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Product Placement in Video Games: The Effect of Brand Familiarity and Repetition on Consumers' Memory

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Abstract

Product placement in video games is gaining momentum as a means to target audiences in an indirect and engaging way. This study uses a 2 (high repetition vs low repetition) × 2 (high brand familiarity vs low brand familiarity) factorial design to test the effects of repetition and brand familiarity on consumers' memory for brands placed in video games. Results suggest that consumers recall familiar brands placed in the video game better than unfamiliar ones. Familiar brands also performed better in a brand recognition measure than unfamiliar brands. As no interaction effect of repetition was found, both familiar and unfamiliar brands will benefit equally of the effect of repetition. Managerial implications, limitations, and future research are also addressed.

Keywords: Product placement; Video games; Brand familiarity; Repetition; Recall; Recognition

Introduction

The use of video games for advertising purposes is not new and can be tracked back to the eighties when brands such as Budweiser or Marlboro placed their brands in video games like *Tapper* and *Pole Position*. Nowadays, just in America more than 150 million of people play video games (Entertainment Software Association [ESA] 2015). This growing number of video game players has also increased advertisers' interest to use video games as a way to approach consumers in an engaging and indirect way. More specifically video games are used to target marketing communications to young audiences (Peters and Leshner 2013; Terlutter and Capella 2013; Van Reijmersdal, Rozendaal, and Buijzen 2012).

Nevertheless, children and youngsters are not the only audience for video games as parents also play video games as a way to both socialize with their children and to monitor the content of the video games they play (ESA 2009). Older video game players also play video games because they grew up as teenagers playing video games and now they continue playing video games during adulthood. Video game developers have also broadened their target audience with older population segments seeking for new market opportunities (for example, health-related video games in the shape of exercise mobile apps or serious games such as *Brain Training*).

As an increasing part of the population is playing video games worldwide, and more audiences can be reached through advertising in video games, advertising in video games is gaining momentum as a marketing communications tool. In fact, advertising in video games will reach $7.2 billion by 2016 (Tassi 2011) and the expectation is for a continued expansion of these efforts going forward (Yeu et al. 2013).

By placing brands and products in video games, marketers expect to influence cognitive, affective, and conative consumer outcomes including brand salience, brand recall, brand recognition, brand attitude, brand choice or purchase intention (Balasubramanian, Karrh, and Patwardhan 2006). One main

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advantage when using product placement in video games is that video game players can spend hours, months, and even years playing their favorite video games. Therefore, marketers may expect a higher brand exposure time, if compared to other media like television or magazines. The interactive and engaging nature of video games may also affect positively brand interactions. For example, in *Worms 3D*, the player can jump higher if he drinks Red Bull cans placed in the video game. In online video games marketers can also track consumer interactions (Herrewijn and Poels 2013) gaining a better knowledge in consumer behavior.

An increasing effort has been made over the last years to achieve a better knowledge on how product placement works in video games. However, more effort is needed to understand better how consumers process information of products and brands placed in video games. Previous research has analyzed different drivers of product placement effects on consumers' memory. These drivers include brand congruence (Nelson 2002; Peters and Leshner 2013), type of placement (Grigorovici and Constantin 2004), video game genre (Yang et al. 2006), proximity (Lee and Faber 2007; Peters and Leshner 2013), arousal (Yoon and Vargas 2013), and game difficulty level (Herrewijn and Poels 2013). However, extant literature on the effects of repetition in product placement in video games is scarce if not completely inexistent.

Message repetition is considered a key factor in media planning with implications for advertising effectiveness not only in traditional media like radio and television (Singh and Cole 1993) but also in new media like the Internet (Huang and Lin 2006). While literature on repetition in traditional media can be tracked back to the 70s and 80s (Berlyne 1970; Calder and Sternthal 1980) more research is needed in order to better understand the effects of repetition on consumers' memory in product placement in video games.

Regarding brand familiarity, previous research has analyzed the effect of brand familiarity on consumers' recall (Mau, Silberer, and Constien 2008; Nelson 2002; Nelson, Keum, and Yaros 2004). However, to the best of our knowledge, no previous research has analyzed the effect of repetition and the interaction effect of brand familiarity and repetition on consumers' memory in product placement in video games. The present study aims at filling up this research gap.

Product Placement in Video Games

Product placement refers to the "practice of including a brand name product, package, signage or another trademark merchandise within a motion picture, television or other media vehicles for increasing the memorability of the brand and for instant recognition at the point of purchase" (Panda 2004, p. 1). Traditionally, product placement has been used as a marketing communications tool in media like cinema (Brennan, Dubas, and Babin 1999; D'Astous and Chartier 2000; Law and Braun-La Tour 2000) and television (Gould and Gupta 2006; Russell 2002; Russell and Stern 2006; Van Reijmersdal, Smit, and Neijens 2010). Recently, there is an increasing use of product placement in books (Petrecca 2006), music (Burkhalter and Thornton 2014; Delattre and Colovic 2009; De Gregorio and Sung 2009; Ferguson and Burkhalter 2014), and video games (Chang et al. 2010; Choi, Lee, and Li 2013; Lewis and Porter 2010; Van Reijmersdal, Rozendaal, and Buijzen 2012).

Some examples of product placement in video games include Pizza Hut and KFC in *Crazy Taxi* and AXE and Nokia in *Splinter Cell: Chaos Theory*. While product placement in cinema and television is usually both visual – *screen placements* – and auditory — *script placements*, product placement in video games is mostly visual, this is, in the shape of banners and billboards placed in the arena or nearby. Visual screen placements can be manipulated to increase brand recall and brand recognition. Therefore, they can potentially affect consumers' brand awareness and brand familiarity. This is possible because screen placements can be at the foreground – *on-set placements* – or at the background – *creative placements* – (Russell 2002) and marketers can manipulate design elements such as size, animation, or colors to attract consumers' attention. Finally, tridimensional branded objects such as kiosks or the product itself can also be placed to draw consumer's attention. A pioneering example of this kind of product placement was Budweiser's blimp in *Tapper*. Nikon also placed branded aerostatic balloons in *Sky Challenge 2009*.

Previous research on product placement has found some superiority of on-set placements over creative placements on consumers' brand recognition (Brennan, Dubas, and Babin 1999). Research on product placement in video games has also found some superiority of bigger on-set placements and smaller creative placements on consumers' brand recall (Grigorovici and Constantin 2004). Because players are usually focused on gameplay, information-processing models have been used to better understand how players process brand stimuli in video games. One such model is the Limited Capacity Model of Mediated Message Processing (Lang 2000), which has been previously applied to analyze how people process product placement in video games (Lee and Faber 2007; Peters and Leshner 2013). Another model, The Processing of Commercial Media Content (PCMC) has been developed to provide a suitable framework to investigate how young people process commercial attempts in marketing communications formats, like product placement, which blur editorial and advertising content (Buijzen, Van Reijmersdal, and Owen 2010).

The Limited Capacity Model of Mediated Message Processing

The Limited Capacity Model of Mediated Message Processing (Lang 2000) is an information-processing model that was originally developed to investigate how people process television messages. The model has two major assumptions: a) people are information processors, and b) a person's ability to process information is limited, this is, once a person has been exposed to a message this message should automatically make it into the sensory store but this sensory store can hold more information than a person can be aware of or attend to. Only selected bits of information will be transformed into activated mental representations in working memory – or short-term memory – for further processing. The information that is not selected for further

processing will be written over by new information and lost (Lang 2000).

The model assumes three major subprocesses of information processing that goes from *encoding* – getting the message out of the environment and into a person's brain – to *storage* – linking newly encoded information to previously encoded information or memories – and, finally, *retrieval* — reactivating a stored mental representation of some aspects of a message. The mechanism that triggers further processing of bits of information starts with the encoding process, which is driven by both automatic (unintentional) and controlled (intentional) processes. Controlled selection processes are driven by a person's goal while automatic processes are driven by the stimulus.

Related to automatic processes – and especially relevant for product placement information processing – are the so-called *orienting responses* (Öhman 1979; Pavlov 1927). An orienting response "causes an automatic allocation of processing resources to the task of encoding the stimulus that elicited the orienting response" (Lang 2000, p. 2), increasing the likelihood of better storing and retrieving the stimulus that originated the orienting response. Signal stimulus – this is, and stimulus that has some meaning for a person, like the person's name – is an example of these orienting responses that can increase the allocation of processing resources when a person is being exposed to a message (Lang 2000). This is of special relevance in product placement processing because the model also assumes that at any given moment a person's processing resources split up into resources allocated to process information related to the primary task (e.g., playing a video game) and spare capacity to process secondary tasks (e.g., environment information like product placement). Resources allocated to the primary task cannot be allocated to process secondary tasks (Kahneman 1973; Lynch and Srull 1982).

We assume that when playing a video game the primary task is related to gameplay, while product placement information processing can be considered a secondary task (Grigorovici and Constantin 2004). Based on this assumption we state that both brand familiarity and repetition can act as orienting responses in a product placement context, hence, enhancing product placement information processing.

The Processing of Commercial Media Content (PCMC) Model

The Processing of Commercial Media Content (PCMC) Model was developed by Buijzen, Van Reijmersdal, and Owen (2010) as a framework to investigate how young people process commercial attempts in nowadays media landscape. The PCMC Model assumes the Limited Capacity Model of Mediated Message Processing (Lang 2000), adapting it specially to hybrid messages (Balasubramanian 1994) like product placement, program tie-ins, and program length commercials in which non-traditional forms of advertising are embedded within program or editorial content (Buijzen, Van Reijmersdal, and Owen 2010).

The PCMC Model proposes three levels of integration between a persuasive message and its context: *format*, *thematic*, and *narrative* integration (Buijzen, Van Reijmersdal, and Owen 2010). The scope of this study falls within the thematic integration in which a conceptual fit or congruence between the persuasive message and its context is achieved (Buijzen, Van Reijmersdal, and Owen 2010). Examples of thematic integration are "placement of ads around thematically congruent content, such as placement of the Nike brand logo in a football or soccer game, or an advertisement for Bratz action figures in the Bratz magazine" (Buijzen, Van Reijmersdal, and Owen 2010, p. 428).

Buijzen, Van Reijmersdal, and Owen (2010) discussed in their model three levels of persuasion processes characterized by varying levels of cognitive elaboration in response to a message: *systematic persuasion processing*, *heuristic persuasion processing*, and *automatic persuasion processing*. Subtle product placements, like the one under analysis in this study, are expected to elicit automatic persuasion processing characterized by a minimal level of cognitive elaboration in which the recipient motivation and ability to process the persuasive message are not required. This is, in this experiment, consumers' main motivation to succeed controlling a car in a car racing video game and not to process the branded billboards surrounding the racing circuit. In this sense, the PCMC Model predicts a low explicit recall of the advertised product or brand featured in the billboards as resources allocated and resources required to process a stimulus are both low (Buijzen, Van Reijmersdal, and Owen 2010). Brand familiarity and repetition can act as orienting responses in these *low allocated resources* and *low required resources* context (Buijzen, Van Reijmersdal, and Owen 2010) enhancing product placement information processing and, therefore, increasing brand recall and brand recognition for this type of subtle product placements.

Brand Familiarity

Brand familiarity has been defined in terms of the previous experience a consumer has with a brand. It can be considered a measure of the extent of a consumer's direct experience (e.g., using the brand) and indirect experience (e.g., being exposed to a brand message) with that brand (Alba and Hutchinson 1987). Brand familiarity has been found to be an important factor influencing brand memory (Choi, Lee, and Li 2013) and explicit attitude toward the brand (Waiguny, Nelson, and Terlutter 2012). Therefore, brand familiarity affects advertising effectiveness based on the association a brand evokes in a consumer memory (Campbell and Keller 2003).

The effects of brand familiarity in consumers' memory have been studied in a wide range of media including traditional advertising (Alba and Hutchinson 1987) and new advertising formats such as video games (Mau, Silberer, and Constien 2008). Brand familiarity is also an important factor in product placement effectiveness (Balasubramanian, Karrh, and Patwardhan 2006). Previous research has found that familiar stimuli offer a superiority advantage than unfamiliar stimuli at the moment of being coded (Watkins, LeCompte, and Kim 2000). Moreover, it has been suggested that brand familiarity leads to a quicker recognition of a brand (Machleit and Wilson 1988).

Nevertheless, results of brand familiarity effects on consumer's memory in the product placement context are ambiguous. On the

one hand, previous research has found a superiority of unfamiliar brands over familiar brands on consumer's memory due to novelty effects (Nelson 2002; Nelson, Keum, and Yaros 2004). On the other hand, it has been suggested that familiar brands are easier to recall than unfamiliar brands (Brennan and Babin 2004). Nelson's (2002) and Nelson, Keum, and Yaros' (2004) studies took place in a video game context while Brennan and Babin's (2004) took place in a movie context suggesting that media effects can moderate brand familiarity effects in consumers' memory.

Based on the Limited Capacity Model of Mediated Message Processing (Lang 2000), we state that brand familiarity can act as an orienting response steering the selection of information to be encoded when consumers are processing mediated messages (Lang 2000). An orienting response occurs in response to novel or signal stimuli and varies from person to person (Lang 2000). As signal stimuli refer to stimuli that have some meaning for a person, we assume that brand familiarity can act as an orienting response increasing the attentional capacity for those placed brands consumers are familiar with. In fact, orienting responses have been previously used in product placement research in a video game context in the form of animated logos, which elicited a higher recall than static logos (Cauberghe and De Pelsmacker 2010).

Schema theory (Lynch and Schuler 1994; Rumelhart 1980) also supports the effect of brand familiarity in consumers' memory. Schema theory assumes that people use categories and schema to organize and structure information contained in their memories (Rumelhart 1980). A familiar stimulus will be naturally and mechanically processed without a need for cognitive effort, while unfamiliar stimulus will need extra cognitive effort in an attempt to assimilate it and fit it within previous schema. As video game players are processing product placement information as a secondary task, brand familiarity will help in creating new associative links of information and integrate them into already existing memory structures with less effort (Lang 2000). In fact, previous research has found significant higher recall and recognition effects for familiar brands in video games (Mau, Silberer, and Constien 2008; Nelson, Yaros, and Keum 2006; Schneider and Cornwell 2005). So the following hypotheses are posited:

H1. Recall levels will be higher for familiar brands than for unfamiliar brands placed in video games.

H2. Recognition levels will be higher for familiar brands than for unfamiliar brands placed in video games.

Repetition

Repetition effects on consumers' memory have been widely studied in traditional media like radio and television (Berlyne 1970; Calder and Sternthal 1980). In fact, one important factor in media planning is message repetition. Berlyne's two-factor model (1970) assumes two phases associated with repetition effects. The first phase – *wear-in* – affects an individual's familiarity with a brand message due to repetition. This repetition increases brand memory (Newell and Henderson 1998) and a positive attitude toward the brand (Cox and Cox 1988). The second phase – *wear-out* – increases an individual's boredom, irritation, and reactance toward the message (Sawyer 1981) including counter-arguing (Cacioppo and Petty 1979) and viewer wear-out (Calder and Sternthal 1980).

Extant literature has detected a positive effect of repetition of advertising messages on recall (Belch 1982; Burke and Srull 1988; Cacioppo and Petty 1979). It is assumed that consumers' ability to recall advertising messages will increase with repetition (Yaveroglu and Donthu 2008). "In fact, product placement research has suggested that a moderate repetition level facilitates consumers the opportunity to elaborate on the content of the message, to become more familiar with the stimulus, and to scrutinize relevant details and characteristics of the message, thus facilitating retention in memory" (Homer 2009, p. 22). This rationale is consistent with the Limited Capacity Model of Mediated Message Processing (Lang 2000), which assumes that the higher the exposure to a stimulus, the higher the likelihood will be to select bits of information to be encoded. Therefore, the following hypotheses are posited:

H3. Brand recall will be higher for brands placed in video games with a higher level of brand repetition.

H4. Brand recognition will be higher for brands placed in video games with a higher level of brand repetition.

Brand Familiarity and Repetition Interaction

An interaction effect of brand familiarity and repetition is expected. Previous research has failed to confirm a repetition effect (Belch 1982; Rethans, Swasy, and Marks 1986) suggesting that diverse variables moderate the effect of repetition on advertising messages' effectiveness. Some of the suggested variables include message complexity (Cox and Cox 1988), ease of message processing (Anand and Sternthal 1990), message involvement (Batra and Ray 1986), message variation (Haugtvedt et al. 1994), program content (Singh and Cole 1993), advertising context (Malaviya 2007) and brand familiarity (Campbell and Keller 2003).

The Limited Capacity Model of Mediated Message Processing (Lang 2000) suggests that repetition may increase the likelihood to elaborate message information that will be selected in the encoding subprocess, while brand familiarity will facilitate linking this new information to relate memories by associations during the storage subprocess. As a person thinks about the message – due to repetition – "more and more associations between the 'new' information and old information are formed" (Lang 2000, p. 50). Thus, storage is facilitated first, and retrieval later.

The Limited Capacity Model of Mediated Message Processing (Lang 2000) assumes that the storage subprocess is a continuum from poorly stored – few associations and links – to thoroughly stored — many associations and links. It is assumed that bits of information receive unequal amounts of processing during the storage subprocess — some bits of information will be more thoroughly stored while others will receive only cursory storage. We posit that prior brand familiarity will enhance the effect of repetition facilitating brand information to

be thoroughly stored. Therefore, the following hypotheses are posited:

H5. Repetition will increase brand recall more intensively for familiar brands than for unfamiliar brands placed in video games.

H6. Repetition will increase brand recognition more intensively for familiar than for unfamiliar brands placed in video games.

Method

Design and Participants

A 2 (high brand familiarity vs low brand familiarity) × 2 (high repetition vs low repetition) between-subjects factorial design was used to test the hypotheses. A total of 383 undergraduate students from one public Spanish university participated in the study. The average age of participants is 23.3 years old and 52% of them are female. Although using college students samples has been criticized when conducting consumer research, college students samples are appropriate for video game research (Sung and De Gregorio 2008) and have been previously used in product placement research in video games (Peters and Leshner 2013). Four versions of a real online car racing video game – property of a professional video game developer – were developed to create the four conditions. A total of 106 participants played version 1 (high repetition and familiar brand), 100 participants played version 2 (low repetition and familiar brand), 94 participants played version 3 (high repetition and unfamiliar brand), and 83 participants played version 4 (low repetition and unfamiliar brand).

Experimental Stimuli and Pretest

Brands appeared in plain sight on billboards that surrounded the virtual racing circuit. To manipulate brand familiarity a pretest was run asking 100 undergraduate students of the same university to rate 35 cell phone brands commercialized in the Spanish market based on their brand familiarity (e.g., "Nokia is a brand I'm familiar with") on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). No student taking part in this pretest participated later in the experiment. Results showed that Nokia was the most familiar brand ($M_{brand\ familiarity}$ = 3.85, *SD* = 0.359) while Geeksphone was the less familiar brand ($M_{brand\ familiarity}$ = 1.03, *SD* = 0.171) being that difference significant (t = 68.53; df = 99; p < 0.01). Based on these results, Nokia and Geeksphone were selected for the high and low brand familiarity conditions. To manipulate repetition, four banners of the target brands (Nokia and Geeksphone) were placed in different locations of the racing circuit (high repetition). In the low repetition conditions, only one banner of the target brands (Nokia and Geeksphone) was placed in one location of the racing circuit. Because the video game allows placing up to 10 banners across the racing circuit, blank banners were filled with different international brands which included Coca-Cola, Heineken, Visa, Google, Nescafe, Disney, Ikea, Santander, and McCormick. It is usual that brands placed in movies or video games compete for attention against other placed brands, so this served to simulate real market conditions. Table 1 shows the four experimental video games (four versions of the video game).

Measures

Manipulation Checks

To investigate whether the manipulation was successful, participants were asked how familiar the target brand (Nokia or Geeksphone) was to them. Participants in the familiar condition were asked to rate brand familiarity for Nokia while respondents in the unfamiliar condition were asked to rate brand familiarity for Geeksphone (e.g., "Nokia is a brand I'm familiar with") on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Results showed that Nokia was the most familiar brand ($M_{brand\ familiarity}$ = 4.51, *SD* = 0.925) while Geeksphone was the less familiar brand ($M_{brand\ familiarity}$ = 1.30, *SD* = 0.773) making that difference statistically significant (t = 50.08; df = 383; p < 0.01) and the manipulation of brand familiarity successful.

Control Variables

Because a person's game experience, ability to play a video game, and easiness to play a video game might affect how cognitive resources are allocated during gameplay and may influence information processing, three control variables were used to guarantee that no group differences existed: perceived easiness of the video game, perceived ability to successfully play the video game, and video game experience. One item was adapted from Davis (1985) to measure players' perceived easiness of the video game ("I find the video game is easy to play"). Another item was adapted from Bartholow, Sestir, and Davis (2005) to measure players' perceived ability to successfully play the video game ("To what extent did you feel able to play the video game successfully?") No significant differences were found for perceived easiness (F(3, 337) = 0.203; p > 0.05) nor for perceived ability (F(3, 380) = 0.514; p > 0.05) among the four experimental conditions. Video game experience (e.g. "how long do you play video games?") is one control variable usually used in video game research (Chaney, Lin, and Chaney 2004). Nevertheless because video game genres widely vary in gameplay and difficulty we used a media affinity scale focused on players' experience playing specifically racing video games. We adapted one item from Perse (1986) ("Playing racing video games is one of the things I do every day") to measure players' video game experience. This variable was not significantly different in the four treatment groups (F(3, 380) = 1.250; p > .05).

Table 1
The four versions and conditions of the video game used in the study.

	High repetition	Low repetition
Familiar brand (Nokia)	Video game 1	Video game 2
Unfamiliar brand (Geeksphone)	Video game 3	Video game 4

Dependent Variables

Brand recall was measured using an open question asking participants to list all the brand names which they recalled encountered while playing the video game. Brand recall was, therefore, a dichotomous variable (e.g., 1 if the player recalled the targeted brand and 0 if he did not). Brand recognition was measured presenting participants a list of 11 brand names including the target brands (Nokia and Geeksphone). Participants were then asked to indicate whether each of the brand names appeared or not in the video game they played (yes/no). This is a common method used in previous research to measure brand recognition in product placement research (Lee and Faber 2007; Peters and Leshner 2013).

Procedure

Participants were contacted on campus and were asked to voluntarily participate in this study. In order to avoid demand artifacts, participants were told a cover story asking them to participate in a beta testing of a new online car racing video game to be launched to the market. Participants were randomly assigned to one of the four experimental conditions and completed the experiment one at a time on a media lab using the same computer, screen, and set-up. Participants spent between 15 and 20 minutes playing the video game. Once they finished playing the video game they were asked to complete an online survey. Once participants completed the online survey, they were debriefed and thanked. All the process was supervised by one of the researchers.

Results

Figs. 1 and 2 depict a graphical representation of the effects of familiarity and repetition on brand recall and brand recognition. To test the hypotheses, we conducted two logistic regressions where recall (model 1) and recognition (model 2) were the dependent variables and the manipulations (familiarity and repetition) and the control variables were the regressors. Table 2 summarizes the results. The two models were statistically significant at $p < 0.001$. Model 1 revealed a significant main effect of familiarity ($b = 2.187$, Wald statistic (1) = 18.535, $p < 0.001$) and repetition ($b = 1.080$, Wald statistic (1) = 3.985, $p < 0.05$) on brand recall thus confirming hypotheses H1 and H3 which postulated that recall would be higher for familiar brand placements and for more frequently repeated placements (repetition). However a non-significant interaction effect ($b = 0.017$, Wald statistic (1) = 0.001, $p > 0.05$) did not allow us to confirm hypothesis H5 which suggested that repetition will increase more intensively brand recall for familiar brands.

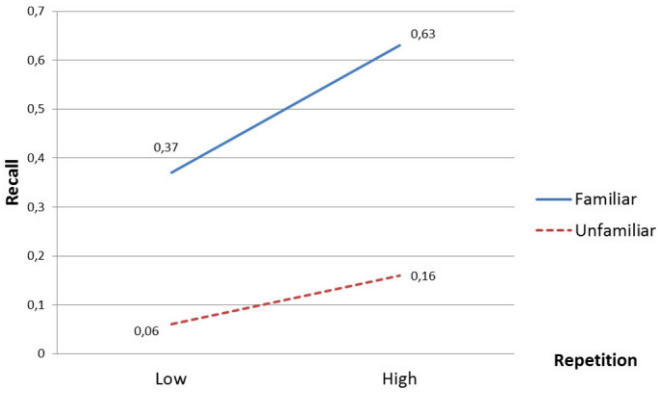

Fig. 1. Percentage of brand recall in each experimental condition.

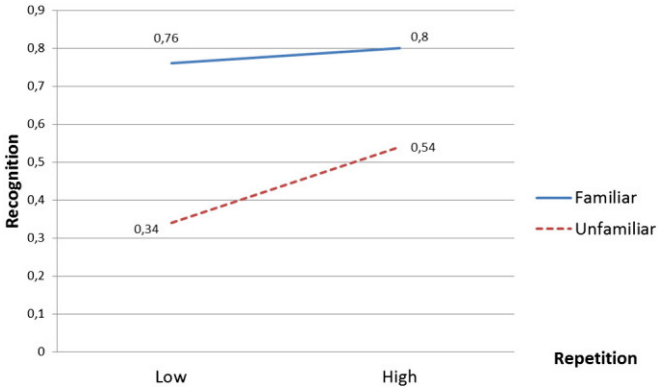

Fig. 2. Percentage of brand recognition in each experimental condition.

Model 2 provided very similar results for brand recognition. Hypotheses H2 and H4 were confirmed as both familiarity ($b = 1.891$, Wald statistic (1) = 31.666, $p < 0.001$) and repetition ($b = 0.824$, Wald statistic (1) = 6.839, $p < 0.001$) increased brand recognition. However, the interaction effect between those two variables was not significant ($b = -0.642$, Wald statistic (1) = 1.903, $p > 0.05$) not supporting hypothesis H6.

Discussion, Conclusions, and Managerial Implications

Results suggest the superiority of familiar brands over unfamiliar brands to impact consumers' memory when using

Table 2
Logistic regression on dichotomous variables recall (model 1) and recognition (model 2).

	Model 1: recall		Model 2: recognition	
	Coefficient	SE	Coefficient	SE
Intercept	−2.907**	0.588	−0.834*	0.403
Manipulations				
Familiarity	2.187**	0.508	1.891**	0.336
Repetition	1.080*	0.541	0.824**	0.315
Familiarity × Repetition	0.017	0.615	−0.642	0.465
Controls				
Easiness	−0.098	0.116	−0.052	0.108
Ability	0.093	0.124	0.139	0.118
Game experience	0.082	0.119	−0.075	0.114
−2 log likelihood	385.241		441.239	
Nagelkerke's R^2	0.300		0.186	
Omnibus model χ^2	91.781**		55.223**	

Notes: N = 383.
* $p < 0.05$.
** $p < 0.001$.

creative (subtle) product placement in video games. Moreover this superiority occurs both in high repetition and low repetition conditions. One main managerial implication is that unfamiliar brands using product placement in video games will need higher repetition levels to achieve the same degree of brand recall and brand recognition than familiar brands. Results also suggest higher levels of recognition than recall. Recognition is a more sensitive measure of memory than recall (Lang 2000; Tulving 1972; Tulving and Thomson 1973) and these results are consistent with previous research that found higher levels of recognition than recall in product placement research (Gangadharbatla, Bradley, and Wise 2013).

One main managerial implication is that for achieving a better effectiveness of product placement in video games, marketers should consider using other marketing communications tools (for example, in-store visual merchandising) in order to trigger consumers' brand recognition in the point of purchase in order to reinforce their marketing communications through product placement in video games.

Our findings support the Limited Capacity Model of Mediated Message Processing (Lang 2000) assumption than the encoding and storage subprocesses will have different memory outcomes — the first on recognition measures and the later on recall measures. While the orienting response elicited by brand familiarity and repetition seems to affect the automatic selection of the bits of information to be encoded thus affecting the recognition of the information provided by the stimulus (Lang 2000), a deeper processing of information, affecting recall, expected to happen during the storage subprocess (due to the creation of links between short-term and long-term memory) seems not to be occurring. This finding of different effects on brand recall and brand recognition is also consistent with the automatic persuasion processing predicted by the PCMC Model (Buijzen, Van Reijmersdal, and Owen 2010) during subtle product placement information processing, where resources allocated and resources required to process a stimulus are both low and no deep cognitive elaboration will happen.

Because no interaction effect was found between brand familiarity and repetition on consumers' memory (brand recall and brand recognition) perhaps the most important finding of the present study is that marketers targeting both familiar and unfamiliar brands will benefit equally of the effect of repetition. From a managerial point of view, this implies that unfamiliar brands will not need to increase repetition in a higher degree than familiar brands to achieve the same brand recall and brand recognition increment. Another finding with important managerial implications is the significant differences on brand recall and brand recognition for familiar brands.

Our results suggest that creative (subtle) product placement in racing video games (in the shape of banners placed surrounding the circuit) works better for familiar brands than for unfamiliar brands. This can be explained by the *automatic persuasion processing* occurring in contexts where resources allocated and resources required to process an stimulus are both low (Buijzen, Van Reijmersdal, and Owen 2010) as it occurs when processing brand logos placed in billboards surrounding the circuit in a car racing video game.

Limitations and Future Research

One main limitation of this study is the convenience sample used. Though college students are one of the most important segments of video game players, the population playing video games has expanded to other segments than college students over the last years. In order to generalize these results, future research should include other segments of video game players. Another limitation is that we only test our hypotheses in one video game genre (a racing video game). Video game genres widely vary on features and gameplay so future research should use other video game genres to confirm these results. Because repetition can benefit both brand recall and brand recognition but can also arouse counter-arguing and wear-out effects, future research should also explore the ideal repetition threshold to maximize benefits on players' memory and to minimize effects on players' negative attitudes.

Brand familiarity and repetition can also affect marketing communications outcomes related to brand attitude and purchase intention. For example, brand familiarity and repetition can decrease consumers' perceived risk when buying a branded product. Therefore, future research should explore the effects of brand familiarity and repetition of product placement in video games on consumers' purchase intention.

Finally, brand familiarity and repetition might also influence brand engagement and brand love with consequences on both brand attitude and purchase behavior (not only purchase intention but also re-purchase behavior) suggesting that future research should delve into the effects of brand familiarity and repetition of product placement in video games on consumers' attitudinal and behavioral outcomes.

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