GET IN THE GAME: THE EFFECTS OF GAME-PRODUCT CONGRUITY AND PRODUCT PLACEMENT PROXIMITY ON GAME PLAYERS' PROCESSING OF BRANDS EMBEDDED IN ADVERGAMES

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by
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The undersigned, appointed by the Dean of the Graduate School, have examined the thesis entitled

GET IN THE GAME: THE EFFECTS OF GAME-PRODUCT CONGRUITY AND PRODUCT PLACEMENT PROXIMITY ON GAME PLAYERS' PROCESSING OF BRANDS EMBEDDED IN ADVERGAMES

Presented by Sara Peters

A candidate for the degree of Master of Arts

And hereby certify that in their opinion it is worthy of acceptance.

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DEDICATION

To Mom and Dad: Thank you both for supporting me in my education, no matter how far I go (in both years and miles). Thank you for encouraging me to go all the way and for having faith in everything I do. I would not have experienced the things I have or have been able to see the world without your help. I love you both.

Thank you Mom for being patient with me and for helping me when I really needed you the most.

Thank you Dad for all of your wisdom throughout the years. I never will forget our talks whether they were shared in our kitchen or a continent away. You have instilled in me the power of an education and that is something I will have with me forever.
"When you educate a man you educate an individual; when you educate a woman you educate a whole family." Ruby Manikan

To my sister Melissa: I love you very much. I wish you luck in the pursuit of your master's degree in the years to come. I am so proud of you. I know you will accomplish great things and be a voice of hope and comfort to many.

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GET IN THE GAME: THE EFFECTS OF GAME-PRODUCT CONGRUITY AND PRODUCT PLACEMENT PROXIMITY ON GAME PLAYERS' PROCESSING OF BRANDS EMBEDDED IN ADVERGAMES

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ABSTRACT

This study examined the effects of congruity and proximity on game players' brand memory, attitude toward the brand, and resources available at encoding for advergames.

A 2(congruity) x 2(proximity) x 2(advergame) repeated-measures experiment was used. Implicit memory was measured using a word-fragment completion task while explicit memory was measured using a recognition test. Attitude toward the brand was measured using three, seven-point attitude scales. STRTs were used to index resources available at encoding. Brand familiarity and prior game-playing experience served as moderating variables.

Results showed that when brands are centrally placed in advergames where the brand is congruent to the game content, game players' explicit memory improves. When the brands are congruent to the game content, game players' implicit memory improves and their attitude toward the brand tends to be more positive as well.

Chapter 1: Introduction

Advertisers are always looking for ways to effectively deliver their messages. It should be no surprise that as more people are going online every year marketers have followed, using the medium to reach their potential consumers. With the development of the Internet, new advertising venues, such as advergaming, have provided advertisers with an alternative way to target audiences.

Although there exists a great volume of scholarly literature on the topic of how exposure to ads affects brand memory, little research has been conducted about the effects advergaming has on gamers' memory for the brand, attitude toward the brand, and purchase behavior (Yang, Roskos-Ewoldsen, Dinu, & Arpan, 2006). Therefore, the purpose of this study is to expand on the advertising literature that exists by redirecting the focus to advergames and their effect on brand memory, attitudes game players form toward the brand, and the amount of cognitive resources game players have available at encoding the brand. Such a shift in focus is gaining value as Internet advertising has become one of the fastest growing areas of advertising research (Faber, Lee, & Nan, 2004). According to PQ Media, a media research firm, the value of studying advergaming will become even more evident as the trend widens and more companies shift their budgets away from traditional media such as broadcast, newspapers, and magazines to alternative media such as online game placements, including advergames, to advertise their brands.

Thus, this paper will aim at synthesizing and analyzing the extant literature on the topic of advergaming to help provide a foundation for this study's primary goal, which

will be to ultimately answer the question of how does the use of product placements affect advergames' ability to influence game players' brand memory, attitude they have toward the embedded brand, and amount of resources available at encoding. The LC4MP model will be used as a guide to explain how the limited amount of cognitive resources a game player has available to process the brands embedded in the games influences their brand memory. Applying this model will be especially important for this thesis in providing an understanding for how to design advergames to insure that the embedded brands are thoroughly encoded, which will influence a game player's brand recognition.

Before previous research can be presented to aid in answering this question, the concepts presented here first need to be defined. The term advergame has been described as the combination of the words "advertisement" and "video game" (Grossman, 2005). In other words, advergames are a specific type of online video game where a brand is embedded within the game. It should be noted that advergames are different from product placements in more general online games. More specifically, online games feature multiple brands where marketers buy product placement space within the game whereas advergames feature only one brand and the game is created by the brand's marketers and sponsored by the brand. The second concept presented in the research question is brand memory. For the purposes of this study, brand memory will be defined as a person's memory of a brand name, evaluated through their explicit and implicit memory of that particular brand. Finally, the concept of product placement is examined as two different variables – game-product congruity and product placement proximity – which are further discussed in the literature review section that pertains exclusively to them.

Therefore, with the intentions of this thesis stated, this thesis has four major goals. First, it will explain the theoretical framework that guides this study. Second, it will examine the concept of product placement in two respects, namely game-product congruity and product placement proximity. Third, the paper will describe the dependent variables: explicit and implicit memory, attitude toward the brand, and resources available at encoding as well as the moderating variables: brand familiarity and prior game-playing experience. Fourth, the paper will discuss the method that will be used for this study, which will be a controlled experiment. The experiment will manipulate two independent variables (game-product congruity and product placement proximity), measure three dependent variables (brand memory, attitude toward the brand, and resources available at encoding), and account for two moderating variables (brand familiarity and prior game-playing experience). Following the method, additional goals for the study are discussed, which include the study's results, a discussion of how the findings can be applied to theory and their implications, this study's limitations and suggestions for future research, and lastly a conclusion.

Chapter II: Literature Review

The literature review is organized into four main sections. First the theoretical foundation for this thesis is explained. More specifically, the LC4MP, an information-processing model, is applied as it relates to the concept of product placements. Second there is a discussion of the extant literature that has examined the two independent variables this study used, which are game-product congruity and product placement proximity. Third there is a discussion on previous studies that have explored the three dependent variables used, brand memory, attitude toward the brand, and resources available at encoding. Fourth the review ends with a discussion on the influence the two moderating variables brand familiarity and prior game-playing experience have between the independent and dependent variables.

The Limited Capacity Model of Motivated Mediated Message Processing

One of the purposes of using product placements is to increase brand recognition (Youn, Lee, & Doyle, 2003). Although product placements have typically appeared in movies and television shows, they have also been designed into video games by advertisers who employ the use of this strategic technique to gain attention for their brands. However, because game players devote most of their attention toward playing the game, brands that are featured in games are not the primary focus, which means that it is valuable for advertisers to determine if and how well their brands are being processed when placed within advergames (Lee & Faber, 2005).

Therefore, it will be important to understand the process of attention, which is defined here as the allocation of cognitive capacity to a task (Kahneman, 1973; Lang & Basil, 1998). With that said the theoretical framework that informs this study is based on Lang's (2006) LC4MP model, which is an information-processing model that assumes people are information processors and that a person's ability to process information is limited. This is because humans only have a finite amount of resources available to process a message, and when these resources are exhausted, recognition suffers.

Based on the idea that the attention one pays to a stimulus varies depending on how resources are shifted between encoding, storage, and retrieval subprocesses, it will also be important to understand how information is processed, either through processes that are automatic or controlled. Automatic processes happen unconsciously and are unintentional on the part of the message recipient. Controlled processes happen consciously and are intentional such that the message recipient is goal driven. Conscious memory retrieval is referred to as explicit memory wherein a person actively attempts to remember previous information they were exposed to. On the other hand, product-information that is retrieved unconsciously is called implicit memory, which is when individuals remember past information without their conscious knowledge that they are performing such a task (Duke & Carlson, 1993, 1994; Shapiro & Krishnan, 2001).

Within this model, three subprocesses of information processing theoretically exist: encoding, indexed by recognition; storage, indexed by cued recall; and retrieval, indexed by free recall (Lang, 2000). The first process, encoding, is where information is selected and transformed into mental representations to be used for later retrieval in a person's working memory (Lang, 2000). The process of encoding is particularly

important for this study as the STRT measure will be used to show the amount of resources a game player has available at encoding. Furthermore, the recognition test will demonstrate how well the game player encoded the brands he or she was exposed to during game play.

It is in this subprocess that people engage in either automatic selection or controlled selection processes. Automatic selection processes are activated via orienting responses to either information that is perceived as relevant to the individual or information that brings about an unexpected occurrence in the environment, which can be caused by structural features within the message such as cuts, edits, or sound effects (Lang, 2000). Applying automatic selection to advergames suggests that stimuli within advergames could evoke orienting responses such that automatic resource allocation would occur to the subprocess of encoding the message. However, in this study, it is assumed that there is no automatic resource allocation because all of the games do not vary on structural dimensions. This is explained further in a later section on the effect of congruity and proximity on resources available at encoding.

In addition to automatic allocation of cognitive resources, controlled processing occurs. For advergames, controlled resource allocation unfolds when the game player does something intentional such as when he or she uses arrow keys on a keyboard to navigate a race car in a racing game or when he or she is directed by goals such as when the game player collects golden coins in order to earn points.

Storage is the next subprocess proposed in the model. It is the process of linking newly encoded information to old information that was previously stored. The more links a person has for newly encoded information in their associative memory network to

previously stored information, the better this newly acquired information will be stored, which will aid in the later retrieval process.

The final subprocess is retrieval which is the process where an individual searches their associate memory network for a piece of previously stored information and reactivates it into his or her working memory (Lang, 2000). The associative memory network is where associative links are attached to a piece of information stored in one's memory. The more links that exist to a specific piece of information, the more thoroughly that information has been stored and is thus more retrievable from one's memory (Lang, 2000).

According to Lang (2000), memory for a specific message is a collection of the outcome of all three of these subprocesses. The message is thoroughly processed when sufficient resources are allocated to all three subprocesses; however, not all information is always processed successfully. More specifically, when insufficient resources are allocated to subprocesses, then cognitive overload will occur, causing some aspect of the message processing to suffer (Lang, 2000). For example, poor recognition levels indicate that the message has not been completely encoded due to cognitive overload (Fox, Lang, Chung, Lee, & Potter, 2004; Lang, 2000; Lang, Potter, & Bolls, 1999). According to Lang (2000), two main factors may hinder successful processing of a message. First, the individual who receives the message may choose to allocate fewer resources to the task than it requires. Second, the message itself may require more resources than the individual has available to allocate to the task, resulting in a cognitive overload. With either factor, the message will not be thoroughly processed and thus the message recipient's memory will likely suffer as a result.

Lang's (2006) model can effectively be applied to advergame studies. For instance, D'Andrade (2007) applied the LC4MP model to his study on the effects of advergames on brand memory for games that featured both high and low object change. Object change refers to the introduction of a new object that abruptly appears on screen, which results in automatic allocation of resources (Lang, Bradley, Park, Shin, & Chung, 2006). For D'Andrade's study, games that were high object change games featured object changes where a brand was displayed prominently on the screen. Games that were low object change games did not have any brand identification on the object change but instead appeared in the background. D'Andrade found that game players' cognitive capacity was exceeded during high object change games such that they experienced a cognitive overload. This finding resulted in lower levels of brand memory; thus, people had a harder time distinguishing from brands they did see during game play from those they did not see.

Therefore, Lang's (2006) model will be applied to this study's examination of advergames effect on brand memory based on the assumption that a game player's ability to process information is limited and when resources are exhausted, recognition suffers. Because increased brand recognition is one of the goals for product placements (Youn, Lee, & Doyle, 2003), memory-based measures have been found to be appropriate ways to test their effectiveness (Nelson, 2002). Therefore, the goal of this experiment will be to measure how game players encode the brands embedded in advergames based on the players' performance on explicit and implicit memory tasks in an effort to understand the effects product placements have on brand memory when allocated resources are divided.

The Effects of Product Placement Within Online Games

The strategic use of brand placements has been an advertising technique employed by marketers for more than 50 years (Babin & Carder, 1996; Sargent, Tickle, Beach, Dalton, Ahrens, & Heatherton, 2001). Brand or product placements are "the paid inclusion of branded products or brand identifiers, through audio and/or visual means, within mass media programming" (Karrh, 1998, p. 33). These placements have been used in movies, television, novels, and video games. The benefits of using product placements are to influence the attitudes people have toward the brand, target a more specific audience with a desired message, and improve the realism of a movie or TV show. More importantly, for the purposes of this study, research has found that memory is improved for a brand when it is placed within a movie in comparison to when that same brand is not featured in the movie (Karrh, 1998). This suggests that the same may be true for other media as well such as advergames, which is the primary question this thesis attempts to answer.

In addition to movies, the concept of product placement is important in understanding the effectiveness of advergames as product placements have been shown to enhance brand memory (Youn, Lee, & Doyle, 2003) by incorporating the brands or products into the gaming environment (Winkler & Buckner, 2006). In their simplest form, these product placements are branded products or brand identifiers such as a food item, product package, brand character, or brand logo that are included as part of a mass media program (Karrh, 1998).

Thus, due to the idea that game players have a limited capacity to process the brand-related information contained in advergames, several factors may affect how

successful product placements in games will be in eliciting brand memory. For instance, according to Grigorovici and Constantin (2004), game players are likely to allocate most of their cognitive resources to process the main message, the advergames, leaving fewer resources available to use for encoding and storing the secondary messages, namely product placements.

Game-product congruity. Product placements affect brand memory in terms of how they fit within the content of the message. Advertisers can place their products in games that fit well with their products (e.g., *Kingsford* charcoal advertised in a barbeque game) or they can place their brands in games that appear to be unrelated to the featured product (e.g. *Extra* gum advertised in a hockey game). This relationship will be referred to as game-product congruity (Lee & Faber, 2005).

Congruity has been conceptualized in multiple ways that have examined the relationships between the visual and verbal elements of the ad (Heckler & Childers, 1992); the ad and the context in which it appears (Moorman, Neijens, & Smit, 2002); the sponsor and the sponsored event (Rodgers, 2003); the product category and its brand name (Meyers-Levy, Louie, & Curren, 1994); and the modality (i.e., audio versus visual placements); and plot connection of a product placement (Russell, 2002). Because congruity has been conceptualized in a number of different ways, Lee and Faber (2005) suggest that for describing the relationship of product placements in games, congruity should be described as the degree to which the product category of the embedded brand is related to the content of the game. The authors go on to note that this relationship can be

assessed across four different dimensions that include function, lifestyle, image, and advertising.

According to Lee and Faber (2005), the multiple definitions of congruity have led in part to different theories and conflicting results on congruity effects on memory. Cognitive priming theory is used to explain how when advertisements and messages are congruent in content, memory increases (Sanbonmatsu & Fazio, 1991). For example, studies have found that congruent ads, which are those where the product category matches the ad content, produce higher memory rates than incongruent ads, which are those ads where the product category does not match the ad context (Lambert, 1980; Moorman et al., 2002; Rodgers, 2003; Shamdasani, Stanaland, & Tan, 2001). This is because when people who are provided with new information match it with preexisting schema, and when this new information is assimilated into the schema, greater memory develops for congruent information (Lee & Faber, 2005). Thus, brands that are congruent with the content of the game are encoded better while requiring fewer resources to process.

Moorman et al. (2002) also performed a study to test for congruency effects on brand memory by comparing magazine content to the ads featured in the magazine. The researchers found that thematically congruent ads (e.g., a shampoo ad placed in a health magazine) were recognized more than incongruent ads (e.g., a shampoo ad placed in an interior decoration magazine).

Likewise, Furnham, Bergland, and Gunter (2002) found that the program content of a television show affected viewers' memory of the advertisement that followed when the show's content was related to the ad. More specifically, brand recognition for the

advertised beer brand was increased when the ad was aired during a television program in which the content of the show featured the characters drinking alcohol. Therefore, the program content affected memory for the congruent advertisement (i.e., the beer commercial).

However, other studies, which follow a different theoretical framework, have found the opposite congruity effects on memory. According to cognitive interference, when an advertisement is placed within a message with similar content, a process known as meltdown occurs. Meltdown is a process in which certain aspects of the message and advertisement merge together, which results in impaired recall (Bryant & Zillmann, 1994). Therefore, brand memory would be enhanced whenever the advertisement is placed within an environment where the message it belongs to is incongruent in terms of content. For instance, memory increased for brand-related information that is incongruent rather than congruent to the content of the game (Dimofte, Forehand, & Deshpande, 2003; Heckler & Childers, 1992; Russell, 2002).

According to Srull and Wyer (1989), because incongruent information is novel, distinctive, and prominent during the encoding process, greater attention may be paid to the message. This explanation can be extended to the findings of Huang, Scale, and McIntyre (1976), who suggest that because products placed within the games are incongruent, they direct more attention and produce higher levels of recall than products that would be expected during game play such as products that are congruent to the content of the game.

Likewise, Balasubramanian, Karrah, and Patwardhan (2006) reference past literature on the relationship that develops from the perceived relevance of the brand to

the content of the game play. They note that when a product placement appears to be atypical or incongruent with the content in which it was placed, the brand is more likely to be memorable to the game player because it is unexpected and increases one's recall. Researchers suggest that incongruent information inclines people to attempt to make sense of the incongruity, which in turn prompts them to engage in more cognitive elaboration (Mandler, 1982; Srull & Wyer, 1989).

These opposing findings can be attributed to several factors. It should be noted that the studies that support the idea that incongruent brands are more memorable than congruent brands found this only when measuring recall. Similar to how dissociations exist between explicit and implicit memory, dissociations can exist between recognition and recall tasks such that recognition memory may not have the same pattern of congruency and product placement effects as recall memory (Kent & Machleit, 1990). Kent and Machleit (1990) argue that there is a need to account for this distinction that can exist between these two processing types to better understand how memory operates in the realm of advertising. For example, in their study on the effects of congruency on brand memory for online games, Lee and Faber (2005) found different results for recognition and recall such that incongruent brands produced a significant main effect for recall but not for recognition such that recall increased while recognition did not. This difference can be attributed to the fact that different memory tasks index different subprocesses of memory (Lang, 2000). Studies that have measured recognition, which is the most sensitive measure of memory, index how well the information was encoded (Lang, 2000). For example, Lee & Faber (2005) measured game players' recognition and found that brands that are congruent with the content of the game were encoded better,

leading to higher levels of brand recognition. Studies that have measured recall index either how well the information was stored or retrieved, depending on whether a cued or free recall test is administered. Although the message may be thoroughly encoded, which would increase recognition, this does not guarantee similar results for storage and retrieval. For example, when encoding is high and storage is low, recognition would be high and recall would be low, according to the LC4MP model (Lang, 2006).

Thus, congruity may have different effects for recognition than it does for recall because of the fact that recognition and recall index different subprocesses of memory (Lang, 2000). Additionally, because one of the purposes of this study is to examine how well brand information is encoded, recognition will be measured and since the majority of the previously mentioned studies support the finding that high recognition is dependent on congruent brands, the following is hypothesized:

H1: Explicit (recognition) memory for congruent brands will be better than for incongruent brands.

Product placement proximity. Because the way brands are placed in a medium may influence their effectiveness on brand memory, product placements have been tested in a variety of different ways. For example, scholars have examined whether the placement is visual or verbal (Gupta & Lord, 1998; Russell, 2002), the visual prominence of the placement (Brennen, Dubas, & Babin, 1999; d'Astous & Chartier, 2000; Law & Braun, 2000), and if the placement is involved in the plot of the story (Russell, 2002). For this study, the visual prominence of the placement will be used to examine the product placement proximity between two levels, central versus peripheral.

Central placements are defined as those where the product or brand identifier, such as the brand name, logo, or brand character, appears inside the border of the game. For example, in the *Taco Bell* game, the game player tried to collect food as it falls from the sky with the *Taco Bell* logo appearing on the restaurant located clearly within the border of the game. On the other hand, peripheral placements are defined as those in which the product or brand identifier is set outside the border of the game. For instance, in the *Kingsford* game the word *Kingsford* appeared outside the border of the game where information related to the game was kept such as the score, the round of the game, and the time elapsed.

As previous research has shown, the more central a brand appears within an advergame, the fewer resources are required to process the embedded brand, which enhances recognition of the product (Lee & Faber, 2005). This is because the product is placed within the center of the action of the game, or in this study, within the border of the game, and is thus more integral to the primary task of playing the game. However, when the product is not as prominently displayed, in other words when the brand is more peripherally located, more resources are required for processing the brand as it is not as integral to the task of playing the game, resulting in lower recognition scores for the embedded brand (Lee & Faber, 2005).

For instance, in a study on product placements in movies, d'Astous and Chartier (2000) exposed participants to 18 product placements appearing in 11 different movies. After a week had past, the participants were asked to recall the products and brands they had seen in the movies and to complete a recognition task. The authors found that the prominence of the placement had a significant enhancement on recognition memory.

This finding suggests that when product placements appear prominently, recognition should increase for the brands that are presented in the message. Babin and Carder's (1996) study on viewer memory of brands placed within films further supports this idea such that brands that were prominently placed, touched, or used by one of the films' characters were remembered better than those brands featured in the background of a scene.

Similar studies on brand placements in movies have shown that peripheral placements of brands result in lower levels of recognition memory than placements that are considered more visually prominent (McCarty, 2004; Yang, 2004). Likewise, Law and Braun (2000) found that visual prominence, or what they call centrality of placement, was influential on recognition such that recognition significantly increased for centrally placed brands. The authors explain that greater cognitive processing may have occurred for a product that was more centrally placed than for a product that was less centrally placed.

Most studies have examined brand placement within traditional media; however, Schneider and Cornwell (2005) studied the effect of brand placements in computer games. More specifically, the researchers performed an experiment to test the immediate consequences of brands presented in a banner format within the content of the game on a player's short-term recall and recognition. The authors found that how the banners were placed affected how they were retrieved from memory. For instance, prominent placements of the banners led to higher recall and recognition levels than subtle placements or those placements that tended to appear in the background of the game. However, it should be noted that banners that were placed in a subtle manner and did not

visually stand out as much as the prominent placements were still able to increase a game player's memory of the advertised brand depending on how the brand related to the actions the game player performed. For instance, the more central to the action a subtle banner was, the more it contributed to the recall of brand placements in the games. The finding that brands that appear within the action of an ad are important in contributing to a game player's recall illustrates how online video games are more effective than traditional advertising avenues due to their ability to engage the player with the advertised product.

Another study that has shown that product placement affects recognition memory in video games is Yang et al.'s (2006) research that found that recognition rates were higher for the brands that were featured more prominently in the games. This implies that centrally located product placements will have a greater influence on brand memory than those that appear in the background or that are peripherally positioned. Thus, based on the effects of central and peripheral placements described above, it is hypothesized that:

H2: Explicit (recognition) memory for central placements will be better than for peripheral placements.

Explicit Memory

Explicit memory is conscious memory retrieval wherein a person intentionally attempts to remember previous information he or she was exposed to (Duke & Carlson, 1993, 1994; Shapiro & Krishnan, 2001). It is important to measure for those purchase decisions that do require conscious memory retrieval. For instance, high involvement purchase decisions that involve risk, such as the purchase of expensive items, would

motivate a person to engage in explicit memory retrieval to help make these types of risky purchase decisions.

According to Vaidya, Keane, Gutierrez-Rivas, Gabrieli, Monti, and Zarella (1997), memory that is measured explicitly is done so through tests of free recall, cued recall, or recognition. One example of an explicit memory test is a recognition test where participants are instructed to consciously remember information they saw from the previous exposure session. For the purposes of this study, recognition was the explicit memory measure of choice. One reason researchers choose to use recognition tasks is because past studies have shown that recognition tests can be more indicative of exposure effects of product placements than free recall (Law & Braun, 2000). Another reason to use a recognition task is that it is the most sensitive memory measure and indexes whether information was encoded (Lang, 2000).

Implicit Memory

The process where information is unconsciously retrieved is called implicit memory, which is where an individual remembers past information without intentional recollection of a past event (Graf & Schacter 1985, 1987; Law & Braun-LaTour, 2004) or without his or her conscious knowledge that he or she is performing such a task (Duke & Carlson, 1993, 1994; Shapiro & Krishnan, 2001).

According to past brand placement studies, implicit memory is an important concept to evaluate in advertising research (Duke & Carlson, 1993, 1994; Krishnan & Chakravarti, 1999). Implicit memory is important to account for from a practical marketing standpoint because it can retrieve those brands from memory that an individual

did not deliberately select for processing. For instance, implicit memory would be important to utilize when consumers do not deliberately search their memory for previously encoded information. A situation that would not require an effortful search of memory would be when people are making low involvement purchases and impulse buys (Shapiro & Krishnan, 2001).

Researchers have also employed implicit memory tasks as another way of measuring advertising effects because there exists limitations in using only explicit memory measures (Shapiro & Krishnan, 2001). For instance, explicit memory measures can account only for advertising effects that are accessible to conscious processes; thus, implicit memory should also be measured to reveal those effects that are the result of unconscious processes (Krishnan & Chakravarti, 1999). According to Shapiro and Krishnan (2001), implicit memory measures can detect incidental advertising exposure that can occur when people are not fully paying attention to the advertisement. Incidental advertising exposure will be important to consider in this study because the game players may not be devoting their full attention to the embedded brands while playing the game, especially if their goal is to play the game and not to attend to the brand. According to Grodal (2000), video games often require players' visual attention and motor actions, causing players to devote less attention to the brand names embedded within the games, particularly those brands that appear in the background.

Therefore, it is valuable to measure game players' implicit memory that can reveal different advertising effects of brand placements in advergames than an explicit memory test may show (Sanyal, 1992).

A common method used to measure implicit memory is a word-fragment completion task (Duke & Carlson, 1993, 1994; Leshner & Coyle, 2000; Yang et al., 2006). In this task, participants are instructed to fill in blanks that are missing in a word fragment in order to complete the word. This implicit memory task is given after the participant has been exposed to a target word, usually a brand name, to examine whether the participant has successfully been primed to remember the target word they were previously exposed to. For instance, the Yang (2004) study used a word-fragment test and found that the completion rate for target words, the brands that appeared in movies participants had previously seen, was higher than foil words, which were those brands that were not featured in the movies shown. This finding illustrated the key purpose of the word completion task, which was to show brand placements in movies increased participants' implicit memory for the featured brands.

Similar results have been found in studies on video game product placement. Yang et al. (2006), for example, used a word-fragment completion task and found that game players completed word-fill tasks for target brands at a much higher rate than for those of foil brand names. The authors tested a racing game versus a soccer game and employed implicit and explicit memory measures. Participants were randomly assigned to one of three groups. The participants from all three groups were instructed to complete a word-fragment completion task. The results from this task suggested that in-game advertising influenced implicit memory. Thus studies such as this one provide support for the idea that implicit memory is important to measure because game players may remember brands featured in a game without their conscious awareness.

Whereas the visual placement of brands tends to influence viewers' level of explicit memory, the same cannot be said for implicit memory. For example, Shapiro and Krishnan (2001) found that when participants were provided with a secondary task, implicit memory was not influenced, suggesting that the nature of the brand placement had less influence on implicit memory for the brand than on explicit memory.

Likewise, Law and Braun's (2000) study supports this idea. In their study participants watched clips from the TV show *Seinfeld* that featured products that were referred to audibly and/or products that were seen visually. Law and Braun found that central placements had greater impact on recall and recognition performance, both explicit memory measures, in comparison to peripheral placements. However, when the researchers tested for implicit memory, the centrality of the placement failed to produce a reliable effect, indicating that the product placement proximity variable did not have an effect on implicit memory. The authors attribute these findings to the dissociations that are reported to exist between the implicit and explicit memory test. More specifically, Law and Braun discussed how the effectiveness of placement depended on how it was measured. Previous findings showed explicit memory tests revealed different results than implicit choice behavior as the performance on one test was uncorrelated with the performance on the other. Thus, the authors suggested that implicit memory measures should be used to understand incidental advertising exposure that happens when consumers are not devoting their full attention to the advertisement (Law & Braun, 2000).

Therefore, given the fact that studies have found that explicit and implicit memory tests can have disassociated results (Law & Braun, 2000), this study measured

both explicit and implicit memory to better understand memory effects of product placements (Yang et al., 2006).

Dissociations between implicit and explicit memory measures. As previously mentioned, measuring both implicit and explicit memory is important because dissociations can exist between the two. If a dissociation exists between the two memory measures, then the memory tests are not capturing a complete picture of what information the message recipient had retrieved. According to Shapiro and Krishnan (2001), evidence suggests that explicit and implicit memory do not respond similarly to the same experimental manipulations. For instance, Law and Braun (2000) found a dissociated pattern for modality of placement such that seen-only products most influenced implicit memory but least influenced explicit memory. Thus, it is important to investigate dissociations between memory measures for both predicting patterns of performance on specific memory tests and for understanding how memory functions in general (Blaxton, 1989).

One dissociation that is important to mention, particularly in the case of this study, comes from literature on the effects of divided attention on explicit and implicit memory. Scholars have found that when participants are given a secondary task to complete, their explicit memory is negatively influenced such that they are unable to fully process the message (Debner & Jacoby, 1994; Murdock, 1965). On the other hand, implicit memory may be preserved when one's attention is divided by a secondary task, which would indicate that the exposure did have an effect at least at an unconscious level (Debner & Jacoby, 1994; Murdock, 1965). It is thought that explicit and implicit

memory will lead to a dissociated pattern when attention is divided because each relies on different retrieval processes. In other words, explicit memory relies on the process of conscious memory retrieval whereas implicit memory relies on the process of unconscious memory retrieval (Shapiro & Krishnan, 2001). For instance, in a study conducted by Shapiro and Krishnan (2001), participants were instructed to watch a series of 12 advertisements and were tested for their implicit and explicit memory performance for the brands that were featured in the ads. The researchers found that when participants were given a secondary task during the ad exposure and when there was a time delay between ad exposure and test, a dissociation emerged between the two memory measures. Specifically, explicit memory results showed lower performance in delayed versus the immediate test condition and in the condition of divided versus full attention. However, implicit memory results showed that the manipulations had no effect on the implicit memory measure.

Because dissociations can exist between explicit and implicit memory, (Shapiro & Krishnan, 2001), implicit memory may not have the same congruity and proximity effects as explicit memory. Although strong support exists for the effects both congruity and proximity variables will have on explicit memory, as discussed in the previous sections, the effects they will have on implicit memory remains unclear as few studies exist. Therefore, the following research question is introduced:

RQ1: What are the effects of congruity and proximity on implicit memory?

The Effect of Congruity and Proximity on Attitude Toward the Brand

In addition to memory-based awareness measures, another way to measure the effectiveness of product placements is according to attitudes (Nelson, 2002). This is because branded products embedded within online games can affect the associations, emotions, and attitudes players form toward the brand (Nelson, 2005).

According to Nebenzahl and Secunda (1993), audiences tend to have more positive attitudes toward specific brand placements than they do toward advertisements in general. This finding will be important to understand since researchers have suggested that a transfer of attitude can occur from the game to the brand (Pelsmacker, Geuens, & Anckaert, 2002). More specifically, attitudes toward the media content can be transferred to the advertised brand such that when feelings are positive, brand evaluations would be positive as well.

Several studies that have examined participants' attitudes toward the brands have linked this variable to game-product congruity. Wise, Bolls, Kim, Venkataraman, and Meyer (2006) found that when game players enjoyed the game, they also had positive feelings toward the brand featured in the game. This finding occurred when the participants played product relevant advergames as opposed to games that did not have a thematic connection between the brand and the game's content. Therefore, when the game is thematically related to the advertised product, the game player will likely have a more positive attitude toward the embedded brand as well.

Likewise, Nelson, Keum, and Yaros (2004) conducted a study on game players' interpretations, attitudes, and beliefs about product placements in computer games. The

authors also found that players were positive about brands embedded in the games when the brands were relevant to the game play. Therefore, it is hypothesized that:

H3: Congruent games will elicit more positive attitudes toward the brand than incongruent games.

In terms of product placement proximity, attitude toward the brand has been found to be more positive the more centrally located the brand placement appears. For instance, Yang and Roskos-Ewoldsen (2007) conducted a study on product placements in movies and found that when the featured brand was used by a character, viewers' attitudes toward the brand were more positive than when the product was simply displayed in the background of a scene.

Likewise, Nelson (2005) found similar results in her study on consumers' responses to the use of advergaming and the effectiveness of this emerging marketing strategy in building brand awareness. She described how the use of the branded product embedded within online games affected the associations, emotions, and attitudes players form toward the brand. Nelson examined several different theories for understanding the effectiveness of product placement and how these would operate in terms of the interactive nature of advergames. One of these theories was the mere exposure effect (Zajonc, 1968), which suggests that repeated exposure to a product facilitates positive brand evaluations. Because central brands receive more frequent exposures due to their prominent location, brands that are centrally placed should theoretically produce more positive attitudes than those brands that are peripherally placed within the advergames (Nelson, 2005). Given the abovementioned findings, it is hypothesized that:

H4: Central games elicit more positive attitudes toward the brand than peripheral games.

The Effect of Congruity and Proximity on Resources Available at Encoding

Along with the importance of measuring both explicit and implicit brand memory and attitude toward the brand, secondary task reaction times (STRTs) will also be collected. In this study, STRTs will be used to index resources available at encoding to better understand how well brands are encoded to the primary task, which ultimately influences the game players' brand recognition.

According to Lang and Basil (1998), content and structural features of a message can impact the resources that are required and resources allocated to a message. Structural features of the medium can elicit orienting responses (Alwitt, Anderson, Lorch, & Levin, 1980; Anderson & Levin, 1976; Singer, 1980), which produce additional resources being allocated to process a message (Geiger & Reeves, 1993; Lang, Geiger, Strickwerda, & Sumner, 1993). For example, structural features such as cuts and edits have been shown to automatically increase resource allocation (Lang et al., 2006).

For the purposes of this study, it is assumed that there is no automatic resource allocation because all of the games do not vary on structural dimensions. Because of this, differences in STRTs showed how difficult or not a message was to encode (Miller & Leshner, 2007). Therefore, if resources that are being allocated to the primary task increase, then STRTs will speed up assuming resources required are constant (Lang et al., 2006). More specifically, in the context of this study where participants are playing advergames, the game player was paying more attention to playing the game and had better recognition scores for the brand names that appeared during game play. However, if the message requires more resources than one has allocated, he or she will experience

cognitive overload, which will result in lower recognition levels and slower STRTs (Lang, 2000).

Theoretically, the more resources an individual is using to process a brand, the fewer resources an individual has available to respond to the secondary task (Lang, 2006). In this study, the level of the independent variables should determine the amount of resources that are required to process the embedded brands in the advergames. As argued in the earlier sections on congruity and proximity, a game that features a brand that is congruent with the content of the game should require fewer resources to process as well as a game where the brand is centrally placed. For instance, when products are congruent with the content of the ad, people are able to match it with preexisting schema, and when this new information is assimilated into the schema, greater memory develops for congruent information (Lee & Faber, 2005). Thus, brands that are congruent with the content of the game are encoded better while requiring fewer resources to process, increasing recognition memory. Likewise, when a brand is centrally placed fewer resources are required to process the embedded brand, which enhances recognition of the product. Fewer resources are required because the product is placed within the center of the action of the game and is thus more integral to the primary task of playing the game (Lee & Faber, 2005). This means that for a game where the brand is congruent and centrally positioned STRTs should be faster since fewer resources are required. Thus, it is hypothesized that:

H5a: STRTs will be faster for centrally located brands than for peripherally located brands.

H5b: STRTs will be faster for congruent brands than for incongruent brands.

H6: STRTs will be faster for the congruent/central game condition than for the other game conditions.

Moderating Role of Brand Familiarity and Prior Game-Playing Experience

Determining whether brands embedded in the advergames are familiar to the game player will be important in measuring the effect on brand memory and whether or not positive attitudes are formed toward the brands featured in the advergames.

Because unfamiliar stimuli are incongruent with one's prior expectations, they tend to attract greater attention and produce superior cognitive outcomes than familiar stimuli (Balasubramanian, Karrh, & Patwardhan, 2006). Nelson (2002) noted that familiar brands were not remembered as well as the unfamiliar brands featured in race car video games. This supports past research that has suggested that novel or distinctive stimuli are more likely to be remembered than familiar stimuli (Waddill & McDaniel, 1998).

In terms of brand attitude, advergames that use products that are already known to the game players are likely to show more positive attitudes toward the embedded brand than those products that are new to the game players (Winkler & Buckner, 2006). Given the abovementioned arguments for brand familiarity the following research questions are asked:

RQ2a: Does brand familiarity moderate the impact of congruity and proximity on explicit brand memory?

RQ2b: Does brand familiarity moderate the impact of congruity and proximity on implicit brand memory?

RQ2c: Does brand familiarity moderate the impact of congruity and proximity on attitude toward the brand?

Prior game-playing experience is another important potential moderating variable to examine in a study on the influence of advergames on a game player's brand memory. It is important to account for prior game-playing experience because with experience comes expectations, schema, and skills that can affect the amount of attention one devotes to processing the embedded brands (Lee & Faber, 2005). More specifically, the more games a person has experience with playing, the more likely he or she will be able to anticipate what his or her next move will be without having to use a greater amount of cognitive resources to play the game and will therefore be able to increase his or her memory of the embedded brands. For instance, Schneider and Cornwell (2005) tested game players' brand memory for brands featured in a car racing game. They found that players who had prior game-playing experience showed greater levels of brand memory than inexperienced players.

Lee and Faber (2005) took into account the proximity variable and found that proximity and game-playing experience interacted on brand memory. More specifically, inexperienced game players' had a greater difference in explicit memory retrieval between focal and peripheral brands such that explicit memory decreased for peripheral brands more so than for focal brands. Therefore, when accounting for prior game-playing experience the following is hypothesized and research questions are asked:

H7: Prior game-playing experience will interact with congruity and proximity such that games with congruent, centrally placed brands will show the best explicit memory.

RQ3a: Does prior game-playing experience moderate the impact of congruity and proximity on implicit brand memory?

RQ3b: Does prior game-playing experience moderate the impact of congruity and proximity on attitude toward the brand?

Chapter III: Method

The method that was used for the purposes of this study was a controlled experiment because it is the strongest method for finding links between cause and effect relationships to better understand and predict media effects. The goal here was not to estimate parameters in a defined population; instead, the goal was to test for relationships among variables (Grabe & Westley, 2003).

Design

The design of this experiment was a 2(game-product congruity: congruent v. incongruent) x 2(product placement proximity: central v. peripheral) x 2(games) x 4(order) repeated-measures design. Congruity and proximity were within-subjects factors. Order was the between-subjects factor. Two advergames were used for each of the four congruity x proximity game conditions, so each participant played a total of eight games.

Using a within-subjects design was important as within-subjects designs are more sensitive in detecting differences caused by the independent variables on dependent variables (Grabe & Westley, 2003). Within-subject designs are more sensitive because each participant serves as his or her own control, allowing for a clearer picture of treatment effects due to less error variation. As Reeves and Geiger (1994) suggest, this benefit is particularly helpful in message processing experiments due to the fact that "individual difference in the levels of many measures will often be large" (p. 167). Other

benefits of using a repeated-measures design is the fact that fewer participants will need to be recruited while still maintaining adequate power.

However, there are limitations with running all independent variables within-subjects. The most common objection to using within-subjects factors is that the repeated exposure to any treatment may sensitize participants to the purpose of the experiment and therefore influence their responses (Reeves & Geiger, 1994). To counter this problem, Reeves and Geiger (1994) note that whether or not participants are able to determine what the study is about depends in part on the research question being examined. If, for instance, the question relates to cognitive responses to media, as this study asks, the question is not as easy to figure out even when the same individual is exposed to all the treatments as he or she is in a within-subjects design. The design is further strengthened when the messages are sampled within each treatment level and when messages are presented in a random manner across all treatment levels.

Lastly, it should be noted that multiple games were included in this study's design in order to reduce the threats to internal and external validity that come with using only a single game per condition. It was important to use multiple games because of the complex nature of games in general. More specifically, one game is not likely to "capture the natural variation in a single feature….Each message added to the sample further reduces systematic between-message differences to less pernicious random error" (Reeves & Geiger, p. 167, 1994). Thus, using multiple games decreased the likelihood that any results were due to the specific characteristics of any one game.

Independent Variables

Game-product congruity. As mentioned previously in the literature review, game-product congruity has been conceptualized in many ways depending on the specific relationship the researcher is examining. For the purposes of this study, congruity was conceptualized as the extent to which the product category of the embedded brand or product fit within the content of the advergame (Lee & Faber, 2005). More specifically, advertisers can place their products in games that fit well with their products (e.g., *Kingsford* charcoal advertised in a barbeque game) or they can place their brands in games that appear to be unrelated to the featured product (e.g. *Extra* gum advertised in a hockey game).

Product placement proximity. Product placement proximity is conceptualized as the spatial location of a brand within the advergame. For this experiment, the products appeared in either a central or peripheral manner within a given game. Central placements were defined as those where the product or brand identifier, such as the brand name, logo, or brand character, appeared inside the border of the game. An example of a central placement is, in the *Taco Bell* game, where the game player tried to collect food as it falls from the sky with the *Taco Bell* logo appearing on the restaurant building. Peripheral placements were defined as those in which the product or brand identifier was set outside the border of the game. For instance, in the *Kingsford* game the word *Kingsford* appeared outside the border of the game where information related to the game was kept such as the score, the round of the game, and the time elapsed.

Dependent Measures

Implicit memory test. To measure implicit memory a word-fragment completion task was given. Game players were required to fill in the missing letters in 16 word fragments. All of the word fragments could be completed using the brands that appeared in the advergames. However, these word fragments were designed so that the game players could complete them using words other than the target brands as well. More specifically, participants were asked to complete the 16 words by filling in the blanks for the missing letters (e.g., C_ _ E for "Coke"). Participants were instructed that they could use the same word to complete multiple word fragments (e.g., C _ _ E or _ O K _). The purpose of this measure was to see how often the brands featured in the advergames came up in the participants' minds after game play. This was given as a distractor task before recognition was measured. Table 11 shows the word completion task that was used for this study.

Explicit memory test. Explicit memory was analyzed using a recognition test where participants were required to indicate using the yes-no procedure which brands appeared in the advergames from a pool of brands that contained both targets and foils. In total, eight brands were targets (the brands that appeared in the advergames played) and eight brands were foils (brands that did not appear in the games). It is important to note that the foils used were within the same product category as the targets. For example, if the target brand was *Dunkin Donuts* the foil brand used during the recognition test would be another brand of doughnuts such as *Krispy Kreme Doughnuts*.

The participant was asked to indicate whether they did or they did not see during game play a specific brand for each of the 16 brand names that appeared during the recognition test. Furthermore, it should be noted that the recognition task was included in this study's pretest to try to avoid ceiling effects. To see the list of both targets and foils used see Table 10.

The recognition task was given after the word-fragment task in which targets and foils flashed onto a computer screen one at a time and participants were instructed to press a green button for 'yes' (they did see the brand during game play) or to press a red button for 'no' (they did not see the brand during game play). DirectRT was used to expose the participant to each brand for 2000 milliseconds. Latencies were also collected to measure how long it took for the participant to respond with their answer.

SDT and analysis. Recognition accuracy was calculated as the percentage of hits or the percentage of times the game player said 'yes' to a target. The rate of hits and false alarms was used to calculate recognition sensitivity (A prime) in an effort to measure the participants' ability to accurately recognize the brand that appeared in the advergames from those that did not. Thus, signal detection measures were used to control for the influence of guessing on participants' recognition scores. Calculating recognition sensitivity was important in this study because some brands may be more popular than others and participants may guess that these brands had been present provided the nature of the game. For instance, game players may guess that *Denny's* was the featured brand in a game where the player was instructed to flip pancakes on a grill.

More importantly, recognition sensitivity guards against the participant from saying 'yes' to every brand name in the recognition test.

In addition to measuring the participants' sensitivity, the participants' criterion bias (B double prime) was calculated, which indicated how liberal or conservative a game player was in his or her evaluation of whether a target had been previously seen in the game he or she played (Shapiro, 1994). If a game player was liberal this means that that he or she was more willing to say 'yes' to a target. If a game player was conservative, he or she was more reserved in his or her evaluation and was less willing to 'yes' to a target. SDT calculations for A prime and B double prime are listed in the Appendix.

To account for both right-handed and left-handed game players, participants were randomly assigned to one of the two laptops. One of the laptops had the 'yes' button on the right side of the keyboard and the other laptop had the 'yes' button on the left side of the keyboard.

Attitude toward the brand. An attitude toward the brand scale was used for each of the eight brands that every participant was exposed to during game play. After each game was played, the game player was asked to indicate his or her attitude toward the brand featured in the game on three seven-point semantic differential scales: good/bad; pleasant/unpleasant; and favorable/unfavorable, a measure used by MacKenzie and Lutz (1989). Reliability was tested on the three attitude scales with a Cronbach's alpha of .952.

Resources available at encoding. According to Lang and Basil (1998), STRTs index resources available at encoding. STRTs are measured in an effort to better understand the resources required by the game, which ultimately influences the game players' brand recognition. While the participants' main task was to play the games in this experiment, a secondary task was introduced when the game players were asked to respond to a series of tones that appeared randomly during game play. More specifically, a series of four tones were randomly generated, one tone per every 30 seconds for a total duration period of two minutes.

Reaction times for STRTs were also collected during each time segment to measure how long it took the game player to respond to the tone. When STRTs are slow, the game requires more resources to play, which should decrease the amount of resources available at encoding (Lang et al., 2006). For this study, slower STRTs mean that more resources where required to play the game and, if no cognitive overload occurs, then recognition could increase for brand names that appeared during game play.

Moderators

Brand familiarity. Brand familiarity was an important variable to measure to see how it moderated the impact of congruity and proximity on explicit and implicit brand memory and brand attitudes.

Each participant's brand familiarity was measured for 50 brands, which included the eight target brands that were featured in the advergames that were played. Prior to game play, the participant rated his or her brand familiarity using a seven-point semantic differential scale ranging from 1-Unfamiliar to 7-Familiar.

Before data analysis, a median split was computed on brand familiarity. Based on a scale ranging from 1 to 7, the median was 6. Each brand familiarity score was recoded as either a zero (n=12) if the original brand familiarity score was below 6 or was coded as a one (n=42) if the score was above 6. Four new means for brand familiarity were then created, one for each of the four game conditions, and were used in the data analysis.

Prior game-playing experience. Each participant's prior game-playing experience was also measured to show the moderating impact of game experience on congruity and proximity on brand memory and brand attitudes.

Prior to playing the actual games, participants were instructed to provide responses to the following questions to better access their game-playing experience level: How often do you play video, computer, online, or arcade games during an average week: everyday, 5-6 days, 3-4 days, 1-2 days, or never; How long do you play video, computer, online, or arcade games on an average day: 7 hours or more, 5-6 hours, 3-4 hours, 1-2 hours, or less than one hour or no time at all. See Table 3 in the Appendix for results on the often and length variables.

Z-scores were taken of the two different scales that were used to create an index to measure the game players' previous game experience. Z-scores that were below zero (n=18) were coded as inexperienced game players and z-scores that were above zero (n=36) were coded as experienced game players. Then the mean of these two z-scores were taken to generate the overall mean for the prior game-playing experience variable. The Pearson correlation between the two variables was $r = .793$, $p<.001$, which indicates a strong positive association.

Stimulus Materials

Participants played advergames, the majority of which were created by Blockdot, Kewlbox, and Candystand.com, which are a few of numerous Web sites that feature and create advergames. It is important to acknowledge that not all advergames come from their specific brand's Web site and that most of these games are instead featured on gaming sites such as miniclip.com and addictinggames.com that offer a large collection of free online games, some of which are advergames. Therefore, the individual is not actively seeking out the brand before playing the game as they would be if they had gone to the brand's Web site and played the advergame there. Because of this, the individual's brand memory and attitude toward the brand may be different for a game featured on a gaming site that also has other games with other brands on the site. Thus, it is valuable for this study to measure a game players' brand memory and attitude toward the brand as not all advergames are intentionally sought out for on their specific brand's Web site.

The eight advergames that were used for this study's main experiment were selected based on the results obtained from a pretest that examined two sets of eight games each (i.e., a total of 16 advergames, four games per game condition). Each game required the use of only one hand to play and provided a simple set of instructions on how to play the game. Most of the games were either sports-related or arcade games. For instance, in the *Coke* game, players played a game of football while in the *Tic Tac* game, players engaged in a game of pong. For a complete list of the games used in this study's main experiment as well as the Web site from which they were downloaded from see Appendix, Table 8.

Advergames for the main experiment were those that represented the strongest manipulation of congruent and incongruent levels for the game-product congruity variable and of central and peripheral levels for the product placement proximity variable. (See Table 1 for pretest data.) This means that for the main experiment, each game player played a total of eight advergames, two advergames within each congruity x proximity game condition. No two games featured the same brand.

Pretest

The purpose of the pretest was to obtain stimulus advergames that contained a strong manipulation of the two levels of each of the independent variables according to the mean scores each received. Twenty-five participants (n = 25) were recruited to evaluate the stimuli such that half of the participants played one set of eight advergames while the second half of participants played the second set of eight advergames.

For the game-product congruity variable, the game players were asked after playing each game about the relationship between the embedded brand and the game's content. The participant was instructed to indicate to what extent he or she thought the embedded brand that appeared in the previous game was related to the game's content on a seven-point response scale, ranging from "The featured brand was unrelated to the game's content" to "The featured brand was related to the game's content." Based on the results of the pretest, those games that showed the strongest ratings of either the congruent or incongruent condition were selected and used in the main experiment. (See Table 1 for pretest data on the congruity variable).

For the product placement proximity variable, the game players were instructed to indicate to what extent they thought the brand identifier that appeared in each game was within the border of the game on a seven-point response scale, ranging from "The brand identifier was not at all within the border of the game" to "The brand identifier was clearly within the border of the game." Based on the results of the pretest, those games that showed the strongest manipulation of either the central or peripheral condition were selected and used in the main experiment. (See Table 1 for pretest data on the proximity variable).

A paired-sample t-test was run on all 16 games for the congruity and proximity variables. Those games that had means that were significantly different on those measures were candidates for the incongruent / central and congruent / peripheral game conditions. Those games that did not have means that were significantly different were candidates for the congruent / central and incongruent / peripheral game conditions.

The two games that showed the strongest manipulations for each of the four game conditions were selected to represent that game condition according to their means based on the following scale: incongruent – 1.00; peripheral – 1.00; congruent – 7.00; and central – 7.00. Table 1 shows the two games that were selected for each of the four game conditions.

Table 1

Pretest Data

	Game 1		Game 2	
Incongruent/Peripheral	SBC	2.42 (1.31) (pr) 1.75 (0.91) (co)	Tic Tac	4.62 (1.45) (pr) 2.17 (0.70) (co)
Incongruent/Central	Coke	4.75 (1.87) (pr) 1.85 (0.86) (co)	Extra	3.62 (1.22) (pr) 0.92 (0.55) (co)
Congruent/Peripheral	Kingsford	3.00 (1.48) (pr) 4.67 (1.37) (co)	Dunkin Donuts	3.38 (1.76) (pr) 4.00 (1.12) (co)
Congruent/Central	Taco Bell	5.69 (1.86) (pr) 5.62 (1.65) (co)	Denny's	5.67 (1.49) (pr) 5.92 (1.29) (co)

Note. Data is based on the following scale: Incongruent – 1.00; peripheral -- 1.00; congruent – 7.00; and central – 7.00. The (pr) indicates the proximity mean. The (co) indicates the congruity mean. Standard deviations appear in parentheses.

As shown in Table 1, some of the games could possibly fit into more than one game condition. For instance, the *Tic Tac* game had a high mean for the proximity variable, such that it could be put in a central game condition; however, the congruity variable is too low for the congruent/central game condition and too high for the incongruent/central game condition when compared to the means for the *Coke* and *Extra* games. Multiple games likely fit into more than one game condition because participants may have not fully understood the operational definitions for the congruity and proximity variables. Future studies will need to define these variables better and make sure participants understand how to categorize the games into the correct game conditions.

Participants

Fifty-four college-aged participants were recruited from a large Midwestern university. The participants were recruited from undergraduate and graduate journalism classes and those who volunteered were compensated with extra credit for their participation. College students are one of the groups that most frequently play video games. According to Jones (2003), 70 percent of college students play these games, thus members from this group are important to study for the purpose of understanding explicit and implicit memory, attitudes, and resources available at encoding for embedded brands in advergames.

Procedures

Participants were given a written consent form to read and sign before participating in the study. The consent form informed the participants of their rights to confidentiality and ability to choose to end their participation in the experiment as well as the general purpose of the study. A researcher then assigned the participant to a laptop computer located in the PRIME lab. MediaLab software controlled the presentation of all study instructions, stimulus materials, audio probes, and dependent measures. After stating the study's instructions, but before playing the games, participants were asked to answer questions regarding their degree of prior game-playing experience and familiarity with brand names.

MediaLab then presented each advergame for the participant to play until the game's time had elapsed. Two games were used for each level so that each participant played eight games in total to help avoid ceiling effects during the recognition task.

Participants played for 16 minutes, two minutes per game, which is close to the average amount of time game players typically spend on advergames (Hein, 2006). It is important to note here that each game used in this study was either self-explanatory or contained very few instructions. Thus, two minutes should have given each game player enough time to learn how to play the game. During game play, STRTs were measured and game players' reaction times were recorded. In order to collect reaction times, the advergames used in this study required the use of only one hand so that the game player would have another hand free to respond to the tones when they were generated. Because the game player could press either of the shift keys located on the laptop where the study took place to respond to the tone, he or she was able to select which hand he or she wanted to use to play the games.

After participants had finished playing each game, they were instructed to indicate their attitude toward the brand featured in the game. After playing all eight advergames an implicit memory test was given followed by a recognition test. The order for the recognition test, in which both target and foil items were presented in DirectRT, was randomly determined for each participant. Finally, each participant was debriefed, thanked, and dismissed.

Chapter IV: Results

Prior to statistical analysis, data that were collected for both STRTs and recognition latencies were screened for outliers. For STRTs, outliers (37/1728 = 2.14%) were truncated to plus or minus three standard deviations from the participants' overall STRT means. For recognition latencies, outliers (26/432 = 6.02%) were truncated to plus or minus three standard deviations from the participants' overall recognition latency means. Neither STRTs nor the recognition latency distributions deviated substantially from normal after truncation. All missing or timed out data were recoded as zero. Only STRTs had missing or timed out data (253/1728 = 14.64%) that were treated as missing.

A repeated measures 2(congruity) x 2(proximity) ANOVA was run on each dependent variable for all four congruity by proximity game conditions. A repeated measures 2(congruity) x 2(proximity) x 2(brand familiarity) ANOVA and a 2(congruity) x 2(proximity) x 2(prior game-playing experience) ANOVA were also run to account for any three-way interactions that existed for the moderating variables. The results of these analyses can be found below.

Explicit Memory

H1 stated that explicit (recognition) memory for congruent brands will be better than for incongruent brands. H2 stated that explicit (recognition) memory for central placements will be better than for peripheral placements. Separate ANOVAs were performed on the accuracy data and on the latency data.

The findings for the accuracy rate (i.e., hit rate) showed that an interaction existed between congruity by proximity that approached significance ($F(1, 51)=3.122$, $p=.083$, partial eta squared=.058). The condition that had the best accuracy rate was high congruity x high proximity ($M=.98$, $SD=.10$). The conditions that had the lowest accuracy rate were low congruity x low proximity ($M=.88$, $SD=.23$) and low congruity x high proximity ($M=.88$, $SD=.21$). Furthermore, there was a main effect for each independent variable as both congruity ($F(1, 51)=3.236$, $p=.078$, partial eta squared=.060) and proximity ($F(1, 51)=2.373$, $p=.083$, partial eta squared=.42) approached significance. This means that the participant said 'yes' they did see the brand when it was present in the game most often for games that featured congruent brands that were centrally located. Because the interaction and main effects approached significance, based on $p<.1$, marginal support is shown for H1 and H2. Figure 1 displays the recognition accuracy data below in a line graph and Table 4 in the Appendix shows the numerical data.

A signal detection analysis was also run to better understand the participants' recognition scores. First, the participants' sensitivity (A') was measured to guard against the participant from saying 'yes' to every brand name shown in the recognition test.

A prime revealed no significant interaction ($F(1, 50)=2.090$, $p=.154$, partial eta squared=.040). However, a significant main effect was found for congruity ($F(1, 50)=5.041$, $p=.029$, partial eta squared=.092). This indicates that for games where the brand was congruent to the content of the game and centrally placed, memory sensitivity was the highest ($M=.96$, $SD=.06$). Memory sensitivity was the lowest for games where the brand was incongruent to the content of the game and peripherally placed ($M=.89$, $SD=.10$). This provides further support for H1 and H2. Figure 2 shows recognition

sensitivity data in a line graph and Table 5 in the Appendix shows the data in numerical form.

In addition to measuring the participants' sensitivity (A'), the signal detection analysis was used to measure the participant's criterion bias (B"), which indicated how liberal or conservative a game player was in his or her evaluation of whether a target had been previously seen in the game he or she played (Shapiro, 1994). A significant interaction was found for congruity by proximity ($F(1, 51)=3.892$, $p=.054$, partial eta squared=.071). B double prime showed the high congruity x high proximity condition ($M= -.29$, $SD=.35$) had the most liberal bias. The condition that had the most conservative bias was low congruity x high proximity ($M= -.14$, $SD=.43$). These findings show that when the game featured a brand that was congruent to the content of the game and when the brand was centrally located the participants had the most liberal bias such that they were the most confident in their responses when they said that they did see the brand in a previously played game. On the other hand, when the game featured a brand that was incongruent to the content of the game and the brand was centrally located the participant was more conservative in his or her responses. H1 and H2 again are further supported here because the game player is most confident in his or her responses for congruent, centrally located brands for the recognition test. See Figure 3 for a line graph of the criterion bias data and Table 5 in the Appendix for the data displayed in numerical form.

The recognition latencies revealed a significant interaction for congruity by proximity on recognition latencies ($F(1, 53)=8.421$, $p=.005$, partial eta squared=.137). The fastest reaction latencies were for those games in the high congruity x high proximity

condition (M=859.30, SD=268.27). The slowest reaction latencies were for those games in the high congruity x low proximity condition (M=996.85, SD=336.44). This means that game players were able to respond to the target brand names the fastest for games that had congruent, centrally located brands, while the game players responded slowest to the target brand names that were featured in games that had congruent, peripherally located brands. No significant main effects for either congruity or proximity were found. Figure 4 shows the recognition latencies for each game condition below and Table 4 in the Appendix displays the numerical data.

Figure 1

Recognition Accuracy

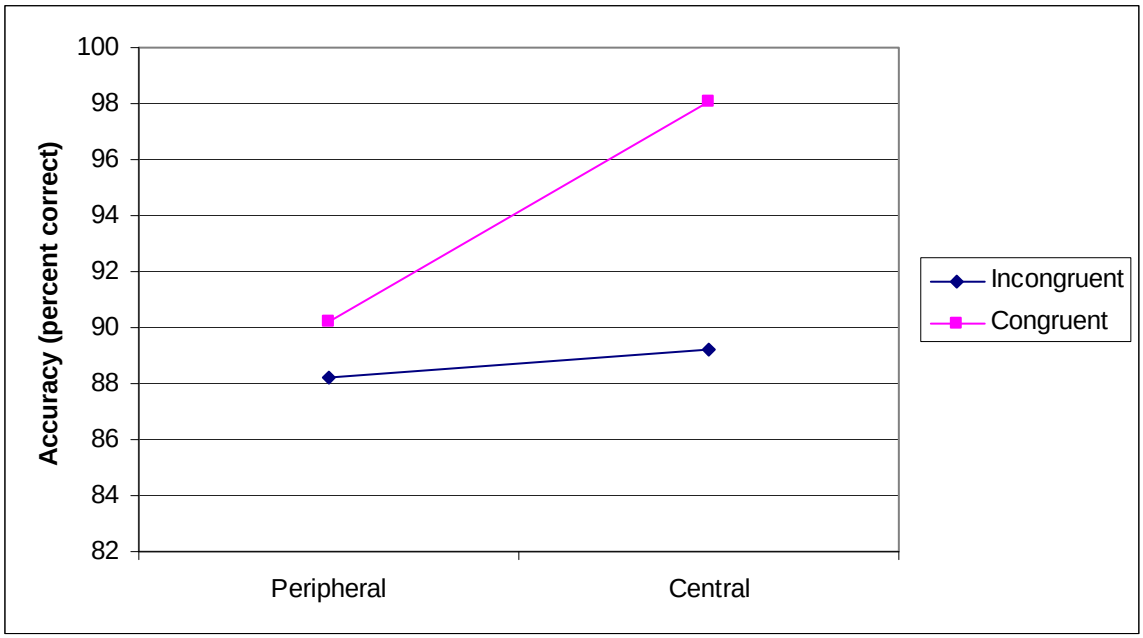


Figure 2

Recognition Sensitivity

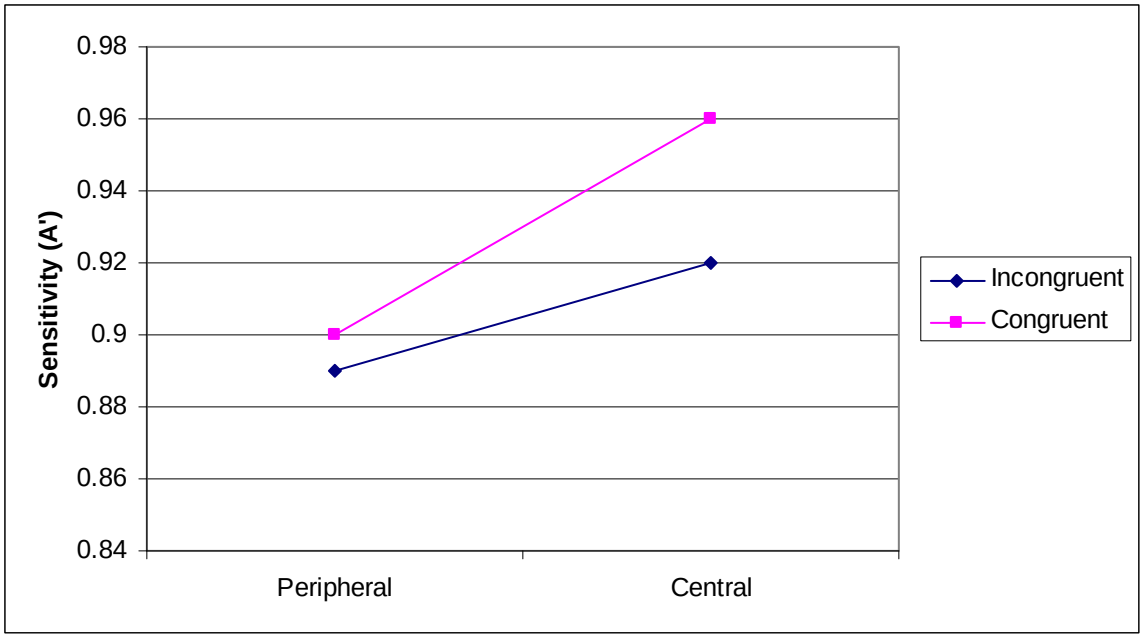


Figure 3

Recognition Criterion Bias

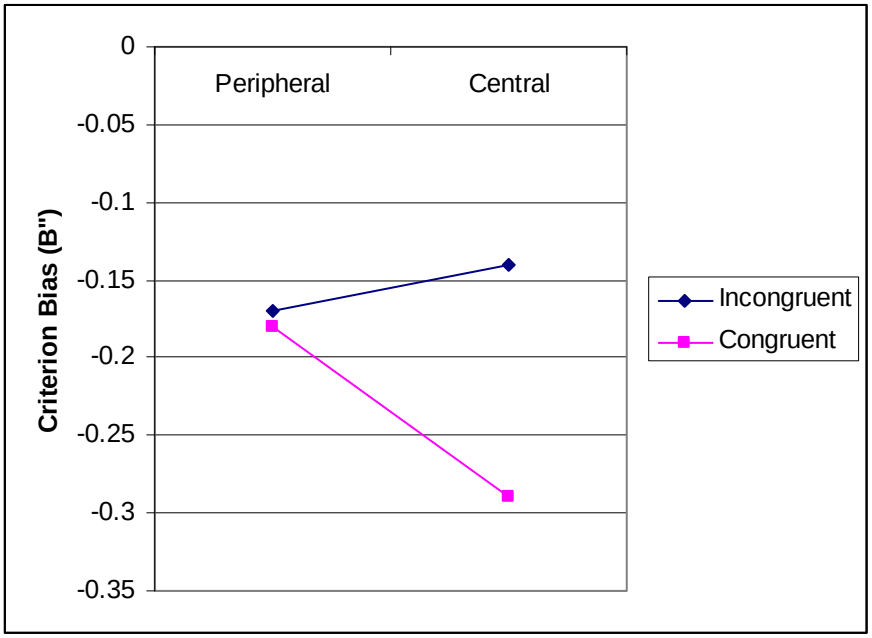
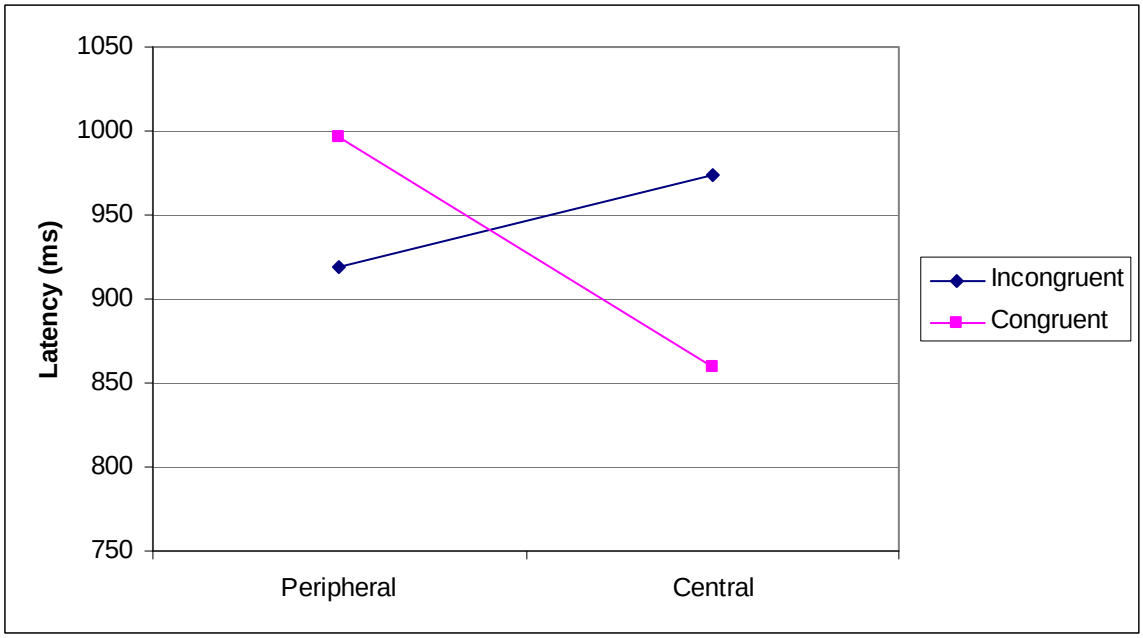


Figure 4

Recognition Response Times



Implicit Memory

RQ1 asked about the impact congruity and proximity had on implicit memory. Results showed that there was a significant main effect for congruity on implicit memory ($F(1, 53)=16.079$, $p<.05$, partial eta squared=.233); however, there was not a significant main effect for proximity ($F(1, 53)=2.308$, $p=.135$, partial eta squared=.042) or a significant interaction between congruity by proximity ($F(1, 53)=.606$, $p=.440$, partial eta squared=.011). Congruity affected implicit memory such that implicit memory was higher for high congruity games (M=.61, SD=.03) than for low congruity games (M=.49, SD=.03). Thus, when the game featured a brand that was congruent to the game content, implicit memory performance was likely to improve than when the game featured a brand

that was incongruent to the game content. See Table 2 to see the percentage of brand names game players correctly completed.

Table 2

Implicit Memory as a Function of Congruity x Proximity Game Condition

		Congruity	
		Congruent	Incongruent
Proximity	Central	62.96	53.24
	Peripheral	59.72	44.44

Note. The numbers above indicate the percentage of word-fragments correctly completed.

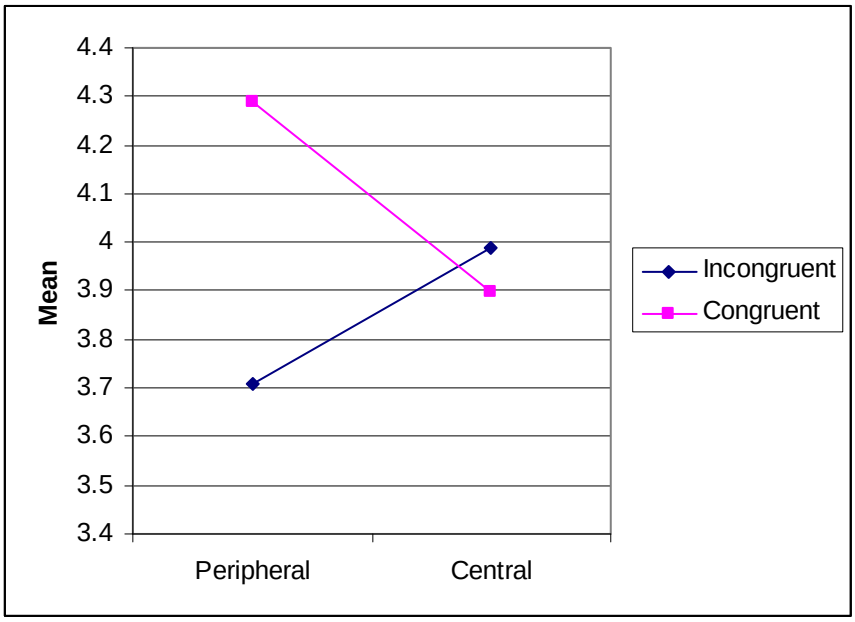
Attitude Toward the Brand

H3 predicted that congruent games will elicit more positive attitudes toward the brand than incongruent games. H4 stated that central games elicit more positive attitudes toward the brand than peripheral games. A significant interaction for congruity by proximity was found ($F(1, 53)=5.594$, $p<.05$, partial eta square =.095) such that game players' had the highest positive attitudes for games in the high congruity x low proximity condition ($M=4.29$, $SD=.78$) while games in the low congruity x low proximity condition produced the lowest positive attitudes ($M=3.71$, $SD=.87$). A main effect for congruity on attitude toward the brand approached significance ($F(1, 53)=2.849$, $p=.097$, partial eta squared=.051) such that game players' had more positive attitudes for brands that were congruent to the game content ($M=4.10$, $SD=.11$) than for brands that were

incongruent to the game content (M=3.85, SD=.11). Therefore, H3 is supported. However, H4 is not supported. Figure 5 shows the attitude toward the brand means for each game condition displayed in a line graph and Table 6 in the Appendix shows the numerical means and standard deviations.

Figure 5

Attitude Toward the Brand



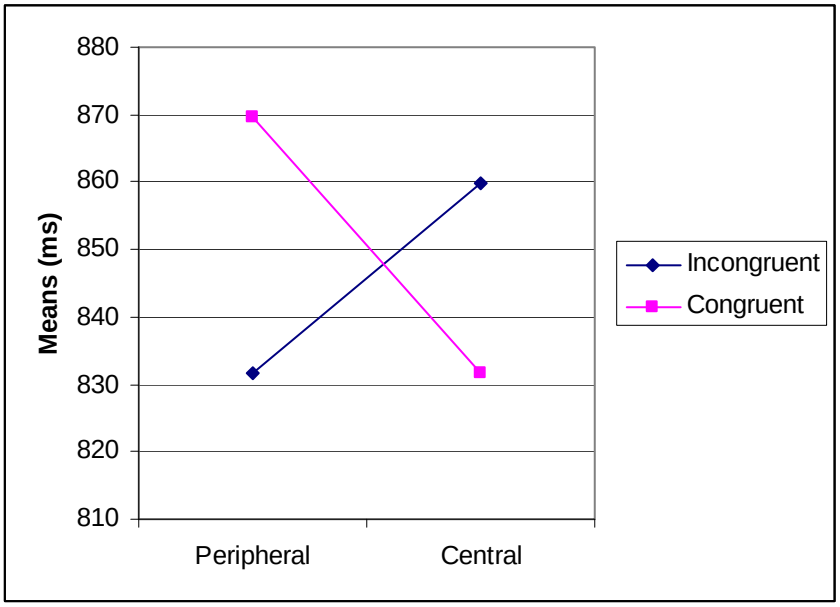
STRTs

According to H5a, STRTs will be faster for centrally located brands than for peripherally located brands. H5b stated that STRTs will be faster for congruent brands than for incongruent brands. H6 predicted STRTs would be faster for the congruent/central game condition than for the other game conditions.

After averaging across all four reaction times, no significant interaction was found between congruity by proximity (F(1, 52)=2.287, p=.137, partial eta squared=.042). Likewise, no significant main effect was found for congruity (F(1, 52)=.050, p=.823, partial eta squared=.001) or proximity (F(1, 52)=.048, p=.827, partial eta squared=.001). Thus, H5a, H5b, and H6 failed to be supported. See Figure 6 for a line graph of the data and Table 7 for the means for each game condition.

Figure 6

STRTs Averaged Across Four Reaction Times



Brand Familiarity

In order to analyze the moderating role of brand familiarity on brand memory and attitude toward the brand, a 2(congruity) x 2(proximity) x 2(brand familiarity) ANOVA was run.

RQ2a asked if brand familiarity moderated the impact of congruity and proximity on explicit brand memory. RQ2b asked if brand familiarity moderated the impact of congruity and proximity on implicit brand memory. RQ3c asked if brand familiarity moderated the impact of congruity and proximity on attitude toward the brand. Results showed that brand familiarity did not moderate the relationship between congruity by proximity on explicit memory as no significant three-way interaction for congruity by proximity by brand familiarity ($F(1, 50)=.140$, $p=.710$, partial eta squared=.003) was found. Likewise, no significant three-way interaction ($F(1, 52)=.934$, $p=.338$, partial eta squared=.018) was found on implicit memory when accounting for brand familiarity. Further, brand familiarity showed no significant three-way interaction ($F(1, 52)=.246$, $p=.622$, partial eta squared=.005) on attitude toward the brand. Thus, brand familiarity did not function as a moderating variable for the relationship between congruity and proximity on explicit or implicit memory or attitude toward the brand.

Prior Game-Playing Experience

H7 predicted a three-way interaction such that prior game-playing experience will interact with congruity and proximity so that games with congruent, centrally placed brands will show the best explicit memory. RQ3a asked if prior game-playing experience moderated the impact of congruity and proximity on implicit brand memory. RQ3b asked if prior game-playing experience moderated the impact of congruity and proximity on attitudes toward the brand. To answer these questions, a 2(congruity) x 2(proximity) x 2(prior game-playing experience) ANOVA was run to see if any three-way interactions existed.

No three-way interaction was found to be significant for congruity by proximity on explicit memory ($F(1, 50)=.036$, $p=.850$, partial eta squared=.001). Prior game-playing experience did not moderate the relationship between congruity and proximity on explicit memory, which means that H7 failed to be supported. Additionally, no three-way interaction was found to be significant for congruity by proximity on implicit memory ($F(1, 52)=.011$, $p=.917$, partial eta squared=.000) or attitude toward the brand ($F(1, 52)=.320$, $p=.574$, partial eta squared=.006) when prior game-playing experience was included as a moderator.

Chapter V: Discussion

This study examined the effects of congruity and proximity in advergames on explicit and implicit memory, attitude toward the brand, and resources available at encoding. It looked at how game players' limited cognitive resources influenced their processing of brands embedded in advergames based on the LC4MP model.

Implicit and Explicit Memory

After assessing the impact of congruity and proximity on implicit memory it was found that only congruity affected implicit memory such that advergames that featured brands that were congruent to the game content produced higher levels of implicit memory than incongruent games. For explicit memory, the analysis on the accuracy rate indicated that participants were more accurate for games that featured congruent brands that were centrally located.

According to A prime, for games where the brand was congruent to the content of the game, game players could discriminate between target and foil brand names. Thus, these findings suggest that in order for a game to produce high memory strength for recognition, the brand should be embedded in a game where the brand is congruent to the game content and be centrally placed. For example, a barbeque grilling game where *Kingsford* charcoal was used and was positioned within the center of the game should result in high memory strength for recognition.

Additionally, based on B double prime findings, when the game featured a brand that was congruent to the content of the game and when the brand was centrally located,

participants had the most liberal bias in that they were most confident in their responses during the recognition test. On the other hand, when the game featured a brand that was incongruent to the content of the game and when the brand was centrally located, participants were more conservative in their responses.

These results support past studies that have found that for ads where the product category is congruent to the ad content, products are often better remembered than products that are featured in ads where the product category is incongruent to the ad content (Lambert, 1980; Moorman et al., 2002; Rodgers, 2003; Shamdasani, Stanaland, & Tan, 2001). Products featured in congruent ads are better remembered because when people who are provided with new information match it with preexisting schema, and when this new information is assimilated into the schema, greater memory develops for congruent information (Lee & Faber, 2005). Thus, brands that are congruent with the content of the game are encoded better while requiring fewer resources to process, which leads to higher recognition scores.

Better recognition for congruent games is an idea that was supported by this study's findings for recognition latencies as well such that game players were able to respond to the brand names the fastest for games that had brands that were congruent and central to the game content. Recognition latencies were fastest for centrally placed brands because the product is placed within the center of the action of the game, or in this study, within the border of the game, and is thus more integral to the task of playing the game. It should also be noted that games that featured congruent, centrally placed brands showed the best memory scores across all memory measures.

However, a dissociation was found between the implicit and explicit memory measures for the congruent, peripheral game condition. More specifically, participants showed a higher positive performance when completing the implicit memory task and demonstrated a lower performance rate for the recognition accuracy, sensitivity, criterion bias results. Thus, a case is made for a dissociation that existed between the two memory measures and makes an argument for testing implicit memory in addition to explicit memory. The dissociation can be attributed to the fact that differences may exist between the two memory tasks because they rely on different retrieval processes. Furthermore, according to Shapiro and Krishnan (2001), evidence suggests that explicit and implicit memory do not respond similarly to the same experimental manipulations. This study's dissociation showed that implicit memory is valuable to measure, particularly when advertisers want to better understand how consumers behave in the marketplace and if they rely on incidental exposure advertising.

Attitude Toward the Brand

Another finding of this study was a significant interaction for congruity by proximity on attitude toward the brand such that game players had more positive attitudes for brands that were congruent to the game content and were peripherally located within the game. This finding is supported by past research in that players are fairly positive about brands embedded in games when the brands were relevant to the game play (Nelson, Keum, & Yaros, 2004). Likewise, Hernandez, Chapa, Minor, Maldonado, and Barranzuela (2004) study found that incongruence was one of the two most significant factors that led to negative attitudes toward the brands embedded in the advergames.

In terms of proximity, it was predicted that centrally placed brands would have produced more positive attitudes than peripherally placed brands because central brands receive more frequent exposures due to their prominent location (Nelson, 2005). However, this study found that when the brand was congruent to the game content, the brand had to be peripherally located to produce the highest positive attitude toward the brand. On the other hand, when the brand was incongruent to the game content, the brand needed to be centrally located to produce a high positive attitude toward the brand.

Furthermore, although a significant interaction was found for congruity by proximity on attitude toward the brand, this study did not find a significant main effect for proximity on attitude toward the brand. This may be because the manipulation for the proximity variable was not as strong as it was for the congruity variable and thus failed to find any significant results for attitude toward the brand.

STRTs

Several different factors may have contributed to the fact that no significant interaction was found between congruity by proximity nor were main effects found for congruity or proximity. First, the STRTs in this study's results were twice as slow when compared to other previous studies that have measured STRTs for television. For example, Lang et al. (2006) conducted a study to test whether STRTs measured during television viewing index available resources. The researchers' analysis reported three STRT means for information messages, resulting in 455.41, 465.02, and 460.66. However, in this study where STRTs were measured during advergame play, STRT means were reported as 831.72, 859.82, 869.49, and 831.59. Because the STRTs in this

study are twice as slow as other researchers have found, this may indicate that resources available at encoding may not have been the only process that was measured. Instead, multiple subprocesses likely were occurring at one time as people are more active during game play than when they are performing other tasks.

More specifically, from a cognitive and emotional perspective, advergames demand resources in ways that are different from television and other traditional media, which the LC4MP model has most often been tested on (Bolls, Lang, & Potter, 2001; Lang, 2006). The fact that no significant interaction was found for the STRTs suggests that more internal processing may have been happening within the storage and retrieval subprocesses during game play than during television viewing.

While playing advergames, mental activity is being used toward the execution of a behavioral response; for example, players are being asked to perform motor movements required to play the game. Therefore, motor interference may develop, causing too many resources to be allocated toward playing the game. Applying this idea to the LC4MP model, which conceptualizes information processing as a group of simultaneously occurring subprocesses (i.e., encoding, storage, and retrieval), if a message recipient, or in this case a game player, does not have sufficient processing resources available, one subprocess may be thoroughly processed while the other subprocesses may suffer. In effect, this would leave an insufficient amount of resources available to thoroughly process the embedded brand.

Another way processing advergames differs from processing television, is that the act of playing advergames motivates an individual differently than the act of watching television. More specifically, individuals are more motivated while playing advergames

than when they are watching television due to the required action on the part of the game player. LC4MP theorizes that motivational systems, whether the activation is aversive or appetitive, impact how resources are allocated across the subprocesses (Lang, 2005). If both systems are activated, which in this study they likely were, more resources are allocated among encoding, storage, and retrieval processes, which will affect how the message is processed. For instance, when motivation is coactive, there is more competition for resources so that when additional resources are allocated to one subprocess, the available resources for the other two subprocesses are reduced (Lang, 2005). Thus, coactivation may improve processing of the message for one subprocess but can also produce a cognitive overload (Lang, 2006).

Second, the way the STRTs were measured in this particular study may have contributed to the insignificant findings. STRTs were likely measuring multiple audio occurrences going on during game play. For example, the games used in this study featured audio separate from the generated tones that were used to measure the STRTs. Thus, audio confusion may have occurred such that the game player may have thought that a STRT tone was part of the original audio of the game, which means that the player would not have a reaction time for that tone as he or she would not have pressed either of the SHIFT keys in response to the tone. Likewise, because the game players' were playing the advergames with their dominant hand, they were responding to the STRT tones with their non-dominant hand. Because of the way STRTs were measured in this study, this would help explain the 14.64% of missing or timed out STRT data that was found.

Thus, the fact that no significant interaction was found suggests that cognitive and emotional processing of game playing experience is still in its infancy and future studies may need to find alternative ways to measure STRTs.

Brand Familiarity

Results showed that brand familiarity did not function as a moderating variable for congruity and proximity on attitude toward the brand. Likewise, no significant interaction was found between congruity and proximity on explicit or implicit memory when brand familiarity served as a moderating variable. Significant interactions may not have been found based on the participants rating the majority of brands featured in the games as familiar. Thus, not enough variation for brand familiarity existed to make a difference, so there may not have been enough power to show significant findings. If more of the brands were rated as unfamiliar in the games that were played, brand familiarity may have been shown to serve as a moderating variable. This suggestion is supported by past research that has shown that unfamiliar stimuli tended to elicit greater brand memory than familiar stimuli (Waddill & McDaniel, 1998).

Prior Game-Playing Experience

When taking into consideration the participants' prior game-playing experience, findings showed that prior game-playing experience did not moderate the relationship between congruity and proximity on explicit memory, implicit memory, or attitude toward the brand. Therefore, just as with the brand familiarity variable, prior game-

playing experience did not show variation because the majority of game players tended to have previous game-playing experience.

Chapter VI: Limitations and Suggestions for Future Research

Although a pretest was run on 16 games to find the eight games that had the strongest manipulation of congruity and proximity levels, the reported means from the paired-sample t-test did not reveal large differences between the means. Thus, some of the games that were not selected from the pretest data for the main experiment were close to being chosen and those that were chosen could have possibly fit into more than one game condition, two factors which may have slightly influenced the dependent variables.

Another possible limitation of this study is that the amount of time each game was played (i.e., 2 minutes) may not represent the average time people spend playing advergames. For instance, game players spend an average of 17 minutes playing advergames (Hein, 2006). Still, many advergames only last a few minutes per level, so even though people may play advergames for 17 minutes this does not mean that one game lasts the entire time or that the game players only play a single game during that time. Thus, this study may be a close replication of typical game play in that each game player played each game for two minutes and spent a total of 16 minutes playing the advergames.

A third possible limitation of this particular study is the fact that the games chosen only required the use of one hand to play the game. This was done so that the game player would have another hand free to press a button on the laptop keyboard to respond to the generated tones that were used to measure STRTs. However, these games may have different amounts of cognitive resource allocation than games that require the use of two hands, which may be more involving. Additionally, another element of the games

that might have negatively affected the STRT results was the audio sound each game featured. With each game having its own audio disbursed throughout game play, the game sounds may have interfered with the generated tones used to measure STRTs. Thus, future studies might need to find an alternative way to measure STRTs to avoid the methodological issues that arose in this study.

The participants used in this study on advergame effects should be another consideration for researchers. The participants used in this particular study were college students from a large Midwestern University. Although 70 percent of college students play these types of games (Jones, 2003), another population that frequently plays advergames is children. According to the U.S. Dept. of Education (2003), approximately 64 percent of children between the ages of 5 to 14 who use the Internet play online games. Because children's cognitive abilities differ from adults, it would be valuable to measure children's performance on explicit and implicit memory tasks to measure the effects of advergames on their brand memory. Thus, more studies in the future should examine this specific audience population as well.

Future research should also consider testing other independent variables such as interactivity due to the complex structure of advergames. Additionally, other memory tasks could be measured. For instance, in place of the word completion task that was used in this study a different implicit memory task such as an implicit product-choice test could be administered in future studies. This task would be important to administer given the fact that many of the products featured in the advergames used in this study would fit into a low involvement purchase decision. Thus, studies conducted in the future should

take into consideration the involvement levels the products featured in the advergames require and use the appropriate implicit memory task accordingly.

Moreover, in terms of explicit memory measures, future research should study the long-term effects of advergame exposure on brand memory. This is because most experiments have studied the short-term effects on game players' brand recall and recognition. The Nelson (2002) study is an exception. Several of the studies in this literature review referenced the empirical study conducted by Nelson as it was the first piece of research to examine the use of brand placements in a computer game context and look at both short-term and long-term recall effects. Her examination of delayed effects on brand recall is typically a missing factor in similar research studies. Other researchers have noticed this deficiency such as Subrahmanyam, Greenfield, Kraut, and Gross (2001) who suggested that more research is needed to understand long-term effects of Internet use on users' cognitive skills and the effects product placements have on audience impact.

In addition to testing for different independent variables and using alternative dependent measures, future researchers should use more advergames that feature unfamiliar brands. Another limitation of this study was that the majority of games used featured familiar brands. This may have been because the advergames selected for the study had to meet certain criteria (i.e., games that required the use of only one hand and games that met the particular IV manipulations). Because the selection pool was reduced, there were not as many games to choose from, and so it was harder to find games that featured unfamiliar brands.

The other moderator in this study, prior game-playing experience, produced another limitation of this study such that the majority of game players had previous game-playing experience. Future studies should base participants' previous game experience on their exposure to advergames specifically as they may be structurally different from online video games. For instance, advergames feature only one brand and are designed by brand marketers. However, the scale used in this study did not include advergames as part of the rating system in order to avoid giving the study's purpose away and thereby possibly influencing the game players' processing of the embedded brands. Instead, future studies should administer the scale after game play to prevent game players from figuring out what the study aimed to examine. By doing so, this could change the game players' level of game experience and possibly produce a moderating effect.

By taking the abovementioned limitations and suggestions into consideration, future studies that examine product placements in advergames should be improved and provide more significant results.

Chapter VII: Conclusion

It is important to understand how the content and structure of advergames affect the way game players' process the embedded brands in the games to determine which types of games are best remembered. By knowing which types of games produce the best memory effects, brand marketers will be better able to target their potential consumers.

This particular advergame study showed that when brands are centrally placed in advergames where the brand is congruent to the game content, game players' explicit memory improves. When the brands are congruent to the game content, game players' implicit memory improves and their attitude toward the brand tends to be more positive as well. This suggests to brand marketers who design advergames to place their sponsored brand centrally in the game and make sure the brand is congruent to the content of the game. By doing so, the advergames should be more effective in increasing brand memory and positively influencing the game players' attitude toward the featured brand.

The findings presented in this study help to provide a better insight and understanding of how brands should be embedded in advergames and the direction future studies should take in further examining this advertising medium. Such findings will be of great value, to a number of vested interests, as advergaming becomes more mainstream, the percentage of game players increase, more marketers begin to recognize its advantages, and advertisers begin to utilize this stealth marketing technique.

Appendix

Table 3

Prior Game-Playing Experience Data

	Often	Length
Means	4.13	4.44
Std. Dev.	1.065	1.003

Note. The data suggest that the average participant played video, computer, online, or arcade games 1-2 days during an average week for 1-2 hours on an average day.

Table 4

Recognition Accuracy and Latency Data as a Function of Game Condition

	Accuracy (percent correct)	Latency (ms)
Incongruent/Peripheral	88.46	919.45
Incongruent/Central	88.46	974.02
Congruent/Peripheral	89.42	996.85
Congruent/Central	98.08	859.30

Table 5

Sensitivity and Criterion Bias for Recognition Memory Data as a Function of Game Condition

	Sensitivity (A')	Criterion Bias (B")
Incongruent/Peripheral	.89	-.17
Incongruent/Central	.92	-.14
Congruent/Peripheral	.90	-.18
Congruent/Central	.96	-.29

Table 6

Attitude Toward the Brand as a Function of Game Condition

	Mean	Std. Deviation
Incongruent/Peripheral	3.71	.87
Incongruent/Central	3.99	1.36
Congruent/Peripheral	4.29	.78
Congruent/Central	3.90	1.19

Note. The above means are based on three 7-point attitudinal scales: (7=Good to 1=Bad; 7=Pleasant to 1=Unpleasant; 7=Favorable to 1=Unfavorable).

Table 7

STRTs as a Function of Game Condition

		Congruity	
		Congruent	Incongruent
Proximity	Central	831.59 (265.60)	859.82 (231.72)
	Peripheral	869.49 (232.82)	831.72 (267.86)

Note. Cell entries are means in ms, with standard deviations in parentheses.

Table 8

List of Advergames Used in Main Experiment

Advergame Name	Brand	Game Condition
1. "Braving the Elements"	SBC	LCLP
Web address: www.blockdot.com/portfolio/gamePlay.aspx?gameID=49		
2. "Tic Tac Challenge"	Tic Tac	LCLP
Web address: www.tictacusa.com/game.php		
3. "Retro Electro Football"	Coke	LCHP
Web address: media.y8.com/games/content/cz_retro_600.swf		
4. "Slapshot Shoot-out"	Extra	LCHP
Web address: www.addictinggames.com/slapshotshootout.html?r=user_posted_link		
5. "Sure Fire Flipper"	Kingsford	HCLP
Web address: www.grillwithkingsfordu.com/game.htm		
6. "Ski Slope Showdown"	Dunkin Donuts	HCLP
Web address: www.kewlbox.com/games/GameDetail.aspx?GameId=231		
7. "Taco Bell Late Night"	Taco Bell	HCHP
Web address: www.mylocaltacobell.com/game/index.asp		
8. "Real or Fake Breakfast Challenge"	Denny's	HCHP
Web address: www.flashrolls.com/puzzle-games/Dennys-Real-or-Fake-Breakfast-Challenge-Flash-Game.htm		

Note. LCLP = low congruity, low proximity; LCHP = low congruity, high proximity; HCLP = high congruity, low proximity; HCHP = high congruity, high proximity.

Experimental Orders – Game Play

All participants were randomly assigned to one of the five game orders. Each of the following experimental orders was also randomly assigned an order in which games were played.

Table 9

Experimental Order of Advergames Played Listed by Brand Sponsoring the Game

	ORDER 1	ORDER 2	ORDER 3	ORDER 4
1	Kingsford	Denny's	Dunkin Donuts	Coke
2	Extra	Tic Tac	Coke	SBC
3	Denny's	Extra	Kingsford	Dunkin Donuts
4	Tic Tac	Taco Bell	Taco Bell	Denny's
5	Taco Bell	SBC	SBC	Tic Tac
6	Coke	Dunkin Donuts	Denny's	Taco Bell
7	Dunkin Donuts	Kingsford	Extra	Extra
8	SBC	Coke	Tic Tac	Kingsford

Explicit Memory Task – Recognition

Explicit memory was analyzed using a recognition test where participants were required to indicate using the yes-no procedure which brands appeared in the advergames from a pool of brands that will contain both targets and foils. It is important to note that the foils used were within the same product category as the targets. The eight targets and eight foils flashed onto a computer screen and participants were instructed to press a green button for 'yes' (they did see the brand during game play) or to press a red button for 'no' (they did not see the brand during game play). DirectRT was used to expose the participant to each brand for 2000 milliseconds (i.e., 2 seconds). Latencies were also collected to show how long it took for the participant to respond with their answer.

Table 10

Explicit Memory Task

Targets:	**Foils:**
Coke	Pepsi
Extra	Trident
Kingsford	Duraflame
Dunkin Donuts	Krispy Kreme Doughnuts
Taco Bell	Burger King
Denny's	IHOP
SBC	ING
Tic Tac	Mentos

Implicit Memory Task

To measure implicit memory a word-fragment completion task was given. All of the 16 word fragments could be completed using the brands that appeared in the advergames, thus all 16 words were target words and no foils were used. However, game players could complete them using words other than the target brands as well.

Table 11

Implicit Memory Task

Brand: Dunkin Donuts 1. D U _ _ _ _ _ _ N U _ _ (2 words) 2. _ U N _ _ _ D _ _ _ T S (2 words)
Brand: SBC 3. S _ _ 4. _ _ C
Brand: Taco Bell 5. T A _ _ _ E L _ (2 words) 6. _ A C _ B _ L _ (2 words)
Brand: Extra 7. E X _ _ _ 8. _ _ _ R A
Brand: Tic Tac 9. T _ _ _ A _ (2 words) 10. _ I _ _ _ C (2 words)
Brand: Kingsford 11. _ _ _ _ _ F O R _ 12. K I _ _ _ _ _ _ _
Brand: Coke 13. C _ _ E 14. _ O K _
Brand: Denny's 15. _ _ N N _ _ 16. D E _ _ _ S

Signal Detection Analysis Calculations

Formulas used for Signal Detection Analysis – A' & B"

$A' = \frac{1}{2} + [(H - F)(1 + H - F)] / 4H(1 - F)$ If $H \geq F$

$B'' = [H(1 - H) - F(1-F)] / [H(1 - H) + F(1 - F)]$ If $H \geq F$,

where H = Hit rate (the participant said 'yes' they did see the brand when it was present in the game)
F = False alarm (the participant said 'yes' they did see the brand when it was not present in the game)

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