

THE INFLUENCE OF RISKY AND SEXY VIDEO GAME  
CONTENT ON MOTIVATIONAL ACTIVATION,  
EMOTIONAL RESPONDING  
AND COGNITION

by

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A THESIS

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## ABSTRACT

Humans are limited in what they can encode, store and retrieve. Humans also enjoy media such as video games, and usually video games contain the same type of information as other media do, including television, film, magazines and billboards. The Limited Capacity Model of Motivated Mediated Message Processing (LC4MP) offers a theoretical framework in explaining the approach and avoid systems within human beings, as well as their ability to encode, store and retrieve such information.

This study examined both risky and sexy content within video games and asks how it influences the encoding of the content as well as the motivational activation of the content within video games. The results were gathered from 69 participants and proved interesting results. It seems that video game characters and situations may give off separate meanings of sexy and risky than do human characters and situations from other types of media.

Similar studies have been used in looking at other sources such as television, film, magazines and billboards to understand how sexy content and/or risky content influence individuals in various ways. However, video games are a somewhat neglected part of our world within these realms, as violence seems to dominate the study of video games. Further testing should allow for in depth analysis in categories of violence with other variables, such as risky and sexy.

## DEDICATION

This thesis is dedicated to many individuals, but I would like to dedicate it to my husband Seth, as I can do anything with him in my life. I would also like to dedicate this to the rest of my entire family, especially my father Padgett Jr., who has taught me the ways of the media world before I began to walk and talk, and my late grandpa Harold Padgett Sr., the man who brought my dad into the media world, and although I never met him, I hope I have made proud as he is looking down on me from Heaven above.

## LIST OF ABBREVIATIONS AND SYMBOLS

$\eta^2$	Eta Squared: the sum of squares total divided by the sum of squares between
$F$	Fisher's $F$ ratio: A ration of two variances
$M$	Mean: the sum of a set of measurements divided by the number of measurements in the set
$p$	Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
$t$	Computed value of $t$ test
$SD$	Standard deviation: a measure of the variance or dispersion of a population
$<$	Less than
$>$	Greater than
$=$	Equal to

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## CHAPTER 1

### INTRODUCTION

The question guiding this study asks how do risky and sexy content influence motivational activation and encoding of video game content. From a practical standpoint, the question is important because of the pervasiveness of sexy and risky portrayals in video games. Sexy content includes non-pornographic presentations of animated characters in revealing attire including swimsuits, lingerie, or underwear. Risky content includes presentations of animated characters engaged in behaviors that are potential health hazards or dangerous. In the case of this study, risky content includes behaviors such as alcohol abuse and prostitution.

A better understanding of how sexy and risky content in video games influence emotional responding and cognition offers potential pro-social and pro-business benefits. By understanding how sexy and risky media content influence cognition, pro-social and/or pro-business messages may be communicated more effectively. Within the context of video games, for example, if risky sexy images facilitate cognitive processing of information, risky sex could be used to communicate pro-sexual health messages in certain video games. Business aims could also be served. For instance, risky products presented in sexy video games may enhance cognitive processing of embedded sponsorships in video games.

In the theoretical context of this study, risky and sexy content are conceptualized as variously arousing pleasant and/or unpleasant stimuli. The Limited Capacity Model of Motivated Mediated Message Processing (LC4MP: A. Lang, 2006a; A. Lang, 2006b) offers an explanatory framework for understanding how variously arousing positive (e.g., pleasant) and negative (e.g.

unpleasant) information influence moment-to-moment motivational activity (emotional response) and cognitive processing of media content. Just as the question guiding this study stands to promote practical aims, there are several theoretical benefits to investigating the influence of risky and sexy content in video games.

Lang and her colleagues (2005b) have examined the influence of risky products on motivational activation and cognition. Lang and her colleagues (2005b) have also demonstrated that risky products influence motivated cognition and that the influence is moderated by individual differences in motivational predispositions. Although the current study excludes individual-difference considerations, the study extends existing knowledge with respect to motivated cognitive processing of risky information. To date, previous studies such as Lang and her colleagues study (2006b), have only examined motivated processing of still images (e.g., photographs) of risky products. The current study examines motivated cognitive processing of risky *content* in video games. Risky content involves the use of risky products and/or participation in risky behavior. Unlike the previous studies that examined still images of risky products, the examination of risky content in video games is a dynamic enterprise because video games unfold over time.

Previous studies from the limited capacity perspective have examined the influence of sexual content on motivated processing of mediated content including television advertisements (Sparks & Lang, 2009) and billboards (Lang, et al., 2003). However, the current study represents a first to examine the influence of sexual content in video games on information processing. Aside from contributions related to the video-game context of the investigation, the present study stands to further promote understandings of two categories of motivationally relevant content in risky and sexy. A better understand of the *general* influence of risky and sexy

content on motivational activation patterns offers substantial potential benefits to emotion researchers interested in media psychology.

The literature review in Chapter 2 will introduce a conceptual model that explains how sexy and risky content influence motivational activation and cognitive processing rooted in the LC4MP perspective. Following the conceptual model, an operational model for testing the theoretical explanation will be introduced.

## CHAPTER 2

### LITERATURE REVIEW

The present study offers a motivational explanation for the influence of risky and sexy content on emotional responding to and cognitive processing of information in video games. The motivated cognition explanation offered includes a motivational model (Cacioppo & Gardner, 1999) and a cognitive model (Lang, 2000; 2006b).

The motivational model (Cacioppo & Gardner, 1999) presumes that two independent motivational systems underlie emotional responding. The appetitive and aversive systems are constantly responding automatically to emotional stimulation in the environment to sustain (appetitive) and protect (aversive) life (Cacioppo & Gardner, 1999). To say that the response is automatic is to say that the response is outside individuals' conscious control (Lang, 2006a)—one cannot start or stop activation in the motivational systems.

However, the activation of the systems influences individuals' interactions with the environment (Lang, 2006b). The appetitive system is an approach system, whereas aversive system is a withdrawal or avoidance system (Cacioppo & Gardner, 1999). The appetitive system initiates an approach response to positive stimuli. The aversive system initiates withdrawal from negative stimuli. Because the systems are independent, they can be activated at the same time, or co-active, and an individual will have simultaneous tendencies to approach and avoid (Cacioppo & Gardner, 1999).

Conscious human emotional experience results from activation in the systems (Bolls, Lang, & Potter, 2001). Emotional experience can further be conceptualized into two categories:

Valence and arousal (Bradley, 2000). Valence of emotional experience relates to whether one feels pleasant (positive, good) or unpleasant (negative, bad) and depends on which motivational system is active. When the appetitive system is active, an individual experiences pleasant emotion. When the aversive system is active, an individual experiences unpleasant emotion. The second dimension, arousal, relates to how calm versus excited one feels and is determined by the intensity of environmental stimulation. Greater arousal results in greater motivational systems activation, which ultimately results in stronger emotional experience (P. J. Lang, Bradley, & Cuthbert, 1997).

In a neutral environment, the intensity of positive and negative stimulation is low and neither system is very active. The resting activation level of the appetitive system is greater than that of the aversive system. Therefore, individuals are generally predisposed to approach (Lang, et al., 2007). The higher activation level of the appetitive systems in response to low intensity positive stimuli, when compared to the aversive system response to low intensity negative stimuli is called *positivity offset*. However, as the intensity of positive and negative stimulation increases, the aversive system activates faster than the appetitive system.

A fast avoidance or withdrawal response to negative stimulation of increasing intensity promotes survival by quickly getting an individual out of harms' way. The faster response of the aversive system to negative stimulation of increasing intensity when compared to the response function of the appetitive system to positive stimulation of increasing intensity is called *negativity bias* (Lang, et al., 2007).

Sexy and risky content are two categories of motivationally relevant (e.g., positive, negative, and/or arousing) content that are present in media, including video games (Lang, 2006a), and thought to initiate activation in the human motivational systems predictably

consistent with the patterns discussed. Risky, sexy, and risky sexy content will be discussed in terms of the motivational model presented in the following sections.

*Risky content.* Alcohol is a substance among the most risky of products and situations, as alcohol abuse and advertising are abundant among teenagers and young adults (Escobar-Chaves & Anderson, 2008). There has been thought of as a possible connection between high levels of media exposure and increased health risk behaviors (Escobar-Chaves & Anderson, 2008). Youth spend a lot of time in front of the media, including video games, daily. In fact, there are hardly any, if any, studies on alcohol advertising within video games (Escobar-Chaves & Anderson, 2008).

Previous research (Lang, et al., 2005a) has demonstrated that risky content is more arousing than content that is not risky. Research that has looked at responses to risky content has found that the presence of “risky” can also increase arousal levels (Lang, et al., 2005b). Of course, this all depends on the individual and what they view as positive. For example, “Participants reported how arousing and how positive they felt” when they watched movie clips with smoking as opposed to non-smoking (Lang, et al., 2005a, p. 286), from the same clip, just with the smoking edited out. Smokers tend to prefer the smoking clip, whereas non-smokers tend to prefer the non-smoking clip.

What is positive and what is arousing may be two different things however. Results from Lang’s (2005b) study show that both the smokers and the non-smokers rated pictures with smoking in it more arousing when compared to pictures in the neutral category. A similar study, but with drinking, showed that those who drink socially rate pictures of drinking as more arousing than those in the neutral category (Lang, et al., 2005a).

It is assumed that playing a video game is voluntary, and voluntary resource allocation is determined by an individual's "motivations, interests, needs or goals" while engaging in media (Lang, et al., 2005a, p. 429). It can also be assumed that viewing images or video of scenes that are similar to who you are or what you *like* can elicit a more positive feeling – such as Lang's (2005a) example of smokers who like pictures of others smoking – and vice versa for nonsmokers. Those who are actively seeking arousing over calm information are high sensation seekers, and they have a greater orienting response to media of riskiness and sexiness (Lang, et al., 2005b). Unpredictability is a discomfort, such as in situations with shelter and food (Caspi & Moffitt, 1993).

An individual's perception on risk is how that individual assesses a risky situation in terms of uncertainty and controllability (Sitkin & Weingart, 1995). Benefits are, on the other hand, with mate attraction for example, which is appetitive (Reichert & Carpenter, 2004). In fact, individual differences early on have influence on the development of behavior in the future (Caspi & Moffitt, 1993).

So, with all of these "negative" connotations with risky situations, behaviors or products, why are some individual's attracted to this? Some claim that risky products are like "forbidden fruit" such as many other studies have indicated (Lang, et al., 2005a). Taboo products and topics that are rarely discussed, such as sex can be considered risky (Lang, et al., 2005a).

Ratings may also be an indicator to what is attractive, appealing, or taboo especially to teenagers and young adults. As in Lang's (2005b) study, "boys were more likely to watch the programs labeled as violent, sexual, or appropriate for older teens such as TV 14 or TV M" (p. 286). Warning labels actually may attract individuals to such video games like the study done in

this article on films, because it is “tainted or forbidden” fruit which makes it attractive according to the individual (Bushman & Stack, 1996).

The Entertainment Software Rating Board discusses sexual content in all of their ratings, and can even be seen in E10, which is supposed to be appropriate for everyone aged 10 and above. The sexy content is described as “minimal suggestive themes” which is defined as “mild provocative references or materials” on the ESRB website ([www.esrb.org](http://www.esrb.org)). “Suggestive themes” can be seen in games rated “T” for teens aged 13 and older, and are defined as “mild provocative references or materials” ([www.esrb.org](http://www.esrb.org)). In games rated “M” – mature - for ages 17 and older, “sexual content” may be seen, and this is defined as “non-explicit depictions of sexual behavior, possibly including partial nudity” ([www.esrb.org](http://www.esrb.org)). Finally, in games rated “AO” – adult only – for ages 18 and older, “graphic sexual content and nudity” may appear in the games. Strong sexual content is defined as “explicit and/or frequent depictions of sexual behavior, possibly including nudity,” and partial nudity is defined as “brief and/or mild depictions of nudity” ([www.esrb.org](http://www.esrb.org)).

Video games can play a role on how a person feels and can actually elicit emotion like other mediums. For example, a study by Wiederhold and Wiederhold (2007) shows that video games can be used to distract from pain, and suggests that increases in arousal go together with “effective distraction” (Wiederhold & Wiederhold, 2007, p. s183). Of course, with this study, we are not looking at physiological responses, but there is evidence in this that arousal levels can play a role in making an individual feel a certain way. In Lang’s (2005b) study, the study predicted that risky pictures along with audio could elicit arousal and larger orienting responses, and that the pictures of the risky versus non-risky did in fact do just that. Audio is not being tested in this study, but would be good for future studies.

Risky content can be conceptualized for this study as video showing products that are “taboo” or inappropriate by society’s average standards for various age groups depending on content, respectfully, and that may cause health hazards, as well as the effects of these products, or risky behavior (i.e., prostitution, strippers). The conceptualization of what a risky product can be defined as is based on Lang, et al.’s (2005a) definition. Risky content is expected to activate the aversive system because it has negative consequences. However, some things that are taboo or pose risk may be positive in nature. Individuals would be expected to experience greater aversive and appetitive (e.g., coactivation) activation in response to risky content. Thus, emotional responses to risky content are likely to be both negative and positive, as well as arousing (Lang, et al., 2003).

*Hypothesis 1: Positive emotional experience, negative emotional experience, and arousal should be greater during risky video game content when compared to not risky.*

*Sexy content.* Sexy content is pervasive in media (Reichert, 2003), and video games are no exception (Beasley & Standley, 2002, Miller & Summers, 2007). It is easy to confuse “sexy” with risky sexual behavior, and in fact the two can go hand-in-hand at times. Both positive and negative sexual arousal can happen at the same time, and can also overlap with other positive and/or negative emotions (James, et al., 2000). Sex appeal in advertising is prominent (Reichert, 2003), and can also be seen in video games.

Sexy is seen in how an actor or model behaves or dresses, which is similar to video game characters, and this has increased in all media over the years (Reichert, et al., 1999), and it is seen in video games as well. Sex appeal is used to sell items (Reichert, 2003), and could quite be the same in selling a video game. “Advertising researchers and numerous advertising studies suggest the inappropriate or excessive use of sexual content can have negative effects” (Reichert,

et al., 1999, p. 7). In video games, a lot of times female characters are seen as wearing revealing clothing, being attractive and sexy. This is also seen in male characters, but in a muscular sense more so than anything (Miller & Summers, 2007). Game characters can be seen as role models, thus it is important to understand that enjoyment and influence may come from gaming characters. Understanding messages are important because media messages can affect both genders' identity and their sexual behaviors (Miller & Summers, 2007).

Since video games are no exception to this rule, it is important to understand that the influence of video games may be more important than any other types of media. "Video games have the potential to be more influential than other forms of media because of their engaging, interactive and repetitive nature" (Miller & Summers, 2007, p. 735), and because of this interactivity, a gamer may choose their behaviors unlike in other forms of media. An individual not only sees or hears a video game, they get to be the character and interact with other characters in any way they want.

In games like the Grand Theft Auto series or the Fable games, a gamer can choose which way they want to behave, and in turn may have sex with a person, kill them, and go on about their day (Miller & Summers, 2007). Some of the behavior a person chooses will be different than something they ever have or would have engaged in. Video games can be exciting, and excitement and joy can amplify the sex drive, and reality-orientation tends to fade and sexual orientation takes over as the focus (Mosher, 1980). This is a human response, which makes it interesting to study in video games with such high levels of interactivity. It is obvious that mass media has not looked into video games and effects enough, except with violence and gender differences of game players.

Sexual appeals or attractiveness of a character can elicit an emotional response (Lang, et al., 2003). “Messages with arousing content are defined as messages which contain emotional scenes” (Lang, et al., 2004, p. 67). To appeal to or attract consumers, evoking an emotional response takes place (Reichert & Carpenter, 2004). Actions such as “sex and fighting” are examples of this (Lang, et al, 2004).

Sexy can be conceptualized for this study as sexual appeal or suggestiveness in appearance and/or actions. This definition is closely linked to Harris and Scott’s (2002) and seems to best describe the sexual appeals that are pervasive in mainstream media (Reichert & Carpenter, 2004, Streitmatter, 2004). Sexy content is expected to activate the appetitive system because it is positive, and means that humans will approach, or “induce favorable evaluations” (Ye & Zhou, 2007, p. 60). “Typically, there is a direct relationship between the positively valenced arousal evoked by sexual appeals and evaluations” (Reichert, Heckler, & Jackson, 2001). Sex sustains life (Lang, et al., 2006b), therefore is deemed as necessary to humankind.

“Sexy” in video games is of interest for this study, because sex is one of the most important elements to make up media for consumers of media (Ye & Zhou, 2007), and in this case video gamers. Depictions of sex or sexy characters should elicit emotion, more specifically arousal (calm versus excited).

Sexual information has been known to spark emotional responses of individuals (Reichert, Heckler, & Jackson, 2001). Sexy content and individuals in media have been noted as being attention-getting or arousing (Reichert, Heckler, & Jackson, 2001), therefore it can be assumed to elicit more enjoyment from the viewer. Sexy content could very well be used to lure in video game players, much like advertisements use sexy content to try to sell products. Appearance is a major indicator in determining the sexiness of a character, and within

appearance, clothing is a main element. The clothing a character wears is a good depiction of the sexuality or sexiness of a character (Beasley & Standley, 2002). Sexiness in a character is not gender-biased, as it can be seen in both male and female characters, even within the video game world. “Sexy” female characters are generally adorned with tight clothing and curvy, proportional figures or thin figures, and “sexy” male characters are also usually in tight clothing or even topless, with muscular figures and strong attributes (Beasley & Standley, 2002). Individuals would be expected to experience greater appetitive activation in response to sexy content. Thus, emotional responses from this nature of sex appeal are likely to be positive responses as well as arousing (Lang, et al., 2003).

*Hypothesis 2: Positive emotional experience and arousal should be greater during sexy video game clips when compared to not sexy. Further, participants should experience less negative emotion during sexy video game clips.*

*Sexy and risky content.* Risky behavior and situations can go hand-in hand with risky products, which has been thoroughly studied by Lang and her colleagues (2005b). In fact, the use of alcohol on a regular basis is associated with sexual risk taking (Temple & Leigh, 1992). “Anecdotally, it has long been recognized that drinking and drug use are associated in complicated ways with sexual behaviors” (Leigh, 1990, p. 200), and risky behaviors include risky sexual behavior such as prostitution or strippers, which may lead to risky situations. Of course, we understand that sex can be risky if done outside of these situations, but these are the ones being accounted for as extremities and of scenes that are rapidly showing up in video games. “Sexy” can be related to all of this as well as will be seen later on in the literature.

Sexual content is not the only appeal that elicits arousal, as risky products (or content) can do the same. It is suggested the mere presence of a product such as alcohol can elicit arousal

(Lang, et al., 2003). The presence of both alcohol and sexual content could very well also be responsible for eliciting automatic attention responses (Lang, et al., 2003). As with this study, sexual content and risky content are shown simultaneously at times, and often this is done on purpose to show appeal and gain attention. “Sexual themes have been shown to generate attention to advertising, and they are often used to promote alcohol products” (Lang, 2003, p. 107). There is also evidence that arousing content will elicit a more positive attitude toward a message, so combining sex appeal with alcohol is seen as pleasurable to some individuals (Lang, et al., 2003).

Attitudes toward risky sexual behavior in general can be indicative of attitudes toward prostitution and strippers (i.e. lap dances). Risky situations may also include the appearance of alcohol or the after effects of alcohol (drunkenness). Risky behaviors can include smoking, use of alcohol, sexual behaviors and violence. In other words, they can cause death, disability and health problems (Escobar-Chaves & Anderson, 2008). In this study, alcohol use and sexual behaviors along with sex appeal are viewed since they are more prominent within video games than drug use and less studied than violence.

Those with thrill-seeking behaviors or an impulse to such behaviors may be more likely to partake in risky sexual behavior or drinking habits (Temple & Leigh, 1992). Individuals also have different risky propensity (Sitkin & Weingart, 1995), which is an individual’s tendency toward risk-taking. Experience can also change a person’s take or avoid on risks (Sitkin & Weingart, 1995), as well as factors can impede a person who normally takes a risk – in taking a risk (Sitkin & Weingart, 1995).

Advertising risky products such as alcohol, which leads to risky situations, is actually designed to appeal to younger individuals (Escobar-Chaves & Anderson, 2008). “It sells images

of success, sexuality, fun and love” (Escobar-Chaves & Anderson, p. 159). Imagery such as this is found in film, television, magazines, radio, billboards... and yes, even video games.

Individuals, or the recipient of a message, select what they want to encode, process and store in their brains. This is due to the fact that it is impossible to store all information in the brain, and a selection process occurs due to this (Lang, et al., 2003).

Since individuals differ in what they view as important, different information is processed accordingly. There is much concern about the nature of what is classified as being graphic sexually or by riskiness. Frequent exposure to such media content tends to die down the initial shock of seeing provocative or risky behavior (Reichert & Carpenter, 2004), thus forcing media outlets to make something new that will again arouse its consumers. Individuals would be expected to experience greater appetitive and aversive activation in response to risky sexy content. Thus, emotional responses from this nature of risky sexual appeal are likely to be both negative and positive, as well as arousing (Lang, et al., 2003).

*Hypothesis 3: Positive, negative, and arousal emotional experience should be greater during risky sexy video game clips when compared to not risky not sexy.*

*The influence of sexy and risky on motivated cognition.* According to the cognitive model guiding this study (Lang, 2000; 2006b), individuals have a limited and fixed capacity of cognitive resources for processing information. Those resources are allocated via automatic and controlled mechanisms to the various subprocesses (e.g., encoding, storage, and retrieval) involved in information processing (Lang, 2000). Encoding of information is the subprocess of interest in this study. Encoding involves creating a temporary mental representation of an environmental stimulus (Lang, 2000). Automatic resource allocation to encoding occurs outside the conscious control of individuals and is initiated by novel and signal stimuli (Lang, 2000).

The mechanism for automatic resource allocation is the orienting response (Lang, 1994).

Motivationally relevant stimuli represent one category of signal stimuli that initiate orienting responses or automatic allocation of resources for encoding information (Lang, 2000).

When appetitive activation is low and aversive activation is low, automatic resources allocated to encoding are low (Lang, 2000). However, resources allocated to encoding are higher at low appetitive than low aversive activation. When appetitive activation is moderate and aversive activation is moderate, automatic resources allocated to encoding are moderate (Lang, 2000). However, resources allocated to encoding are higher at moderate aversive than moderate appetitive activation. When appetitive activation is high and aversive activation is high, automatic resources allocated to encoding are high for appetitive and declining for aversive activation (Lang, 2000). At this stage, resources allocated to encoding are higher for high appetitive than high aversive activation.

Since sexy and risky content are conceived of motivationally relevant (e.g., positive, negative, and/or arousing) content and are thought to activate the human motivational systems, risky and sexy content are expected to influence emotional responding and automatic allocation of cognitive resources to encoding. Emotional response data from Hypotheses 1-3 will be used to determine levels of appetitive and aversive activation and to make specific predictions about resources allocated to encoding for risky and sexy content. Thus, a general hypothesis is offered here based on the theoretical statements of the previous paragraph. Several more specific hypotheses will be extended based on these general propositions in the results section after review of the emotional response data.

*Hypothesis 4a: If motivational activation levels are low (arousal is low), positive video game content will be encoded more thoroughly than negative video game content.*

*Hypothesis 4b: If motivational activation levels are moderate (medium in arousal), negative video game content will be encoded more thoroughly.*

## CHAPTER 3

### METHODS

#### *Design*

A risky (2: not risky, risky) x sexy (2: not sexy, sexy) x message (2) within subjects experimental design was used. Analysis of Variance (ANOVA) was used to test all hypotheses.

#### *Stimuli*

Video clips were recorded from video games (*Fable II* and *Grand Theft Auto IV*) while the experimenter played the games. The manipulation of risky and sexy content within video games was informed by the Entertainment Software Rating Board (ESRB) ratings. The ESRB ratings range from Early Childhood (EC), Everyone (E), Everyone age 10 or older (E 10+), Teen (T), Mature (M), and Adults Only (AO). To be more specific, EC games are for children ages 3 or older, E is suitable for ages 6 and older, E10 is for ages 10 and older, T is for ages 13 and older, M is for ages 17 and older and AO is for ages 18 and older. Both of the video games used in this study were rated as M.

To capture the footage, software by Honestech, *VHS to DVD 3.0*, was used and connected to an Xbox 360 output to a personal computer. Then, the footage was edited in Adobe Final Cut Express for use in the experiment. Editing was performed to obtain 30-second segments. Although the actual playing of a video game typically lasts longer, 30-second segments were chosen because such segments were believed to be sufficient for manipulating the independent variables of interest through conveying an intact story (Escalas, 2004).

*Sexy content.* Sexy was operationalized for this study as content that the experimenter and another coder agreed as sexy. Sexy clips were those that included men and women in swimwear, underwear, or lingerie. An equal number of clips with sexy men and women were selected. In order for a 30-second clip to be rated as sexy, the clip must have included at least 20 seconds of such sexy depictions, therefore displaying significantly more than half of the time with sexy content. Nonsexy content fully excluded sexual imagery and sexual suggestiveness of characters by appearance and/or actions.

*Risky content.* Risky content was operationalized for this study as the appearance and/or use of alcohol for minors or excessive use for adults, characters of a taboo profession, unsafe sex or the mix of any or all of the above. Risky content for the purposes of this study included the presence of alcohol, prostitution, and/or strippers (that are not being used to present a risky sexual situation). Nonrisky content excluded references to alcohol, prostitution, and/or strippers. The manipulation of risky content within video games was also informed by the ESRB ratings. On the ESRB website, content descriptors are added to such as “alcohol reference,” “drug reference,” “tobacco reference,” and use of drugs,” “use of alcohol,” and “use of tobacco” (<http://esrb.org>). In order for a 30-second clip to be rated as risky, the clip included at least 20 seconds of risky depictions, therefore displaying significantly more than half of the time with risky product or situation content.

#### *Dependent Variables*

*Positive valence.* A self-report measure of participants’ emotional experience of positive valence was used to gauge appetitive activation. After viewing each video game clip, participants were asked to rate how positive they felt while viewing the previous clip on a Not at all(1) to Very Good (9) scale in order to indicate appetitive activation.

*Negative valence.* A self-report measure of participants' emotional experience of negative valence was used to gauge aversive activation. After viewing each video game clip, participants were asked to rate how negative they felt while viewing the previous clip on a Not at all(1) to Very Bad (9) scale in order to indicate aversive activation.

*Arousal.* A self-report measure of participants' emotional experience of arousal (excitement) was used to gauge motivational activation levels. After viewing each video game clip, participants were asked to rate how aroused they felt while viewing the previous clip on a Not at all/calm (1) to Very/ Very Excited (9) scale in order to indicate the strength of motivational activation.

*d prime.* Signal detection theory is rooted in radar technology and statistical decision theory (Fox, 2004). Both theories assume that “decisions about detecting signals from noise stimuli depend not only on the stimulus but also on the expected outcomes of the decision” (Fox, 2004, p. 526). In other words, what the individual sees and what they expect to see may influence the decision in memory. Many other forms of memory testing have been used since the statistical decision theory and radar technology (Fox, 2004). Signal Detection Theory allows the determination of “memory strength” and “decision effects” (Fox, 2004, p. 526). In other words, signal detection theory determines memory sensitivity. Memory sensitivity is conceptualized as the distinguishing between new information and old information (Fox, 2004) from a mediated message. Old information is what the individual has already seen, and new information is information just introduced that the individual has not seen, however it may be quite similar to the message that they did in fact see.

A signal detection measure was used as an indicator of visual encoding of information from the video games. In order to do this, two targets and two foils were used for each of the 16

video game clips. The targets images were taken from the actual video game clips viewed during the experiment. The foils images were taken from similar clips that participants did not see during the experiment but also captured from *Fable II* and *Grand Theft Auto IV*. Each image was presented within a video clip for 5 frames. A one-second black screen came before and after the image. After viewing the clip, participants were asked whether they had seen the presented image before and asked to answer by clicking “yes” or “no”. Presentation of the targets and foils were randomized. The probability of a hit and the probability of a false alarm were calculated for each level in the fully crossed risky x sexy design. D’prime was then calculated, which is the standardized probability of a hit minus the standardized probability of a false alarm in a signal detection memory test. Higher d’prime scores indicate greater recognition sensitivity.

#### *Participants*

Sixty-nine (38 female, 31 male) undergraduate participants were recruited from classes at the University of Alabama during the Summer 2009 semester. Participants completed the experiment in order to receive extra credit, or volunteered with no extra credit. Participation in the study was completely voluntary, and each student was reminded that they may opt out of the Institutional Review Board (IRB) approved study at any time with no penalty.

#### *Procedures*

During approximately 30-minute sessions, participants completed the experiment on 15 personal computer work stations located in laboratory within the Institute for Communication and Information Research. The experiment was administered using MediaLab Software (Jarvis, 2004). Participants viewed 16, 30-second, clips prerecorded from video games varying in risky and sexy content from *Fable II* and *Grand Theft Auto IV*. After viewing each video-game clip, participants rated how positive, how negative, and how aroused they felt while viewing. After

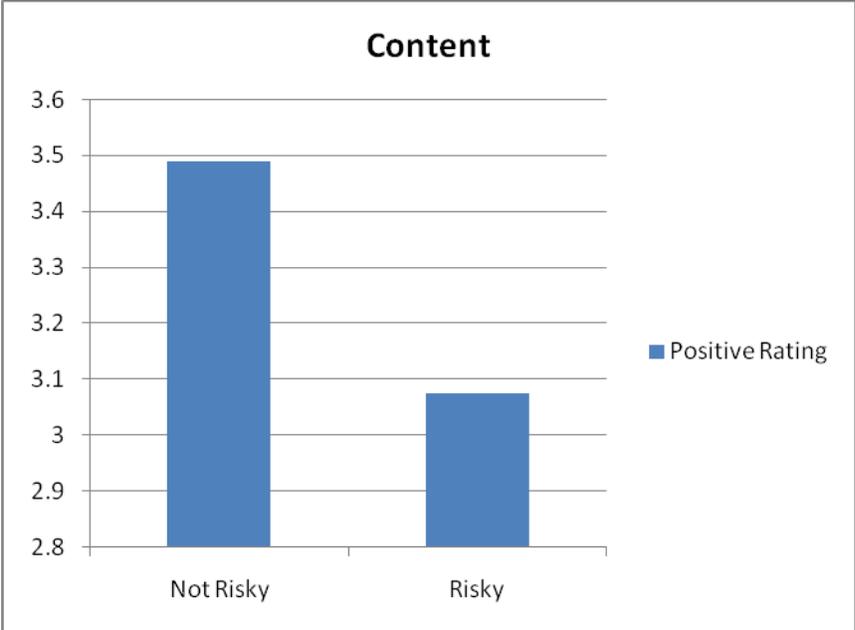
viewing and rating all clips, participants completed the signal detection memory test. The signal detection memory test required participants to respond to 32 targets and 32 foils. After completing the memory test, participants were thanked and dismissed.

## CHAPTER 4

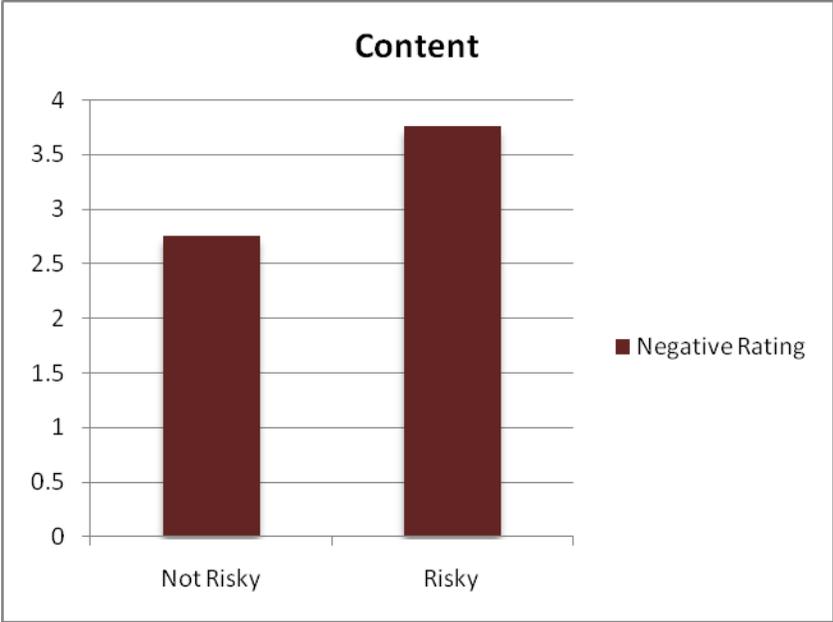
### RESULTS

Analysis of Variance (ANOVA) was used to test all hypotheses. Hypothesis 1 predicted that positive emotional experience, negative emotional experience, and arousal should be greater during risky video games when compared to not risky. Although the majority of this hypothesis was supported, one part of it was not. As shown in Figure 1, not risky ( $M = 3.47, SD = 1.89$ ) was actually rated as more positive than risky ( $M = 3.07, SD = 1.72$ ),  $F(1, 67) = 7.38, p < .05, \eta^2 = .10$ . The other portions of the hypothesis were supported. As shown in Figure 2, risky ( $M = 3.67, SD = 1.94$ ) was rated more negative than not risky ( $M = 2.77, SD = 1.70$ ),  $F(1, 67) = 35.69, p < .05, \eta^2 = .35$ . As shown in Figure 3, risky ( $M = 2.36, SD = 1.35$ ) was rated more arousing than not risky ( $M = 1.93, SD = 1.08$ ),  $F(1, 67) = 16.63, p < .05, \eta^2 = .20$ .

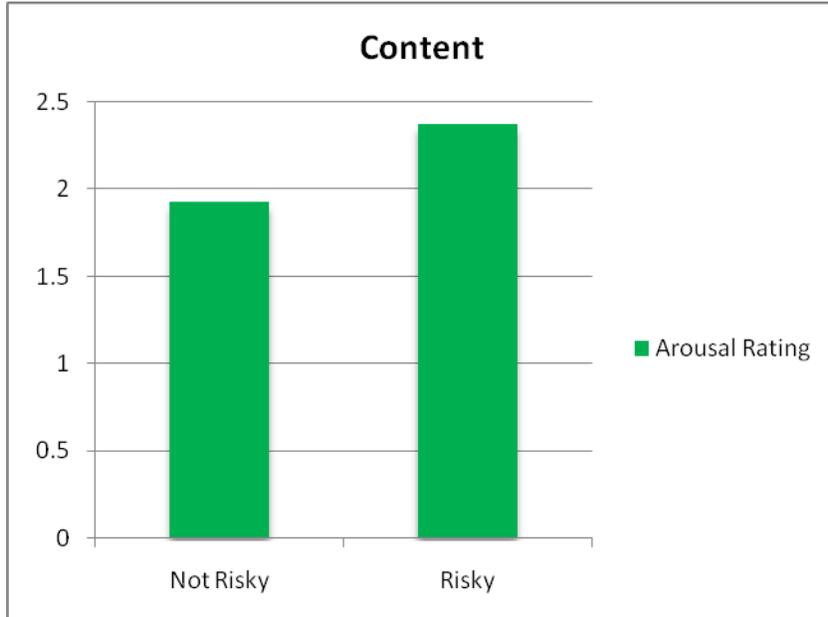
**Figure 1: Main effect of not risky content on positive ratings.**



**Figure 2: Main effect of risky content on negative ratings.**

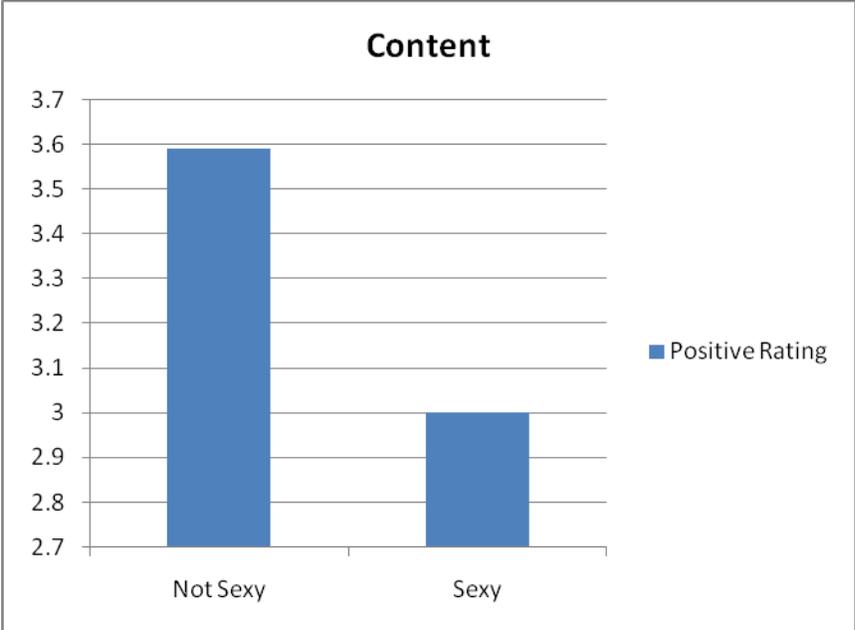


**Figure 3: Main effect of risky content on arousal ratings.**

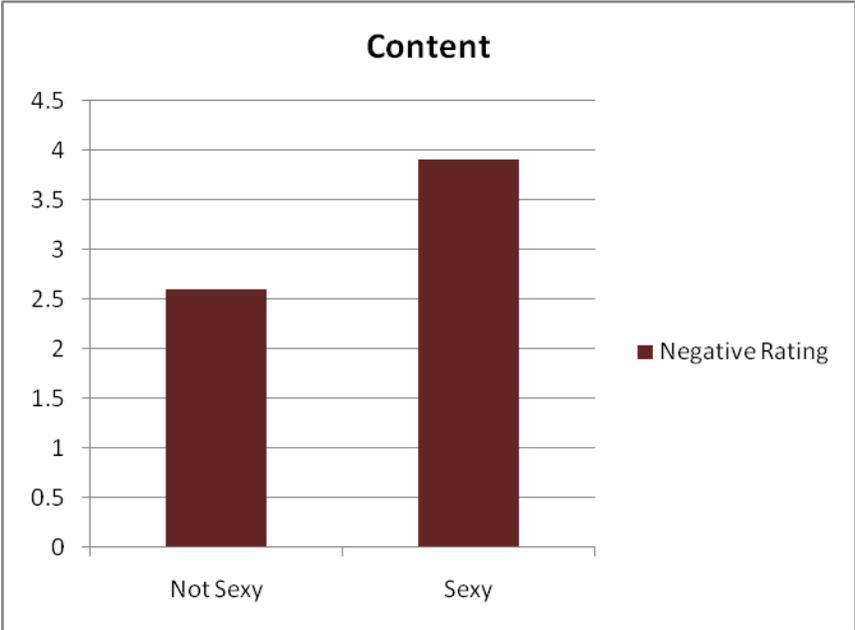


Hypothesis 2 predicted that positive emotional experience and arousal should be greater during sexy video game clips when compared to not sexy. Furthermore, participants should experience less negative emotion during sexy video game clips. This hypothesis was generally not supported, as shown in Figure 4, not sexy ( $M = 3.55, SD = 2.13$ ) was rated more positive than sexy ( $M = 2.99, SD = 1.58$ ),  $F(1, 67) = 10.21, p < .05, \eta^2 = .13$ . As shown in Figure 5, sexy ( $M = 3.85, SD = 1.94$ ) was rated more negative than not sexy ( $M = 2.59, SD = 1.95$ ),  $F(1, 67) = 49.87, p < .05, \eta^2 = .43$ . As shown in Figure 6, the arousal main effect supported this hypothesis, as sexy ( $M = 2.43, SD = 1.24$ ) was rated more arousing than not sexy ( $M = 1.87, SD = 1.14$ ),  $F(1, 67) = 25.00, p < .05, \eta^2 = .27$ .

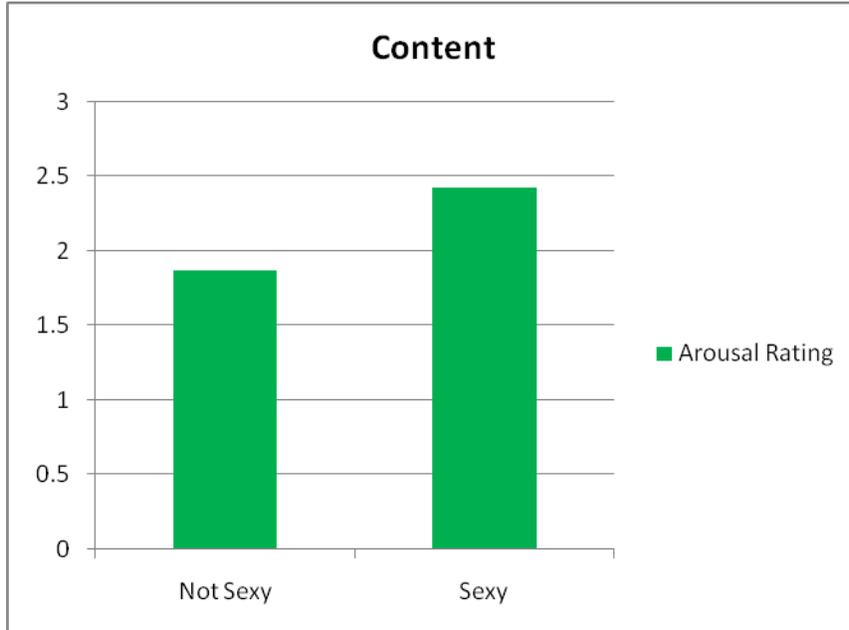
**Figure 4: Main effect of not sexy content on positive ratings.**



**Figure 5: Main effect of sexy content on negative ratings.**

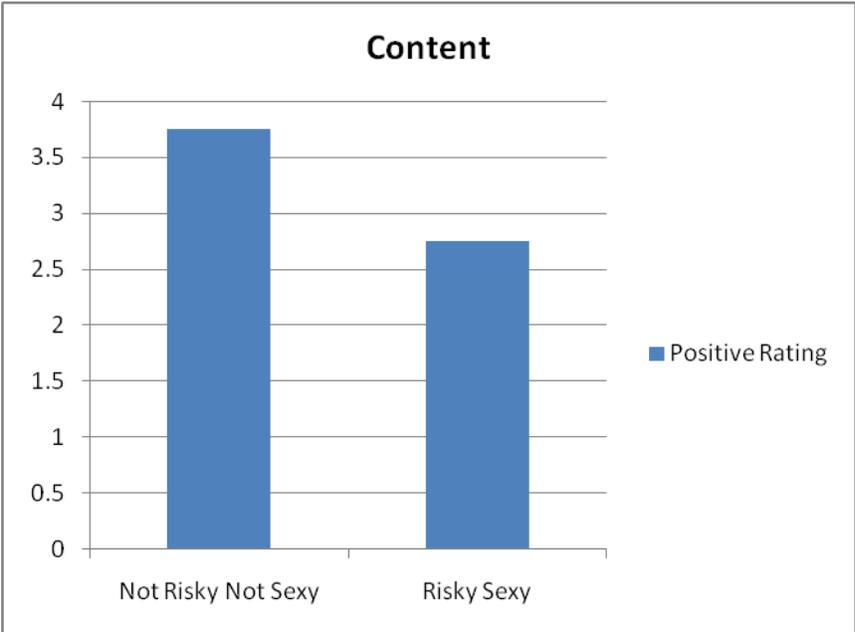


**Figure 6: Main effect of sexy content on arousal ratings.**

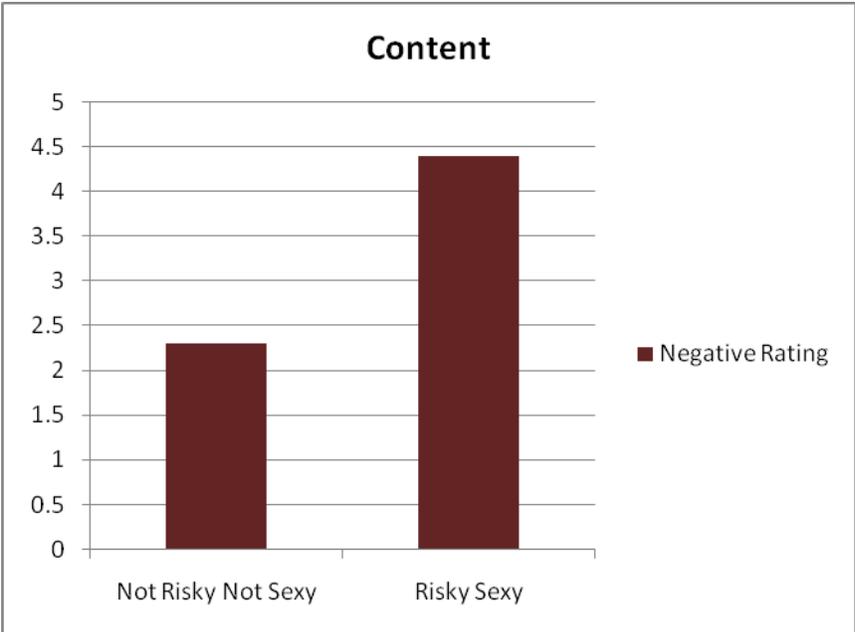


Hypothesis 3 predicted that positive, negative, and arousal emotional experience should be greater during risky sexy video game clips when compared to not risky not sexy. This hypothesis was generally supported, however as shown in Figure 7, not risky not sexy ( $M = 3.70$ ,  $SD = 2.28$ ) was rated more positive than risky sexy ( $M = 2.79$ ,  $SD = 1.47$ ),  $F(1, 67) = 13.42$ ,  $p < .05$ ,  $\eta^2 = .17$ . The other portions of hypothesis 2 were supported. As shown in Figure 8, risky sexy ( $M = 4.36$ ,  $SD = 1.99$ ) was rated more negative than not risky not sexy ( $M = 2.21$ ,  $SD = 1.49$ ),  $F(1, 67) = 66.70$ ,  $p < .05$ ,  $\eta^2 = .50$ . As shown in Figure 9, risky sexy ( $M = 2.73$ ,  $SD = 1.49$ ) was rated more arousing than not sexy ( $M = 1.75$ ,  $SD = 1.07$ ),  $F(1, 67) = 36.05$ ,  $p < .05$ ,  $\eta^2 = .35$ .

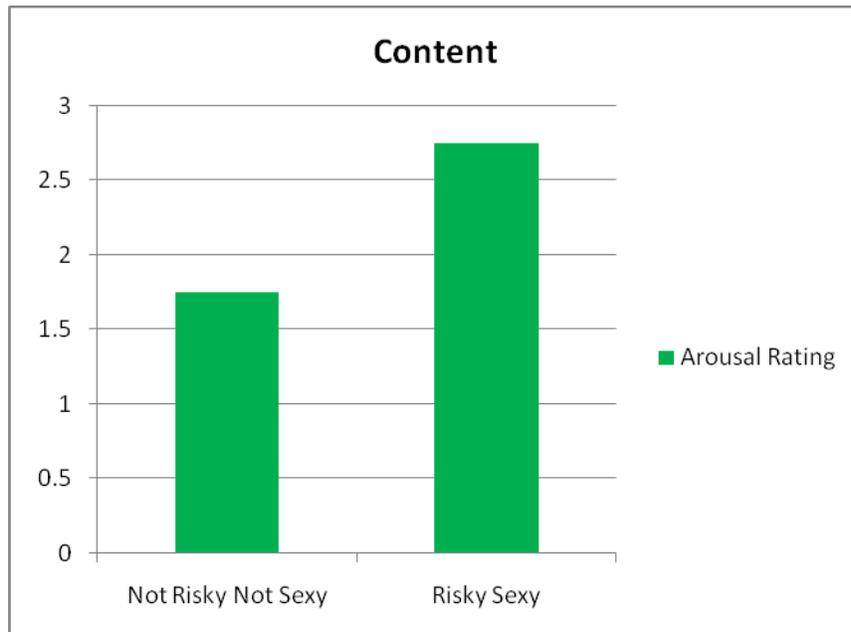
**Figure 7: Main effect of not risky not sexy content on negative ratings.**



**Figure 8: Main effect of risky sexy content on negative ratings.**



**Figure 9: Main effect of risky sexy content on arousal ratings.**

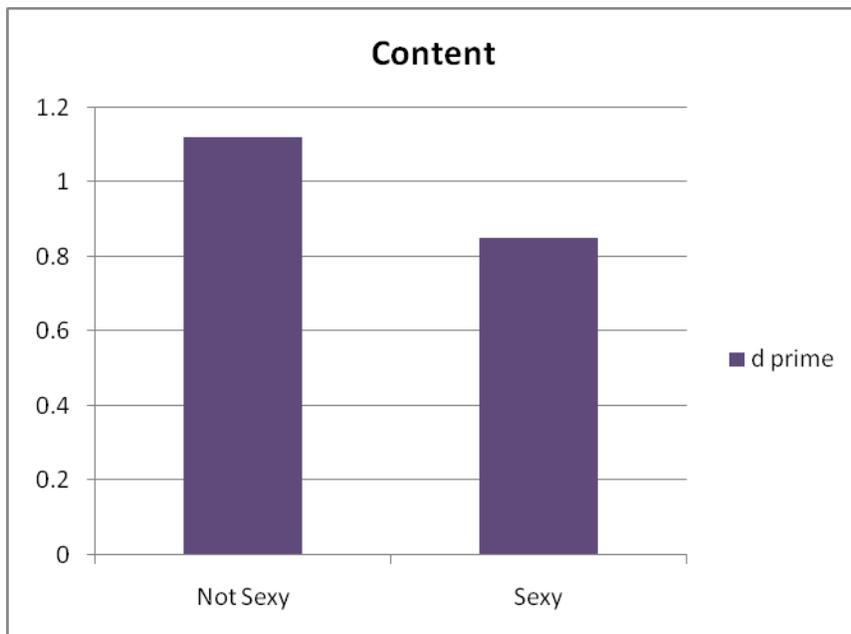


According to the emotional response data, arousal levels were in the low range ( $M < 3.00$ ). Hypothesis 4 predicted that if motivational activation levels are low (arousal is low), positive video game content will be encoded more thoroughly than negative video game content. Based on the emotional response data and the general proposition, risky, sexy, and risky sexy video game content was more negative than not risky not sexy content. Thus, Hypothesis 4 (a) predicted that sensitivity ( $d'$ ) should be greater for not sexy and not risky video game clips, when compared to sexy and risky clips, respectively. Further, sensitivity should be greater for not risky not sexy, when compared with risky sexy video game content.

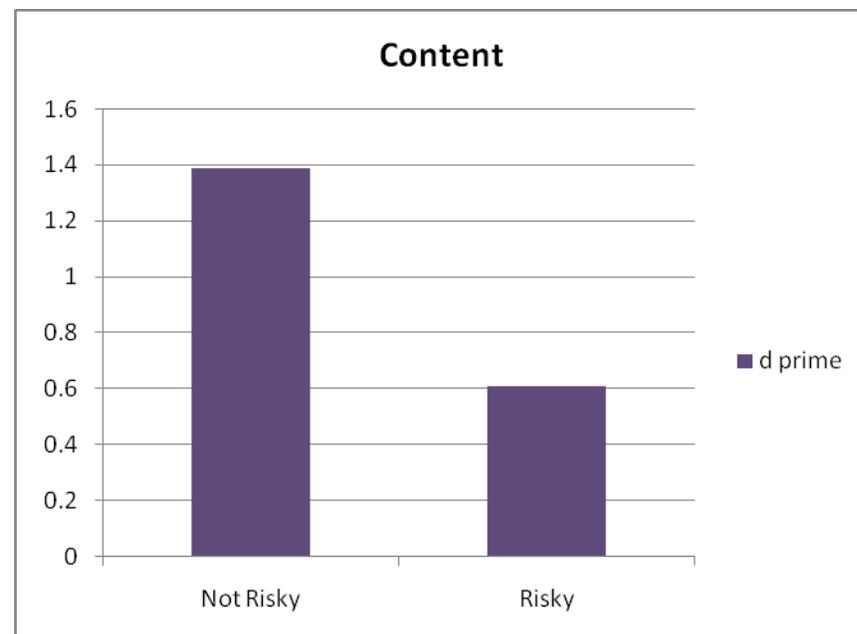
Hypothesis 4(a) was supported. As shown in Figure 10, sensitivity was greater for video game clips that were not sexy ( $M = 1.14, SD = .77$ ), when compared with those that were sexy ( $M = .85, SD = .65$ ),  $F(1, 67) = 8.59, p < .05, \eta^2 = .11$ . As shown in Figure 11, sensitivity was greater for video game clips that were not risky ( $M = 1.36, SD = .62$ ), when compared with those

that were risky ( $M = .61, SD = .73$ ),  $F(1, 67) = 102.51, p < .05, \eta^2 = .61$ . As shown in Figure 12, sensitivity was greater for video game clips that were not risky not sexy ( $M = 1.38, SD = .74$ ), when compared with risky sexy ( $M = .37, SD = .57$ ),  $F(1, 67) = 72.82, p < .05, \eta^2 = .52$ .

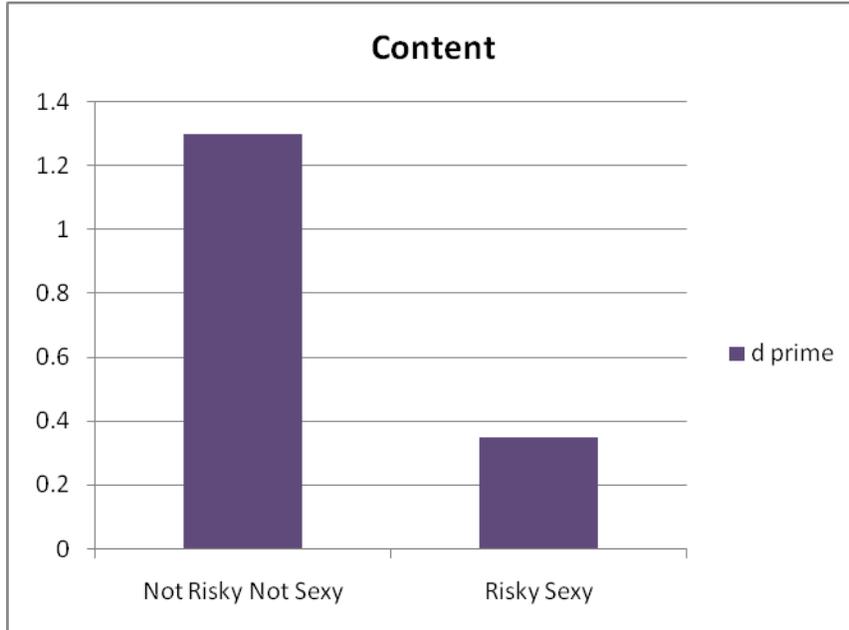
**Figure 10: Main effect of not sexy content on d prime.**



**Figure 11: Main effect of not risky content on d prime.**

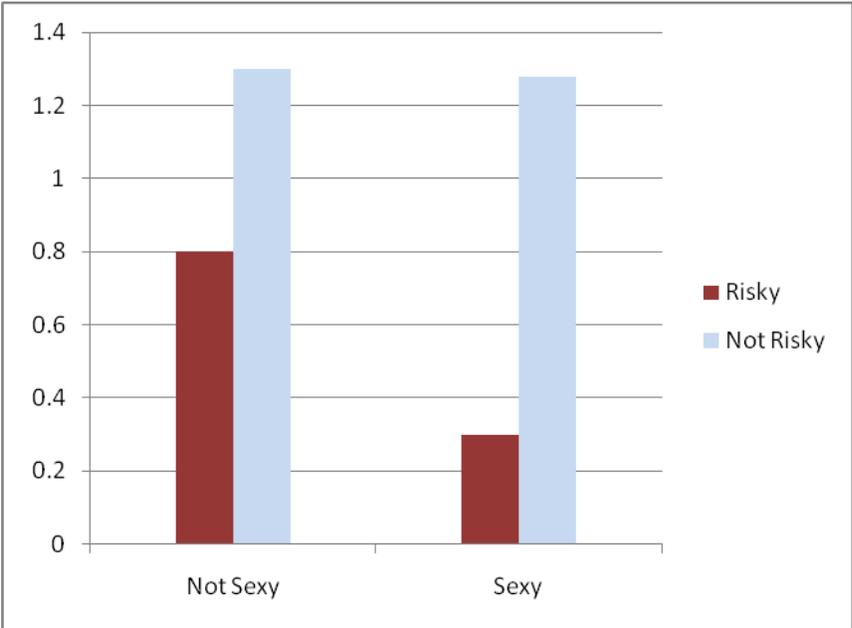


**Figure 12: Main effect of not risky not sexy content on d prime.**



Hypothesis 4(b) predicted sensitivity should be best for video game clips that are not risky not sexy, following in descending order by risky not sexy, not risky sexy and risky sexy. Hypothesis 4(b) was generally supported by the significant Risky x Sexy interaction shown in Figure 13,  $F(1, 67) = 8.65, p < .05, \eta^2 = .11$ . Overall, sensitivity was greater for not risky not sexy ( $M = 1.38, SD = .74$ ), when compared with risky not sexy ( $M = .87, SD = .80, t(68) = 4.21, p < .001$ , two-tailed), and risky sexy ( $M = .37, SD = .57, t(68) = 8.64, p < .001$ , two-tailed). However, sensitivity for not risky sexy ( $M = 1.35, SD = .72$ ) was comparable with not risky not sexy, ( $t(68) = .26, p > .05$ , two tailed), but greater than risky not sexy, ( $t(68) = 4.17, p < .001$ , two-tailed). Consistent with the predictions of Hypothesis 4(b), sensitivity for risky sexy was significantly lower than risky not sexy ( $t(68) = 4.62, p < .001$ , two tailed) and not risky sexy ( $t(68) = 10.29, p < .001$ , two-tailed).

**Figure 13: Risky x Sexy interaction on d prime.**



## CHAPTER 5

### DISCUSSION

Previous studies have shown that sexy media elicits appetitive activation, according to physiological and self-report measures (Sparks & Lang, 2009). The self-report emotional experience result from this study indicated that animated sexiness in video games is not appetitively activating, but mildly (e.g., low arousing) aversive. Animated mediated sexiness appears to lack the motivational relevance of portrayals of sexy “human” characters. Since, video games allow the opportunity to experience emotions in a “fantasy world,” (Sherry, 2004) it comes to no surprise that this fantasy world is just that, therefore lacking any “real” opportunities. Although a manipulation check revealed that participants rated the sexy clips ( $M = 3.03$ ,  $SD = 1.66$ ), as more sexy than the nonsexy clips ( $M = 1.37$ ,  $SD = 0.71$ ,  $F(1, 67) = 90.94$ ,  $p < .05$   $\eta^2 = .58$ ), there may be little practical significance in this difference from a motivational perspective.

According to Reeves and Nass (1996), the old brain (which includes the appetitive and aversive motivational systems) treats mediated opportunities as if they are real opportunities. Because the sexy characters in the games are animated representations, the human motivational systems may not respond to them the same as they might a real person (e.g., a human character in a television show, movie or advertisement as discussed in the literature). Therefore, the appetitive system is not activated. Appetitive activation in response to sexy human stimuli promotes survival by facilitating sexual attraction and reproduction. Although the likeness of a

sexy human may be judged as “sexy,” appetitive activation with sexual attraction or arousal would be adaptively fruitless.

Because participants self-reported how good, bad, and aroused they felt while viewing the sexy video game content, a social desirability explanation seems tenable. Perhaps, the participants felt good, indicative of appetitive activation, but reported feeling bad. Perhaps they felt bad because the animated sexy portrayals made them feel good. The best way to discern the nature of the participants’ motivational state is through the conceptual and operational models utilized in this study. Based on those models from the LC4MP, the recognition sensitivity results concurred with theoretical predictions based on the motivational activations indicated by the self-reported ratings. The sensitivity results support the validity of the self-report ratings, in this theoretical context. Therefore a social desirability explanation seems untenable. From all this we gather, sexy content appears to be aversive in this context. Sexy characters in the games are animated representations and are likely not treated as “real” sexual opportunities by the human motivational systems.

With respect to risky content, the results contradicted expectations. It was predicted that risky content would be coactive. The results indicate that risky content appeared to be primarily aversive in this context. As demonstrated by previous studies (Lang, 2005b), individual in risky behavior experience (e.g., alcohol users versus nonusers) and resting motivational activation differences should be investigated. For example, alcohol users may be more appetitively activated by risky content than nonusers. Future studies should explore motivational predispositions in this context using the Motivational Activation Measure (MAM: Lang, 2007). Future studies should also consider implementing an enjoyment factor, as it is well known that enjoyment varies from person to person in mediums (Holbrook, et al., 1984, Oliver, 1993, Raney

& Bryant, 2002, Sherry, 2004), but video games are neglected in this area. Enjoyment could go hand-in-hand with the MAM studies.

This study is relevant because of the growing industry of video games and the growing industry to appeal to consumers. To appeal to consumers, gaming industries will continue to find new, and even shocking ways to sell their products. Video games have come a long way with their realistic nature, although it is not quite human-like enough, it is still more so than before and will likely continue that trend. Violence is not the only concern now, as video games portray vast amounts of sexy content and risky content to go along with the already excessive amounts of violence that is seen in a lot of video games on the market. How individuals process information is very vital, and media plays an important role in everyday life, especially today.

Also, because video games often carry a negative connotation, it would be helpful to use psychophysiological measures to examine motivational activation and emotional responding during risky and sexy video games. By society standards, like alcohol, video games may be socially unacceptable to “like” what you see because of the controversy that surrounds this medium. Maybe answering a *certain way* as opposed to how an individual really feels is quiet possible.

Having individuals actually play the game themselves could also be more helpful in measuring their arousal since *getting into* the game can give off more real-life sensations than actually viewing the material. The strategy of playing a game requires much concentration, and even frustration within a game. Thus, this could make the characters seem more *life-like*, and may answer why hypotheses 1 and 2 were partially opposite of what was predicted. Even though violence is already the most prominent aspect studied within video games, future studies could benefit in determining differences in violent video games, such as first-person shooters versus

third-person shooters (Schneider, 2001), and so on within the realms of being surrounded by sexy and/or risky content such as seen in this current study. Otherwise, future studies could also benefit from more of a variety of video games, using audio without confounds, and using various consoles and the PC to see if this makes a difference in any of the factor.

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