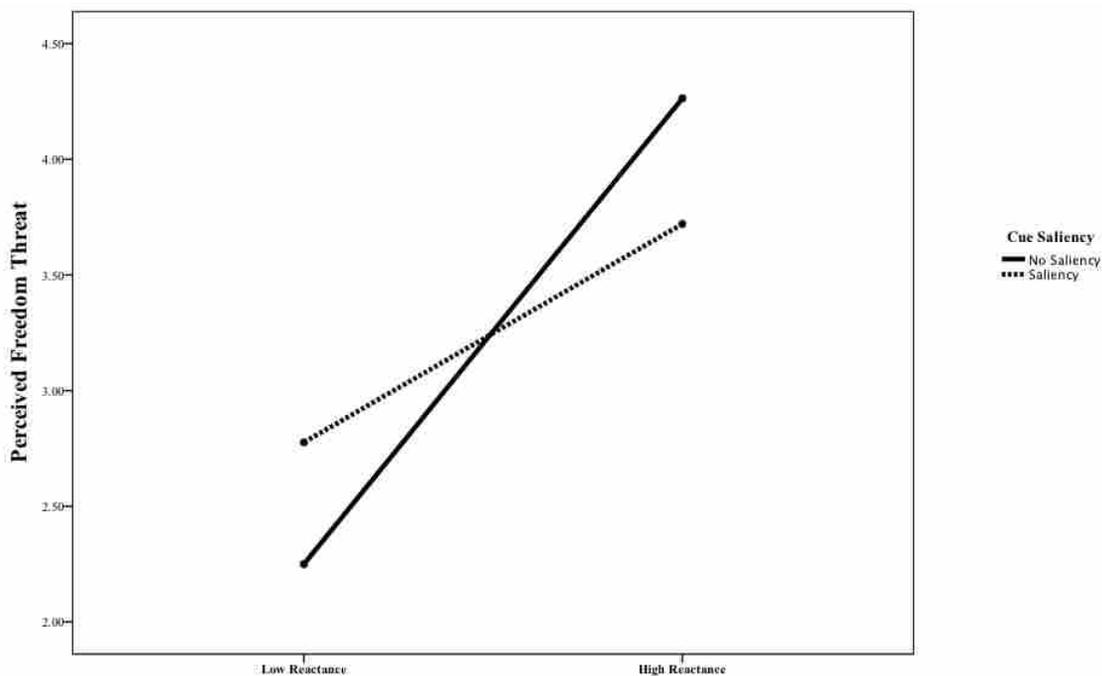
H3$_{PRT3}$ predicted that the high reactance potential condition would elicit significantly more negative cognitions relevant to the target message. This contention was supported; those in the high reactance potential condition generate more negative, message-relevant cognitions (M $_{HIGH}$ = 1.89 SD $_{HIGH}$ = 2.71) than those in the low reactance condition (M $_{LOW}$ = 0.81, SD $_{LOW}$ = 2.71), $F(1, 108) = 4.77$, *p* < .05, partial η^2 = .04. As it related to RQ3$_{PRT3}$, No main effects for cue saliency were observed, $F(1, 111)$

$= 0.003$, $p > .95$. Moreover, the interaction effect was not significant, $F(1, 111) = 0.07$, $p > .78$.

Figure 10. Exploratory plot showing the relationship between message reactance potential, cue saliency, and anger towards the message
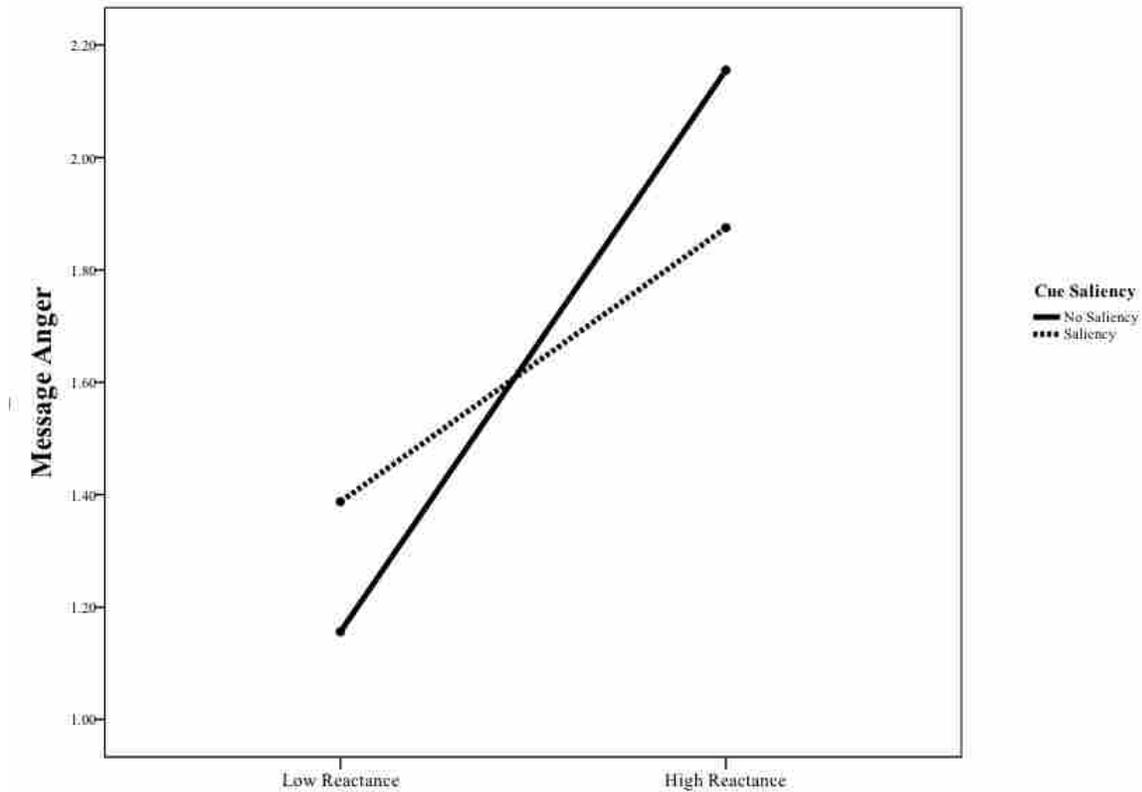
RQ4$_{PRT3}$ was interested in examining the relationship between reactance formation, cue saliency, and recall of message details amongst study participants. The results of a two-way ANOVA failed to indicate a significant main effect for either reactance potential condition, $F(1, 110) = 0.97$, $p > .32$, or cue saliency, $F(1, 110) = 0.96$, $p > .32$. Moreover, the interaction effect was non-significant, $F(1, 110) = 0.86$, $p > .35$.

Conclusion

PRT3 explored the relationship between message reactance potential and cue saliency in a low arousal environment. Three primary findings, relevant to the current work as a whole, resulted from PRT3. First, considered in isolation, the high reactance version of the message was shown to elicit significantly higher levels of perceived freedom threat, anger towards the message, and negative message relevant cognitions than the low reactance version of the message among a sample drawn from the population of interest. Second, this study suggested that cue saliency exerted a buffering effect on the formation of state reactance in a low arousal context. Specifically, I observed an interaction effect between reactance potential and cue saliency such that cue saliency appeared to act as a bulwark against perceived freedom threat. A similar effect, albeit not significant a $p < .05$, was also observed for the message relevant anger. This effect was not hypothesized *a priori*. Third, the results indicated that cue saliency did not exert a meaningfully detectable impact on individual abilities to commit information to memory.

Having explored participant evaluations of the high and low reactance potential messages in low arousal context, the current work was next concerned with evaluating the individual and conjoint roles of reactance potential and cue saliency in a comparatively high arousal context.

Main Experiment 2

The primary goal guiding ME2 was to explore the individual and combined effects of cue saliency and reactance potential on outcomes related to reactance formation, message evaluations, message effects, and recall in a high arousal media

132

context. Following the theoretical specifications outlined in Chapter II, the current work posited that cue saliency would exacerbate the onset and effects of state reactance. Moreover, the expectation associated with the current work was that cue saliency, alone, would influence participant recall of message details. These hypotheses are explicated below:

> $H1_{ME2}$: **Cue saliency will amplify the effects of the high reactance potential message on perceived freedom threat.**
>
> $H2_{ME2}$: **Cue saliency will amplify the effects of the high reactance potential message on anger toward the message.**
>
> $H3_{ME2}$: **Cue saliency will amplify the effects of the high reactance potential message on negative message relevant cognitions.**
>
> $H4_{ME2}$: **Cue saliency will have a positive influence on participant recall.**
>
> $H5_{ME2}$: **State reactance formation will be negatively associated with attitudes toward the message ($H5_{ME2}a$), attitudes toward the behavior ($H5_{ME2}b$), and behavioral intentions ($H5_{ME2}c$).**
>
> $H6_{ME2}$: **Favorable attitudes toward the message ($H6_{ME2}a$), favorable attitudes toward the message-advocated behavior ($H6_{ME2}b$), and positive behavioral intentions ($H6_{ME2}c$) will predict to likelihood of newsletter signup.**
>
> **RQ1: Will sex influence state reactance formation of message outcomes of interest?**

Procedure

ME2 was a completely randomized, 2 (low reactance potential, high reactance potential) by 2 (no cue saliency, cue saliency) between-subjects design. Broadly speaking, the procedure for ME2 was nearly identical to that used in support of ME1. Because of technological demands associated with the video game stimulus, students were run in individual sessions. ME2 used the same *Counter-Strike* map (*CS_Office*; see

133

Appendix B) used in ME1. Participants played a 10-minute deathmatch-styled game in which they competed against the computer's AI. Participants played with seven other game-controlled combatants, 3 of which were on their team and 4 of which were on the opposing team. The opposing bots were set to "easy" difficulty. Before the gameplay session began, participants were given a 30 second introduction on the game, game mode, and the basic controls for navigating the game. Additionally, a postcard providing instructions for how to use the basic functions of the game was posted above the computer used to display the game. For maximum control over the experimental environment, each participant used two computers. Computer 1 hosted the pre-test and post-test questionnaires. A computer, located to each participant's immediate right (Computer 2), had the game loaded, properly configured, and ready to play. Once the participants completed the questionnaire, they were instructed to move to Computer 2. As mentioned above, the game was initialized via a remote server command. The message stimulus used in ME2 was identical to the stimulus used in PRT3 (see Appendix A for text). The message appeared within the game environment at the conclusion of the gameplay session. As in ME1, participants were given 45 seconds to evaluate the message. A screenshot showing how the message appeared in the game is shown in Appendix C. Each session had a total duration of approximately 30 minutes.

Sample

116 completed or partially completed responses were received. To remain consistent with previous studies, participants for whom English was their second language were removed from the sample; this resulted in the removal of 15 responses, resulting in an analytic *n* of 101. Randomization procedures resulted in the group

assignment frequencies shown in Table 30. The sample had an average age of 20.53 years

(SD = 1.49) and was 66.3% female (n = 67). With regards to racial/ethnic composition of

the sample, 83.2% (n = 84) identified as White/Caucasian, 5.9% (n = 6) identified as

Asian/Asian American, 5.0% (n = 5) identified as Hispanic/Latino, 2.0% (n = 2)

identified as Black/African-American. 3 participants (3.0%) did not identify with any of

the provided racial/ethnic categories.

Table 30. Distribution of sample organized by manipulation conditions

Cell Conditions	Cell n	% of Sample
Low reactance message, no saliency	29	28.7%
Low reactance message, saliency	22	21.8%
High reactance message, no saliency	21	20.8%
High reactance message, saliency	29	28.7%

Missing Data Analysis

Missing data patterns were evaluated among all variables of interest. Overall, a

trivial amount of data was missing. Specifically, 0.11% of the overall data was missing;

specifically, 7 cases (6.93% of the overall sample) were missing data. Little's MCAR test

indicated that the data was missing completely at random, χ^2(339) = 347.33, p > .36; thus,

missing data in subsequent analyses were handled using listwise deletion (Harel,

Zimmerman, & Dekhytar, 2008).

Measures

Table 31 describes the measures, and their respective roles, used in ME2. Full

description of these measures can be found in Chapter III and Appendix B.

Table 31. Description of measures used in ME2

Variable	Level	Type
Trait Reactance	Continuous	Cov./P. Confound
Numeracy	Count/Continuous	Cov./P. Confound
VG Expertise	Continuous	Cov./P. Confound
C-S Experience	Continuous	Cov./P. Confound
Perceived Game Difficulty	Continuous	Cov./P. Confound
Video Game Presence	Continuous	Cov./P. Confound
Performance Evaluation	Continuous	Cov./P. Confound
Message Anger	Continuous	Dependent
Perceived Freedom Threat	Continuous	Dependent
Negative Cognitions	Continuous	Dependent
Recall	Count/Continuous	Dependent
Message Attitudes	Continuous	Dependent
Behavioral Intentions	Continuous	Dependent
Behavioral Attitudes	Continuous	Dependent
Newsletter Signup	Binary	Dependent

Note: Cov. = Covariate; P. Confound = Potential confound

The means, standard deviations, range boundaries, distributional characteristics, and reliability coefficients for each variable are reported in Table 32. As seen, the distributional characteristics associated with each variable indicated a lack of deviance from approximately normal distribution (Kline, 2011). Moreover, each variable indicated acceptable levels of internal reliability (i.e., > .70).

Group Equivalency

Consistent with previous studies, group equivalency was evaluated. One-way ANOVAs suggested that the groups did not significantly differ in terms of trait reactance, $F(3, 96) = 0.81$, $p > .49$, numeracy, $F(3, 97) = 0.56$, $p > .56$, previous experience with *Counter-Strike*, $F(3, 97) = 0.63$, $p > .59$, subjective expertise related to video game play, $F(3, 96) = 1.30$, $p > .27$, video-game elicited arousal, $F(3, 95) = 0.21$, $p > .88$, perceived game difficulty, $F(3, 97) = 0.76$, $p > .51$, subjective performance evaluation, $F(3, 97) =$

0.76, $p > .51$, or attitudes toward the video game, $F(3, 94) = 1.03$, $p > .38$. Finally, a chi-square analysis indicated that the groups were not significantly different in terms of gender, $\chi^2(3) = 1.57$, $p > .66$, or racial, $\chi^2(12) = 4.78$, $p > .96$, distribution.

Table 32 Means, standard deviations, ranges, distributional statistics, and reliabilities for continuous measures used in ME2

Variable	M	SD	Range	Skew.	Kurt.	α
Trait Reactance	3.88	0.75	1.73 – 6.18	0.20	0.76	.77
Numeracy	3.95	1.86	0.00 – 8.00	0.14	-0.45	.67
VG Expertise	2.89	1.73	1.00 – 7.00	0.81	-0.32	.97
C-S Experience	1.76	2.15	1.00 – 8.00	2.55	4.67	---
Per. Game Difficulty	6.31	1.56	1.00 – 10.00	- 0.64	2.56	---
Video Game Presence	4.06	1.42	1.25 – 7.00	0.06	-0.47	.80
Performance Evaluation	3.04	1.63	1.00 – 7.00	0.64	-0.61	.98
Game Attitudes	4.53	1.79	1.00 – 7.00	- 0.40	-0.79	.97
Arousal	4.48	1.18	1.00 – 7.00	- 0.49	0.60	.88
Message Anger	1.96	1.01	1.00 – 5.00	1.06	0.39	.93
Per. Freedom Threat	3.01	1.42	1.00 – 7.00	0.53	-0.30	.88
Negative Cognitions	0.91	1.60	0.00 – 7.00	2.26	4.89	---
Recall	1.05	0.95	0.00 – 4.00	0.61	-0.21	---
Message Attitudes	4.42	0.93	1.67 – 7.00	0.22	0.82	.7
Behavioral Attitudes	5.66	0.76	4.00 – 7.00	0.07	-0.78	.84
Behavioral Intentions	3.98	1.08	1.40 – 6.20	- 0.09	-0.34	.76

Analytic Strategy

To test H1$_{ME2}$ – H3$_{ME2}$, a series of three discrete two-way ANOVAs were estimated. As in all previous studies, effect sizes associated with significant main and interaction effects were evaluated using partial η^2 (Tabachnick & Fidell, 2001). A two-way ANOVA was similarly used to probe H3$_{ME2}$. As a first step, however, a series of independent samples *t*-tests to confirm that the reactance manipulation, on its own, functioned as desired. While the results of the two-way ANOVA do, of course, report the influence attributable to the main effects of each variable, the reported *F* statistic is

corrected to account for the presence of the all other terms included in the model. Thus, as a means of remaining consistent with previous studies, the *t*-tests were used as an initial, descriptive, step. H4$_{ME2}$ was also probed using an independent samples *t*-test. All significant *t*-tests were accompanied by Cohen's *d* (Cohen, 1992). Hypotheses H5$_{ME2}$a - c were tested using OLS regression. Finally, hypotheses H6$_{ME2}$a-c were tested using a binary logistic regression model.

Statistical Results

An independent samples *t*-test confirmed that those in the high reactance condition perceived significantly higher levels of freedom threat (M $_{HIGH}$ = 3.02, SD = 1.51) than those in the low reactance condition (M $_{LOW}$ = 2.47, SD $_{LOW}$ = 1.21), *t*(97) = 2.03, *d* = 0.40. Likewise, those in the high reactance potential condition had significantly higher levels of message-oriented anger (M $_{HIGH}$ = 2.20, SD = 1.10) than those in the low reactance potential condition, (M $_{LOW}$ = 1.75, SD $_{LOW}$ = 0.87), *t*(93.93) = 2.30, *d* = 0.45. Finally, those in the high reactance potential condition generated more message-relevant negative cognitions (M $_{HIGH}$ = 1.26, SD = 1.76) than those in the reactance potential condition, (M $_{LOW}$ = 0.58, SD $_{LOW}$ = 1.36), *t*(92.06) = 2.17, *d* = 0.43. These results confirmed that, considered in isolation, the reactance manipulation functioned in a manner consistent with previous studies.

Next, to test H1$_{ME2}$, a two-way ANOVA was estimated. As expected, a significant interaction effect between reactance condition and cue saliency was identified, *F*(1, 95) = 4.39, *p* < .05, partial η^2 = .04. Additionally, a main effect for reactance condition was observed, *F*(1, 95) = 3.86, *p* ≤ .05 [*p* = .052], partial η^2 = .04. The main effect for cue saliency was non-significant, *F*(1, 95) = .002, *p* >.96. The interaction effect is depicted

below in Figure 11. As seen, the figure broadly indicated that combination of high reactance potential and cue saliency amplified the degree to which participants perceived that the message threatened their freedom to choose. Tests of simple effects suggested that those in the high reactance, cue saliency group ($M_{HIGH + SALIENCY} = 3.25$, $SD_{HIGH + SALIENCY} = 1.56$) had significantly higher mean scores than those in the low reactance, cue saliency group ($M_{LOW+ NO SALIENCY} = 2.14$, $SD_{LOW + NO SALIENCY} = 0.94$), $p < .01$. This finding suggested that cue saliency suppressed perceived freedom threat when message reactance potential was low but, comparatively speaking, exacerbated perceived freedom threat when message reactance potential was high. For the comparison between the high reactance and salient cue condition and the high reactance, no saliency condition ($M_{HIGH + NO SALIENCY} = 2.69$, $SD_{HIGH + NO SALIENCY} = 1.40$), simple pairwise comparisons approached, but did not reach, significance, $p > .15$. A similar effect was observed when comparing the high reactance and salient cue condition with the low reactance, non-saliency condition ($M_{LOW + NO SALIENCY} = 2.72$, $SD_{LOW + NO SALIENCY} = 1.35$; $p > .10$). Interestingly, and in contrast to the results of PT2 and PRT3, the pairwise comparison between those in the high reactance potential, no cue condition and those in the low reactance potential, no cue condition was strongly non-significant, $p > .95$. Taken as a whole, these results suggest that the provision of an external saliency marker effectively "steepened" the relationship between message reactance potential and perceived freedom threat; thus, $H1_{ME2}$ was supported.

139

Figure 11. Plot showing the effect of cue saliency on the relationship between high/low reactance potential and perceived freedom threat.
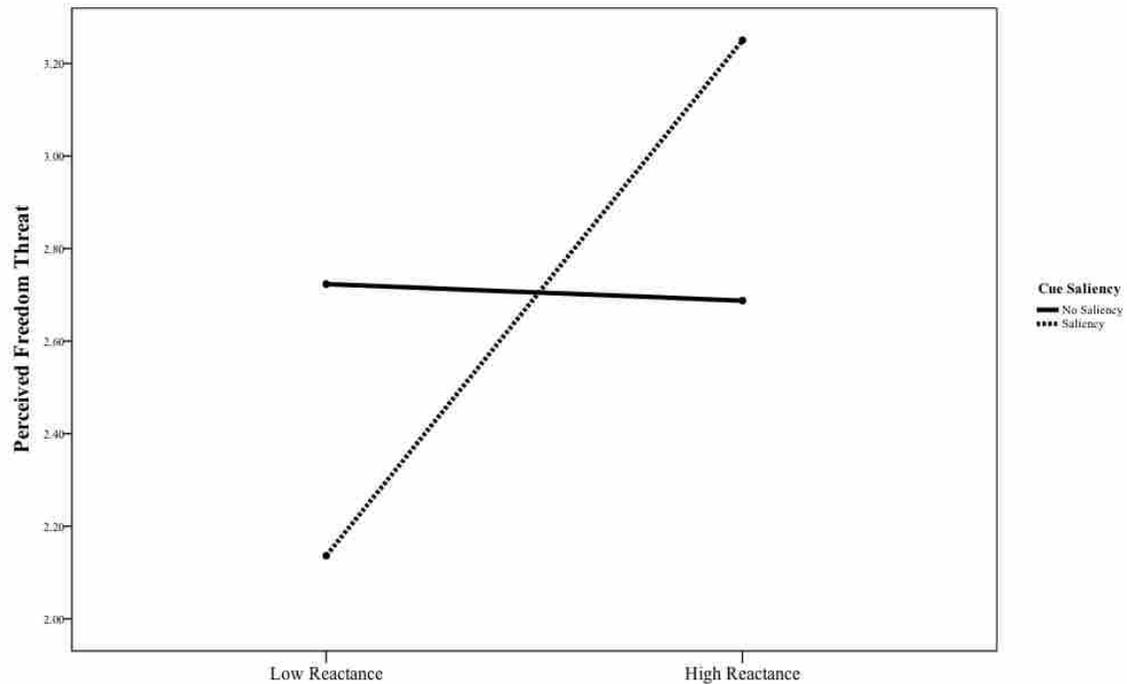
A second two-way ANOVA was estimated to test H2$_{ME2}$. A marginally significant two-way interaction was found between reactance condition and cue saliency, $F(1, 96) = 3.91, p \leq .05$ [$p = .051$], partial $\eta^2 = .04$. Moreover a significant main effect was identified for reactance condition, $F(1,96) = 4.98, p < .05$, partial $\eta^2 = .05$. Cue saliency did not exert a significant main effect on anger towards the message, $F(1, 96) = 0.03, p > .85$. In light of the marginal significance of the interaction effect between reactance condition and cue saliency, a follow-up test was conducted before interpretation. Specifically, the two-way ANOVA was re-created in an OLS model using effects codes (i.e., 1, -1) to represent each experimental condition. The interaction term was the product of the two dummy variables. This allowed for assessment of statistical significance to be examined using 5,000 bias-corrected, bootstrapped re-samples in addition to traditional significance

140

testing. The logic behind this procedure was to better explore the stability of the *p*-value

observed as a result of the two-way ANOVA. The results of this test indicated that the

95% confidence interval for the interaction term ($b = 0.20$) did not include 0, $95\%_{CI} =$

.04, .41. Thus, the interaction effect was investigated with some additional confidence in

the statistical significance of the parameter estimate. The shape of the interaction, as

shown in Figure 12, generally mimicked the result found for $H1_{ME2}$ such that cue saliency

appeared to exert an amplifying effect on participant anger towards the message. Tests of

simple effects suggested that those in the high reactance, cue saliency condition ($M_{HIGH +}$

$_{SALIENCY} = 2.38$, $SD_{HIGH + SALIENCY} = 1.20$) had significantly high levels of anger toward

the message than those in the low reactance, cue saliency condition ($M_{LOW + SALIENCY} =$

1.55, $SD_{LOW + SALIENCY} = 0.64$; $p < .01$). Put differently, the current results suggested that

cue saliency induced lower levels of message anger among those who evaluated a low

reactance potential message but amplified message anger among those who evaluated a

high reactance potential message. Further simple means comparisons also indicated that

those in the high reactance, no cue saliency condition ($M_{HIGH + NO SALIENCY} = 1.55$, SD

$_{HIGH + NO SALIENCY} = 0.64$; $p \leq .05$; $[p = .051]$) were significantly, albeit marginally, less

likely to express anger towards the message. The simple means contrast between those in

the high reactance potential, salient cue condition and those in the low reactance, no

saliency condition ($M_{LOW + NO SALIENCY} = 1.87$, $SD_{LOW + NO SALIENCY} = 0.99$) was not

significant at $p < .05$ ($p > .13$). Finally, as in the case of $H1_{ME2}$ (and in stark contrast to

the findings from PT2 and PRT3), the simple pairwise comparison between those in the

high reactance, no saliency and low reactance, no saliency conditions was strongly non-

significant, $p > .77$. Despite the marginal significance of the interaction term, these

results generally supported H2$_{ME2}$ as the presence of a salient cue both steepened the relationship between reactance potential and message anger and meaningfully exacerbated the degree of message anger perceived within the high reactance potential condition.

Figure 12. Plot showing the effect of cue saliency on the relationship between high/low reactance potential and perceived freedom threat.
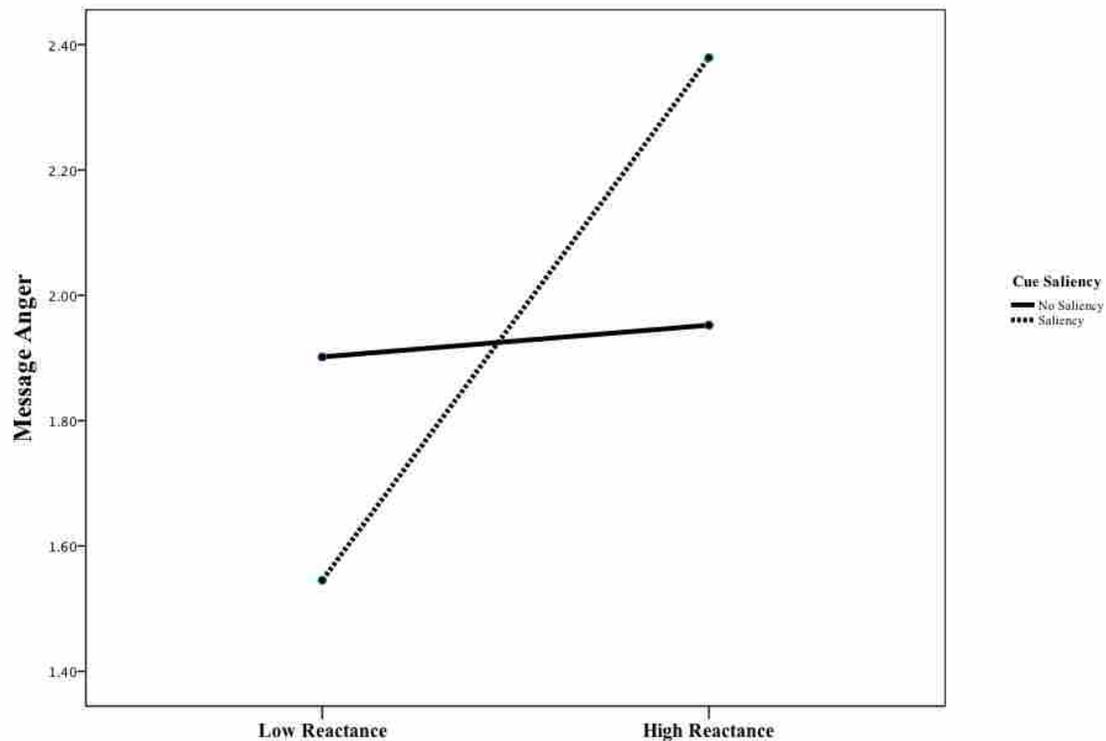

H3$_{ME2}$ suggested that cue saliency would exert an amplifying effect on participant generation of message relevant negative cognitions. To test this hypothesis, a two-way ANOVA was estimated. The results suggested a significant main effect for reactance potential condition, $F(1, 96) = 4.39, p < .05$, partial $\eta^2 = .04$. However, non-significant effects were returned for both the main effect of cue saliency, $F(1, 96) = 0.22, p > .64$, and the interaction term, $F(1, 96) = 1.26, p > .26$. Furthermore, simple comparison of the

cell means failed to indicate that mean vector was in the direction hypothesized (Table

33). Accordingly, H3$_{ME2}$ was not supported.

Table 33. Mean number of negative, message relevant cognitions generated by experimental condition

	High Reactance, Saliency	High Reactance, No Saliency	Low Reactance, Saliency	Low Reactance, No Saliency
Negative Cognitions (M)	1.17 (1.98)	1.38 (1.43)	0.86 (1.88)	0.35 (0.70)

Note: Standard deviations in parenthesis

H4$_{ME2}$ was concerned with exploring the relationship between cue saliency and

recall. An independent samples t-test failed to indicate that cue saliency was related to

participant recall of message details, $t(98) = 0.43$, $p > .67$. Accordingly, H4$_{ME2}$ was not

supported.

To better explore the null result observed for H4$_{ME2}$, an exploratory three-way

ANOVA model was estimated. This model included the cue saliency manipulation, a

median split for participant arousal (median = 4.67; high $n = 45$, low $n = 46$) and a median

split for the self-reported measure of video game presence (median = 4.25; high $n = 40$,

low $n = 49$). The reasoning here was that those who were either highly aroused by and/or

highly involved in the video game environment may have less resources immediately

available for message processing and thus may be relatively more dependent upon the

provision of externally provided message processing cues. This exploratory model also

included the variable representing the reactance potential manipulation as this variable

was of obvious and substantive interest to the current work as a whole. To impose

reasonable limitations on the number of estimated parameters, the model was modified

such that no 4-way effects were estimated. The resultant model failed to identify any

significant main effects (all F values < 1.00). An interaction effect was, however, identified, $F(1, 74) = 4.46$, $p < .05$, partial $\eta^2 = .04$. No other two or three-way interactions were identified (all F values < 1.80). Examination of the shape of the effect (Figure 13) suggested that those who experienced high levels of in-game presence and who evaluated the message containing salient cues were better able to recall message-specific details. Examination of simple effects suggested that those in the cue salient condition who experienced high levels of presence (M $_{\text{HIGH PRESENCE + SALIENCY}}$ = 1.27, SD $_{\text{HIGH PRESENCE + SALIENCY}}$ = 1.15) had significantly higher levels of recall than those who experienced low levels of presence in the cue saliency condition (M $_{\text{HIGH PRESENCE + SALIENCY}}$ = 0.71, SD $_{\text{HIGH PRESENCE + SALIENCY}}$ = 0.81; $p < .05$). No other significant/marginally significant simple effects or pairwise mean comparisons were identified.

Figure 13. Exploratory plot showing the effect of video game induced presence on the relationship between cue saliency provision and recall scores.
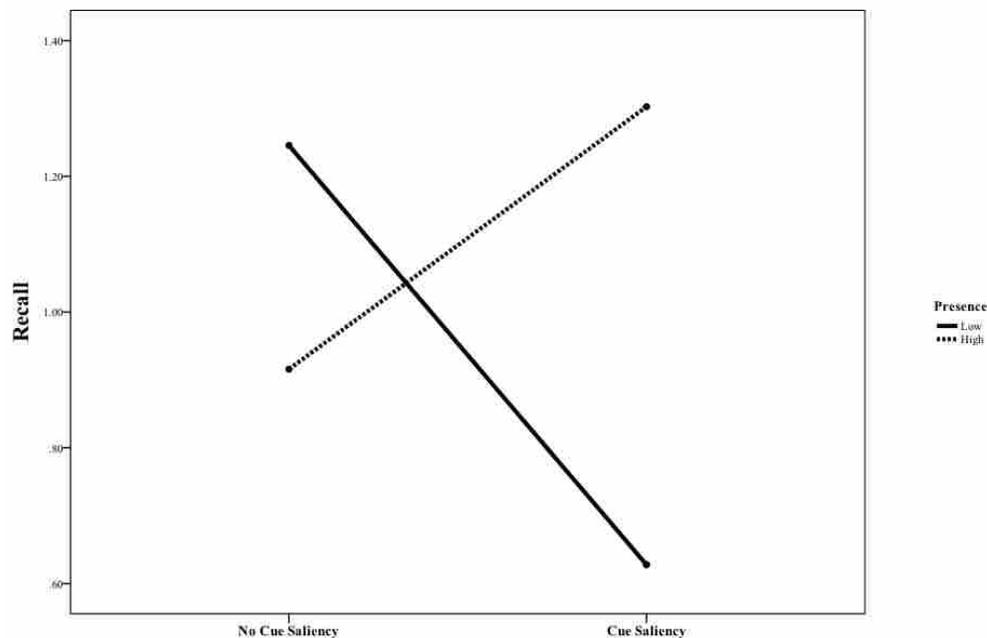
To test H5$_{ME2}$a-c, a factor score consisting of the anger and negative cognitions measures was generated using principal axis extraction with regression computation (DiStefano, Zhu, & Mindrila, 2009). Next, a partial bivariate correlation matrix that controlled for the effects of trait reactance as estimated. Contrary to expectations, only attitudes toward the message were significantly related to state reactance, $r_p = -.26$, $p < .01$. A summary of variable inter-correlations is provided in Table 34. Examination of the correlation matrix, and the patterns of association therein, suggested the potentiality that message attitudes may have mediated the relationship between state reactance and both behavioral attitudes and behavioral intentions. To test this contention, a series of indirect effects/mediation models were generated. The first series of models separately tested the notion that effect of state reactance on both behavioral attitudes and behavioral intentions was facilitated by message attitudes. Next, after testing these models individually, a second series of models were tested for serial mediation. These analyses specifically tested the proposed relational chain structured such that state reactance -> message attitudes -> behavioral attitudes -> behavioral intentions. All analyses controlled for the effects of reactance proneness. All indirect effects were identified using 5,000 bias-corrected bootstrapped resamples (Hayes, 2013); specifically, if the values that appear at the lower and upper 95th percentiles do not include 0, evidence of statistical significance is obtained (Hayes, 2013). This method favorably compares to traditional approaches, such as the Sobel test, that erroneously assume normality of the *ab* term used to describe mediation (Hayes, 2009; Hayes, 2013; Preacher & Hayes, 2008; Preacher & Hayes, 2004).

*Table 34. Partial correlations between state reactance and message outcomes*

Variable	1	2	3	4
State Reactance (1)		-.26**	-.17[T]	.16
Message Attitudes (2)			.50***	.25*
Behavioral Attitudes (3)				.43***
Behavioral Intentions (4)				

Note: *** $p < .001$, ** $p < .01$, *$p < .05$, [T]$p < .10$

The first grouping of models involved estimating a series of OLS regressions. In each case, the first OLS regression examined the relationship between state reactance and message attitudes, controlling for the effects of trait reactance. The next series of models explored the relationship between (1) message attitudes and behavioral attitudes and (2) message attitudes and behavioral intentions. Each of these models controlled for the effects of state reactance. As suggested by Table 34, state reactance and message attitudes were significantly and negatively related after controlling for trait reactance ($b = -.49, p < .01$), $F(1, 95) = 8.95, p < .01, R^2 = .09$. In the case of behavioral attitudes, the second OLS model indicated that after controlling for state reactance, message attitudes were significantly related to behavioral attitudes, $b = 0.40, p < .001; F(2, 94) = 14.80, p < .001, R^2 = .24$. The identified indirect effect of state reactance on behavioral attitudes was negative, $ab = -0.20$. Examination of the upper and lower bootstrapped confidence intervals suggested that this negative effect was statistically significant, $95\%_{CI} = -0.38, -0.06$. For behavioral intentions, the OLS model controlling for state reactance identified a significant direct effect for message attitudes, $b = 0.30, p < .05; F(2, 95) = 4.28, p < .05, R^2 = .08$. However, for the indirect effect ($ab = -0.15$), the confidence intervals included 0 ($95\%_{CI} = -.36, .02$), indicating that the indirect effect was not significant. To further explore the structural relationship among the variables, I next tested for serial mediation such that state reactance -> message attitudes -> behavioral attitudes -> behavioral

intentions. The results indicated support the above-specified serial mediation model.

First, as reported above, the relationship between state reactance and message attitudes was negative and statistically significant at $p < .05$. Second, also as described above, Model 2 indicated that after controlling for the effects of state reactance, message attitudes were a significant and positive predictor of behavioral attitudes. Next, Model 3 indicated that after controlling for the effect of both state reactance and message attitudes, behavioral attitudes were a significant predictor of behavioral intentions, $b = 0.59$, $p < .001$; $F(4, 91) = 10.24$, $p < .001$, $R^2 = .25$. Fourth, the indirect effect of state reactance on behavioral intentions, as facilitated sequentially by message attitudes and behavioral attitudes, was negative, $ab = -0.11$, and significant, $95\%_{CI} = -0.26, -0.03$. This effect is illustrated in Figure 14. In their sum, these results suggested full support for H5$_{ME2}$a. Notably, however, H5$_{ME2}$b and H5$_{ME2}$c predicted direct, negative relationships between state reactance and behavioral attitudes and behavioral intentions, respectively. The data, however, suggested the existence of indirect, negative relationships between these variables. Thus, H5$_{ME2}$b and H5$_{ME2}$c were only partially supported.

Figure 14. Indirect effect of state reactance on behavioral intentions
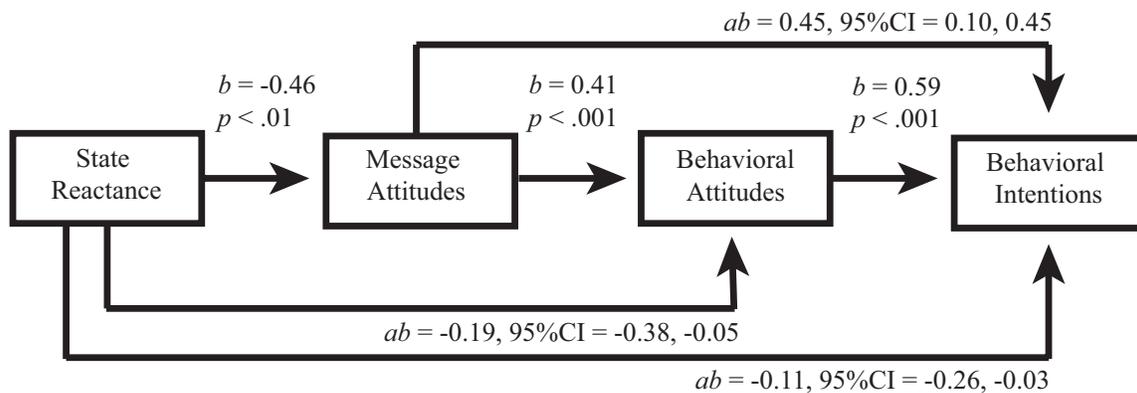
Finally, H6$_{ME2}$a-c suggested that message attitudes, behavioral attitudes, and behavioral intentions would each predict likelihood of newsletter signup. To test this prediction, a binary logistic regression model, controlling for the effects of trait reactance, was estimated. The results of this test failed to indicate a significant relationship between message attitudes and newsletter signup ($b = 0.16$, Wald $= 0.18$, $p > .67$, Exp(B) $= 0.58$) or behavioral attitudes and newsletter signup ($b = -0.08$, Wald $= 0.03$, $p > .85$, Exp(B) $= 0.92$). A significant relationship did, however, emerge between behavioral intentions and newsletter signup, $b = 0.81$, Wald $= 0.32$, $p < .05$, Exp(B) $= 2.26$. In light of this finding, the possibility that newsletter signup (i.e., behavior) may be the outcome of the causal chain described in Figure 15 was considered. This contention was compatible with both reactance research specifically and attitude-behavior theories generally (e.g., Dillard & Shen, 2005; Fishbein & Ajzen, 1975; Webb & Sheeran, 2006; Quick & Stephenson, 2009; Quick, Scott, & Ledbetter, 2011). Empirical testing of the variable structure underlying the newsletter signup proceeded in a manner analogous to that used for H5$_{ME2}$; the primary exception was that the added model (i.e., Model 4) used to test the relationship between newsletter signup and behavioral attitudes was a binary logistic regression model. The results, as summarized in Figure 15 below, suggested that state reactance exerted a significant indirect effect on newsletter signup.

Figure 15. Indirect effect of state reactance on newsletter signup probability
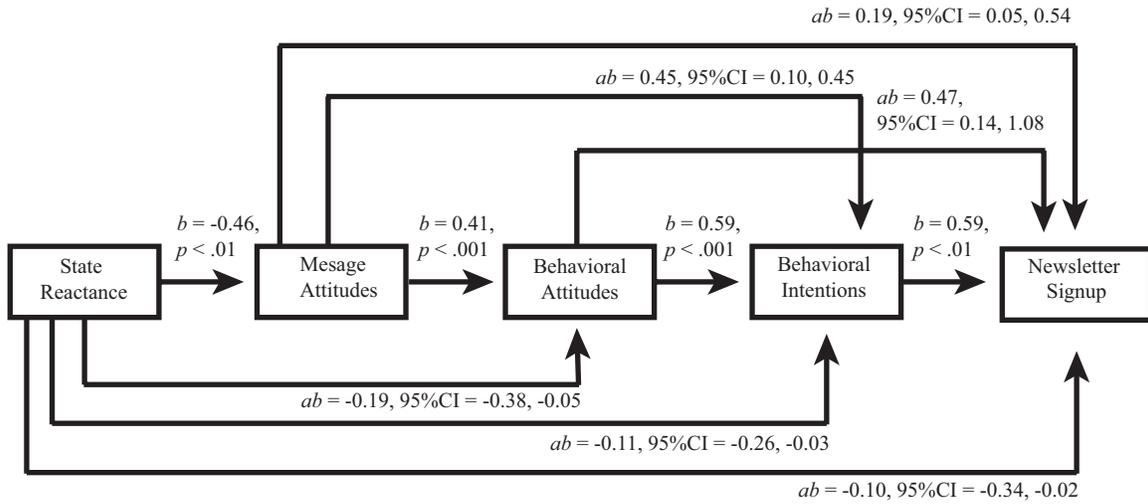
Specifically, when controlling for the effects of trait reactance, message attitudes, and behavioral attitudes, behavioral intentions were statistically associated with newsletter signup, $b = 0.93$, Wald $= 6.89$, $p < .01$, Exp(B) $= 2.53$. The identified indirect of state reactance was negative and significant, $ab = -0.10$, $95\%_{CI} = -0.33$, $- 0.02$. The full results of the binary logistic model are shown below (Table 35). Thus, the current results suggested direct support for H6$_{ME2}$c and partial support for H6$_{ME2}$a and H6$_{ME2}$b.

Table 35. Logistic regression predicting likelihood of signing up for anti-violence newsletter

Predictor	b	b_{se}	Wald	Exp(B)
Trait Reactance	- 0.62	0.63	0.97	0.54
State Reactance	- 0.62	0.63	0.97	0.53
Message Attitudes	0.10	0.39	0.07	1.11
Behavioral Attitudes	- 0.18	0.47	0.15	0.83
Behavioral Intentions	0.93**	0.35	6.87	2.04

Note: Nagelkerke $R^2 = .20$; **$p < .01$

Finally, to explore the potential effects of gender (RQ1), a series of multivariate analyses of variance (MANOVA) models were estimated. The first model included gender, reactance condition, and saliency condition. The dependent variables were perceived freedom threat, anger towards the message, and negative, message-relevant cognitions. The results failed to indicate either a main of interaction effect for any of the parameter estimates including gender (all F values < 1.45). A second MANOVA again included gender, reactance condition, and saliency condition as the independent variables. The dependent variables were the message outcomes of interest, specifically message attitudes, behavioral attitudes, and behavioral intentions. Again, the results of these analyses failed to indicate any main or interaction effects involving gender (all F values < 0.55).

Conclusion

ME2 set out to test the effects of reactance potential and cue saliency on an anti-violence message presented within a violent video game environment. The results provided mixed support for the stated hypotheses. First, the current results suggested that, as expected, cue saliency played a meaningful role in the formation of reactance in a high arousal media context. In contrast to the findings associated with PRT3, the results indicated that the relationship between message reactance potential and both perceived freedom threat and message relevant anger was rather substantially dependent upon the provision of cues designed to diminish the processing demands placed upon message evaluators. Therein, the results of ME2 suggested that participants in the no-cue condition evaluated the high and low reactance message similarly in terms of perceived freedom threat and message relevant anger. Second, the results failed to support the contention

that cue saliency would exert a meaningful influence on participant recall. The incumbent expectation, consistent with the ABC approach, had been that those in the cue condition would be comparatively better able to recall message-relevant details. Exploratory post-hoc analyses did, however, suggest that those in the cue condition who were highly involved in the video game posted higher recall scores than those who highly involved in the game in the no-cue condition. Third, the results suggested that the formation of state reactance had significantly negative effects on message attitudes, behavioral attitudes, behavioral intentions, and functional behavioral outcomes. Specifically, the data suggested a causal chain in which state reactance -> message attitudes -> behavioral attitudes -> behavior. Empirical tests of serial mediation supported the contention that this casual chain facilitated a significant effect of state reactance on the behavioral measure (newsletter signup). These results, contextualized within the findings of this work as whole, are more thoroughly discussed in the following chapter.

CHAPTER V

DISCUSSION

This Chapter V is divided into five distinct subsections. The first subsection provides an overview of the study's results as an aggregate whole. The second subsection is devoted to the current manuscript's contributions to both theory and practice. The third subsection discusses the limitations associated with this work. The fourth subsection is devoted to discussion of areas ripe for future research. Fifth, and finally, some concluding discussion is provided.

General Discussion

The stated hypotheses and their respective outcomes are summarized in Table 36.

Table 36. Summary of all hypotheses and results associated with each primary and secondary study

Hypothesis	Proposition	Result
$H1_{PT1}$	The high reactance potential message will elicit higher levels of freedom threat than the low reactance potential message.	Supported
$H2_{PT1}$	The high reactance potential message will elicit higher levels of anger than the low reactance potential message.	Supported
$H1_{PRT1}$	The high reactance potential message will elicit higher levels of freedom threat than the low reactance potential message.	Supported
$H2_{PRT1}$	The high reactance potential message will elicit higher levels of anger than the low reactance potential message.	Supported
$H1_{PRT2}$	The game play condition will elicit higher levels of state arousal than the non-gameplay condition.	Supported

152

H2$_{PRT2}$	The high reactance message potential condition will elicit higher levels of freedom threat than the low reactance potential condition.	Supported
H3$_{PRT2}$	The high reactance message potential condition will elicit higher levels of anger toward the message than the low reactance potential condition.	Supported
H4$_{PRT2}$	The high reactance message potential condition will elicit more negative cognitions toward the message than the low reactance potential message.	Supported
H5$_{PRT2}$	High levels of arousal coupled with low levels of state reactance will result in comparatively heightened attitudes toward the message.	Not Supported
H6$_{PRT2}$	High levels of arousal coupled with low levels of state reactance will result in comparatively heightened attitudes toward the behavior.	Supported
H7$_{PRT2}$	High levels of arousal coupled with low levels of state reactance will result in comparatively heightened behavioral intentions.	Supported
H8$_{PRT2}$a	Favorable attitudes toward the message will predict likelihood of newsletter signup.	Not Supported
H8$_{PRT2}$b	Favorable attitudes toward the message-advocated behavior will predict likelihood of newsletter signup.	Not Supported
H8$_{PRT2}$c	Heightened behavioral intentions will predict likelihood of newsletter signup.	Not Supported
H1$_{ME1}$	The high reactance potential message will elicit higher levels of perceived freedom threat than the low reactance potential message.	Supported
H2$_{ME1}$	The high reactance message potential will elicit higher levels of anger toward the message than the low reactance potential message.	Supported
H3$_{ME1}$	The high reactance message potential condition	Supported

	will elicit more negative cognitions toward the message than the low reactance potential message.	
H4$_{ME1}$	The game play, low reactance potential message condition will elicit higher attitudes toward the message than the game play, high reactance potential condition.	Supported
H5$_{ME1}$	The game play, low reactance potential message condition will elicit higher behavioral attitudes than the control condition.	Not Supported
H6$_{ME1}$	The game play, low reactance potential message condition will elicit higher behavioral intentions than the control condition.	Not Supported
H7$_{ME1}$	The game play, low reactance potential message condition will elicit higher respondent probability of agreeing to sign up for the newsletter than the control condition.	Supported
H1$_{PT2}$	The high reactance potential message will elicit higher levels of freedom threat than the low reactance potential message.	Supported
H2$_{PT2}$	The high reactance potential message will elicit higher levels of anger than the low reactance potential message.	Supported
H1$_{PRT3}$	The high reactance potential message will elicit higher levels of perceived freedom threat than the low reactance potential message.	
H2$_{PRT3}$	The high reactance potential message will elicit higher levels of anger toward the message than the low reactance potential message.	Supported
H3$_{PRT3}$	The high reactance potential message potential condition will elicit more negative cognitions toward the message than the low reactance potential message.	Supported
H1$_{ME2}$	Cue saliency will amplify the effects of the high reactance potential message on perceived freedom threat.	Supported

H2$_{ME2}$	Cue saliency will amplify the effects of the high reactance potential message on anger toward the message.	Supported
H3$_{ME2}$	Cue saliency will amplify the effects of the high reactance potential message on negative message relevant cognitions.	Not Supported
H4$_{ME2}$	Cue saliency will have a positive influence on participant recall.	Not Supported
H5$_{ME2}$a	State reactance formation will be negatively associated with attitudes toward the message.	Supported
H5$_{ME2}$b	State reactance formation will be negatively associated with attitudes toward the behavior.	Partially Supported
H6$_{ME2}$c	State reactance formation will be negatively associated with behavioral intentions.	Partially Supported
H6$_{ME2}$a	Favorable attitudes toward the message will predict likelihood of newsletter signup.	Partially Supported
H6$_{ME2}$b	Favorable attitudes toward the behavior will predict likelihood of newsletter signup.	Partially Supported
H7$_{ME2}$c	Heightened behavioral intentions will predict likelihood of newsletter signup	Supported

The following paragraphs provide discussion of this dissertation's results as a whole. In so doing, I highlight findings of note, discuss null results, and provide some alternative explanations for non-significant hypotheses.

Although a considerable amount of research has been previously devoted to investigating message-induced state reactance formation (e.g., Dillard & Shen, 2005; Kim, S. Y. & Levine, 2008a; Kim, S. Y. & Levine, 2008b; Quick & Considine, 2008; Quick & Stephenson, 2008; Zhang & Sapp, 2011), scholars have mostly neglected to explore the relationship between media-activated excitation and message reactance

potential. Accordingly, one of the primary goals underlying this dissertation was to better understand both *if* and *how* media-induced arousal influenced the onset and effects of state reactance. A core assumption made in the current work was that arousal is emotionally neutral in character (e.g., Gorn, Pham, & Sin, 2001; Schachter & Singer, 1962). Moreover, it was also assumed that arousal facilitates the onset of selective processing (e.g., Eysenck, 1982; Pham, 1996) such that highly salient cues are prioritized (e.g., Gorn, Pham, & Sin, 2001, Mather & Sutherland, 2011). Following these assumptions, the expectation was that (1) arousal would heighten the negative effects of state reactance and (2) that state reactance formation could be influenced, to a nonignorable degree, by the use of externally provided cues designed to influence processing priority.

The studies encompassed by the current work confirm that arousal does, in fact, amplify the negative effects of state reactance. Most notably, as delineated in the results section associated with PRT2, the combination of high levels of arousal *and* high levels of state reactance was associated with diminished attitudes toward the message, diminished attitudes toward the message advocated behavior, and diminished behavioral intentions. Conversely, high levels of arousal coupled with low levels of state reactance were associated heightened attitudes toward the message advocated behavior and heightened participant intentions to perform activities associated with the message. Examination of the pattern of effects using the Johnson-Neyman technique (Hayes, 2013; Johnson, P. O. & Fay, 1950) suggested that these effects were exacerbated relative to increases in arousal. Furthermore, ME1 found that those who were both exposed to an arousal-inducing video game and a low reactance potential message were more likely to

perform the object behavior than those exposed to the high reactance potential message or those in the control condition. In light of previous research that suggests media-induced arousal is "hedonically neutral" (Zillamn, 2008, para. 4) and functions as an energizing force on subsequent cognitive processes (e.g., Bryant & Miron, 2003; Gibson & Zillman, 1994; Zillman, 2008), these findings indicate that exposing aroused individuals to a low reactance message can, and is perhaps likely to, activate a number of attitudinal and behavioral functions in a message-desired direction.

The current work's results also indicate that cues embedded within a message may conditionally influence its reactance potential. Interestingly, PRT3's findings provided some initial evidence that - among non-aroused message evaluators - cue saliency exerted a *buffering* force on evaluators' ability to detect the presence of controlling language. However, a markedly different pattern of results was observed when the same message was inserted into a high arousal potential media environment (ME2). Here, the provision of cue appeared to exert a substantial and *amplifying* influence on how the message was processed in relation to perceptions of both freedom threat and anger towards the message. Specifically, cues provided within a high reactance message resulted in comparatively strong perceptions of freedom threat and high levels of message oriented anger while cues provided in the low reactance potential message resulted in diminished perceptions of freedom threat and lower levels of message relevant anger. However, in the no-cue conditions, participants evaluated the high and low reactance messages similarly on the basis of both perceived freedom threat and the degree to which the message elicited anger. Although the expectation was that the provision of a cue would amplify the positive/negative effects reactance, it was *not*

157

expected that the absence of a cue would substantially impair individual abilities to meaningfully discriminate between a high and low reactance potential message. Before its use in ME2, the message was subjected to a series of pilot and pre-tests (PT2 and PRT3); in each case, the effect sizes for the influence of reactance potential on perceived freedom threat, message anger, and negative cognitions ranged from moderate to strong (the Cohen's *d* range for the non-cue only versions of the messages ranged from .39 to 1.58). This can be further contrasted with ME1, wherein the effect sizes of the results obtained from the associated pre and pilot tests were generally analogous to the effect sizes observed when participants evaluated the message within the game environment.

One explanation for the lack of consistent findings across PT2, PRT3, and ME2 could be that the introduction of numeric/statistical information and the message's slightly higher word count made the message, in comparison to the message used in PT1 – ME1, more difficult for evaluators to process (e.g., Yalch & Elmore-Yalch, 1984). Thus, when in an aroused state, evaluator ability to perceive message aspects such as controlling language may be substantially impaired. This proposition aligns with the LC4MP model (e.g., Lang, 2006; Lang, 2000; Lang et al., 2007), which generally holds that the combination of complex content and physiological arousal can lead to often severely impaired processing capabilities (e.g., Lang, Bolls, Potter, & Kawahara, 1999). Moreover, these results are compatible with previous findings from Sanbonmatsu and Kardes (1988), who asserted (1) that arousal reduces the availability of processing resources and (2) that in such cases, evaluators subsequently "focus on less complex information that requires relatively little cognitive processing capacity" (p. 380). Taken together, these propositions suggest the possibility that, in the case of ME2, highly

aroused participants were *only* able to process those cues assigned priority via the saliency manipulation (i.e., *winner take more, loser take less*). Furthermore, the notion that numeric information was comparatively more difficult to process could also explain the (non-hypothesized) *buffering* effect of cue saliency that was observed in PRT3. The cue-salient messages used in PT2 – ME2 applied perceptual contrast (i.e., bottom-up cueing; Mather & Sutherland, 2011) to highly goal-relevant information (i.e., top-down cueing; Mather & Sutherland, 2011). Among evaluators low in arousal, these cues could have effectively established the boundary conditions under which the message was evaluated. In contrast to PRT3, however, secondary (i.e., non-salient) cues were still processed. Thus, among those in the cue conditions, the logic/goal of the message was assigned priority relative to other, freedom-limiting aspects of the message's language. However, these aspects were still processed, resulting in the onset of state reactance, albeit in a comparatively diminished form. As a postscript to this discussion, it should, however, be pointed out that some contradictory research exists on whether the inclusion of numeric information/statistical information *does* or *does not* make messages more difficult to process (see O'Keefe, 1998 for meta-analytic review; also, see Hart, 2014 for discussion of the conditional effects of numeric information on message processing).

The present findings failed to support the hypothesis (H4$_{ME2}$) that recall would be aided by cue saliency among aroused individuals. At the onset of the study, there existed the expectation that arousal would bias processing in *winner take more, loser take less* manner such that content with highly salient detail would committed to memory at the expense of less salient detail (Mather & Sutherland, 2011; 2012). One potential, and perhaps obvious, explanation for this null result is operationalization failure. However,

several key hypotheses (namely $H1_{ME2}$ and $H2_{ME2}$) were supported, suggesting that, clearly, cue saliency had *some* type of effect on how the in-game message was processed. Although related, evaluative and memory-based systems draw from somewhat different resource pools and thus can and do operate independently (e.g., Allan, 2007; Eagly, Kulesa,Chen, & Chaiken, 2001; Loken & Hoverstad, 1985). Building upon the assumption that arousal makes in increasingly difficult to "maintain multiple representations of equal priority in working memory" (Mather & Sutherland, 2011, p. 8), it may have been the case that the messages used in support of ME2 placed perceptive emphasis on too many cues and, thus, exceeded the contrast threshold necessary for commitment to short-term memory. To this point, much of the research on the relationship between arousal and memory has used comparatively simpler stimuli (e.g., D'Argembeau & Van der Linden, 2004; Doerksen & Shimamura, 2001; Kensinger & Corkin, 2003; Mather & Sutherland, 2011) that often consisted of only a single word, letter, or color. Alternatively, it could have been the case that measuring memory in implicit terms would have yielded different results.

Additionally, the *a priori* expectation was that serving a lucid, non-freedom-threatening anti-violence message to highly aroused individuals would elicit favorable gains in the areas of behavioral attitudes ($H5_{ME1}$), behavioral intentions ($H6_{ME1}$), and behavior ($H7_{ME1}$). However, the results only offered empirical support for the prediction related to behavioral outcomes ($H7_{ME1}$). Although actual behavior is, presumably, the most important component of message effectiveness in many, if not all, persuasive contexts, the lack of consistency across the measures of message effectiveness is concerning. One potential explanation for this null result could be that the majority of

160

participants were strongly in favor of reducing community violence and, thus, the absence of a main effect could be due to minimal variance in the measures (Quick, Scott, & Ledbetter, 2011). Conversely, the newsletter signup measure was more discerning and, thus, best represented the message's persuasive influence. Indeed, examination of the distributional statistics associated with the behavioral attitudes and behavioral intentions measures indicated, across studies, that participant attitudes toward violence reduction were (1) quite homogenous and (2) quite high overall. A second explanation could be, as suggested by Quick, Scott, and Ledbetter (2011), could be that the "severity and somberness" (p. 673) of the on-hand topic could have mitigated the influence of the message on attitudinal and intentional outcomes.

Implications

This dissertation examined the relationship between arousal and state reactance formation within the context of a video game-embedded anti-violence message. The theoretical expectations associated with the current work originated from and were anchored in previous research in the areas of psychological reactance theory, ETT, and message processing theory. Relative to psychological reactance theory, the expectation was that messages that employed controlling/freedom-limiting would result in an amalgam of message-relevant anger and motivated counter-arguing. From a message processing perspective, the hypotheses, on both conceptual and granular levels, were developed using a theoretical amalgam of assumptions arising from the ELM (e.g., Petty & Cacioppo, 1986a; Petty & Cacioppo, 1986b), the LC4MP (e.g., Lang, 2006), the ABC model (e.g., Mather & Sutherland, 2012) and Pham's (1996) selectivity hypothesis. In their whole, each of these approaches assume that (1) message processers have limited

161

internal resources to allocate to message processing and (2) that arousal induces a *narrowing* process that results in certain cues being processed at the detriment of others. With some notable exceptions, the findings generally provided support for the proposed theoretical framework. The following paragraphs directly explicate the theoretical contributions of this work.

First, arousal-induced cognitive narrowing processes exert a meaningful influence on the formation of state reactance. Research on reactance formation has been consistently executed in environments in which study participants were isolated from the effects of other media. However, persuasive messages are rarely, if ever, delivered/evaluated in such environments; instead, message evaluators commonly carry cognitive "baggage" from media content preceding the message of interest. The current results provide initial evidence that reactance formation may be a product of both message artifacts and the environment where the message is presented. In so doing, the results further suggest that media-facilitated physiological arousal can be understood as a non-trivial component of reactance formation and, furthermore, a factor that exerts a meaningful influence on the consequences of arousal formation.

Second, and consistent with the present scholarly understanding of psychological reactance theory, the current results suggest that the onset of state reactance has a very real and very negative influence on message effectiveness. The formation of state reactance was associated with diminished attitudes toward the message, diminished attitudes toward the behavior advocated by the message, diminished behavioral intentions, and decreased probability of performing behaviors consistent with those discussed in the message. These results join previous studies in their suggestion that use

of controlling language should, at all costs, be avoided when crafting persuasive messages (e.g., Dillard & Shen, 2005; Magid, 2011; Miller et al., 2007; Miller et al., 2013; Rains, 2013; Quick, 2005; Quick & Considine, 2008; Quick & Stephenson, 2008). Conversely, the combination of high arousal and low reactance was consistently shown to drive favorable message effects. For instance, PRT2 found that high levels of arousal and low levels of state reactance were associated with favorable evaluations of the message, favorable evaluations of the message-advocated behavior, the formation of message-positive behavioral intentions. ME1's results indicated that a low reactance message placed within the video game environment was associated with heightened levels of newsletter signup when compared to both the high reactance potential and the control condition. Finally, findings from ME2 supported the ideas that (1) cue saliency exerted a significant influence on reactance formation and (2) that state reactance either directly or indirectly negatively influence message attitudes, behavioral attitudes, behavioral intentions, and behavior itself.

Third, the current findings add to the still developing ABC approach. To this point, the framework has generally been applied to the effects of emotional arousal on short-term memory (e.g., Mather, 2007; Mather & Sutherland, 2011; Mather & Sutherland, 2012). Although the current work's hypotheses related to memory based outcomes were not directly supported, the findings did suggest that external saliency assignation had an appreciable influence on the formation of state reactance, which subsequently was associated with a host of message effectiveness indicators.

When considering this work's implications from an applied/practical standpoint, it bears repeating that video games are an enormously popular form of entertainment.

163

Estimates from the ESA (2012, 2013) suggest that nearly half of all American households own a technological device that is devoted specifically to game play. Globally, the video game industry is larger than the film and music industries *combined* (Reuters, 2013). Shooter-styled games (i.e., FPS) are one of the most popular game genres; in fact, in 2012, the genre accounted for over 20% of all games sold in the United States (ESA, 2013). These games, which are by often quite violent in nature, have been robustly criticized as lubricants for social violence (Children Now, 2001; Anderson et al., 2004; Barlett, Harris, & Baldassaro, 2007; Bushman & Huesmann, 2006; Carnagey, Anderson, & Bushamn, 2007; National Institute on Media and the Family, 2008; Sherry, 2001).

This research did not consider whether video games cause violence or are, instead, merely correlated with violence. Such endeavor was beyond the scope of this work and is, in all likelihood, to persist as an unresolved issue for the foreseeable future. Instead, the current approach, taken in light of the enormous popularity of the medium among those most likely to commit violent crime in society, attempted to explore the degree to which violent video game environments could be used for the purposes of sending positive, pro-social anti-violence messages.

The results provided some initial support for the notion that anti-violence message can be effectively sent via FPS games. For instance, in the cases of both ME1 and ME2, I found no evidence that players extended their feelings toward the messages to the game as a whole. Further analyses of the data gathered in ME2 similarly suggested that attitudes toward the game were not meaningfully associated with message induced freedom threat ($r = .09, p > .37$), message oriented anger ($r = -.08, p > .44$), or message-relevant negative cognitions ($r = .10, p > .33$). From a practical standpoint, these findings

164

suggest that game makers (especially those who make violent video games) can, and perhaps should, consider including anti-violence messaging within their video games. In light of criticisms originating from any number of special interest groups (e.g., Children Now, 2001; LaPierre, 2013; National Institute on Media and the Family, 2008), the video game industry has an inherent interest in de-coupling video game play, especially violent video game play, from real-world violence.

Furthermore, the practical implications of the current results can be extended beyond anti-violence messaging contexts. In light of the inconsistent findings related more traditional approaches to in-game messaging/product placement (e.g., Chaney, Lin, & Chaney, 2004; Lee & Faber, 2007; Nicovich, 2005; Yang, M., Roskos-Ewoldsen, Dinu, & Arpan, 2006; Yang, H. & Wang, 2008; Yoo & Pena, 2008), the present results provide some initial indication that message senders may be able to better affect desired outcomes (at least from an evaluative perspective) using a post-scroll strategy. Advertisers could, for example, place advertising content that loads between video game levels rather than embed such content directly within the game play environment. In addition to having better sender-side control over how content is processed, such approach would seemingly offer a heightened likelihood that participants of all skill and experience levels were exposed to the content.

Limitations

This project had a number of limitations that affect the generalizability and reproducibility of the reported results. Specifically, at least five considerations limit the findings of this study. These limitations are delineated in full depth below.

First, the sample sizes used in the main and sub studies comprising the current work were all quite small. In fact, in all cases, cell *n*s trended towards the lower bounds of the power estimates identified in Table 6. Obviously, small sample sizes increase the likelihood of committing a Type II error. Perhaps more importantly, however, were the constraints that the small samples imposed upon the current work's analytic approach. Previous research has generally, if not almost completely, used MLE based SEM in statistical tests involving the intertwined model of state reactance (e.g., Dillard & Shen, 2005; Rains, 2013; Rains & Turner, 2007; Quick & Bates, 2009; Quick & Kim, 2009; Quick, Scott, & Ledbetter, 2011; Quick & Stephenson, 2009). Given the near-overwhelming consensus that the intertwined model is, in fact, the best representation of state reactance (e.g., Dillard & Shen, 2005; Rains, 2013; Rains & Turner, 2007), the decision was made to utilize it as the primary means of assessing state reactance. However, as the number of observations in each sample were well below the recommended lower bounds for use of SEM, a number of alternate techniques were employed. First, the nature of the data and the sample sizes therein required a "piecemeal" approach to state reactance in which ANOVA techniques were used to individually explore both factors strongly related to state reactance onset (i.e., freedom threat) and the constituent elements of state reactance itself (i.e., anger towards the message and negative message relevant cognitions). As a result of this piecemeal approach, notable inconsistencies were observed; for instance, in ME2, message relevant anger was influenced by the conjoint effects of reactance potential and cue saliency while negative cognitions were only influence by message reactance potential.

Furthermore, the inability to use structural modeling techniques when testing the effects of state reactance formation also limits the current findings. To approximate the intertwined model, a composite variable consisting of anger and negative, message relevant cognitions was estimated using principal axis extraction. Like MLE-based SEM (and in contrast to methods such as principal components analysis), principal axis extraction excludes unique error attributable to variables comprising the factor structure as a whole (Costello & Osborne, 2005). Also, because the negative cognitions measure was consistently skewed, principal axis extraction was judged to offer a more stable solution than factors derived using comparable maximum likelihood extraction procedures (Fabrigar, Wegener, MacCallum, Strahar, 1999). Nonetheless, the use of these methods, combined with the use of OLS/logistic regression techniques for modeling casual structures, likely resulted in a non-negligible impairment on the current work's ability to properly account for measurement error.

A second limitation associated with this study was the disproportionately high number of females included in a number of studies. As discussed earlier, FPS players tend to be overwhelmingly male. Although efforts were taken to recruit roughly equal-sized subsamples of male and female participants, the acquired samples were generally representative of the gender demographics from the population from which they were drawn. While exploratory analyses (ME2, RQ1) failed to find any statistical differences between genders in terms of the inter-relationships between message characteristics, reactance formation, and message outcomes, there nonetheless exists the possibility that a sample with a higher number of males would have returned different results and, therein,

167

results that were perhaps more directly generalizable to the population of FPS game players.

A third limitation associated with this dissertation was the relative inconsistency related to the testing environments employed. PT1, PRT1, PT2, and PRT3 were all Internet-based experiments; PRT2 was conducted in a multi-purpose computer laboratory with multiple participants per session; and ME1 and ME2 were conducted a relatively small, single use room with participant sessions run individually. This lack of consistency between testing environments limits the ability to make comparisons across studies, especially in regards to direct comparison between results obtained in a laboratory setting and results obtained via Internet-based experimentation.

Fourth, and related to the point made above, the artificial nature of the lab-based experimental procedures employed in PRT2, ME1, and ME2 hinders the overall generalizability of the current findings. As with almost any lab-based experimental procedure, I was forced to balance the benefits of a controlled experiment (i.e., enhanced internal validity) with its costs (i.e., loss of external generalizability) (e.g., Babbie, 2002).

Fifth, one could, perhaps quite fairly, criticize the current message stimuli for being less-than-realistic on the basis of (1) their highly targeted geographic nature and (2) the artificial severity of the language used to comprise some of the fear appeals. As a means of driving participant involvement with the message, all of the here-reported studies, save PT1 and PT2, were geographically targeted to directly appeal to those evaluating the message. Although message senders have increasingly developed technological tools that allow for geographic localization of persuasive messages, the probability that message senders will integrate these technologies into video game

environments seems, at the moment, rather distant. Thus, the results observed in the current study may not be replicated among future studies employing a less regionally focused (and therefore perhaps more realistic) message. A second message-related limitation associated with this work revolves around the vivid language component used in both messages. It could be the case that the primary fear appeal (e.g., "*you could be the next victim*") was perceived by respondents as non-realistic and thus artificially influenced attitudes, behavioral intentions, and behavior away from the position advocated for by the message. The goal of the current work, however, was not to provide a prescription for how anti-violence messages ought to be constructed. Instead, the results are offered as a means of providing additional information on the implications of specific message features when generating pro-social, anti-violence messaging. Moreover, given the substantive dearth of to-date studies on reactance formation within stimulating media environments, I was worried that subtler reactance frames may not have been perceived by respondents. Finally, vivid language in the form of a victimization fear appeal is commonly used in both academic research on reactance formation (e.g., Magid, 2011; Quick, 2005; Stephenson & Witte, 2001) and in persuasive health messages distributed to the public.

Future Research

The results of this work suggest several areas fertile for future research. First, future research would do well to further explore the relationship between message reactance potential, characteristics associated with cue presentation, and arousal. Specifically, further, targeted investigation of the relationship between arousal-induced *narrowing* and reactance formation seems especially warranted. The current results exist

169

only as a starting point and, given the limitations associated with the present endeavor, are quite tenuous in nature. Special attention should be allocated to investigation of the relationship between residual arousal, message complexity, and message comprehension. This research could take a number of forms. Researchers could, for example, directly compare processing outcomes related to messages with and without numeric information. Alternately, message complexity could be operationalized in terms of lexical/syntactical structure, claim strength, or information density. Scholars could also individual-level baseline processing capabilities relative to intra-individual rates of processing decline in highly arousing media environments.

A second course of research suggested by the current findings relates to further exploration of the boundary conditions under which processing selectivity *does* and *does not* influence retention/recall. The differential threshold (i.e., contrast conditions created via cue saliency) used in the current message was roughly conceived and less-than-systematic in its development. As noted, it could have been the case that the messages employed in ME2 simply presented too difficult of a challenge for participants. Thus, future research could endeavor to find (1) the point at which saliency contrasts fail to be discriminable and (2) if such point is moveable on the basis of individual differences and/or media characteristics.

Third, one of the fundamental principles underlying psychological reactance theory is that is that the formation of state reactance subsequently initiates a motivational state wherein individuals are compelled to restore their freedom either directly or indirectly (J. W. Brehm & S. S. Brem, 1981). Direct restoration occurs when message recipients attempt to express their independence behaviorally, cognitively, or emotionally

170

(Quick, 2005). Indirect restoration, alternately, occurs when through vicarious observation of others engaging in the restricted behavior (Brehm, J. W., 1966; Quick, 2005). For its part, the current work focused on single, limited indicator of direct freedom restoration (newsletter signup). Future research could probe the degree to which arousal and state reactance together influence restoration either in the form of direct behavioral outcomes and/or in relation to vicarious outcomes. Conceivably, it could be the case that arousal inflames individual approach systems, which could subsequently influence the likelihood of directly engaging in or purposefully observing behaviors that are in direct opposition to the behaviors advocated for by the message.

Fourth, future research could better explore the relationship between game-related presence and post-game message evaluation. Exploratory results from ME2 suggested participant recall scores were dependent, in part, upon video-game induced telepresence. This finding is consistent with previous research, which suggests that presence may have highly conditional effects on how people process mediated content (e.g., Nelson, M., Yaros, & Keum, 2006; Newhagen, 2004). Future research could systematically investigate how presence influences selective processing outcomes in terms of memory, counter-arguing, attitude formation, and attitude change.

Future research could also attempt to correlate self-report data related to reactance and gameplay variables with physiological and neurological data gathered using perhaps more objective means (i.e., eye-tracking, galvanic skin response, heart rate fluctuation). As noted by Rains (2013) in his meta-analytic review of psychological reactance theory, objective cognitive processing measures "may help uncover new insights about psychological reactance and responses to freedom threats" (p. 69).

171

Sixth, future research could explore the relationship between message-media congruency in post-scroll messaging contexts. Notably, as the current study placed an anti-violence message within a violent video game, there was a high degree of congruency between the message and the media environment with which the message was presented. This fact could have biased the current results in an unknown manner. Future research could experimentally probe if incongruous messages, presented within a post-scroll context, affect differing levels of attention and retention.

Conclusion

The present study employed a series of inter-related primary and secondary studies, all experimental in nature, to explore the theoretical implications and practicable viability of inserting anti-violence messages into violent video games. Specifically, the current project was interested in exploring pro-social message presentation in a *post-scroll*, or post-game, context. As described in Chapter II, this research was motivated by a number of factors, including (1) the lack of consistent results related to the efficacy of more traditional means of in-game message placement and delivery; (2) the lack of research on the relationship between message reactance potential and the excitatory potential of the media environment surrounding the message; and (3) the notion that the demographic most likely to commit violent crime is also the demographic most likely to play FPS games.

Taken as a whole, three primary findings result from this work. First, the results indicated that the combination of high levels of arousal and low levels of message-elicited reactance resulted in a number of favorable attitudinal and behavioral outcomes. This finding extends the extant understanding of psychological reactance theory (e.g.,

172

Brehm, J. W., 1966; Dillard & Shen, 2005; Hornik, Jacobson, Orwin, Piesse, & Kalton, 2008; Rains, 2013) by empirically describing the amplifying effects of media-induced arousal (e.g., Zillman, 1978; 1996; Zillman, Johnson, & Day, 2000) on message reactance potential. Second, the data suggested that in media environments with high levels of arousal potential, onset of state reactance is influenced, albeit on a conditional basis, by cue saliency. Of particular interest, the results suggested that high levels of arousal resulted in diminished processing capabilities that, in turn, appeared to limit participants' ability to meaningfully differentiate between messages employing varying levels of controlling language. This finding further extends the current understanding of psychological reactance theory by suggesting that the ability to detect message reactance potential can be severely compromised in highly stimulating media environments. In so doing, this finding also provides general support for limited capacity processing models such as the LC4MP (e.g., Lang, 2006; Lang, 2000; Lang et al., 2007), the ABC approach (Mather & Sutherland, 2011; 2012), and the selectivity hypothesis (Eysenck, 1982; Pham, 1996). Third, the results provided some initial support for post-scroll messaging as a viable message delivery mechanism.

At the heart of the current study was the notion that interactive platforms, even those that feature violent or otherwise anti-social content, can be used, albeit conditionally, as a force for social good. To be sure, the current study dealt with a number of complex issues. Topics such as the relationship between media consumption and social violence, the effects of interactive technologies on message processing, and the relationship between new/interactive media and embedded messaging have not, historically speaking, tended to yield clear-cut, wholly consistent results. In that sense,

173

this work was no different. A number of key hypotheses were not supported. And, at times, some of the findings were not consistent across studies. Yet, and in spite of these issues, I believe that findings resultant of the current study meaningfully contribute to the current understanding of physiological reactance theory, messaging processing theory, and the efficacy of pro-social message delivery in interactive environments.

Messages used in PT1

High reactance potential. The violence epidemic is worsening in Chicago! If you are a reasonable person, you have to agree that it is the responsibility of all members of the community to take a stand against interpersonal violence. You must stop the denial! There is a problem and you must be a part of the solution. The first step of ending the violence is becoming informed. Sign up for the Chicago Anti-Violence e-mailing list right now. If you don't take a stand, incidents of murder, rape, aggravated assault, and other violent behaviors will continue to rise. You could be the next victim.

Low reactance potential. Statistics recently released by the Chicago Police Department suggest that there has been an increase in interpersonal violence in Chicago over the last five years. Most people would agree that it takes an entire community to take a stand against violence. The first step in combating violence in our community is learning more about the ways that you can help prevent violence. Informed citizens are more likely to work together to identify a solution that benefits everyone. Please consider joining the Chicago Anti-Violence e-mailing list. If we don't do something now, violent behavior may continue to rise in Eugene.

Messages used in PRT 1 – ME1

High reactance potential. The violence epidemic is worsening in Eugene! If you are a reasonable person, you have to agree that it is the responsibility of all members of the community to take a stand against interpersonal violence. You must stop the denial! There is a problem and you must be a part of the solution. The first step of ending the violence is becoming informed. Sign up for the Eugene Anti-Violence e-mailing list right now. If you don't take a stand, incidents of murder, rape, aggravated assault, and other violent behaviors will continue to rise. You could be the next victim.

Low reactance potential. Statistics recently released by the Eugene Police Department suggest that there has been an increase in interpersonal violence in Eugene over the last five years. Most people would agree that it takes an entire community to take a stand against violence. The first step in combating violence in our community is learning more about the ways that you can help prevent violence. Informed citizens are more likely to work together to identify a solution that benefits everyone. Please consider joining the Eugene Anti-Violence e-mailing list. If we don't do something now, violent behavior may continue to rise in Eugene.

Message used in PT2

High reactance potential. The violence epidemic is worsening at the University of Chicago. Statistics from the Chicago Police Department indicate that violent crime on campus has increased by 30% over the last four years.

The first step to ending the violence on campus is becoming informed! You absolutely must stop the denial. There is a problem and you must be part of the solution. Similarly sized universities in Illinois, Indiana, and Minnesota that have instituted student-run anti-crime initiatives have seen on-campus crime decrease. In fact, some estimates suggest these programs have reduced crime by 40%. On a yearly basis, that's nearly 1,600 less incidents of violent crime.

Do your part. Sign up for the University of Chicago Anti-Violence (UCAN) newsletter today! If you don't take stand, incidents of murder, rape, aggravated assault, and other violent behaviors will continue to rise. You could be the next victim.

Low reactance potential. There has been an increase in violent crime on the University of Chicago's campus. Statistics from the Chicago police department indicate that violent crime on campus has increased by 30% over the last four years.

The first step in combatting violence on our campus is learning more about the ways that you can help prevent violence. . Similarly sized universities in Illinois, Indiana, and Minnesota that have instituted student-run anti-crime initiatives have seen on-campus crime decrease. In fact, some estimates suggest these programs have reduced crime by 40%. On a yearly basis, that's nearly 1,600 less incidents of violent crime.

As such, please consider signing up for the University of Chicago Anti-Violence Newsletter (UCAN). Informed citizens are more likely to work together to identify a solution that benefits everyone. If we don't do something now, violent behavior may continue to rise at the University of Chicago.

Messages used in PRT3 –ME2

High reactance potential, no cue saliency. The violence epidemic is worsening at the University of Oregon! Statistics from the Eugene Police Department indicate that violent crime on campus has increased by 30% over the last four years.

The first step to ending violence on campus is becoming informed! You absolutely must stop the denial! There is a problem and you must be a part of the solution. Similarly sized universities in Oregon, Washington, and Nevada that have instituted student-run anti-crime initiatives have seen on-campus crime decrease. In fact, some estimates suggest these programs have reduced crime by 40%. On a yearly basis, that's nearly 1,600 less incidents of violent crime.

Do your part! Sign up for the University of Oregon Anti-Violence Newsletter (UOAN) today! If you don't take a stand, incidents of murder, rape, aggravated assault, and other violent behaviors will continue to rise. You could be the next victim.

High reactance potential, cue saliency. **The violence epidemic is worsening at the University of Oregon! Statistics from the Eugene Police Department indicate that violent crime on campus has increased by 30% over the last four years.**

The first step to ending violence on campus is becoming informed! You absolutely must stop the denial! There is a problem and you must be a part of the solution. **Similarly sized universities in Oregon, Washington, and Nevada that have instituted student-run anti-crime initiatives have seen on-campus crime decrease.** In fact, some estimates suggest these programs have reduced crime by 40%. On a yearly basis, that's nearly 1,600 less incidents of violent crime.

Do your part! **Sign up for the University of Oregon Anti-Violence Newsletter (UOAN) today!** If you don't take a stand, incidents of murder, rape, aggravated assault, and other violent behaviors will continue to rise. You could be the next victim.

Low reactance potential, no saliency. There has been an increase in violent crime on the University of Oregon's campus. Statistics from the Eugene Police Department indicate that violent crime on campus has increased by 30% over the last four years.

The first step in combatting violence on our campus is learning more about the ways that you can help prevent violence. Similarly sized universities in Oregon, Washington, and Nevada that have instituted student-run anti-crime initiatives have seen on-campus crime decrease. In fact, some estimates suggest these programs have reduced crime by 40%. On a yearly basis, that's nearly 1,600 less incidents of violent crime.

As such, please consider signing up for the University of Oregon Anti-Violence Newsletter (UOAN). Informed citizens are more likely to work together to identify a solution that benefits everyone. If we don't do something now, violent behavior may continue to rise in at the University of Oregon.

Low reactance potential, cue saliency. **There has been an increase in violent crime on the University of Oregon's campus. Statistics from the Eugene Police Department indicate that violent crime on campus has increased by 30% over the last four years.**

The first step in combatting violence on our campus is learning more about the ways that you can help prevent violence. **Similarly sized universities in Oregon, Washington, and Nevada that have instituted student-run anti-crime initiatives have seen on-campus crime decrease**. In fact, some estimates suggest these programs have reduced crime by 40%. On a yearly basis, that's nearly 1,600 less incidents of violent crime.

As such, **please consider signing up for the University of Oregon Anti-Violence Newsletter (UOAN).** Informed citizens are more likely to work together to identify a

solution that benefits everyone. If we don't do something now, violent behavior may continue to rise in at the University of Oregon.

APPENDIX B

MEASURES

Self-Reported Arousal

How do you currently feel? [Seven-point semantic-differential scales]

1. Relaxed/Stimulated
2. Calm/Excited
3. Unaroused/Aroused
4. Deactivated/Activated
5. Depleted/Charged
6. Unenergized/Energized

Attitude Toward the Game

The video game you just played was: [Seven-point semantic-differential scales]

1. Bad/Good
2. Not enjoyable/Enjoyable
3. Boring/Entertaining
4. Not fun/Fun
5. Not interesting/Interesting

Attitude Toward the Message

The message displayed at the end of the video game was: [Seven-point semantic-differential scales]

1. Not interesting/Interesting
2. Not involving/Involving
3. Not informative/Informative
4. Not enjoyable/Enjoyable
5. Unappealing/Appealing
6. Unlikeable/Likeable

Attitude Toward the Message-Advocated Behavior

Learning more about violence in my community and ways I can help prevent it is: [Seven-point semantic-differential scales]

1. Not interesting/Interesting
2. Unappealing/Appealing
3. Bad/Good

4. Not Worthwhile/Worthwhile
5. Not worth my time/Worth my time
6. Unimportant/Important

Anger Toward the Message

How did you feel while reading the message? [Five-point Likert-type scales, 1= None of this feeling, 5 = A great deal of this feeling]

1. Irritated
2. Aggravated
3. Annoyed
4. Angry

Behavioral Intentions

How likely would you be to do the following? [Seven-point Likert-type scales, 1 = very unlikely, 7 = very likely]

1. Sign a petition urging your city's leadership to find innovative ways to reduce violence
2. Participate in a community discussion group interested in finding ways to reduce violence in the community
3. Work with other people to find grassroots ways to reduce violence
4. Read a weekly newsletter detailing on-campus violent behavior and ways that such behavior can be reduced
5. Spend time talking with fellow citizens about how you can reduce violence as a community

Behavior

1. Do you want to join the Eugene Anti-Violence e-mailing list? This mailing list will provide you information about community events related to violence reduction. To join the e-mail list, you will need to provide your name, e-mail address, and local mailing address. [Dichotomous, yes/no]

Freedom Threat

Thinking about the message you just read, please answer the following questions [Seven-point Likert-type scales, 1 =strongly disagree, 7 = strongly agree]

1. The message threatened my right to choose
2. The message tried to make a decision for me
3. The message tried to manipulate me
4. The message tried to pressure me
5. The message tried to tell me what I should do

6. The message tried to tell me how I should think

Negative message relevant cognitions

1. The question is a free-form thought-listing procedure. Below, please write the first 10 - 15 words or very short phrases that come to mind as you think about the message you saw at the end of the video game. This should take between 2 and 3 minutes [Open-ended responses]

Numeracy

1. If the chance of getting a disease is 10%, how many people out of 1000 would be expected to get the disease? [Open-ended responses]
2. If the chance of getting a disease is 20 out of 100, this would be the same as having a _____% chance of getting the disease? [Open-ended responses]
3. Imagine that we roll a fair, six-sided die 1000 times. Out of 1000 rolls, how many times do you think the die would come up as an even number? [Open-ended responses]
4. n the BIG BUCKS LOTTERY, the chances of winning a $10.00 prize are 1%. What is your best guess about how many people would win a $10.00 prize if 1000 people each buy a single ticket from BIG BUCKS? [Open-ended responses]
5. In the ACME PUBLISHING SWEEPSTAKES, the chance of winning a car is 1 in 1000. What percent of tickets of ACME PUBLISHING SWEEPSTAKES win a car? [Open-ended responses]
6. A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? [Open-ended responses]
7. In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? [Open-ended responses]
8. If it takes five machines 5 minutes to make five widgets, how long would it take 100 machines to make 100 widgets? [Open-ended responses]

Presence

1. How involving was the video game you just played? [Seven-point semantic-differential scale] Not at all involving/Very involving
2. To what extend did you feel mentally immersed in the video game? [Seven-point semantic-differential scale] Not at all immersed/Very immersed
3. I was so involved in the video game environment that I lost track of time. [Seven point Likert-type scale, 1 = strongly disagree, 7 = strongly agree]
4. I felt as if I was part of the game. [Seven point Likert-type scale, 1 = strongly disagree, 7 = strongly agree]

Perceived game difficulty

1. Would you say that the game you just played was: [Seven point Likert-type scale, 1 = very difficult, 7 = very easy]

Previous Experience with Counter-Strike

1. About how often would you say that you play the video game title Counter-Strike? [Seven point Likert-type scale, 1 = never, 8 = daily]

Recall

1. What Police Department was named in the message?
   a. The Eugene Police Department
   b. The University of Oregon-Eugene Cooperative Police Department
   c. The Oregon State Police Department
   d. The University of Oregon Police Department
   e. The Lane County Police Department
   f. Don't Know/Don't Remember

2. The message indicated that crime has risen by what percentage?
   a. 22%
   b. 28%
   c. 30%
   d. 35%
   e. 40%
   f. Don't Know/Don't Remember

3. The stated percentage increase of crime was calculated over what time period?
   a. 3 Years
   b. 4 Years
   c. 5 Years
   d. 6 Years
   e. 7 Years
   f. Don't Know/Don't Remember

4. What was the name of the anti-violence newsletter named in the message?
   a. Eugene Anti-Violence Newsletter
   b. University of Oregon Anti-Violence Newsletter
   c. University of Oregon Anti-Crime Newsletter
   d. University of Oregon Anti-Violence and Crime Prevention Newsletter
   e. Oregon Anti-Crime Prevention Newsletter
   f. Don't Know/Don't Remember

Subjective Expertise with Video Games

Please rate your overall expertise as it relates to playing video games: [Seven-point semantic-differential scales]

1. Beginner/Expert

2. Bad/Good
3. Novice/Skilled

Subjective Performance Evaluation

Given your previous experience/inexperience with the video game, how well would you say that you performed? [Seven-point semantic-differential scales]

1. Very bad/Very good
2. Very ineffectively/Very effectively
3. Unsuccessfully/Successfully

Trait Reactance

Please valuate the following statements: [Seven-point Likert-type scales, 1 =strongly disagree, 7 = strongly agree]

1. Regulations trigger a sense of resistance in me
2. I find contradicting others stimulating
3. When something is prohibited, I usually think "That's exactly what I'm going to do"
4. The thought of being dependent on others aggravates me
5. I consider advice from others to be an intrusion
6. I become frustrated when I am unable to make free and independent decisions
7. It irritates me when someone points out things that are obvious to me
8. I become angry when my freedom of choice is restricted
9. Advice and recommendations usually entice me to do just the opposite
10. I am content only when I am acting of my own free will
11. I resist the attempts of others to influence me

Video Game Play Frequency

1. In the average week, about how much time would you say that you spend playing video games? [1 = I don't play video games, 6 = 10 or more hours per week].

APPENDIX C

SCREEN SHOTS


Screen shot of game play environment

Screen shot of game play environment

Screen shot of game play environment

Beginning of round screen

There has been an increase in violent crime on the University of Oregon's campus. Statistics from the Eugene Police Department indicate that violent crime on campus has increased by 30% over the last four years.

The first step in combatting violence on our campus is learning more about the ways that you can help prevent violence. **Similarly sized universities in Oregon, Washington, and Nevada that have instituted student-run anti-crime initiatives have seen on-campus crime decrease**. In fact, some estimates suggest these programs have reduced crime by 40%. On a yearly basis, that's nearly 1,600 less incidents of violent crime.

As such, **please consider signing up University of Oregon Anti-Violence Newsletter (UOAN).** Informed citizens are more likely to work together to identify a solution that benefits everyone. If we don't do something now, violent behavior may continue to rise in at the University of Oregon.

End of game message. Depicted message is the low reactance, high saliency message from ME2

READING TASK

Expecting the Unexpected From Jeff Bezos

From: The New York Times
Date: August 17, 2013
Authors: David Streitfeld and Christine Haughney
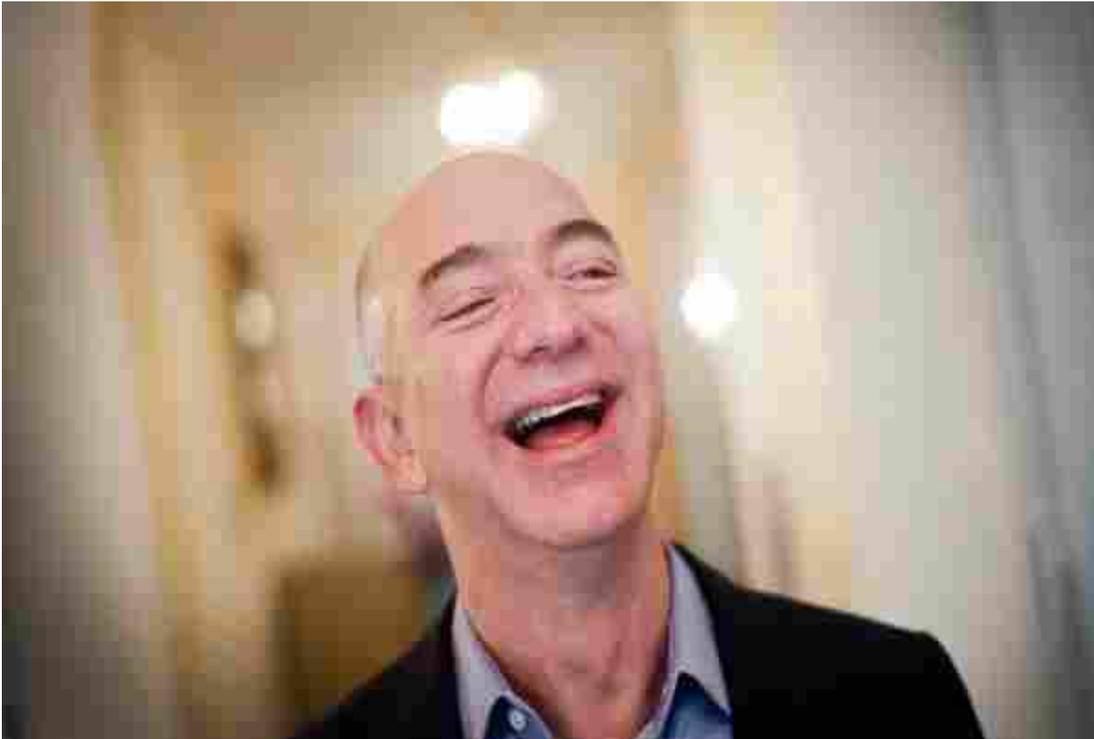
Caption: Jeff Bezos introducing Amazon products in 2012. As The Washington Post's owner, he can be counted on to think unpredictably, with a zeal for disruption and for tinkering until he gets things right.

Early employees of Amazon still remember the day the company took away their aspirin.

It was late 1999. After years of heady excess, the Internet boom was beginning to falter. Amazon, among the most celebrated of the dot-coms, was burdened with debt and spiraling losses. Jeff Bezos, its founder and chief impresario, had to impress Wall Street that he was serious about cutting costs.

But how? Amazon had never indulged employees with Silicon Valley perks like massages or sushi chefs. Just about the only thing that workers received free was aspirin. So the aspirin went.

The removal created a lot of muttering, but the cost-cutting — including layoffs — and promises of future profit helped Amazon escape the jaws of doom. Now, 14 years later, Mr. Bezos, 49, has become so rich and successful that he can surprise the world by buying The Washington Post for the equivalent of pocket change, which in his case is $250 million.

No one, apparently including Mr. Bezos himself, seems to know what he intends to do with that fabled newspaper. This is, after all, a man who once said the quality he most wanted in a wife was the ability to spring him from a third-world prison. He can probably be counted on to think unpredictably.

The aspirin take-away and similar incidents over the course of Mr. Bezos' career show a determination to do whatever is necessary to succeed and a fanatic attention to detail, even at the expense of appearing ridiculous. Also, he does not care about your headache.

"Jeff may be outwardly goofy, with that trademark laugh, but he's a very tough guy," said James Marcus, who was Amazon employee No. 55. "If he goes even halfway through with his much-vaunted reinvention of journalism, there is no way he's not going to break some eggs."

Mr. Bezos is the sole founder, the public face, the largest shareholder and the visionary of Amazon. "For many of us, creating Earth's biggest bookstore would have been enough," said Kerry Fried, employee No. 251. "Jeff's goal was a touch grander: to conquer the world."

He has more than his share of detractors — just ask your neighborhood bookseller, if you can find one. But it is increasingly hard to dispute that he is the natural heir of Steve Jobs as the entrepreneur with the most effect on the way people live now.

Amazon, which is as much a reflection of Mr. Bezos' personality as a corporation worth $125 billion can be, is by far the fastest-growing major retailer, although that simple label long ago ceased to suffice. It is also a movie studio, an art gallery (a 1962 Picasso," Jacqueline au Chapeau Noir," can be had for $175,000) and a publisher. It is an empire that spans much of the globe and even has its own currency, Amazon Coins. What it does not have much of, and never did, are old-fashioned profits.

The company has all sorts of regulatory and competitive concerns, making for a minefield of possible conflicts of interest for the owner of The Post. Amazon has opposed states' efforts to have e-commerce companies collect sales tax. It was the main beneficiary of the Justice Department's successful pursuit of five publishers and Apple on antitrust grounds. It is locking horns with major companies like Walmart and I.B.M. And as it expands into same-day delivery of its products, it will come up against grocery chains and drugstores.

Through its thriving data storage division, Amazon is becoming an important contractor to the government bureaucracy that is a mainstay of The Post's reporting. If persistent rumors are true and the company produces an Amazon phone, yet another set of antagonists will arise.

Other newspaper publishers have similar, if fewer, conflicts. The Washington Post Company owns Kaplan, the for-profit education business that came under Congressional scrutiny, and the company fought efforts to impose regulations. But the newspaper nonetheless maintained its commitment to investigative journalism. Some argue that it would to take more than a change of ownership to transform that culture.

"Newsrooms are very conservative," said Bill Buzenberg, executive director for the Center for Public Integrity. "They have difficulty changing and certainly they have difficulty selling out their core principles."

Perhaps. But then, few newsrooms have ever been confronted with a new owner whose zeal for disruption is matched by his obsession with tinkering until he gets it right. As Steve Yegge, a former employee, once put it, "He just makes ordinary control freaks look like stoned hippies." A relevant fact: Mr. Bezos originally thought of naming Amazon "Relentless."

Mr. Marcus, now the executive editor of Harper's Magazine, said it all made sense, kind of: "Bezos is fascinated by broken business models. And whatever else you think of newspapers, the business model is broken."

There is a reason that not even the most imaginative press critics ever thought that Jeff Bezos might one day buy The Washington Post: he has never seemed much of a fan of journalism or journalists.

He gives interviews only when he has something to promote, and always stays on message. He likes his privacy; there are no "at home with" magazine features with him lounging with his wife, MacKenzie, and four children at his luxurious Seattle lakeside estate. Amazon's quarterly earnings calls with analysts and journalists are festivals of vagueness.

Even a number as basic, and presumably impressive, as how many Kindle e-readers the company sells is never released. There are no bold signs on its growing Seattle headquarters complex to identify what is contained within. And there are fewer leaks out of Amazon than the National Security Agency.

The philanthropic Bill Gates, whose wife, Melinda, served on The Post's board, might have been a more likely buyer. Mark Zuckerberg, who adopted Donald E. Graham, the

Post Company's chief executive, as a mentor, could have been plausible. When it turned out to be Mr. Bezos instead, no one minded admitting astonishment. Neither his managerial style nor his entrepreneurial success nor his passion for secrecy seem to necessarily transfer over to his newest possession.

"Every story you ever see about Amazon, it has that sentence: 'An Amazon spokesman declined to comment,' " Mr. Marcus said. Drew Herdener, an Amazon spokesman, declined to comment.

Though indisputably one of the great marvels of the age, Amazon is a curious beast that offers few obvious lessons for how a newspaper like The Post might become profitable. Financial writers have noted that Apple makes more than twice as much money in a quarter than Amazon earned during the last decade. Last quarter, Amazon had a net loss of $7 million. But Wall Street loves Amazon anyway, despite its slim margins.

Amazon tends to give its profits directly to its customers. It sells to them at a discount, will often ship free and, if a customer wants to return an item, will refund the money before even receiving the return.

Sometimes it will even do more. Say you buy a book, and then decide it's not for you. You tell Amazon you are returning it. You might get a message like this: "Keep this item and receive a refund! It's on us!"

That's a sure way to win friends and lose money. But Wall Street believes that the company will someday monetize tens of millions of customers — in other words, make a real profit each time it sells them something. Maybe next year. Or the year after. From the very beginning, Mr. Bezos has made Amazon an investment story about the company's potential rather than its reality.

People who have worked closely with Mr. Bezos say he refuses to waste time on anything that isn't directly about the customer. "That's where his ego is," one former colleague said.

As tech companies grow old and big, they strive to keep the energy and boldness of the start-up they once were. They almost always fail. Amazon is the exception. "If a new product was launching, sometimes the day would never end," a former employee said. As an Amazon joke has it, work-life balance is for people who do not like their work.

In Seattle, employees who are partly paid in stock have been rewarded with its 600 percent climb in the last five years. Out in the warehouses, where most of Amazon's 90,000 employees work, starting pay is about $12 an hour and workers can quickly lose their jobs if they slow down.

It was so hot in Allentown, Pa., in May 2011 that some workers at the Amazon warehouse there collapsed. Another company with different attitudes might have installed air-conditioning, or simply sent workers home during heat spells. If Amazon did that, however, East Coast customers might not get their Jay-Z CDs or diapers or jars of heather honey as quickly as they expected.

So the company chose a different solution. It arranged to station ambulances and paramedics out front during five days of excessive heat, according to The Morning Call, the Pennsylvania newspaper that broke the story. Fifteen workers were taken to area hospitals after they fell, and as many as 30 more were treated by paramedics at the warehouse. Workers quoted by the paper said the heat index in the facility, a measure that includes humidity, was as high as 114 degrees. Amazon had little to say to the newspaper, even when it later installed air-conditioning.

It is unlikely that Mr. Bezos will treat The Post's reporters the way he treated his warehouse workers.

"I don't expect him to turn off the air-conditioning," said Ken Doctor, an analyst at Outsell. But Mr. Doctor suggested that Mr. Bezos did have one particularly relevant area of expertise: gathering data and using it to figure out what consumers want. "The Washington Post has a major political news audience," Mr. Doctor said. "Yet it hasn't been able to segment that audience commercially."

One other competency that Mr. Bezos has: money, and lots of it.

"There's not a person in this world that can save the newspaper industry," said Craig Huber, an independent research analyst. "He's going to be dealing with operating losses as far as the eye can see. I think The Washington Post sold to him because he's going to be more willing to absorb those losses."

 CORE role for any newspaper is to cover the local government. For The Post, that includes the federal government. In recent years, however, Amazon has become a government contractor — in effect, the government's digital filing cabinet.

Amazon Web Services, Mr. Bezos' cloud computing operation, is a leading service for third-party rental of computing and data storage. Besides hundreds of thousands of individuals and businesses, more than 2,000 research institutions and 500 government institutions worldwide use A.W.S. Amazon runs several large data centers, each containing hundreds of thousands of servers, along with 42 smaller facilities around the world.

The operations of these data centers, like most other details about A.W.S., are a closely held secret. Even the company's senior executives must have a valid reason to be inside one of the big facilities.
In addition to the eight major centers, A.W.S. operates a separate data center, called GovCloud, for the United States government. GovCloud is compliant with the government's International Traffic in Arms Regulations, or ITAR, controls. Only United

States citizens can use these computers. Much other government work, for both the United States and foreign governments, is done in other A.W.S. centers as well.

In one important recent development, A.W.S. was awarded a contract valued at $600 million to provide computing services to the Central Intelligence Agency. James Staten, an analyst with Forrester Research, said the C.I.A. contract was a breakthrough for Amazon. "Every other national intelligence service will want the same kind of computing, if they can get it," he said.

Every other cloud services company, meanwhile, wants a piece of the action. I.B.M. formally protested the award on undisclosed grounds. The Government Accountability Office, while finding generally for Amazon, said the C.I.A. should re-examine the deal. Amazon is expected to officially apply for the original award to stand.

Although Mr. Bezos, not Amazon, bought The Post, his role as Amazon's chief executive and biggest shareholder makes for awkward relationships. Kate Martin, director of theCenter for National Security Studies, said, "It's a serious potential conflict of interest for a major newspaper like The Washington Post to have a contractual relationship with the government and the most secret part of the government."

But Steve Aftergood, director of the project on government secrecy for the Federation of American Scientists, said that if The Washington Post did not publish a story about the C.I.A. because of Amazon's business relationship with the agency, "there would be no shortage of other venues that would be eager to publish the information in question."

Bob Woodward, The Post's most famous reporter, said he first met Mr. Bezos at a Forstmann Little conference in Colorado about a decade ago and that they spoke "a number of times at those conferences and elsewhere."

Mr. Woodward said that when he discussed projects and books with Mr. Bezos, "he always struck me as very serious about it and in tune with the values of independence,

aggressiveness." He added that he hoped that because Mr. Bezos ran a company that was "customer focused," the entrepreneur would recognize how much readers appreciate high-quality reporting.

Mr. Bezos has made the right noises. Referring to a famous assertion that John N. Mitchell, President Nixon's 1972 campaign director, directed at Katharine Graham, The Post's publisher, the Amazon chief wrote in a letter to Post employees that "while I hope no one ever threatens to put one of my body parts through a wringer, if they do, thanks to Mrs. Graham's example, I'll be ready."

Mr. Bezos' critics, however, have been clamoring to put him through a wringer for years now. Leaving aside the complaints of bookstores, publishers and distributors, all groups whose viability he is challenging, two controversies seem to prefigure the sort of conflicts he will have as The Post's new owner.

WikiLeaks briefly used Amazon Web Services in late 2010 to host its purloined classified documents, but then Amazon pulled the plug. The company said that contrary to news reports, it was not acting at the government's request. Instead, it said it took WikiLeaks offline for violating Amazon's rules against posting material you do not own. The Electronic Frontier Foundation said Amazon "ran away with its tail between its legs."

A more recent complaint involves the opposite of the WikiLeaks situation. Ask.fm, a Web site for anonymous teenagers, is being pilloried in the British media for allowing cyberbullying that was blamed in the suicides of four youths. Amazon, which reportedly hosts Ask.fm, has been asked to take it down for violating its rules against hate speech. An Amazon spokeswoman declined to comment or even confirm that the company hostsAsk.fm.

Largely overlooked in the commentary over what Mr. Bezos will do with The Post is the fact that he has already commanded a large editorial team.

In the early days of Amazon, he set up a department to produce reviews of the books that Amazon was selling. It was an impressive gesture: Whoever heard of a store with editors? But it offered Amazon instant credibility. Mr. Bezos never suggested that the reviews be positive, and he gave the department his full support.

Until he did not. People at Amazon at the time describe a struggle between high-minded reviewers and data-driven M.B.A.'s, otherwise known as the Vulcans in a tribute to Mr. Bezos' favorite television show. The Vulcans pointed out that relatively few customers actually read the reviews, so maybe Amazon shouldn't spend so much to produce them.

"It was a culture war and the Vulcans won," said Tim Appelo, who worked in the editorial department. "Many people in Amazon editorial were embittered because Bezos scuttled us."

The professional reviews yielded to the innovation of customer reviews — sometimes an impartial evaluation, sometimes a love song by the author's mother disguised as an impartial evaluation. There was no way to tell, and no one in management seemed to care. Many of the reviewers quit or were laid off.

Mr. Appelo was not bitter. In fact, he went back to Amazon for a second stint, introducing its digital video store in 2006. (He is now at The Hollywood Reporter.) "Bezos knows that there is a difference between the marketplace and the marketplace of ideas," Mr. Appelo said. "He is relentlessly and ruthlessly inventive but I don't think he'll indulge his Vulcan side too much."

Put like that, it sounds somewhere between a gut feeling and a heartfelt wish. In these troubled times for newspapers, that may be the most The Washington Post can expect.

REFERENCES CITED

Adachi, P., & Willoughby, T. (2011). The effect of violent video games on aggression: Is it more than just the violence? *Aggression & Violent Behavior*, *16*, 55-62.

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* Thousand Oaks, CA: Sage Publications Inc.

Ajzen, I. (1985). From intention to action: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 11-39). New York: Springer-Verlag.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50,* 179-211.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Englewood Cliffs, NJ: Prentice-Hall.

Albarracin, D., Johnson, B. T., & Zanna, M. P. (2005). *The handbook of attitudes.* Mahwah, NJ; Erlbaum Associates.

Albarracin, D., Johnson, B. T., Fishbein, M., & Muellerleile, P. (2001). Theories of reasoned action and planned behavior as models of condom use: A meta-analysis. *Psychological Bulletin, 127*, 142-161.

Allan, D. (2007). Sound advertising: A review of the experimental evidence on the effects of music in commercials on attention, memory, attitudes, and purchase. *Journal of Media Psychology, 12*, 1-35.

Allport, G. W. (1968). The historical background of modern social psychology. In G. Lindzey & E. Aronson (Eds.), *The handbook of social psychology* (pp. 1-80). Reading, MA; Addison-Wesley.

Amazon (2013). *Amazon Mechanical Turk: General questions*. Retrieved March 19, 2013, from: https://www.mturk.com/mturk/help?helpPage=overview

Anderson, C. A. (2004). An update on the effects of playing violent video games. *Journal of Adolescence, 27*, 113-122.

Anderson, C. A., & Bushman, B. J. (2001). Effects of violent games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *Psychological Science, 12*, 353-359.

Anderson, C. A., Carnagey, N. L., Flanagan, M., Benjamin, J. A. J., Eubanks, J., & Valentine, J. C. (2004). Violent video games: Specific effects of violent content on aggressive thoughts and behavior. *Advances in Experimental Social Psychology, 36,* 202.

Anderson, C. A., Gentile, D. A., Buckley, K. E. (2007). *Violent video game effects on children and adolescents: Theory, research, and public policy.* New York: Oxford Press.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behavior: A meta-analytic review. *British Journal of Social Psychology, 40*, 471-499.

Babbie, E. (2002). *The basics of social research (2nd ed.).* Belmont, CA: Wadsworth Group.

Bagozzi, R. P. (1981). Attitudes, intentions, and behavior: A test of some key hypotheses. *Journal of Personality and Social Psychology, 37*, 913-929.

Bagozzi, R. P., & Silk, A. (1983). Recall, recognition, and the measurement of memory for print advertisements. *Marketing Science*, *2*, 95-134.

Bandura, A. (1977). *Social learning theory.* Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. & Wood, R. (1989). Effect of perceived controllability and performance standards on self-regulation of complex decision-making. *Journal of Personality and Social Psychology, 56*, 805-814.

Bandura, A. (2006). *Self-efficacy beliefs of adolescents*. Greenwich, CT: Information Age Publishing.

Barlett, C. P., Branch, O., Rodeheffer, & Harris, R. (2009). How long do the short-term violent video game effects last? *Aggressive Behavior, 35*, 225-236.

Barlett, C. P., Harris, R. J., & Baldassaro, R. (2007). The effect of advances in video game technology and content on aggressive cognitions, hostility, and heart rate. *Media Psychology, 11*, 540-565.

Bauer, D. J., & Curran, P. J. (2005). Probing interactions in fixed and multilevel regression: Inferential and graphical techniques. *Multivariate Behavioral Research, 40*, 373-400.

Bee, C. C., & Madrigal, R. (unpublished). It's not whether you win or lose, it's how the game is played: The influence of suspenseful sports programming on advertising. Retrieved February 12, 2013, from http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/34293/BeeColleenBusinessNotWeatherYou.pdf?sequence=1

Bentler, P. M., & Speckart, G. (1979). Models of attitude-behavior relations. *Psychological Review, 86,* 452-464.

Berinsky, A. J., Huber, G. A., & Lenz, G. S. (2012). Evaluating online labor markets for experimental research: Amazon.com's Mechanical Turk. *Political Analysis, 20,* 351-368.

Bettman, J. R. (1979). *An information processing theory of consumer choice.* Reading, MA: Addison-Wesley Publishing Co.

Bezio, K. M. S. (2013,February 12). Stop blaming video games for America's gun violence. *Christian Science Monitor*. Retrieved from http://www.csmonitor.com/Commentary/Opinion/2013/0212/Stop-blaming-video-games-for-America-s-gun-violence

Blumstein, A. & Wallman, J. (2000). *The crime drop in America*. New York: Cambridge University Press.

Bocanegra, B. R., & Zeelenberg, R. (2009). Dissociating emotion-induced blindness and hypervision. *Emotion, 9*, 865-873.

Borland, R. , & Hill, D. (1997). Initial impact of the new Australian tobacco health warnings on knowledge and beliefs. *Tobacco Control*, *6*, 317-325.

Brehm, J. W. (1966). A theory of psychological reactance. New York: Academic Press.

Brehm, J. W. (1993). Control, its loss, and psychological reactance. In G. Weary, F. H. Gleicher, & K. L. Marsh (Eds.), *Control motivation and social cognition*. New York: Springer-Verlag.

Brehm, J. W., & Brehm, S. S. (1981). *Psychological reactance: A theory of freedom and control.* San Diego, CA: Academic Press.

Brehm, J.W., & Sensenig, J. (1966). Social influence as a function of attempted and applied usurpation of choice. *Journal of Personality and Social Psychology, 4*, 703-707.

Broadbent, D. E. (1971). *Decision and stress*. London: Academic Press.

Brosch, T. , Grandjean, D. , Sander, D. , & Scherer, K. (2009). Cross-modal emotional attention: Emotional voices modulate early stages of visual processing. *Journal of Cognitive Neuroscience, 21*, 1670-1679.

Brosch, T., & Van Bavel, J. (2012). The flexibility of emotional attention: Accessible social identities guide rapid attentional orienting. *Cognition, 125*, 309-316.

Brosius, H-B. (1999). The influence of exemplars on recipients' judgments: The part played by the similarity between exemplar and recipient. *European Journal of Communication, 14*, 213 – 224.

Brown, A. D. & Curhan, J. R. (2013). The polarizing effect of arousal on negotiation *Psychological Science, 24,* 1928 – 1935.

Bryant, J. & Comisky, P. (1978). The effect of positioning a message within differentially cognitively involving portions of a television segment on recall of the message. *Human Communication Research, 5,* 63 – 75.

Bryant, J. & Miron, D. Excitation-transfer and three-factor theory of emotion. In Bryant, J., & Roskos-Ewoldson, D. (Eds.), *Communication and emotion: Essays in honor of Dolf Zillman* (pp. 31 – 60). Mahwah, NJ: Lawrence Erlbaum Associates.

Bunce, S. C., Larsen, R. J., Cruz, M. (1993). Individual differences in the excitation transfer effect. *Personality and Individual Differences*, 15, 507 – 514.

Burgoon, M., Alvaro, E. M, Grandpre, J., & Voloudakis, M. (2002). Revisiting the theory of psychological reactance: Communicating threats to attitudinal freedom. In J. P. Dillard & M. Pfau (Eds.), *The persuasion handbook: Developments in theory and practice* (pp. 213 – 232). Thousand Oaks, CA: Sage.

Burgoon, M., Alvaro, E. M., Broneck, K., Miller, C., Grandpre, J. R., Hall, J. R., & Frank, C. A. (2002). Using interactive media tools to test substance abuse prevention messages. In W. D. Crano & M. Burgoon (Eds.), Mass media and drug prevention: Classic and contemporary theories and research (pp. 67-87). Mahwah, NJ: Lawrence Erlbaum Associates.

Bushman, B. J., & Anderson, C. A. (2002). Violent Video Games and Hostile Expectations: A Test of the General Aggression Model. *Personality and Social Psychology Bulletin, 28,* 1679-1686.

Bushman, B. J., & Huesmann, R. (2006). Short-term and long-term effects of violent media on aggression in children and adults. *Archives of Pediatrics & Adolescent Medicine, 160,* 348- 352.

Cacioppo, J. T. (1997). Mapping cognitive structures and processes through verbal content: The thought-listing technique. *Journal of Consulting and Clinical Psychology, 65* 928–40.

Cacioppo, J. T., & Petty, R. E. (1981). Social psychological procedures for cognitive response assessment: The thought-listing technique. In T. V.Merluzzi, C. R. Glass, &M. Genest (Eds.), *Cognitive assessment* (pp. 309–342). New York: Guilford Press.

Cacioppo, J.T., Petty, R.E. (1989). Effects of message repetition on argument processing, recall, and persuasion. *Basic and Applied Social Psychology, 10,* 3–12

Cacioppo, J. T., von Hippel, W., & Ernst, J. M. (1997). Mapping cognitive structures and processes through verbal content: The thought-listing technique. *Journal of Consulting and Clinical Psychology, 65,* 928 – 940.

Calvo, M. G. & Nummenmaa, L. (2008). Detection of emotional faces: Salient physical features guide effective visual search. *Journal of Experimental Psychology, 137,* 471 – 494.

Cantor, J. R., Bryant, J., & Zillmann, D. (1974). Enhancement of humor appreciation by transferred excitation. *Journal of Personality and Social Psychology, 30,* 812– 821.

Cantor, J. R., Mody, B., & Zillman, D. (1974). Residual emotional arousal as a distractor in persuasion. *Journal of Social Psychology, 92,* 231- 244.

Cantor, J. R., & Zillmann, D. (1973). The effect of affective state and emotional arousal on music appreciation. *Journal of General Psychology, 89,* 97–108.

Carnagey, N., Anderson, C. , & Bartholow, B. (2007). Media violence and social neuroscience: New questions and new opportunities. *Current Directions in Psychological Science, 16,* 178-182.

Carnagey, N. L., Anderson, C. A., & Bushman, B. J. (2007). The effect of video game violence on physiological desensitization to real-life violence. *Journal of Experimental Social Psychology, 43,* 489–496.

Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology, 39,* 752 – 766.

Chaney, I., Lin, K., and Chaney, J. (2004). The effect of billboards within the gaming Environment. *Journal of Interactive Advertising, 5,* 37 – 45.

Cherulnik, P. D., & Murray, M. C. (1974). Individual difference in psychological reactance: The interaction between locus of control and mode of elimination of freedom. *Journal of Personality and Social Psychology*, *29*, 398–404.

Children Now. (2001). *Fair play? Violence, gender, and race in video games*. Oakland, CA. Retrieved April 2, 2013, from: http://www.childrennow.org/uploads/documents/fair_play_2001.pdf

Choi, Y. , & Lee, J. (2012). The persuasive effects of character presence and product type on responses to advergames. *CyberPsychology, Behavior & Social Networking*, *15*, 503-506.

Claypool, K., & Claypool, M. (2007). On frame rate and player performance in first person shooter games. *Multimedia Systems*, *13*, 3-17.

Cohen J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement, 20,* 37-46.

Cohen, J. (1988). *Statistical power for the behavioral sciences.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*, 155-159.

Corson, Y., & Verrier, N. (2007). Emotions and false memories: Valence or arousal? *Psychological Science, 18*, 208-211.

Costello, A. B., & Osborne, J. W. (2005). Best practices in factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment Research & Evaluation, 10*, 1-9.

Cummins, R., Wise, W., & Nutting, B. (2012). Excitation Transfer Effects Between Semantically Related and Temporally Adjacent Stimuli. *Media Psychology*, *15*, 420 – 442.

Danaher, P. J., & Mullarkey, G. W. (2003). Factors affecting online advertising recall: A study of students. *Journal of Advertising Research, 43,* 252-267.

Daugherty, T., Li, H., & Biocca, F. (2008). Consumer learning and the effects of virtual experience relative to indirect and direct product experience. *Psychology & Marketing, 25,* 568 – 596.

D'Argembeau, A., & Van der Linden, M. (2004). Influence of affective meaning on memory for contextual information. *Emotion, 4,* 173–188.

De Hoog, N., Stroebe, W., & De Wit, J. B. F. (2007). The impact of vulnerability to and severity of a health risk on processing and acceptance of fear-arousing communications: A meta-analysis. *Review of General Psychology*, *11*, 258–285.

Dillard, J. P. & Pfau, M. (2002). *The persuasion handbook.* Thousand Oaks, CA: Sage.

Dillard, J. P. & Peck, E. (2001). Persuasion and the structure of affect: Dual systems and discrete emotions as complementary models. *Human Communication Research, 27*, 38 – 68.

Dillard, J. P., & Shen, L. (2005). On the nature of reactance and its role in persuasive health communication. *Communication Monographs*, *72*, 144–168.

Dillard, J. P., Shen, L. , & Vail, R. (2007). Does perceived message effectiveness cause persuasion or vice versa? 17 consistent answers. *Human Communication Research*, *33*, 467-488.

Dillard, J. P., Wilson, S. R., Tusing, K. J., & Kinney, T. A. (1997). Politeness judgments in personal relationships. *Journal of Language and Social Psychology, 16,* 297-325.

Ding, L., Belicer, W. F., & Harlow, L. L. (1995). The effects of estimation methods, number of indicators per factor, and improper solutions on structural equation modeling fit indices. *Structural Equation Modeling*, 2, 119 – 144.

DiStefano, C., Zhu, M., & Mindrila, D. (2009). Understanding and using factor scores: Considerations for the applied researcher. *Practical Assessment, Research, & Evaluation, 14,* 1 – 11.

Doerksen, S., & Shimamura, A.P. (2001). Source memory enhancement for emotional words. *Emotion, 1*, 5–11.

Donnell, A. J., Thomas, A., & Buboltz, W. C. (2001). Psychological reactance: Factor structure and internal consistency of the questionnaire for the measurement of psychological reactance. *Journal of Social Psychology, 141,* 679-688.

Dowd, E. T., Milne, C. R., & Wise, S. L. (1991). The therapeutic reactance scale: A measure of psychological reactance. *Journal of Counseling &Development, 69,* 541–545.

Dowd, E. T., & Wallbrown, F. (1993). Motivational components of client reactance. *Journal of Counseling and Development, 71,* 533-538.

Dowd, E. T., Wallbrown, F., Sanders, D., & Yesenosky, J. M. (1994). Psychological reactance and its relationship to normal personality variables. *Cognitive Therapy and Research, 18,* 601-612.

Dudai, Y. (2007). Memory: It's all about representations. In H. L. Roedinger, Y. Dudai, & S. M. Fitzpatrick (Eds.), *Science of memory: Concepts* (pp. 13 – 16). New York: Oxford University Press.

Dudai, Y. (2004). The neurobiology of consolidations, or, how stable is the engram? *Annual Review of Psychology*, 2004, 51 – 86.

Eagly, A.H., Kulesa, P., Chen, S., Chaiken, S. (2001). Do attitudes affect memory? Tests of the congeniality hypothesis. *Current Directions in Psychological Science, 10,* 5–9.

Easterbrook, J. A. (1959). The effects of emotion on cue utilization and the organization of behavior. *Psychological Review, 66,* 183 – 201.

Eastin, M. & LaRose, R. (2000). Internet self-efficacy and the psychology of the digital divide. *Journal of Computer-Mediated Communication, 6*, retrieved from http://jcmc.indiana.edu/vol6/issue1/eastin.html

Elder, J. , Ayala, G. , & Harris, S. (1999). Theories and intervention approaches to health-behavior change in primary care. *American Journal of Preventive Medicine*, *17*, 275-284.

ESA (2012). *Sales, demographic, and usage data*. Retrieved April 04 2013, from http://www.theesa.com/facts/pdfs/ESA_EF_2012.pdf

ESA (2013). *Sales, demographic, and usage data*. Retrieved May 08, 2014, from http://www.theesa.com/facts/pdfs/ESA_EF_2013.pdf

Eysenck, H. J. (1967). *The biological basis of personality*. Springfield, IL: Charles C. Thomas.

Eysenck, H. J., & Eysenck, M. W. (1985). *Personality and individual differences*. New York: Plenum Press.

Eysenck, M. W. (1982). *Attention and arousal, cognition and performance*. New York: Springer.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4,* 272—299.

Farrand, T. (2007) *The brave new world of gaming. Admap, 11,* 41 – 44.

Fazio, R. H., & Williams, C. J. (1986). Attitude accessibility as a moderator of the attitude–perception and attitude–behavior relations: An investigation of the 1984 presidential election. *Journal of Personality and Social Psychology, 51,* 505–514.

Fahrenberg, J. (1987). Concepts of activation and arousal in the theory of emotionality (neuroticism): A multivariate conceptualization. In J. Strelau & H. J. Eysenck (Eds.), *Personality and dimensions of arousal* (pp. 99- 120). New York: Plenum Press.

Faul, F., Erdfelder, E., Lang, A—G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175-191.

Fecteau, J. H., & Munoz, D. P. (2006). Salience, relevance, and firing: a priority map for target selection. *Trends in Cognitive Sciences, 10*, 382-390.

Federal Bureau of Investigations (2011). *Preliminary annual uniform crime report, January-December, 2011*. Retrieved April 20, 2013, from http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2011/preliminary-annual-ucr-jan-dec-2011

Federal Bureau of Investigations (2012a). *Preliminary semiannual uniform crime report, January-June 2012*. Retrieved April 20, 2013, from http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2012/preliminary-semiannual-uniform-crime-report-january-june-2012

Felson, R. (1996). Mass media effects on violent behavior. *Annual Review of Sociology*, *22*, 103-128.

Fischer, C. (2010). *A crime puzzle: Violent crime declines in America*. Retrieved April 20 2012, from http://blogs.berkeley.edu/2010/06/16/a-crime-puzzle-violent-crime-declines-in-america/

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA; Addison-Wesley.

Fishbein, M., Hall-Jamieson, K., Zimmer, E., von Haeften, I., & Nabi, R. (2002). Avoiding the boomerang: Testing the relative effectiveness of antidrug public service announcements before a national campaign. *American Journal of Public Health*, *92,* 238–245.

Flesch, R. (n. d.). *How to write in plain English*. Retrieved April 28, 2013, from http://www.mang.canterbury.ac.nz/writing_guide/writing/flesch.shtml

Fleming, M. J., & Rickwood, D. J. (2001). Effects of violent versus nonviolent video games on children's arousal, aggressive mood, and positive mood. *Journal of Applied Social Psychology, 31*, 2047–2071.

Flocke, S.,& Stange, K. (2004). Direct observation and patient recall of health behavior advice. *Preventive Medicine*, *38*, 343-349.

Forrow, L., Taylor, W. C., & Arnold, R. M. (1992). Absolutely relative: How research results are summarized can affect treatment decisions. *American Journal of Medicine, 92*, 121 –124.

Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic Perspectives, 19,* 25 – 42.

Gangadharbatla, H. (2006). Alternative media strategies: Measuring product placement in videogames. Unpublished doctoral dissertation. University of Texas, Austin, TX.

Gangadharbatla, H. (2008, March). *Gender, arousal, and presence as predictors of recall of brands placed in video games.* Paper presented at the annual conference of American Academy of Advertising, San Mateo, CA.

Gartner (2011). *Gartner says spending on gaming to exceed 74 billion in 2011.* Retrieved March 10, 2013, from http://www.gartner.com/newsroom/id/1737414

Gibson, R., & Zillman, D. (1994). Exaggerated versus representative exemplifying testimony on issue perception. *Journalism and Mass Communication Quarterly, 75*, 167 – 176.

Glasman, L., & Albarracin, D. (2006). Forming attitudes that predict future behavior: A meta-analysis of the attitude-behavior relation. *Psychological Bulletin, 132*, 778-822.

Godin, G. & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behavior. *American Journal of Health Promotion, 11*, 87 – 98.

Gorn, G., Pham, M. T., Sin, L. Y. (2001). When arousal influences ad evaluation and valence does not (and vice versa). *Journal of Consumer Psychology, 11,* 43 – 55.

Goodall, C. E., & Slater, M. D. (2010). Automatically activated attitudes as mechanisms for message effects: The case of alcohol advertisements. *Communication Research, 37,* 620 – 643.

Goto, Y. , Grace, A., (2008). Dopamine modulation of hippocampal-prefrontal cortical interaction drives memory-guided behavior. *Cerebral Cortex*, *18*, 1407-1414.

Hackley, S. A., & Valle-Inclan, F. (1999). Accessory stimulus effects on response selection: Does arousal speed decision making? *Journal of Cognitive Neuroscience, 11,* 321-329.

Hagger, M.S., Chatzisarantis, N. L., & Biddle, S. J. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport and Exercise Psychology, 24*, 3 – 32.

Hammock, T. & Brehm, J. W. (1966). The attractiveness of choice alternatives when freedom to choose is eliminated by a social agent. *Journal of Personality, 34,* 546 – 554.

Harel, O., Zimmerman, R., & Dekhytar, O. (2008). Approaches to the handling of missing data in communication research. In A. F. Hayes, M. D. Slater, & L. B. Snyder (Eds.), *Advanced data analysis methods for communication research* (pp.349 – 372). Thousand Oks, CA: Sage Publications

Hart, P. S. (2014). The role of numeracy in moderating the influence of statistics in climate change messages. *Public Understanding of Science*, *22,* 785 – 798.

Hasher, L., & Zacks, R. T. (1979). Automatic and effortful process in memory. *Journal of Experimental Psychology, 108,* 356 – 388.

Haugtvedt, C. P., & Kasmer, J. A. (2008). Attitude change and persuasion. In C. P. Haugtvedt, P. M. Herr, & F. R. Kardes (Eds.), *Handbook of Consumer Psychology* (pp. 419 – 435). New York: Taylor & Francis.

Hayes, A. F. (2005). *Statistical methods for communication science*. Mahwah, NJ: Lawrence Erlbaum Associates.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs, 76*, 408-420.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Gulford.

Hong, S. M. (1992). Hong's psychological reactance scale: A further factor analytic validation. *Psychological Reports, 70,* 512-514.

Hong, S. M., & Faedda (1996). Refinement of the Hong psychological reactance scale. *Educational and Psychological Measurement, 56,* 173-182.

Hong, S. M., Giannakopoulos, E., Laing, D., & Williams, N. A. (1994). Psychological reactance: Effects of age and gender. *Journal of Social Psychology,* 134, 223-228.

Hong, S. M., & Page, S. (1989). A psychological reactance scale: Development, factor structure and reliability. Psychological Reports, 64, 1323-1326.

Hornik, R., Jacobsohn, L., Orwin, R., Piesse, A., & Kalton, G. (2008). Effects of the national youth anti-drug campaign on youths. *American Journal of Public Health, 98,* 2229-2236.

Hovland, C. I., Janis, I. L., & Kelley, H. H. (1953). *Communication and persuasion: Psychological studies of opinion change.* New Haven, CT: Yale University Press.

Humpreys, M. S., & Revelle, W. (1984). Personality, motivation, and performance: A theory of the relationship between individual differences and information processing. *Psychological Review, 1991,* 153 – 184.

Jansz, J. & Tanis, M. (2007). Appeal of playing online first person shooter games. *Cyberpsychology and Behavior, 10, 1,* 133-136.

Jenkins, H. (2003). *Reality bytes: Eight myths about video games debunked*. Retrieved April 21, 2013, from http://www.pbs.org/kcts/videogamerevolution/impact/myths.html

Jennings, P., McGinnis, D., Lovejoy, S., & Stirling, J. (2000). Valence and arousal ratings for velten mood induction statements. *Motivation and Emotion, 24,* 285–297.

Jeong, E. , & Biocca, F. (2012). Are there optimal levels of arousal to memory? Effects of arousal, centrality, and familiarity on brand memory in video games. *Computers in Human Behavior*, *28*, 285-291.

Jeong, E. , Bohil, C., & Biocca, F. (2011). Brand logo placements in violent games effects of violence cues on memory and attitude through arousal and presence. *Journal of Advertising*, *40*, 59-72.

Johnson, P. O., & Fay, L. C. (1950). The Johnson-Neyman technique, its theory and application. *Psychometrika, 15*, 349–367.

Johnson, M. R., & Johnson, M. K. (2009). Top-down enhancement and suppression of activity in category-selective extrastriate cortex from an act of reflective attention. *Journal of Cognitive Neuroscience, 21,* 2320 – 2327.

Jones, C. R. & Fazio, R. H. (2008). Associative strength and consumer choice behavior. In C. P. Haugtvedt, P. M. Herr, & F. R. Kardes (eds.), *Handbook of consumer psychology* (pp. 437- 459). New York: Taylor & Francis.

Kahai, S., S. & Cooper, R. B. (2003). Exploring the core concepts of media richness theory: The impact of cue multiplicity and feedback immediacy on decision quality. *Journal of Management Information Systems, 20,* 263 – 299.

Kahneman, D. (1973). *Attention and effort.* Englewood Cliffs, NJ: Prentice-Hall.

Keller, K. L. (1987). Memory factors in advertising: The effect of advertising retrieval cues on brand evaluations. *Journal of Consumer Research*, *14*, 316-333.

Keller, K. L., Heckler, S. E., & Houston, M. J. (1998). The effects of brand name suggestiveness on advertising recall. *Journal of Marketing, 62,* 48 – 57.

Kensinger, E.A., & Corkin, S. (2003). Memory enhancement for emotional words: Are emotional words more vividly remembered than neutral words? *Memory & Cognition, 31,* 1169–1180.

Kim, M. S., & Hunter, J. E. (1993a). Attitude-behavior relations: A meta-analysis of attitudinal relevance and topic. *Journal of Communication, 43,* 101-142.

Kim, T., & Biocca, F. (1997). Telepresence via television: Two dimensions of telepresence may have different connections to memory and persuasion. *Journal of Computer-Mediated Communication, 3*, from http://jcmc.indiana.edu/vol3/issue2/kim.html

Kim, S. Y., & Levine, T. (2008a, November). *Intertwined versus separate process models of resistance to persuasion: The moderating effect of method.* Paper presented at the annual meeting of the National Communication Association, San Diego, CA.

Kim, S. Y., & Levine, T. (2008b, November).*Revisiting the intertwined model of psychological reactance.* Paper presented at the annual meeting of the National Communication Association, San Diego, CA.

Kim, S. Y., Levine, T., & Allen, M. (2013). Comparing separate process and intertwined models for reactance. *Communication Studies, 64*, 273 – 295.

Kim, M.S, & Hunter, J. E. (1993). Relationships among attitudes, behavioral intentions, and behavior: A meta-analysis of past research, part 2. *Communication Research, 20,* 331 – 364.

Kiviniemi, M. , & Rothman, A. (2006). Selective memory biases in individuals' memory for health-related information and behavior recommendations. *Psychology & Health*, *21*, 247-272.

Klein, L. (2003). Creating virtual product experiences: The role of telepresence. *Journal of Interactive Marketing, 17,* 41 – 55

Kline, R. B. (2011). *Principles and practice of structural equation modeling.* New York: Guilford.

Klonowicz, T. (1987). Reactivity and the control of arousal. In J. Strelau & H. J. Eysenck (Eds.), *Personality and dimensions of arousal* (pp. 183 - 196). New York: Plenum Press.

Klucharev, V. , Smidts, A. , & Fernandez, G. (2008). Brain mechanisms of persuasion: How expert power modulates memory and attitudes. *Social Cognitive and Affective Neuroscience, 3*, 353-366.

Kohn, P. M., Goodstadt, M. S., Cook, G. M., Sheppard, M.,&Chan, G. (1982). Ineffectiveness of threat appeals about drinking and driving. *Accident Analysis and Prevention, 14,* 457–464.

Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication, 50,* 46–70

Lang, A. (2006). Motivated cognition (LC4MP): The influence of appetitive and aversive activation on the processing of video games. In P. Messarsis & L. Humphries (Eds.), *Digital media: Transformation in human communication* (pp. 237–256). New York: Peter Lang.

Lang, A., Bolls & P., Potter, R., & Kawahara, K. (1999). The effects of pacing and arousing content on the information processing of television messages. *Journal of Broadcasting & Electronic Media, 43,* 451 – 475.

Lang, A., Park, B., Sanders-Jackson, A. N., Wilson, B. D., & Wang, Z. (2007). Cognition and emotion in TV message processing: How valence, arousing content, structural complexity, and information density affect the availability of cognitive resources. *Media Psychology, 10,* 317–338.

Lang, A., Schwartz, N., Chung, Y., & Lee, S. (2004). Processing substance abuse messages: Production pacing, arousing content, and age. *Journal of Broadcasting and Electronic Media, 48,* 1- 35.

LaPierre, W. (2012). *Press release.* Fairfax, VA: National Rifle Association. Retrieved April 11, 2013, from http://home.nra.org/home/document/nra-press-conference

Lavie, N. (1995). Perceptual load as a necessary condition for selective attention. *Journal of Experimental Psychology, 21,* 451–468.

Lee, M., & Faber, R. (2007). Effects of product placement in on-line games on brand memory: A perspective of the limited-capacity model of attention. *Journal of Advertising, 36,* 75-90.

Leippe, M. R., & Elkin, R. A. (1987). When motives clash: Issue involvement and response involvement as determinants of persuasion. *Journal of Personality and Social Psychology, 52*, 269–278.

Lenhart, A. (2009, March). *Cheats for marketers: Fresh demographics on teen and adult game play and how games can teach kids to be good citizens*. Paper presented at the Game Developers Conference, San Francisco CA.

Leshner, G., Vultee, F., Bolls, P. D., & Moore, J. (2010). When a fear appeal isn't just a fear appeal: The effects of graphic anti-tobacco messages. *Journal of Broadcasting & Electronic Media*, *54*, 485–507.

Levitt, S. D. (2004). Understanding why crime fell in the 1990's: Four factors that explain the decline and six that do not. *Journal of Economic Perspectives, 18,* 163 – 190.

Lewandowski, L. J., Codding, R. S., Kleinmann, A. E., & Tucker, K. L.(2003). Assessment of reading rate in postsecondary students. *Journal of Psychoeducational Assessment, 21*, 134 – 144.

Lieberman, M.D., Ochsner, K.N., Gilbert, D.T., Schacter, D.L. (2001). Do amnesics exhibit cognitive dissonance reduction? The role of explicit memory and attention in attitude change. *Psychological Science, 12,* 135–40.

Lin, W. , Hang, C. , Yang, H. C., & Hung, M. (2011). 2005-2008 nutrition and health survey in Taiwan: The nutrition knowledge, attitude and behavior of 19-64 year old adults. *Asia Pacific Journal of Clinical Nutrition*, *20*, 309-318.

Lindsay, J. J., & Anderson, C. A. (2000). From antecedent conditions to violent actions: A general affective aggression model. *Personality and Social Psychology Bulletin, 26,* 5, 533-547.

Lindsey, A. E. (1996). Affect-congruency in message content: A preliminary evaluation of two accounts. *Communication Quarterly, 44,* 440 – 451.

Lipkus, I. M., Samsa, G., & Rimer,B. K. (2001). General performance on a numeracy scale among highly educated samples. *Medical Decision Making, 21,* 37 – 44.

Little, R. J. A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association, 83,* 1198 – 1202.

Lloyd, D. W., & Clancy, K. J. (1991). Television programming involvement and advertising response: Some unsettling implications for copy research. *Consumer Marketing, 8*, 61 – 74.

Loftus, E. F., & Loftus, G. R. (1980). On the permanence of stored information in the human brain. *American Psychologist, 35*, 409 – 420.

Loken, B., & Hoverstad, R. (1985). Relationship between information recall and subsequent attitudes: Some exploratory research. *Journal of Consumer Research, 12,* 155 -168.

Lombard, M., & Ditton, T. B. (1997). At the heart of it: The concept of presence. *Journal of Computer-Mediated Communication*, *3*, from http://jcmc.indiana.edu/vol3/issue2/lombard.html

Lombard, M., & Snyder-Dutch, J. (2001). Interactive advertising and presence: A framework. *Journal of Interactive Advertising*, 1, 56 – 65.

Magid, Y. (2011). *The following message might make you mad: Forewarning and inoculation against reactance.* Unpublished Master's thesis, University of Maryland, College Park, MD.

Makuch,E. (2011). Counter-Strike: Global Offensive firing up early 2012. *Gamespot*, Retrieved April 12, 2013, from http://www.gamespot.com/articles/counter-strike-global-offensive-firing-up-early-2012/1100-6328645/

Mantonakis, A., Whittlesea, B. W., & Yoon, C. (2008). Consumer memory, fluency, and familiarity. In C. P. Haugtvedt, P. M. Herr, & F. R. Kardes (eds.), *Handbook of Consumer Psychology* (pp. 77 – 102). New York: Taylor & Francis.

Mason, W. & Suri, S. (2012). Conducting behavioral research on Amazon's Mechanical Turk. *Behavioral Research Methods, 44,* 1-23.

Mather, M. (2007). Emotional arousal and memory binding: An object-based framework. *Perspectives on Psychological Science, 2*, 33–52.

Mather, M., & Sutherland, M. (2011). Arousal-biased competition in perception and memory. *Perspectives on Psychological Science*, *6*, 114-133.

Mather, M. & Sutherland, M. (2012). The selective effects of emotional arousal on memory. *APA science brief.* Retrieved March 20, 2013, from http://www.apa.org/science/about/psa/2012/02/emotional-arousal.aspx

Mattes, J., & Cantor, J. (1982). Enhancing responses to television advertisements via the transfer of arousal from prior programming. *Journal of Broadcasting, 26*, 553 – 566.

McFarlane, M., & St Lawrence, J. (1999). Adolescents' recall of sexual behavior: Consistency of self-report and effect of variations in recall duration. *Journal of Adolescent Health*, *25*, 199-206.

Merz, J. (1983). Fragebogen zur Messung der psychologischen reaktanz. [A questionnaire for the measurement of psychological reactance]. *Diagnostica, 29*, 75-82.

Miller, C. H., Ivanov, B., Sims, J., Compton, J., Harrison, K. J., Parker, K. A., Parker, J. L., & Averbeck, J. M. (2013). Boosting the potency of resistance: Combining the motivational forces of inoculation and psychological reactance. *Human Communication Research, 39,* 127 – 155.

Miller, C. H., Lane. L. T., Deatrick, L. M., Young, A. M., & Potts, K. A. (2007). Psychological reactance and promotional health messages: The effects of controlling language, lexical concreteness, and the restoration of freedom. *Human Communication Research, 33,* 219 – 240.

Miller, C. H., Ivanov, B., Sims, J., Compton, J., Harrsion, K. J., Parker, K. A., Parker, J. L., & Averbeck, J. M. (2012). Boosting the potency of resistance: Combining the motivational forces of inoculation and psychological reactance. *Human Communication Research, 39,* 127 – 155.

Miller, G. R. (1980). On being persuaded: Some basic distinctions. In M. Roloff & G. R. Miller (Eds.), *Persuasion: New directions in theory and research* (pp. 11 – 28). Beverly Hills, CA; Sage.

Miron, A.M., & Brehm, J.W. (2006). Reactance theory: 40 years later. *Zeitschrift für Sozialpsychologie, 37,* 9–18.

Montag, C., Flierl, M., Markett, S., Walter, N., Jurkiewicz, & Reuter, M. (2011). Internet addiction and personality in first-person-shooter video gamers. *Journal of Media Psychology, 23,* 163 – 173.

Moodie, C. , MacKintosh, A. , & Hammond, D. (2010). Adolescents' response to text-only tobacco health warnings: Results from the 2008 UK youth tobacco policy survey. *European Journal of Public Health*, *20*, 463-469.

Morman, M. T. (2000). The influence of fear appeals, message design, and masculinity on men's motivation to perform the testicular self-exam. *Journal of Applied Communication Research, 28,* 91–116.

Moscovitch M. (2007). Memory: Why the engram is elusive. In H. L. Roedinger, Y. Dudai, & S. M. Fitzpatrick (Eds.), *Science of memory: Concepts* (pp. 17 - 21). New York: Oxford University Press.

Mundorf, N., D'Alessio, D., Allen, M., & Emmers-Sommer, T. M. (2007). Effects of sexually explicit media. In R. W. Preiss, B. M. Gayle, N. Burrell, M. Allen, & J. Bryant (Eds), *Mass media effects research: Advances through meta-analysis* (pp. 181 – 198). Mahwah, NJ: Lawrence Erlbaum.

Myers, L. S., Gamst, G., Guarin, A. J. (2013). *Applied multivariate research: Design and interpretation.* Thousand Oaks, CA: Sage

Myrtek, M. (1984). *Constitutional psychophysiology*. New York: Academic Press.

National Institute on Media and the Family (2008). *13th Annual MediaWise video game report card.* Retrieved March 30, 2013, from http://www.mediafamily.org/research/2008_video_game_report_card.pdf.

Nelson, B. (2012). Do you read fast enough to be successful? *Forbes*. Retrieved September 15, 2013, from http://www.forbes.com/sites/brettnelson/2012/06/04/do-you-read-fast-enough-to-be-successful/

Nelson, M. (2002). Recall of brand placements in computer/video games. *Journal of Advertising Research, 42,* 80-92.

Nelson, M., Yaros, R. A., & Keum, H. (2006). Examining the influence on spectator and player processing of real and fictitious brands in a computer game. *Journal of Advertising, 35,* 87 – 99.

Newzoo (2013). Americans will spend $20.5 billion on video games in 2013. Retrieved April 2, 2014, from http://www.newzoo.com/in-the-press/americans-will-spend-20-5-billion-on-video-games-in-2013/

Nicovich, S. G. (2005). The effect of involvement on ad judgment in a video game environment: The mediating role of presence. *Journal of Interactive Advertising, 6,* 29 – 39.

Nothduft, H. C. (2000). Salience from feature contrast: Additivity across dimensions. *Vision Research, 40,* 1183 – 1201.

Nunnally, J. C. (1967). *Psychometric theory.* New York: McGraw Hill.

O'Keefe, D.J. (1993). Understanding social influence: Relations between lay and technical perspectives. *Communication Studies, 44,* 228 – 238.

O'Keefe, D. J. (1998). Justification explicitness and persuasive effect: A meta-analytic review of the effects of varying support in persuasive messages. *Argumentation and Advocacy, 35,* 61 – 75.

Paolacci, G., Chandler, J., & Ipeirotis, P. G. (2010). Running experiments on Amazon Mechanical Turk. *Judgment and Decision Making, 5*, 411-419.

Park, H. , & Smith, S. (2007). Distinctiveness and influence of subjective norms, personal descriptive and injunctive norms, and societal descriptive and injunctive norms on behavioral intent: A case of two behaviors critical to organ donation. *Human Communication Research*, *33*, 194-218.

Parks, C. (2013). University of Portland launches anti-violence 'Green Dot' campaign. *Oregon Live.* Retrieved April 15, 2013, from http://www.oregonlive.com/portland/index.ssf/2013/01/university_of_portland_la unche.html

Petty, R. E., & Cacioppo, J. T. (1986a). *Communication and persuasion: Central and peripheral routes to attitude change.* New York: Springer-Verlag.

Petty, R. E., & Cacioppo, J. T. (1986b). The elaboration likelihood model of persuasion. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (pp. 124–181). New York: Academic Press.

Petty, R.E., Cacioppo, John T., and Schumann, D., (1983). Central and peripheral routes to advertising effectiveness: The moderating role of involvement. *Journal of Consumer Research, 10,* 135 – 146.

Petty, R. E., Ostrom, T. M., & Brock, T. C. (1981). *Cognitive responses in persuasion*. Hillsdale, NJ: Erlbaum.

Pfau, M., Semmler, S. M., Lane, L. T., Mason, A. M., Nisbett, G. S., & Deatrick, L. M. (2009). Nuances about the role and impact of affect in inoculation. *Communication Monographs, 76*, 73 – 98.

Pham, M. T. (1996). Cue representation and selection effects of arousal of persuasion. *Journal of Consumer Research, 22*, 373–387.

Phelps, E. A., Ling, S., & Carrasco, M. (2006). Emotion facilitates perception and potentiates the perceptual benefits of attention. *Psychological Science, 17*, 292-299.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*, 879-891.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers, 36*, 717-731.

217

PRNewswire (2011). *Call of Duty: Modern Warfare 3 sets all-time record for the biggest entertainment launch with more than $400 million in North America and United Kingdom sales alone*. Retrieved March 5, 2013, from http://www.prnewswire.com/news-releases/call-of-duty-modern-warfare-3-sets-all-time-record-for-the-biggest-entertainment-launch-with-more-than-400-million-in-north-america-and-united-kingdom-sales-alone-133682883.html

Quick, B. L. (2005). *An explication of the reactance processing model*. (Unpublished doctoral dissertation). Texas A & M, College Station, TX.

Quick, B. L., & Bates, B. R. (2010). The use of gain- or loss-frame messages and efficacy appeals to dissuade excessive alcohol consumption among college students: A test of psychological reactance theory. *Journal of health communication*, *15*, 603–28.

Quick, B. L., & Considine, J. R. (2008). Examining the use of forceful language when designing exercise persuasive messages for adults: A test of conceptualizing reactance arousal as a two-step process. *Health Communication, 23,* 483–491.

Quick, B. L., & Kim, D. K. (2009). Examining reactance and reactance restoration with South Korean adolescents: A Test of psychological reactance within a collectivist culture. *Communication Research*, *36,* 765–782.

Quick, B. L., Scott, A. M., & Ledbetter, A. M. (2011). A close examination of trait reactance and issue involvement as moderators of psychological reactance theory. *Journal of Health Communication, 16,* 660 – 679.

Quick, B. L., & Stephenson, M. T. (2007). Further evidence that psychological reactance can be modeled as a combination of anger and negative cognitions. *Communication Research, 34,* 255–276.

Quick, B. L., & Stephenson, M. T. (2008). Examining the role of trait reactance and sensation seeking on perceived threat, state reactance, and reactance restoration. *Human Communication Research, 34,* 448 – 476.

Quick, B. L., Scott, A. M., & Ledbetter, A. M. (2011). A close examination of trait reactance and issue involvement as moderators of psychological reactance theory. *Journal of Health Communication*, *16*, 660–79.

Rains, S. A. (2013). The nature of psychological reactance revisited: A meta-analytic review. *Journal of Human Communication, 39, 47 – 73.*

Rains, S. A. & Turner, M. M. (2007). Psychological reactance and persuasive health models: A test and extension of the intertwined model. *Human Communication Research, 33,* 241- 269.

Rayner, K., White, S. J., Johnson, R. L., & Liversedge, S. P. (2006). Raeding wrods with jubmled lettres: There is a cost. *Psychological Science, 17,* 192 – 193.

Reisenzein, R. (1983). The Schachter theory of emotion: Two decades later. *Psychological Bulletin, 94,* 239–264.

Rucker, D. D., & Petty, R. E. (2004). When resistance is futile: consequences of failed counterarguing for attitude certainty. *Journal of Personality and Social Psychology*, *86*, 219–35.

Ringold, D. J. (2002). Boomerang effects in response to public health interventions: Some unintended consequences in the alcoholic beverage market. *Journal of Consumer Policy, 25*, 27 -63.

Reisenzein, R. & Gattinger, E. (1982). Salience of arousal as a mediator of misattribution of transferred excitation. *Motivation and Emotion, 6,* 315 -328.

Rueters (2011). Factbox: A look at the $65 billion video games industry. Retrieved October 1, 2013, from rom: http://uk.reuters.com/article/2011/06/06/us-videogames-factbox-idUKTRE75552I20110606

Rueters (2012). Factbox: A look at the $78 billion video games industry. Retrieved April 2, 2014, from http://www.reuters.com/article/2012/06/01/us-videogameshow-e3-show-factbox-idUSBRE8501IN20120601

Rueters (2013). Factbox: A look at the $66 billion video games industry. Retrieved April 2, 2014, from http://in.reuters.com/article/2013/06/10/gameshow-e-idINDEE9590DW20130610

Schacter, D. L. (1987). Implicit memory: History and current status. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 13,* 501-18.

Schachter, S., & Singer, J. E. (1962). Cognitive, social, and physiological determinants of emotional state. *Psychological Review, 69,* 379–399.

Shapiro, S. , & Krishnan, H. (2001). Memory-based measures for assessing advertising effects: A comparison of explicit and implicit memory effects. *Journal of Advertising*, *30*, 1-13.

Shaver, P., Schwartz, J., Kirson, D., & O'Connor, C. (1987). Emotion knowledge: Further exploration of a prototype approach. *Journal of Personality and Social Psychology, 52*,1061-1086.

Sherry, J. L. (2001). The effects of violent video games on aggression: A meta-analysis. *Human Communication Research, 27*, 409–431.

Snyder, H. & Mulako-Wangota, J. (2013). *Arrest data tool.* Washington, DC: Bureau of Justice Statistics. Retrieved April 11, 2013, from http://bjs.gov/index.cfm?ty=datool&surl=/arrests/index.cfm

Sanbonmatsu, D. M., & Kardes, F. R. (1988). The effects of physiological arousal on information processing and persuasion. *Journal of Consumer Research, 15*, 379 – 385.

Schater, D. L. (2007). Memory: Delineating the core. In H. L. Roedinger, Y. Dudai, & S. M. Fitzpatrick (Eds.), *Science of memory: Concepts* (pp. 23 – 27). New York: Oxford University Press.

Schachter, S. (1970). The assumption of identity and peripheralist-centralist controversies in motivation and emotion. In M. B. Arnold (Ed.), *Feelings and emotion*. New York: Academic Press.

Seibel, C. A., Dowd, E. T. (2001). Personality characteristics associated with psychological reactance. *Journal of Clinical Psychology, 57*, 963-969.

Shapiro, S., & Krishnan, H. (2001). Memory-based measures for assessing advertising effects: A comparison of explicit and implicit memory effects. *Journal of Advertising*, *30*, 1-13.

Sheeran, P., & Taylor, S. (1999). Predicting intentions to use condoms: A meta-analysis and comparison of the theories of reasoned action and planned behavior. *Journal of Applied Social Psychology, 29*, 1624 – 1675.

Shen, L., & Dillard, J. P. (2005). Psychometric properties of the Hong psychological reactance scale. *Journal of Personality Assessment, 85,* 74 – 81.

Skilbeck, C., Tulips, J., & Ley, P. (1977). The effects of fear arousal, fear position, fear exposure, and sidedness on compliance with dietary instructions. *European Journal of Social Psychology, 7*, 221–239.

Slater, M. D., Rouner, D., & Long, M. (2006). Television dramas and support for controversial public policies: Effects and mechanisms. *Journal of Communication, 56,* 235 – 252.

Smith, M. J. (1977). The effects of threats to attitudinal freedom as a function of message quality and initial receiver attitude. *Communication Monographs, 44,* 196 – 206.

Stephenson, M. T., & Witte, K. (1998). Fear, threat, and perceptions of efficacy from frightening skin cancer messages. *Public Health Review, 26,* 147-174.

Streitfeld, D. & Haughney, C. (2013, August 17). Expecting the unexpected from Jeff Bezos. *The New York Times*. Retrieved from http://www.nytimes.com/2013/08/18/business/expecting-the-unexpected-from-jeff-bezos.html?pagewanted=all&_r=0

Storbeck, J., & Clore, G. L. (2008). Affective arousal as information: How affective arousal influences judgments, learning, and memory. *Social and Personality Psychology Compass, 2*, 1824-1843.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using Multivariate Statistics* (5th ed.). Upper Saddle River, NJ: Pearson Allyn & Bacon.

Tafalla, R. J. (2008). Gender differences in cardiovascular reactivity and game performance related to sensory modality in violent video game play. *Journal of Applied Social Psychology, 37,* 200-2023.

Talch, R. F., & Elmore-Yalch, R. (1984). The effect of numbers on the route to persuasion. *Journal of Consumer Research, 11,* 522 – 527.

Tavassoli, N. T., Schultz, C. J., & Fitzsimons, G. J. (1995). Program involvement: Are moderate levels best for ad memory and attitude toward the ad? *Journal of Advertising Research, 35*, 61 – 72.

Thomas, A., Donnell, A. J., & Buboltz, W. C. (2001). The Hong psychological reactance scale: A confirmatory factor analysis. *Measurement and Evaluation in Counseling and Development, 34,* 2 -13.

Thorson,E., Wicks, R., & Leshner, G. (2012). Experimental methodology in journalism and mass communication research. *Journalism and Mass Communication Quarterly, 89*, 112-124.

Till, B. D., & Baack, D. W. (2005). Recall and persuasion. *Journal of Advertising, 34,* 47 – 57.

Traut-Mattausch, E., Jonas, E., Forg, M., Frey, D., & Heinemann, F. (2008). How should politicians justify reforms to avoid psychological reactance, negative attitudes, and financial dishonesty? *Journal of Psychology, 216,* 218 – 225.

Truitt, L., Hamilton, W. L., Johnston, P. R., Bacani, C. P., Crawford, S. O., Hozik, L., & Celebucki, C. (2002). Recall of health warnings in smokeless tobacco ads. *Tobacco Control*, *11*, 59—63.

Tucker, R. K., & Byers, P. Y. (1987). Factorial validity of Merz's psychological reactance scale. *Psychological Reports, 61,* 811 – 815.

Tulving, E. (1985). Memory and consciousness. *Canadian Psychologist*, 26, 1-12.

Tulving, E. (2000). Concepts of memory. In E. Tulving & F. I. M. Craik (Eds.), *The Oxford handbook of memory* (pp. 33 – 44). New York: Oxford University Press.

Updegraff, J. A., Sherman, D. K., Luyster, F. S., & Mann, T. L. (2007). The effects of message quality and congruency on perceptions of tailored health communications. *Journal of Experimental Psychology, 43*, 249 – 257.

University of Oregon (2012). *2012 annual campus security and fire safety report*. Eugene, OR.

University of Oregon (2013). *2013 annual campus security and fire safety report*. Eugene, OR.

University of Portland (2013). *Green dot.* Retrieved April 20, 2013, from: http://www.up.edu/greendot/

van Reijmersdal, E. , Jansz, J. , Peters, O. , & van Noort, G. (2010). The effects of interactive brand placements in online games on children's cognitive, affective, and conative brand responses. *Computers in Human Behavior*, *26*, 1787-1794.

Walther, D. B., & Koch, C. (2007). Attention in hierarchical models of object recognition. *Computational Neuroscience: Theoretical Insights into Brain Function,* 165, 57 – 78.

Wang, Z., & Lang, A. (2012). Reconceptualizing excitation transfer as motivational activation changes and a test of the television program context effects. *Media Psychology*, *15*, 68–92.

Webb, T., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? a meta-analysis of the experimental evidence. *Psychological Bulletin*, *132*, 249-268.

Weber, R., Ritterfeld, U., & Kostygina, A. (2006). Aggression and violence as effects of playing violent video games. In Vorder, P., & Bryant, J. (Eds.), *Playing video games* (pp. 347 – 361). Mahwah, NJ: Lawrence Erlbaum Associates.

Weber, R. , Behr, K. , Tamborini, R. , Ritterfeld, U. , Mathiak, K. , et al.,. (2009). What do we really know about first-person-shooter games? An event-related, high-resolution content analysis. *Journal of Computer-Mediated Communication*, *14*, 1016-1037.

Wickland, R. A. (1974). *Freedom and reactance.* Pontiac, MD: Lawrence Erlbaum Associates

Williams, K. (2009). The effects of frustration, violence, and trait hostility after playing a video game. *Mass Communication & Society*, *12*, 291-310.

Witmer, B. G., & Singer, M. J. (1998). Measuring presence in virtual environments: A presence questionnaire. *Presence: Teleoperators and Virtual Environments, 7,* 225 – 240.

Worchel, S., & Brehm, J. W. (1970). Effects of threats to attitudinal freedom as a function of agreement with the communicator. *Journal of Personality and Social Psychology, 14,* 18 – 22.

Ziegler, R. (2010). Mood, source characteristics, and message processing: A mood-congruent expectancies approach. *Journal of Experimental Psychology, 46,* 743 – 752.

Zillmann, D. (1 97 1). Excitation transfer in communication-mediated aggressive behavior. *Journal of Experimental Social Psychology*, 7, 419-434.

Zillman, D. (1978). Attributions and misattributions of excitatory reactions. In J.H. Harvey, W. Ickes, & R. F. Kidd (Eds.), *New directions in attribution research* (pp. 335 – 368). Hillsdale, NJ: Erlbaum.

Zillman, D. (1979). *Hostility and aggression*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Zillman, D. (1984). *Connections between sex and aggression.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Zillman, D. (1989). Effects of prolonged consumption of pornography. In E. P. (Ed.), *Symposium on media violence and pornography: Proceedings and resource bo*ok (pp. 95 – 115). Toronto: Media Action Group.

Zillman, D. (1996). Sequential dependencies in emotional experience and behavior. In R.D. Kavanaugh, B. Zimmerberg, & S Fein (Eds.), *Emotion: Interdisciplinary perspectives* (pp. 243 – 272). Mahwah, NJ: Lawrence Erlbaum Associates.

Zillman, D. (2008). Excitation transfer theory. In Donsbach, W. (Ed.), *The international encyclopedia of communication online*. Retrieved April 14, 2013, from http://www.communicationencyclopedia.com/subscriber/tocnode.html?id=g97814 05131995_yr2011_chunk_g978140513199510_ss49-1

Zillman, D. & Bryant, J. (1986). Sexual callousness re-examined. *Journal of Communication, 36*, 184 – 188.

Zillman, D., Bryant, J., Comisky, P. W., & Medoff, N. J. (1981). Excitation and hedonic valence in the effect of erotica on motivated intermale aggression*. European Journal of Social Psychology, 11*, 233 – 252.

Zillman, D., Gibson, R., Sundar, S. S., Perkins, J. W. (1996). Effects of amplification in news reports on the perception of social issues. *Journalism and Mass Communication Quarterly, 73*, 427 – 444.

Zillman, D., Hoyt, J. L., & Day, K. D. (1974). Strength and duration of the effect of aggressive, violent, and erotic communications on subsequent aggressive behavior. *Communication Research, 1,* 286 – 306.

Zillman, D., Johnson, R.C., & Day, K. D. (2000). Attribution of apparent arousal and proficiency of recovery from sympathetic activation affecting excitation transfer to aggressive behavior. In E. T. Higgins and A. W. Kruglanski (Eds.), *Motivational science: Social and personality perspectives* (pp. 416 – 424). Ann Arbor, MI: Sheridan.

Zillmann, D., & Mundorf, N. (1987). Image effects in the appreciation of video rock. *Communication Research*, 14, 316–334.

Yang, M. , Roskos-Ewoldsen, D. , Dinu, L. , & Arpan, L. (2006). The effectiveness of "in-game" advertising: Comparing college students' explicit and implicit memory for brand names. *Journal of Advertising*, *35*, 143-152.

Yang, H., & Wang, C. (2008). Product placement of computer games in cyberspace. *Cyberpsychology & Behavior*, *11*, 399-404.

Yoo, S. , & Pena, J. (2011). Do violent video games impair the effectiveness of in-game advertisements? The impact of gaming environment on brand recall, brand attitude, and purchase intention. *CyberPsychology, Behavior & Social Networking*, *14*, 439-446.