EFFECTS OF PRODUCT PLACEMENT IN ON-LINE GAMES ON BRAND MEMORY

A Perspective of the Limited-Capacity Model of Attention

Mira Lee and Ronald J. Faber

ABSTRACT: This study explores the conditions under which product placement in an on-line game will get noticed and be remembered from a perspective of the limited-capacity model of attention. Results show that the location of brand messages in the game (referred to here as proximity), game involvement, and prior game-playing experience interact to influence brand memory. Although experienced players in the moderate-involvement condition recognize focal brands better than the peripheral brands, the recognition superiority of the focal brands over the peripheral brands disappears when experienced players' involvement is high. The interaction between proximity and game involvement does not emerge for inexperienced players, however. Findings also demonstrate that the degree of congruity between the product category of a brand and game content influences brand memory such that highly incongruent brands are better recalled than either moderately incongruent brands or highly congruent brands. Implications for researchers are also discussed.

Advances in technology (i.e., expanded television channels from cable and satellite transmission, remote control, VCR, DVR) have made it increasingly easier for consumers to avoid traditional advertising messages. As a result, brands have had to find alternative ways to attract consumer attention. Product placement in entertainment media is one such strategy that advertisers have begun to utilize. Product placement is the inclusion of brand identifiers in entertainment media programming in return for commercial considerations (Karrh 1998; McCarty 2004; Morton and Friedman 2002). Product placements have appeared in a wide range of entertainment media, including novels, plays, songs, television shows, and movies (Gould and Gupta 2006; Karrh 1998; Vollmers and Mizerski 1994). As product placement in entertainment media has become more common, examining how people process brand messages embedded in such entertainment media has emerged as an important research topic in advertising and information-processing literature (Gupta and Lord 1998; Russell 2002; Russell, Norman, and Heckler 2004; Russell and Stern 2006).

Consumers' processing of product placements in entertainment media may be different from their processing of traditional advertising in a couple of ways. First, with traditional advertising, consumers typically recognize the function of the brand message and this activates consumer skepticism and persuasion knowledge, which can serve to counteract and limit persuasive effects (Friestad and Wright 1994; Obermiller, Spangenberg, and MacLachlan 2005). Product placement is less likely to activate these defense mechanisms (Babin and Carder 1996; Grigorovici and Constantin 2004). Second, when attending to traditional advertising, the brand message is the primary focal activity for the viewer. With product placement, however, consumers are consciously attending to the entertainment content, and this occupies their primary attention. Depending on how and where the brand message is placed, it may require additional attentional resources to process this message. The majority of research on product placement has focused on brands placed in movies or television programs. Early research tended to report that people could recall brands that appeared in movies (Steortz 1987; Vollmers and Mizerski 1994), but recall rates tended to vary greatly by movie and brand (Karrh 1994). More recent research has been concerned with factors that might influence memory for product placements (Gupta and Lord 1998; Russell 2002). Factors that have been examined include whether product placement was visual or verbal (or both), where brand identifiers were placed in the movie, and how congruent the brand is with the central plot of the movie (Karrh 1998; Russell 2002).

Studies found that visual and verbal placement leads to greater recall of the brand than a visual placement without verbal mention (Sabherwal, Pokrywczynski, and Griffin 1994),

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and that more prominent placements lead to greater memory effects (d'Astous and Chartier 2000; Gupta and Lord 1998). Russell (2002) found that in general, verbal placements were better recalled than visual placements and that how connected the brand was to the plot did not influence recognition for auditory placements, but did improve recognition for visual placements.

Recently, interest in product placement has begun to expand to other forms of media, especially video, computer, or on-line games (Chaney, Lin, and Chaney 2004; Nelson 2002; Nelson, Yaros, and Keum 2006; Nicovich 2005; Schneider and Cornwell 2005; Yang et al. 2006). Advertisers' interest in games has mirrored the expanded use and sales of these games. The NPD Group reported that U.S. sales of computer and video game hardware and software hit $10.5 billion in 2005, exceeding the box-office receipts of Hollywood movies ($8.99 billion) in that year (National Association of Theater Owners 2006; NPD Group 2006).

In some ways, displaying a brand identifier in games may be similar to product placement in television shows or movies. In other ways, however, playing games may be somewhat different from watching a movie or television program, and the impact of product placements may, therefore, differ. The biggest difference may be in the realm of involvement and its impact on attentional resources. Unlike *passively* watching television or movies, a game player *actively* interacts with the game by modifying and controlling the course of events (Nicovich 2005). As a result of its immersive nature, getting a brand noticed and remembered may be far more difficult in the game context than is the case with movie or television product placements (Chaney, Lin, and Chaney 2004; Nicovich 2005). This difference may also interact with other variables to create a somewhat unique situation for product placement in games.

Thus, the purpose of the current study is to more fully explore how attentional resources influence game players' processing of brand names embedded in the game. Insights regarding the possible effects can be drawn from work on the limited-capacity model of attention (Kahneman 1973). Specifically, this study seeks to explore the interaction between location of brand messages (referred to here as proximity) and involvement on memory for brands. In work on sports sponsorship, Pham (1992) suggested that researchers should examine how involvement may interact with message location to affect brand memory. This recommendation appears to apply equally well to the area of product placement in games. In addition, we attempt to explore how game experience influences the interaction between proximity and involvement on brand memory.

Finally, this study seeks to examine the impact of congruity on brand memory in product placement in games. To our knowledge, only a few product placement studies have touched on this issue. For example, Russell (2002) demonstrated that congruity between the modality of product placement and plot connection improved brand attitude, whereas incongruity between the two led to greater brand memory. In this study, we attempt to expand on her work by examining a slightly different type of congruity and in a different product placement context. Here, congruity refers to the relationship between the product category of the brand placement and the content of the game being played.

LITERATURE REVIEW

The Limited-Capacity Model of Attention

Increasing brand awareness is among the most common goals advertisers have in using product placement in games. It is often assumed that the number of people playing a game is equal to the number of people actually paying attention to the brand names embedded in the game. A game player is engaged in playing the game, however, and *that* is what occupies primary attention. Since brand names displayed in a game are not the focal object of attention, it is important for advertisers to determine whether their brand name is actually being noticed.

Most cognitive psychologists believe that attention is the process of allocating cognitive capacity to an object or task (Kahneman 1973; Lang and Basil 1998). In discussing attention, researchers often focus on two aspects: its selective aspect and its intensive aspect (Kahneman 1973; Lynch and Srull 1982; Olshavsky 1993). Intensity of attention refers to the amount of cognitive capacity that is allocated to a particular task. Selectivity refers to the selective allocation of cognitive capacity to a particular task in preference to others.

The limited-capacity model of attention was developed to explain these selective and intensive aspects of attention (Kahneman 1973). This model assumes that one's total attentional capacity at any one point in time is limited (Kahneman 1973). The total capacity allocated to process all activities can be divided into two parts: capacity devoted to the primary task and spare capacity (Kahneman 1973; Lynch and Srull 1982). Spare capacity is devoted to secondary tasks and other surroundings. It is believed that capacity being used to perform the primary task cannot be used to perform the secondary task. Thus, the more capacity being used for the primary task, the less a person has available to accomplish any secondary task.

Primary task capacity and spare capacity are important in understanding the effects of product placement in games on brand memory. Playing the game is the primary task for game players, whereas processing advertisements embedded in the game is a secondary task (Grigorovici and Constantin 2004). The more attentional capacity that needs to be devoted to playing the game, the less will be available for processing brand information.

Product Placement Proximity

Given limited spare capacity, several factors may affect how successful product placement in games will be in influencing brand memory. One important consideration may be the location where the brand names are placed in the game (referred to here as proximity). Some brands appear in the focal visual field. This focal placement is one in which the brand appears in the center of the action in the game (e.g., Saturn brand name on gates where players are required to pass through in a snowboarding game). Other brands appear in the peripheral visual field. This peripheral placement (e.g., LifeSaver brand name on sideboards in an ice-skating game) is one in which the brand appears outside of the main field of visual focus.

Previous researchers examining product placement found that prominent (more focal) product placement in movies outperformed subtle product placement in eliciting brand memory (d'Astous and Chartier 2000; Gupta and Lord 1998). This general phenomenon should also apply in the context of games. When playing a game, the attention of a game player is mainly focused on the action in the game. Since focal brands appear in the center of the action in the game, the processing of these focal brands is more integral to the primary task (e.g., playing the game), and may thus require less spare capacity to successfully perform the secondary task. But when the brands appear on background billboards, more spare capacity should be required to process the brands. Since game playing consumes a great deal of cognitive capacity, we hypothesize:

> *H1: Memory of brands embedded in the focal area within the game will be greater than that of brands placed in the peripheral field.*

Moderating Role of Game Involvement and Prior Game-Playing Experience

Hypothesis 1 is predicated on the belief that while spare capacity will be limited by game playing, there will still be a sufficient level to allow for the processing of the secondary task. This is generally true for many primary activities, but in some situations, a primary activity may require so much attention that it leaves too little attention to successfully process information that is not relevant to that primary task. This can occur in extremely high involving situations.

Involvement has been one of the most frequently studied topics in advertising and consumer research. There is little agreement about how to define the construct of involvement, however. Some researchers have defined involvement as a process (Greenwald and Leavitt 1984), whereas others have conceptualized it as a state (Andrews, Durvasula, and Akhter 1990; Cohen 1983; Mitchell 1981). It has been defined by its antecedents as well as by its consequences (see Andrews, Durvasula, and Akhter 1990 for review). Although involvement has been defined in many different ways, most researchers appear to agree that involvement is grounded in motivation (Laczniak, Muehling, and Grossbart 1989; Pham 1992; Tavassoli, Shultz, and Fitzsimons 1995). In the current study, we conceive of game involvement as a motivational state to exert cognitive effort at playing a game, and that its primary antecedents are a game player's desire to beat the game or improve his or her game score.

Researchers have examined the role of program involvement in memory of advertisements embedded in a variety of media, including television programs, magazine articles, and on-line games (Grigorovici and Constantin 2004; Norris and Colman 1992; Pham 1992; Tavassoli, Shultz, and Fitzsimons 1995). Although there have been conflicting results (e.g., positive versus negative effects of program involvement on ad memory), it appears that indeed there is an inverted U–shaped relationship between program involvement and ad memory (Pham 1992; Tavassoli, Shultz, and Fitzsimons 1995). Researchers have suggested that consumers who experience greater involvement with a particular program allocate greater cognitive resources to that program. This increased program involvement, in turn, is more likely to carry over to the accompanying advertisements, thus allocating some resources to processing the ads (Krugman 1983; Lloyd and Clancy 1991). As consumers' involvement with the program increases to an extremely high level, however, they start to experience the limiting aspects of their ability to process information (McClung, Park, and Sauer 1985). As people approach the limit of their cognitive capacity, their attention narrows to only the program, and they block out other stimuli such as the accompanying ads (McClung, Park, and Sauer 1985; Mowen 1990). In support of this notion, Pham (1992) found a curvilinear relationship between involvement (low, medium, or high) with watching a soccer game on television and recognition of the sponsorship brands on sideboards around the game.

While a full range of involvement is likely to occur with the use of more passive media such as television viewing, extremely low levels of involvement are harder to envision with more active media use such as game playing. Theoretically, at very low levels of involvement with the game, a game player would not even put in the effort to play the game because of his or her overall lack of interest. If playing does occur, it is likely that the motivation to perform well would create at least some moderate level of involvement. In a moderate-involvement game situation, the requirements of the game itself should receive some amount of attention, but generally not full attention. This will allow some attentional capacity to be allocated to the embedded brands. As involvement increases the demand for primary attentional resources, the available secondary resources will diminish, and at some point this is likely to interact with proximity. The decrease in resources available for a secondary task should initially

diminish performance on more peripherally placed brands. Because primary task attention is devoted to the center of the action on the screen, focal brands should still be processed and remembered. When the player's involvement level is extremely high, however, the player will consume full resources in playing the game and approach his or her limit of resource capacity. In this case, the player's attention should increasingly narrow to focus on the game action at the expense of brands within the game. Consequently, even focal brands may not be fully processed at high levels of involvement.

Some types of games require far more attentional resources than others. Games involving intense, fast-paced action such as shooting games (where opponents quickly appear) or racing games are most likely to require extreme levels of attentional resources. For product placements in these games, it is expected that there will be a significant interaction such that more focal product placement will increase memory in moderate-involvement situations, but product placement proximity will not matter at high levels of game involvement. Thus:

H2: There will be a proximity × involvement interaction on brand memory such that brand memory will be higher in the focal placement/moderate-involvement condition than in the peripheral placement/moderate-involvement condition or in either of the high-involvement conditions.

A second potential moderator variable is prior experience in playing electronic games. This has received far less attention in prior research than has involvement. Game-playing experience provides people with expectations, schema, and skills that can help to reduce attentional demands. Prior experience helps a game player to anticipate what will occur, where and when this will happen, and how to handle this. This allows for a decrease in the overall vigilance a player needs to have, thus providing an experienced player with a sufficient level of spare capacity to allow for the processing of the secondary task (Navon 1984; Pham 1992). However, lack of game-playing experience requires an inexperienced player to spend a greater amount of cognitive effort in trying to master the game, thus decreasing spare resources. In support of this notion, Schneider and Cornwell (2005) found that experienced players showed greater recall of brands placed in a car-racing game than did novice players.

Taking proximity into account, we expect that prior game-playing experience is likely to interact with proximity. Since the amount of spare capacity will have more influence on memory performance for the peripherally placed brands than for the focal brands, the memory of the peripheral brands should be diminished more for an inexperienced player than for an experienced player. Thus, we hypothesize:

H3: There will be a proximity × game experience interaction on brand memory such that the difference in memory for focal brands versus peripheral brands will be greater for inexperienced players than for experienced players.

Moreover, we expect that game experience is likely to influence the interaction effect between proximity and game involvement on brand memory. The experienced player should demonstrate greater memory performance for focal placement than for peripherally placed brands in a moderate-involvement game situation. When the player's involvement is extremely high, however, the experienced player will consume full resources in playing the game. Because the experienced player is so aware of what to focus on, in the high-involvement situation, the player will narrow his or her focal field and will even ignore information that appears near where the player's attention is focused, but is not centrally related to the game-related task. Thus, in a high-involvement situation, the experienced player's brand memory will be no better in focal than in peripheral placement situations originally hypothesized in H2. However, the predicted interaction effect between proximity and game involvement on brand memory will not emerge for an inexperienced player. Due to the player's lack of prior experience, the inexperienced player may not be as aware of what to focus on and what to ignore, and will thus be exposed to some focal brands, even in high-involvement situations. For the inexperienced player, focal placement may be superior to peripheral placement regardless of the level of game involvement. Thus:

H4: There will be a proximity × involvement × prior experience interaction on brand memory such that focal brands will be remembered better than peripheral brands except in the high-involvement condition for experienced game players.

Game–Product Congruity

Currently, some advertisers place their brands in games that seem to fit well with their products (e.g., Dodge car advertised in a car-racing game), whereas others place their brands in games that appear to be unrelated to their products (e.g., Nabisco snacks advertised in a golf game). The relationship is referred to here as game–product congruity.

If product placements are attended to, the congruity between the content of the game and the product category of brands being promoted may influence brand memory (Srull and Wyer 1989). In the psychology and advertising literature, congruity has been conceptualized in a wide range of different ways. These include the relationships between the visual and verbal elements of the ad (Heckler and Childers 1992); the ad and the context in which it appears (Moorman, Neijens, and Smit 2002); the sponsor and the event being sponsored (Rodgers 2003); the product category and its brand name (Meyers-Levy, Louie, and Curren 1994); and the modality (audio versus visual placements) and plot connection of a product

placement (Russell 2002). In the situations of product placement in games, congruity may best be thought of in terms of the extent to which the product category of the embedded brand is related to the content of the game. This relationship can be assessed across a number of different dimensions. These include function, lifestyle, image, and advertising. "Functional congruity" occurs when the product category being advertised in the game is a central object used in the content of the game (Gwinner and Eaton 1999). "Lifestyle congruity" refers to the relationship between the lifestyle of people who engage in the content of the game and the perceived lifestyle associated with the product or brand (Nicholls, Roslow, and Laskey 1994). "Image congruity" occurs when the image of the product category matches the image of the focus of the game (Gwinner and Eaton 1999). Finally, "advertising congruity" occurs when the product category of the brand seems appropriate to be advertised in the context of the game. All four dimensions should be considered in determining the overall congruity between an advertised brand and the game in which it is embedded.

Perhaps partly due to the wide variety of ways in which congruity has been conceptualized, previous research into congruity effects on memory has produced conflicting results. Studies investigating congruity between the product category of the ad and the ad context have found that congruent information is remembered better than incongruent information (Lambert 1980; Moorman, Neijens, and Smit 2002; Rodgers 2003; Shamdasani, Stanaland, and Tan 2001). For example, Moorman, Neijens, and Smit (2002) showed that thematically congruent magazine ads (e.g., a shampoo ad placed in a health magazine) were significantly more recognized than were incongruent ads (e.g., the shampoo ad placed in an interior decoration magazine). Researchers who found superiority of congruent information on memory argue that when new information is encountered, people tend to match it against the preexisting schema. If there is a good match between the new information and the preexisting schema, the new information can be easily assimilated into the schema, yielding greater recall of congruent information compared to incongruent information.

Despite this, most other studies have found memory superiority for incongruent information over congruent information (Dimofte, Forehand, and Deshpande 2003; Heckler and Childers 1992; Russell 2002). For example, Russell (2002) found that brand memory improved when the modality of product placement (audio versus visual) and plot connection (high versus low) in a television show were incongruent rather than congruent. Researchers argue that because incongruent information is particularly novel, distinctive, and prominent during encoding, it is likely to capture greater attention (Srull and Wyer 1989). When this incongruent information is encountered, people attempt to resolve and make sense of the incongruity, thus prompting more extensive cognitive elaboration and facilitating subsequent recall (Mandler 1982; Srull and Wyer 1989).

Some of the discrepancy in findings may be due to differences across studies in the degree of incongruity and the amount of processing resources available. Incongruity may demonstrate a U- or J-shaped curve where high levels of congruity and incongruity are remembered better than moderate levels. In addition, it may be that when attentional or processing resources are limited, as in the playing of an on-line game, the incongruity needs to be particularly large in order to motivate the cognitive elaboration necessary to understand the apparent incongruity. Thus, we would expect that in a situation of product placement in games, brands for a product category that is highly incongruent with the content of a game would be remembered better than brands that are either moderately incongruent or are congruent with the game content. Thus:

> *H5: Brand memory will be higher when the product category of the brand in the game is highly incongruent with the content of the game than when the product and game content are either congruent or only moderately incongruent.*

Furthermore, in order for memory effects to occur, it may be necessary to have sufficient cognitive resources to allow for sufficient cognitive elaboration. Therefore, the combination of both involvement and prior game-playing experience may moderate the impact of congruity on memory. More specifically, experienced players know where in the game to focus their attention, and if they are highly involved with the game, they are likely to block out any extraneous information, including brands. Hence, among experienced players, those who are moderately involved with the game are more likely to attend to and process brand names, and are therefore more likely to remember incongruent brands. Among more inexperienced players, those moderately involved with the game may not make a sufficient effort to process incongruent information. It may be the more-involved inexperienced players who will notice and process the incongruity between the brand and the game. Therefore, it is hypothesized that

> *H6: There will be an experience × involvement × congruity interaction on brand memory such that highly involved inexperienced players and moderately involved experienced players will be the most likely to remember incongruent brands.*

METHOD

Participants and Setting

Volunteer participants from mass communication classes at a Midwestern university were recruited for a study on on-line games. Two incentives were offered: (1) extra course credit, and

TABLE 1
Twelve Experimental Conditions

Condition	Involvement	Proximity	Presentation Order
1	High	Focal	Version 1
2	High	Focal	Version 2
3	High	Focal	Version 3
4	High	Peripheral	Version 1
5	High	Peripheral	Version 2
6	High	Peripheral	Version 3
7	Moderate	Focal	Version 1
8	Moderate	Focal	Version 2
9	Moderate	Focal	Version 3
10	Moderate	Peripheral	Version 1
11	Moderate	Peripheral	Version 2
12	Moderate	Peripheral	Version 3

(2) a chance to win a gift card in a lottery. Overall, 155 students participated. Most respondents (98%) were between the ages of 18 and 25, with a mean age of 20 years old. Women (67%) outnumbered men. The study was held in a campus computer lab. Research has found that students commonly stop by their campus computer lab to play games (Pew & Internet American Life Project 2003). Thus, the setting for the experiment represents a natural on-line game-playing environment.

Procedures

On arrival at the computer lab, participants were seated in front of PC computers and told they would be participating in an evaluation of a new car-racing on-line game. After being thanked for their participation and informed of their rights as participants, they were told to go to a game Web site developed specifically for this study and log in using a unique ID number given by the researcher. This automatically initiated a presentation of experimental stimuli corresponding to 1 of 12 randomly assigned conditions (see Table 1).

At the appropriate game site, participants read an instruction intended to stimulate either high or moderate levels of game involvement. Participants then received a basic training session on how to play the car-racing game. In the game, participants drove a car that competed with three preprogrammed cars in a virtual car-racing course. Using a computer keyboard, participants had to pass through gates on a track while racing five laps as fast as possible. The length of time the game lasted varied depending on participants' skill. The average length of time was six minutes.

The game had been professionally developed for actual use and contained realistic 3D graphics and sound effects. It was professionally modified to meet the requirements of this study. Three hypothetical brand names for each of the three product categories (gasoline, deodorant, and pet food) were embedded in the game. It is noteworthy that a number of competing brands within any given product category (e.g., both Lowes and Home Depot or Shell, Texaco and Exxon gasoline) may be commonly promoted in NASCAR (National Association for Stock Car Auto Racing) events, and thus it would not be unusual for competing brands to appear in racing games. In addition to the brand names, a picture of the product, and a label indicating the product category (e.g., deodorant) were predominantly displayed in each brand placement. Each brand name appeared in two places during a lap around the track. Since players made five laps, each brand appeared 10 times while playing the game.

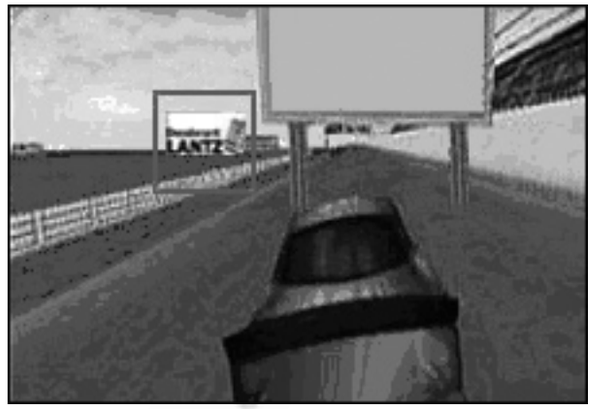
Six different versions of the game were developed. All versions were identical except for two factors. First, they differed in regard to the manipulation of product placement proximity. In half of the versions, placement was central to the action, while in the other half it was peripheral. Second, for each product placement condition, three different versions of the game were prepared such that the order in which brand names were presented was partially counterbalanced to limit the possibility that any treatment effects were due to the order of brand-name presentation.

Immediately after playing the game, participants were asked to answer questions assessing their degree of prior game-playing experience, their recognition and recall of brand names, demographic information, and manipulation-check measures. A final question asked participants to indicate what they thought the purpose of the study was. While some recognized that it involved ads in the game since this is what the questionnaire asked about, none of the participants indicated any awareness of the specific hypotheses being tested. After being thanked for their participation again, participants were debriefed about the purpose of this study. All data were directly captured onto the database, to avoid any data entry errors.

FIGURE 1
Product Placement Proximity

Focal Placement

Peripheral Placement



Independent and Moderating Variables

Two independent and two moderating variables were used in this study. These were product placement proximity, game–product congruity, game involvement, and prior game-playing experience. Prior game-playing experience was measured, while the other three variables were manipulated.

Product Placement Proximity

Brand messages were placed either in focal proximity to the action of the game or in the peripheral field of the player's attention. In the focal proximity placement condition, all of the brand names appeared on the gates through which the car had to pass. In contrast, in the peripheral brand placement condition, all brand names appeared as background billboards, located on the far left side of the track (see Figure 1).

Game–Product Congruity

Discussions with 18 undergraduate and 3 graduate students helped to identify eight potential product categories that might be used in the game. A pretest with 39 undergraduate students further served to select the product categories that best represented high congruity, moderate incongruity, and high incongruity with a car-racing game. Students rated the perceived congruity of each of the eight potential products on four different aspects of congruity. Those measures were: (1) (product) is an object that can be used during a real-life car racing event, (2) the images I associate with (product) are related to the images I associate with car-racing events, (3) (product) represents a lifestyle associated with those who like to attend car-racing events or watch them on television, and (4) an advertisement for (product) is a good fit for car-racing events. All measures were assessed along 10-point (1 = strongly disagree, 10 = strongly agree) scales. These four items were then collapsed to create an overall congruity index.

Cronbach αs for each game–product congruity index ranged from .61 to .85. Based on this pretest, three product categories were chosen. These were gasoline (high congruity, $M = 33.77$), deodorant (moderate incongruity, $M = 19.57$), and pet food (high incongruity, $M = 8.21$). A repeated-measure ANOVA (analysis of variance) confirmed that the mean congruity scores for gasoline, deodorant, and pet food were statistically different from each other, $F(2, 72) = 187.33$, $p < .001$. Additional analyses showed that the mean for gasoline was significantly higher than either that of deodorant ($p < .01$) or pet food ($p < .01$). In addition, deodorant scored significantly higher than pet food ($p < .01$).

Game Involvement

The motivation to exert cognitive effort at playing a game was manipulated by variations in the study instructions. Specifically, high-involvement participants were told that their opinions were extremely important to the game developers in order to improve the game before its release. In addition, they were told that those who obtained high scores on the game would have a chance to win one hundred dollars in a lottery. No mention of opinion importance or of the chance to win one hundred dollars was made in the moderate-involvement condition. The use of monetary incentives was similar to the manipulation used by Baker and Lutz (2000). Given the nature of the game, it was believed that no game players would truly have low involvement. Therefore, this study was limited to examining only differences between moderate- and high-involvement conditions.

Prior Game-Playing Experience

Participants' prior game-playing experience was measured by having them report whether they play games (e.g., video, computer, on-line, or arcade games) in an average week. Fifty-two percent (n = 80) reported typically playing games in an average week, while 48% (n = 75) did not play any games.

Dependent Measures

Two types of brand memory were assessed in this study. These were brand recall and brand recognition sensitivity.

Brand Recall

Brand recall was assessed by asking participants to list all the brand names that appeared in the game. Two coders, who were blind to the treatments, coded the number of brand names recalled. If an advertised brand was not listed or if a nonadvertised brand was listed, it was coded as an incorrect response. An answer was coded as correct if it was completely correct or if it appeared correct but was slightly misspelled. Since there were nine different brands appearing in the game, the number of correct responses could range from zero to nine. Scott's π (.89) showed a good level of intercoder reliability. Disagreements were reconciled after discussion among the two coders and a researcher.

Brand Recognition

Brand recognition was assessed by presenting participants with 13 possible brand names. Participants were informed that not all of the brand names appeared in the game. They were then asked to indicate whether each of the brand names had appeared. Of the 13 brand names presented to the participants, 9 had actually appeared in the game, while the remaining brand names were foils. Simply counting the number of brands correctly indicated would inappropriately benefit people who guessed that the bogus brand names appeared as well. To avoid this problem, a participant's sensitivity to discriminate between actual brands and bogus brands was measured (Green and Swets 1966). Recognition sensitivity (d') from signal detection theory initially computes two separate values for each participant: (1) rate of hits (*H:* the proportion of brand names participants said they had seen that had, in fact, appeared), and (2) the rate of false alarms (*F:* the proportion of brand names they said they had seen that did not previously appear). Each of these scores was then standardized, and the resulting standardized false alarm score is then subtracted from the standardized hits score (Macmillan and Creelman 1991). The perfect performance on the hit or false alarm measure was converted from 0 to .01 and from 1 to .99 for the signal detection analysis (Hirshman 1995). A score of 0 means that a participant is unable to discriminate between actual brands and bogus brands, while a larger d' score reflects greater sensitivity (Macmillan and Creelman 1991).

FINDINGS

Manipulation Checks

Product Placement Proximity

To examine how successfully this study manipulated product placement proximity, participants were asked to indicate along a seven-point scale the degree to which they felt that brand names were located in the center of the action or off to the side. A t test revealed a significant difference in the expected direction, $t(153) = 8.87, p < .001$. Participants exposed to the focal product placement (M = 4.77) felt that brand names had been placed in their focal visual field in the game more than did participants exposed to the peripheral product placement (M = 2.16).

Game–Product Congruity

To test the manipulation of game–product congruity, participants were asked to rate the perceived fit of each of the three product categories with car racing using the same measures as in the pretest. The four measures were assessed along seven-point (1 = strongly disagree, 7 = strongly agree) scales and summed to create a game–product congruity index. The Cronbach αs for each product ranged from .64 to .78. Although not necessarily desirable, researchers have generally argued that an α of .65 is marginally acceptable, especially for newly created indices (DeVellis 1991). A repeated-measure ANOVA was found to be significant, $F(2, 300) = 606.57, p < .001$. As expected, additional analyses showed that the mean for gasoline (high congruity) (M = 21.48) was significantly higher than that for either deodorant (moderate incongruity) (M = 13.61) ($p < .001$) or pet food (high incongruity) (M = 6.60) ($p < .001$). In addition, deodorant scored significantly higher on perceived fit than pet food ($p < .001$). Thus, the manipulation of game–product congruity was successful.

Game Involvement

The amount of cognitive effort a participant allocated to playing the game served as a surrogate indicator of the state of his or her game involvement (Lord and Burnkrant 1993). Although cognitive capacity allocated to game playing cannot be *directly* observed, it can be *indirectly* assessed by measuring spare capacity using secondary task reaction measures (Basil 1994; Lang and Basil 1998; Lord and Burnkrant 1993). To measure spare capacity, 16 auditory probe signals were placed randomly throughout the game. Participants were instructed to press the left control key on the computer keyboard when-

TABLE 2
Mean Scores of Recall and Recognition Sensitivity

Experience[a]	Involvement[a]	Proximity[a]	Congruity[b]	Recall	Recognition	*n*
Inexperienced player	High	Focal	Gasoline	.39	1.18	18
			Deodorant	.67	1.40	
			Pet food	1.22	1.44	
		Peripheral	Gasoline	.00	.43	19
			Deodorant	.00	.28	
			Pet food	.11	.24	
	Moderate	Focal	Gasoline	.56	.96	18
			Deodorant	.67	1.28	
			Pet food	.56	1.13	
		Peripheral	Gasoline	.05	.70	20
			Deodorant	.00	.51	
			Pet food	.10	.37	
Experienced player	High	Focal	Gasoline	.48	.69	21
			Deodorant	.19	1.25	
			Pet food	.33	.33	
		Peripheral	Gasoline	.24	.94	21
			Deodorant	.24	1.11	
			Pet food	.24	.41	
	Moderate	Focal	Gasoline	.55	1.58	22
			Deodorant	.55	1.49	
			Pet food	.68	1.71	
		Peripheral	Gasoline	.19	.13	16
			Deodorant	.25	.59	
			Pet food	.31	.18	

[a] Between-subjects factor.

[b] Within-subjects factor.

ever they heard the signal tone. Their latencies in responding to the tones were recorded, summed, and averaged to form a reaction time index. In addition, the number of no responses to auditory probe signals was recorded.

T tests were run to assess both reaction time and number of misses. Slower reaction time and more misses (number of no responses) to auditory probe signals indicated that a participant was highly involved in the primary task and lacked resources to perform the secondary task (Basil 1994; Lord and Burnkrant 1993). The analysis for reaction time showed that the manipulation of game involvement was successful. Participants in the high-involvement condition (M = 885.7 milliseconds) had longer response times to probe signals than those in the moderate-involvement (M = 793.5 milliseconds) condition, $t(125) = 2.34$, $p < .05$. Participants in the high-involvement condition (M = 4.33) also had more misses than those who were in the moderate-involvement (M = 2.24) condition, $t(153) = 3.25$, $p < .001$.

Test for Order Effects

A repeated-measure MANOVA (multivariate analysis of variance) was conducted to ensure that the order of brand-name presentation did not affect the impact of game–product congruity on dependent variables in this study. None of the analyses revealed any significant order effect on brand recall or brand recognition. Since no order effects were found, all of the data were combined to allow for a single test of each of the hypotheses.

The hypotheses were examined in a 2 (product placement proximity: focal or peripheral) × 2 (game involvement: high or moderate) × 2 (prior game-playing experience: experienced player or inexperienced player) × 3 (game–product congruity: high congruity, moderate incongruity, and high incongruity) mixed factorial design. Game–product congruity was operationalized as a within-subjects variable, while the other three variables were between-subjects variables. See Table 2 for means and cell sizes for all conditions.

Hypotheses Testing

A repeated-measures MANCOVA (multivariate analysis of covariance) was used to test the hypotheses. While hypotheses were generated for only some of the possible effects, the full model was tested here to more completely understand how proximity, involvement, prior game-playing experience, and congruity influenced recall and recognition sensitivity. A participant's gender was not a significant covariate,

TABLE 3
Repeated-Measure MANCOVA: Recall and Recognition Sensitivity

Hypothesized effects	*df*	*F*	Significance
Proximity			
Recall	1	27.76	0**
Recognition	1	13.31	0**
Proximity × involvement			
Recall	1	.17	*n.s.*
Recognition	1	3.20	.08
Proximity × prior experience			
Recall	1	5.84	.02*
Recognition	1	.56	*n.s.*
Proximity × involvement × prior experience			
Recall	1	1.54	*n.s.*
Recognition	1	4.48	.04*
Congruity			
Recall	2	3.38	.04*
Recognition	2	1.50	*n.s.*
Congruity × involvement × prior experience			
Recall	2	4.08	.02*
Recognition	2	1.68	*n.s.*

Notes: MANCOVA = multivariate analysis of covariance; *n.s.* = not significant.

Although the full model was tested, only the effects generated for the hypotheses were reported here due to space limitations.

* $p < .05$.

** $p < .001$.

$F(2, 145) = 1.04$, *n.s.* Among all possible effects, the MANCOVA results indicated a between-subjects main effect for proximity, $F(2, 145) = 14.59$, $p < .001$, and a within-subjects main effect for congruity, $F(4, 143) = 3.31$, $p = .01$. In addition, a significant two-way interaction was found for proximity × prior game-playing experience, $F(2, 145) = 3.42$, $p < .05$, and a significant three-way interaction for proximity × involvement × experience, $F(2, 145) = 3.11$, $p < .05$. A three-way interaction for congruity × involvement × experience approached, but did not reach significance, $F(4, 143) = 2.18$, $p = .07$. No other effect was significant. Separate univariate tests were then run for recall and recognition sensitivity (see Table 3).

Product Placement Proximity

As predicted in H1, a main effect of product placement proximity was found for both recall of brands, $F(1, 146) = 27.76$, $p < .001$, and recognition sensitivity, $F(1, 146) = 13.31$, $p < .001$. In both cases, focal placement led to better brand memory than peripheral placement ($M_{\text{recall}} = 1.67$ versus .42; $M_{\text{recognition sensitivity}} = 1.19$ versus .61, respectively). Thus, H1 is supported.

These findings are qualified, however, by a significant proximity × experience interaction for recall, $F(1, 146) = 5.84$, $p < .05$, and a significant three-way proximity × involvement × experience interaction for recognition sensitivity, $F(1, 146) = 4.48$, $p < .05$. A two-way proximity × involvement interaction for recognition sensitivity approached, but did not reach significance, $F(1, 146) = 3.20$, $p < .08$. As predicted in H3, a contrast test revealed that the difference in recall between brands placed in a focal position versus those placed in the periphery was greater for people who were not experienced in playing games than it was for experienced players ($M_{\text{difference}} = 1.87$ versus .67, respectively), $F(1, 151) = 27.74$, $p < .001$ (see Figure 2). Thus, H3 is supported.

In addition, as seen in Figure 3, contrast tests showed that greater recognition occurred for brands placed in the focal area over those placed peripherally in all conditions ($M_{\text{inexperienced/high}} = 1.27$ versus .49, $F[1, 147] = 5.53$, $p < .05$; $M_{\text{inexperienced/moderate}} = 1.16$ versus .50, $F[1, 147] = 4.09$, $p < .05$; $M_{\text{experienced/moderate}} = 1.56$ versus .46, $F[1, 147] = 11.09$, $p < .001$), except for experienced players in high-involvement conditions. Experienced players in the high-involvement condition did not recognize focally placed brands any better than they did the peripherally placed brands, $M_{\text{experienced/high}} = .78$ versus .94, $F(1, 147) = .28$, *n.s.* Thus, H2 is not supported, but support is found for H4.

Game–Product Congruity

The within-subjects univariate test for H5 revealed that the effect of game–product congruity on brand recall was significant, $F(2, 292) = 3.38$, $p < .05$. As expected, a planned comparison indicated that the recall score of the highly incongruent brands

FIGURE 2
Interaction Effect Between Proximity and Prior Experience on Recall

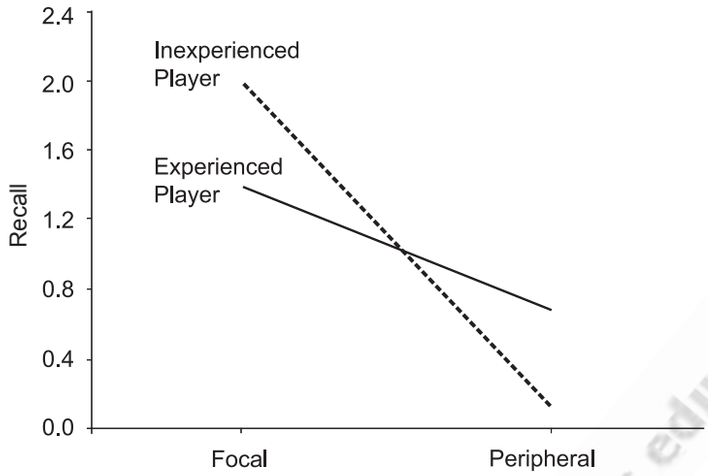
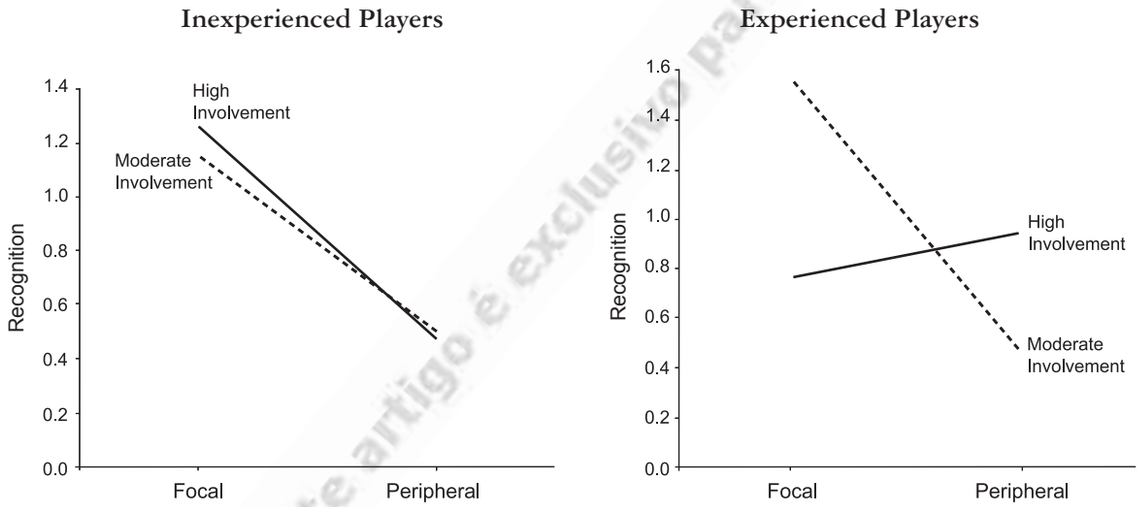


FIGURE 3
Interaction Among Proximity, Involvement, and Prior Experience on Recognition



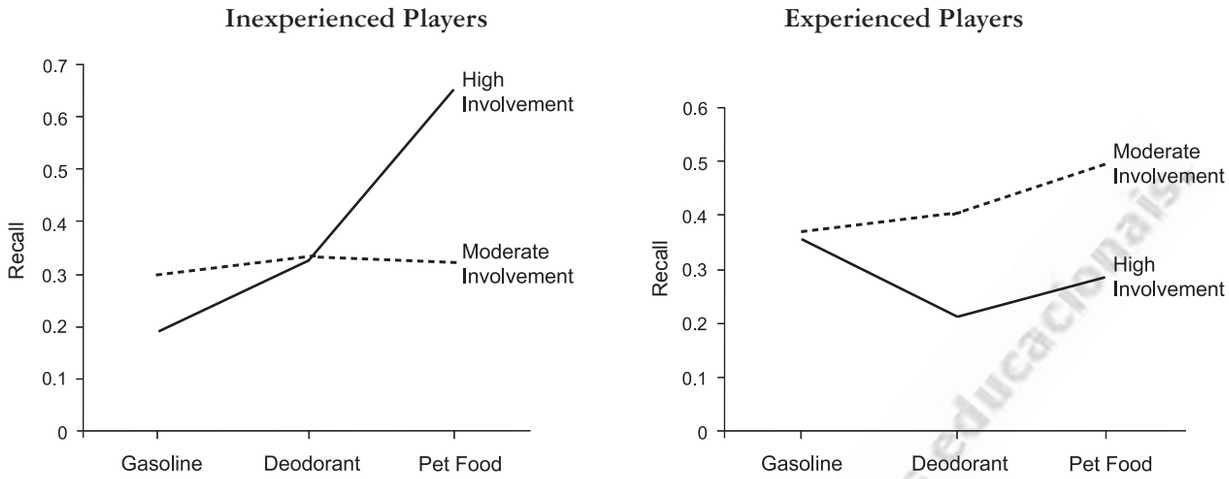
(pet food brands) (M = .44) was significantly higher than that of either the moderately incongruent brands (deodorant brands) (M = .32) (p < .05) or the highly congruent brands (gasoline brands) (M = .31) (p < .05). There was no significant difference in the recall scores between the moderately incongruent brands and the highly congruent brands. Thus, support is found for H5.

This relationship between congruity and recall is qualified by a significant three-way congruity × involvement × experience interaction as predicted by H6. An examination of the cell means indicated that highly incongruent brands were recalled more than others by inexperienced game players in the high-involvement conditions, $F(2, 292) = 4.08, p < .05$ (see Figure 4). Contrast tests revealed that the inexperienced players in the high-involvement conditions recalled the highly incongruent brands (pet food brands) (M = .62) significantly better than either the moderately incongruent brands (deodorant brands) (M = .32, $F[1, 152] = 5.65, p < .05$) or the highly congruent brands (gasoline brands) (M = .19, $F[1, 152] = 7.34, p < .01$). The recall score of the moderately incongruent brands was not significantly different from that of the highly congruent brands for the inexperienced players in the high-involvement condition, $F(1, 152) = .48$, *n.s.* No other combination of experience and involvement demonstrated a significant difference in game–product congruity on recall. Thus, H6 is only partially supported.

DISCUSSION

Brand awareness is among the most common goals advertisers want to achieve when using product placement (Karrh, McKee, and Pardun 2003). This study explored the conditions under

FIGURE 4
Interaction Among Congruity, Involvement, and Prior Experience on Recall



which brand names included in an on-line game would get noticed and be remembered. Insights regarding the possible effects of product placement in games were drawn from work on the limited-capacity model of attention (Kahneman 1973). This model suggests that a game player's limited processing capacity must be divided into the resources necessary for playing the game itself (i.e., primary task) and those needed for processing brand messages embedded within the game (i.e., secondary task). The more capacity a person is using for the primary task, the less capacity that person has available for the secondary activity (processing the brand messages placed in the game).

The results of this study demonstrated that the location of brand messages in the game influenced one's processing of embedded brand messages such that focal product placement led to superior recall and recognition sensitivity of brands compared with peripheral placement. This difference in recall between focal brands and peripheral brands was greater among people who typically do not play electronic games than among those who do. Due to their lack of experience, inexperienced game players might have needed to allocate more resources to try to maneuver the car in the game, thus leaving less resources available for processing advertisements (Navon 1984; Pham 1992). As a result, the decrease in secondary resources diminished inexperienced players' performance on peripherally placed brands more than it did for experienced players.

Building on previous research on the proximity effect, this study further demonstrated a three-way interaction of proximity × game involvement × game experience on brand recognition. Although experienced players in the moderate-involvement condition recognized focal brands better than the peripheral brands, the recognition superiority of the focal brands over the peripheral brands disappeared when experienced players' involvement was high. This finding supports the theory that when involvement with the game is high, game playing will consume full attentional resources and limit secondary resource capacity. As a result, game players will block out all brands embedded in the game, even focal ones, to mitigate cognitive strain. The findings here stress that involvement is an important construct that researchers should take into consideration when examining the effects of product placement in games on brand memory.

It is interesting to note, however, that the interaction between proximity and game involvement did not emerge for inexperienced players. Although inexperienced players in a high-involvement condition might have had lack of resources available for processing advertisements in the game, they could still recognize focal brands better than peripheral brands. Since inexperienced players were not so aware of what to focus on and what to ignore, they may have attended to all parts of the focal field, thus noticing some of the focally placed brands in the game. Future research using eye-tracking equipment may help to test these possibilities by providing more information about the visual attention strategies of people with various levels of prior game experience.

As hypothesized, a game–product congruity main effect on recall was found. Highly incongruent brands (pet food brands) were better recalled than either highly congruent brands (gasoline brands) or moderately incongruent brands (deodorant brands). This is consistent with prior research examining what happens when incongruity involves extremely unexpected or unusual relationships (Meyer and Niepel 1994; Orth and Holancova 2003/2004). It has been argued that when incongruent information is particularly novel and prominent during encoding, it will capture greater attention and thereby lead to an increase in subsequent recall (Srull and Wyer 1989). The research reported here seems to fit this situation. The participants' responses to an open-ended question regarding brands in this game showed that many of them had well-developed

expectations regarding which product categories are appropriate to advertise in a car-racing game. For example, they stated that gasoline fit well with a car-racing game, but ads for pet food were "inappropriate," "surprising," "odd," and "confusing." The surprise presence of the words "pet food" may have led to greater attention to the brand names and facilitated subsequent brand recall of pet food brands.

This study further demonstrated a three-way interaction of congruity × game involvement × game experience on brand recall. Among all combinations of involvement and experience, it was inexperienced players in the high-involvement condition that showed the greatest effect of game–product congruity on recall.

Taken together, this suggests that if recall is the advertiser's goal, it may be best to place the brand in an incongruent game setting. Furthermore, this may have the greatest effect on highly involved players who are not overly experienced. With the type of game being played, once game players are familiar with a game style, they may be able to anticipate the action and focus only on the visual areas necessary for the game performance while blocking out extraneous information. Therefore, developing changing game formats may be important for the future success of product placement in games.

It is also important to remember that brand memory may not be the only important goal for an advertiser. While memory may be enhanced by placing brands in incongruous settings, this disconnection may negatively influence brand attitudes. Future research should examine this possibility.

While support was found for several hypotheses, this study generally showed low levels of brand memory. This raises some possible concern about the effectiveness of product placements in on-line games. Only 12% of the brand names (18.6% in the focal condition versus 4.7% in the peripheral condition) were correctly recalled. This low level of brand memory occurred even though all players would have been exposed to each brand 10 times throughout the game.

This poor memory performance is consistent with prior research in product placement in on-line games. In a study examining the effect of billboard ads in a multiplayer on-line game, Chaney, Lin, and Chaney (2004) found that half of the gamers who participated in their study did not recall any of the brands after a game-playing session. The recall scores found for product placements in games are much lower than those found in studies of product placement in more passive media such as movies or television programs. Generally, prior studies of product placement in movies found an average recall of 20% to 40% (d'Astous and Chartier 2000; Steortz 1987). This discrepancy in brand memory based on placement context reinforces our argument that more *actively* engaging situations such as game playing are more involving and require more attentional capacity than more *passive* activities such as watching a movie or television program. Thus, it is important to think about involvement and attention in absolute, and not just relative, terms when examining the impact of product placement on brand memory.

LIMITATIONS AND FUTURE RESEARCH

Although the findings of this study have potential implications for academic researchers, several limitations exist. A racing game was used for product placement in this study. Racing games have been viewed as an ideal format for placing brand names because real-life race tracks are filled with these advertisements. Although the choice of the racing game was appropriate for this study, it is not representative of all on-line games. Thus, the generalizability of the findings from this study may be limited. Future studies need to replicate the present study across other types of on-line games.

This study used only fictitious brands as stimuli. Using fictitious brands was considered necessary to prevent differing levels of prior knowledge and brand experience from having confounding effects on participants' responses. It may have led to an underestimation of memory performance, however, and this, in turn, may have led to a lack of statistical significance for some of the hypotheses. To evaluate the predictions developed in this study more fully, it is suggested that future research needs to examine established brands as well as novel ones (Nelson, Yaros, and Keum 2006).

The findings in this study may also underrepresent the impact of product placement in games since we examined only explicit and not implicit memory. In the current study, recall and recognition were measured. This is consistent with previous research looking at product placement in games, films, sporting events, and television programs. It is true that better recall occurs when attention is present at the time of encoding. However, it does not always mean that poor recall occurs because attention is not present at the time of encoding. Recent work on memory has shown that implicit memory may exist separately from explicit memory and may be more appropriate to examining situations of limited or incidental exposure (Brunel, Tietje, and Greenwald 2004; Shapiro and Krishnan 2001; Shapiro, MacInnis, and Heckler 1997). Explicit memory refers to conscious recollection of recently presented information (e.g., prior exposure to product placement in games) and is measured by asking participants to remember or recognize information from prior exposure (Schacter 1987). Yet implicit memory does not require conscious recollection of information (Schacter 1987). Implicit memory is believed to exist if task performance (e.g., word fragment completion) is facilitated or influenced by recently presented information (Schacter 1987). Researchers have found that although incidental exposure to ads had no impact on explicit memory (e.g., recall and recognition), it did influence subsequent brand choice (Shapiro, MacInnis, and

Heckler 1997). Future research with product placement in games should look at implicit memory (Yang et al. 2006) and its subsequent role in brand selection.

Some researchers have claimed that memory is not a single faculty, but involves multiple systems with different types of memory requiring different combinations (Gardiner 1988; Hirst et al. 1988). This might help to explain why results for recognition and recall were not always consistent in this study. Future research on different types of memory and the processes needed for each may help to improve our understanding of the impact of not just product placement, but for all forms of advertising.

As technology that allows people to bypass advertising continues to advance, product placement in entertainment productions will continue to increase as an important promotional tool. Given the limited amount of existing research on product placement, there is much left to explore in this domain. It is our hope that future scholars will continue to advance our knowledge of consumer information processing and advertising effects in interactive-entertainment media. Such efforts are likely to be greatly enhanced by utilizing developing theories in areas such as attentional resources and implicit processing. We hope such work can help advertisers understand how to best compete in the challenging media environments they are now experiencing.

REFERENCES

Andrews, J. Craig, Srinivas Durvasula, and Syed H. Akhter (1990), "A Framework for Conceptualizing and Measuring the Involvement Construct in Advertising Research," *Journal of Advertising,* 19 (4), 27–40.

Babin, Laurie A., and Sheri Thompson Carder (1996), "Viewers' Recognition of Brands Placed Within a Film," *International Journal of Advertising,* 15 (2), 140–151.

Baker, William E., and Richard J. Lutz (2000), "An Empirical Test of an Updated Relevance-Accessibility Model of Advertising Effectiveness," *Journal of Advertising,* 29 (1), 1–14.

Basil, Michael D. (1994), "Secondary Reaction-Time Measures," in *Measuring Psychological Responses to Media Messages,* Annie Lang, ed., Hillsdale, NJ: Lawrence Erlbaum, 85–93.

Brunel, Frederic F., Brian C. Tietje, and Anthony G. Greenwald (2004), "Is the Implicit Association Test a Valid and Valuable Measure of Implicit Consumer Social Cognition?" *Journal of Consumer Psychology,* 14 (4), 385–404.

Chaney, Isabella M., Ku-Ho Lin, and James Chaney (2004), "The Effect of Billboards Within the Gaming Environment," *Journal of Interactive Advertising,* 5 (1), available at http://jiad.org/v015/n01/chaney/index.htm (accessed January 15, 2005).

Cohen, Joel B. (1983), "Involvement and You: 1000 Great Ideas," in *Advances in Consumer Research,* vol. 10, Richard P. Bagozzi and Alice M. Tybout, eds., Ann Arbor: Association for Consumer Research, 325–328.

d'Astous, Alain, and Francis Chartier (2000), "A Study of Factors Affecting Consumer Evaluations and Memory of Product Placements in Movies," *Journal of Current Issues and Research in Advertising,* 22 (2), 31–40.

DeVellis, Robert F. (1991), *Scale Development,* Newbury Park, CA: Sage.

Dimofte, Claudiu V., Mark R. Forehand, and Rohit Deshpande (2003), "Ad Schema Incongruity as Elicitor of Ethnic Self-Awareness and Differential Advertising Response," *Journal of Advertising,* 32 (4), 7–17.

Friestad, Marian, and Peter Wright (1994), "The Persuasion Knowledge Model: How People Cope with Persuasion Attempts," *Journal of Consumer Research,* 21 (1), 1–31.

Gardiner, John M. (1988), "Generation and Priming Effects in Word Fragment Completion," *Journal of Experimental Psychology: Learning, Memory and Cognition,* 14 (3), 495–501.

Gould, Stephen J., and Pola B. Gupta (2006), "'Come on Down': How Consumers View Game Shows and the Products Placed in Them," *Journal of Advertising,* 35 (1), 65–81.

Green, David Marvin, and John A. Swets (1966), *Signal Detection Theory and Psychophysics,* New York: Wiley.

Greenwald, Anthony G., and Clark Leavitt (1984), "Audience Involvement in Advertising: Four Levels," *Journal of Consumer Research,* 11 (1), 581–592.

Grigorovici, Dan M., and Corina D. Constantin (2004), "Experiencing Interactive Advertising Beyond Rich Media: Impacts of Ad Type on Brand Effectiveness in 3D Gaming Immersive Virtual Environments," *Journal of Interactive Advertising,* 5 (1), available at http://jiad.org/v015/n01/grigorovici/index.htm (accessed January 15, 2005).

Gupta, Pola B., and Kenneth R. Lord (1998), "Product Placement in Movies: The Effect of Prominence and Mode on Audience Recall," *Journal of Current Issues and Research in Advertising,* 21 (1), 47–59.

Gwinner, Kevin P., and John Eaton (1999), "Building Brand Image Through Event Sponsorship: The Role of Image Transfer," *Journal of Advertising,* 28 (4), 47–57.

Heckler, Susan E., and Terry L. Childers (1992), "The Role of Expectancy and Relevancy in Memory for Verbal and Visual Information: What Is Incongruency?" *Journal of Consumer Research,* 18 (4), 475–492.

Hirshman, Elliot (1995), "Decision Processes in Recognition Memory: Criterion Shifts and the List-Strength Paradigm," *Journal of Experimental Psychology: Learning, Memory, and Cognition,* 21 (2), 302–313.

Hirst, William, Marcia K. Johnson, Elizabeth A. Phelps, and Bruce T. Volpe (1988), "More on Recognition and Recall in Amnesiacs," *Journal of Experimental Psychology: Learning, Memory, and Cognition,* 14 (4), 758–762.

Kahneman, Daniel (1973), *Attention and Effort,* Englewood Cliffs, NJ: Prentice Hall.

Karrh, James A. (1994), "Effects of Brand Placement in Motion Pictures," in *Proceedings of the 1994 Conference of the American Academy of Advertising,* Karen W. King, ed., Athens: University of Georgia, 90–96.

——— (1998), "Brand Placement: A Review," *Journal of Current Issues and Research in Advertising,* 20 (Fall), 31–43.

———, Kathy Brittain McKee, and Carol J. Pardun (2003), "Practitioners' Evolving Views on Product Placement Effectiveness," *Journal of Advertising Research,* 43 (2), 138–149.

Krugman, Hebert E. (1983), "Television Program Interest and Commercial Interruption: Are Commercials on Interesting Programs Less Effective?" *Journal of Advertising Research,* 23 (1), 21–23.

Laczniak, Russell N., Darrel D. Muehling, and Sanford Grossbart (1989), "Manipulating Message Involvement in Advertising Research," *Journal of Advertising,* 18 (2), 28–38.

Lambert, David R. (1980), "Transactional Analysis as a Congruity Paradigm for Advertising Recall," *Journal of Advertising,* 9 (2), 37–45.

Lang, Annie, and Michael D. Basil (1998), *Attention, Resource Allocation, and Communication Research: What Do Secondary Task Reaction Times Measure Anyway?* vol. 21, Beverly Hills: Sage.

Lloyd, David W., and Kevin J. Clancy (1991), "CPMs Versus CPMI: Implications for Media Planning," *Journal of Advertising Research,* 31 (4), 34–44.

Lord, Kenneth R., and Robert E. Burnkrant (1993), "Attention Versus Distraction: The Interactive Effect of Program Involvement and Attentional Devices on Commercial Processing," *Journal of Advertising,* 22 (1), 47–60.

Lynch, John G., and Thomas K. Srull (1982), "Memory and Attentional Factors in Consumer Choice: Concepts and Research Methods," *Journal of Consumer Research,* 9 (1), 18–37.

Macmillan, Neil A., and C. Douglas Creelman (1991), *Detection Theory: A User's Guide,* Cambridge: Cambridge University Press.

Mandler, George (1982), "The Structure of Value: Accounting for Taste," in *Affect and Cognition: The 17th Annual Carnegie Symposium on Cognition,* Margaret S. Clark and Susan T. Fiske, eds., Hillsdale, NJ: Lawrence Erlbaum, 3–36.

McCarty, John A. (2004), "Product Placement: The Nature of the Practice and Potential Avenues of Inquiry," in *The Psychology of Entertainment Media Blurring the Lines Between Entertainment and Persuasion,* L.J. Shrum, ed., Mahwah, NJ: Lawrence Erlbaum, 45–61.

McClung, Gordon W., W. Whan Park, and William J. Sauer (1985), "Viewer Processing of Commercial Messages: Context and Involvement," in *Advances in Consumer Research,* vol. 12, Elizabeth C. Hirshman and Morris B. Holbrook, eds., Provo, UT: Association for Consumer Research, 351–355.

Meyer, Wulf-Uwe, and Michael Niepel (1994), "Surprise," in *Encyclopedia of Human Behavior,* V.S. Ramachandran, ed., San Diego: Academic Press, 353–358.

Meyers-Levy, Joan, Therese A. Louie, and Mary T. Curren (1994), "How Does the Congruity of Brand Names Affect Evaluations of Brand Name Extensions?" *Journal of Applied Psychology,* 79 (1), 46–53.

Mitchell, Andrew A. (1981), "The Dimensions of Advertising Involvement," in *Advances in Consumer Research,* vol. 8, Kent B. Monroe, ed., Ann Arbor: Association for Consumer Research, 25–30.

Moorman, Marjolein, Peter C. Neijens, and Edith G. Smit (2002), "The Effects of Magazine-Induced Psychological Responses and Thematic Congruence on Memory and Attitude Toward the Ad in a Real-Life Setting," *Journal of Advertising,* 31 (4), 27–40.

Morton, Cynthia R., and Meredith Friedman (2002), "'I Saw It in the Movies': Exploring the Link Between Product Placement Beliefs and Reported Usage Behavior," *Journal of Current Issues and Research in Advertising,* 24 (2), 33–40.

Mowen, John C. (1990), *Consumer Behavior,* New York: Macmillan.

National Association of Theater Owners (2006), "Total U.S. Box Office Grosses," available at www.natoonline.org/statistics boxoffice.htm (accessed June 20, 2006).

Navon, David (1984), "Resources: A Theoretical Soup Stone," *Psychological Review,* 91 (2), 216–234.

Nelson, Michelle R. (2002), "Recall of Brand Placement in Computer/Video Games," *Journal of Advertising Research,* 42 (2), 80–92.

———, Ronald A. Yaros, and Heejo Keum (2006), "Examining the Influence of Telepresence on Spectator and Player Processing of Real and Fictitious Brands in a Computer Game," *Journal of Advertising,* 35 (4), 87–99.

Nicholls, J.A.F., Sydney Roslow, and Henry A. Laskey (1994), "Sports Event Sponsorship for Brand Promotion," *Journal of Applied Business Research,* 10 (4), 35–40.

Nicovich, Stefan G. (2005), "The Effect of Involvement on Ad Judgment in a Video Game Environment: The Mediating Role of Presence," *Journal of Interactive Advertising,* 6 (1), available at http://jiad.org/vo16/n01/nicovich/index.htm (accessed March 20, 2006).

Norris, Claire E., and Andrew M. Colman (1992), "Context Effects on Recall and Recognition of Magazine Advertisements," *Journal of Advertising,* 21 (3), 37–46.

NPD Group (2006), "The NPD Group Reports Annual 2005 U.S. Video Game Industry Retail Sales," available at www .npd.com/press/releases/press_060117.html (accessed June 29, 2006).

Obermiller, Carl, Eric Spangenberg, and Douglas L. MacLachlan (2005), "Ad Skepticism: The Consequences of Disbelief," *Journal of Advertising,* 34 (3), 7–17.

Olshavsky, Richard W. (1993), "Attention as an Epiphenomenon: Some Implications for Advertising," in *Attention, Attitude, and Affect in Response to Advertising,* Eddie M. Clark, Timothy C. Brock, and David W. Stewart, ed., Mahwah, NJ: Lawrence Erlbaum, 97–106.

Orth, Ulrich R., and Denisa Holancova (2003/2004), "Consumer Response to Sex Role Portrayals in Advertisements," *Journal of Advertising,* 32 (4), 77–88.

Pew & Internet American Life Project (2003), "Let the Games Begin: Gaming Technology and Entertainment Among College Students," available at www.pewinternet.org (accessed January 10, 2004).

Pham, Michel T. (1992), "Effects of Involvement, Arousal, and Pleasure on the Recognition of Sponsorship Stimuli," in *Advances in Consumer Research,* vol. 19, John F. Sherry and Brian Sternthal, eds., Provo, UT: Association for Consumer Research, 85–93.

Rodgers, Shelly (2003), "The Effects of Sponsor Relevance on Consumer Reactions to Internet Sponsorships," *Journal of Advertising,* 32 (4), 67–76.

Russell, Cristel Antonia (2002), "Investigating the Effectiveness of Product Placements in Television Shows: The Role of Modality and Plot Connection Congruence on Brand Memory and Attitude," *Journal of Consumer Research,* 29 (3), 306–318.

———, and Barbara B. Stern (2006), "Consumers, Characters, and Products," *Journal of Advertising,* 35 (1), 7–21.

———, Andrew T. Norman, and Susan E. Heckler (2004), "The Consumption of Television Programming: Development and Validation of the Connectedness Scale," *Journal of Consumer Research,* 31 (1), 150–161.

Sabherwal, Shonall, Jim Pokrywczynski, and Robert Griffin (1994), "Brand Recall for Product Placements in Motion Pictures: A Memory-Based Perspective," paper presented at the Association for Education in Journalism and Mass Communication Conference, Atlanta, August.

Schacter, Daniel L. (1987), "Critical Review: Implicit Memory: History and Current Status," *Journal of Experimental Psychology,* 13 (3), 501–518.

Schneider, Lars-Peter, and T. Bettina Cornwell (2005), "Cashing in on Crashes via Brand Placement in Computer Games: The Effects of Experience and Flow on Memory," *International Journal of Advertising,* 24 (3), 321–343.

Shamdasani, Prem N., Andrea J. S. Stanaland, and Juliana Tan (2001), "Location, Location, Location: Insights for Advertising Placement on the Web," *Journal of Advertising Research,* 41 (4), 7–21.

Shapiro, Stewart, and H. Shanker Krishnan (2001), "Memory-Based Measures for Assessing Advertising Effects: A Comparison of Explicit and Implicit Memory Effects," *Journal of Advertising,* 30 (3), 1–13.

———, Deborah J. MacInnis, and Susan E. Heckler (1997), "The Effects of Incidental Ad Exposure on the Formation of Consideration Sets," *Journal of Consumer Research,* 24 (1), 94–104.

Srull, Thomas K., and Robert S. Wyer (1989), "Person Memory and Judgment," *Psychological Review,* 96 (1), 58–83.

Steortz, Eva Marie (1987), "The Cost Efficiency and Communication Effects Associated with Brand Name Exposure Within Motion Pictures," M.A. thesis, University of West Virginia.

Tavassoli, Nadar T., Clifford J. Shultz, and Gavan J. Fitzsimons (1995), "Program Involvement: Are Moderate Levels Best for Ad Memory and Attitude Toward the Ad?" *Journal of Advertising Research,* 35 (5), 61–72.

Vollmers, Stacy, and Richard Mizerski (1994), "A Review and Investigation into the Effectiveness of Product Placements in Films," in *Proceedings of the 1994 Conference of the American Academy of Advertising,* Karen W. King, ed., Athens: University of Georgia, 97–102.

Yang, Moonhee, David R. Roskos-Ewoldsen, Lucian Dinu, and Laura M. Arpan (2006), "The Effectiveness of 'In-Game' Advertising," *Journal of Advertising,* 35 (4), 143–152.