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Engaging Consumers with Advergames: An Experimental Evaluation of Interactivity, Fit and Expectancy

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Abstract

*Advergames are increasingly popular for online advertising campaigns. However, few IS studies have investigated the effectiveness of this unique advertising strategy. This study sheds light on the effectiveness of advergames by studying three design factors of advergame: interactivity, fit, and expectancy. We use multiple dependent variables (e.g., attitude toward advergames, attitude toward brand, and purchase intention) to evaluate the effectiveness of advergames. Based on work from human-computer interaction research and the transportation theory, we propose two-way interaction effects of interactivity, fit, and expectancy on attitudes toward advergame, and also their main effects on attitude toward brand. A positive mediating relationship from attitude toward advergame to attitude toward brand, and to purchase intention is also hypothesized. We conducted a 2*2*2 factorial design experiment in an online 3D virtual world environment to test our hypotheses. The results show that, in the high fit condition, both high interactivity and low expectancy lead to a more favorable attitude toward advergames. However, in the low interactivity condition, low expectancy generates a more positive attitude toward advergames. Interactivity and attitude toward advergames have significant positive effects on attitude toward brand, which, in turn, positively impacts purchase intention.*

Keywords: *Advergame, Interactivity, Fit, Expectancy, Attitude toward Advergame, Attitude toward Brand, Purchase Intention, Engagement Theory, Transportation Theory.*

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1. Introduction

Advertisers have been using various conventional and digital media to convey advertising messages (e.g., printed material, television, and website banners). Recently, advergame, a new digital advertising format, is experiencing a boom in popularity. In the US alone, the market for advergaming is projected to reach $68 billion by 2012 (Kanth, 2010). An advergame refers to an integration of advertising messages in a custom-built game (typically online) that promotes a product or brand to potential consumers who are engaged in playing the game (Buckner, Fang, & Qiao, 2002; Mallinckrodt & Mizerski, 2007). Increasingly, in a world of fragmented media proliferation, print ads are losing their prominence as newspaper subscription rates plunge. Television commercials' appeal is decreasing due to high cost and low interactivity, while web banner ads' clickthrough rates drop as consumers are inundated by irrelevant ads. In such a context, the advergame provides a potential solution to such problems of existing advertising formats by providing the consumer with an interactive engaging experience while being exposed to ad messages that may bring about positive advertising responses.

The advergame is typically custom designed for the sponsoring brand and aims to provide consumers with an interactive and engaging brand experience (Wise, Bolls, Kim, Venkataraman, & Meyer, 2008). Compared to traditional advertisements, in the advergame, the role of a consumer changes from a passive observer to an active player since the individual can interact with brand components in the game (Buckner et al., 2002). The value of the advergame lies in its integrated delivery of a captivating advertising message such that consumers are more likely to form a favorable attitude toward the advertised brand (Dahl, Eagle, & Ba'ez, 2009). A typical advergame costs from $10,000 to $100,000 but can garner up to 100,000 interactive minutes engaged with a brand (Guest, 2011; Obringer, 2011). With such engaging interactive brand experiences at a fraction of conventional mass media advertising costs, marketers are actively adopting advergames and diverting their advertising dollars to them. Indeed, the emerging trend of using advergames clearly demonstrates the importance of investigating their effectiveness.

To date, however, few empirical studies have focused on advergames' effectiveness for marketing purposes. It thus remains unclear what makes an advergame effective from both a theoretical and a practical perspective. To study this issue, we focus on advergame design elements and examine how different manipulations of these elements can influence advergames' effectiveness.

We pose two important research questions in this study: 1) What are the fundamental design elements that influence advergames' effectiveness?, and 2) How and to what extent do these elements influence advergames' effectiveness? To answer these research questions, we identify three major design elements that influence advergames' effectiveness; namely, interactivity, fit, and expectancy (Heckler & Childers, 1992; Palmer, 2002; Vessey & Galletta, 1991). To provide insights into advergames' effectiveness, this study investigates two major outcome metrics: attitude toward advergame and attitude toward brand. These two measures are of the most interest to advertisers and are direct measures of advergames' effectiveness (Gardner, 1985; Homer, 1990, 2006; MacKenzie, Lutz, & Belch, 1986; Mittal, 1990). In addition, we investigate whether playing advergames indeed affects consumers' intention to purchase (Koufaris, 2002) the brand advertised in the advergame.

We conducted a 2*2*2 factorial design experiment in an online 3D virtual world environment to test our hypotheses. The results indicate that, in the condition of high fit, consumers had a more favorable attitude toward advergames in high interactivity and low expectancy situations. Contrary to our hypothesis, we found that, in the low interactivity condition, low expectancy generated a more positive attitude toward advergames. Interestingly, interactivity (but not expectancy or fit) had a significant positive direct effect on attitude toward brand. Importantly, the causal effect from attitude toward advergame to attitude toward brand, and the effect from attitude toward brand to purchase intention, were both significantly positive.

Overall, our study makes four important contributions. First, we apply and extend the concept of interactivity from the human-computer interaction (HCI) literature (Jiang, Chan, Tan, & Chua, 2010; Palmer, 2002), and the concept of fit from the task-technology fit (Goodhue & Thompson, 1995) literature into the advertising context. Second, we extend the expectancy concept from the advertising literature (Heckler & Childers, 1992), and use the engagement theory (Kearsley & Shneiderman, 1998) and transportation theory (Green & Brock, 2000) to elaborate how consumers' emotions, mental imagery, and attention can be influenced by the interactivity, fit, and expectancy of an advergame to ultimately affect advertising effectiveness. Third, this is a pioneering effort in the IS literature that uses the transportation theory to provide new theoretical underpinnings to understand the interaction effects among three pivotal advergame design factors. As such, we elaborate how such insights can be applied to the practice of advergame designs. Finally, our study is one of the first to demonstrate that the positive attitude toward advergames can be transported to the brand advertised in the advergame. We also validate the positive effect of attitude toward brand on consumers' purchase intention in the advergame context.

2. Theoretical Foundation

In this study, we use the engagement theory (Kearsley & Shneiderman, 1998) and the transportation theory (Green & Brock, 2000; Green, Brock, & Kaufman, 2004) as our main theoretical foundation. Given that these two theories share a focus on engagement, they can be combined to provide an integrative view that yields a deeper understanding of the underlying mechanisms that can enhance advergames' effectiveness. The engagement theory sheds light on advergames' effectiveness by explaining how individuals are engaged in an advergame. For example, this theory can account for the reasons that individuals are engaged in an advergame. Complementing the engagement theory, the transportation theory explains that, when individuals are engaged in a narrative world such as one portrayed in an advergame, the personal enjoyment derived from the advergame can affect their attitudes and beliefs (Green et al., 2004). Transportation theory thus explains how the feelings and reactions generated in an advergame are transported to the real world and the advertised brand or product.

2.1. Engagement Theory

The fundamental idea underlying engagement theory is that individuals must be meaningfully engaged in activities through interactions, and that technology can enhance engagement in ways that may not be easy to achieve otherwise (Kearsley & Shneiderman, 1998). When individuals are engaged, the experience generated as a result is associated with perceptions of intrinsic interest, attention, focus, and curiosity (Chapman, Selvarajah, & Webster, 1999). In other words, the individual is meaningfully occupied, engrossed with, and captivated by a specific activity. A high level of engagement allows individuals to focus on an activity such that their attention is largely absorbed or captured by it for a significant period (Higgins, 2006). When individuals are engaged with a particular activity or a product, they intend to prolong the activity (Sandelands, 1988) or use the product repeatedly (Jordan, 1998). Moreover, in the HCI literature, higher engagement can result in a more positive view of the interactions with computer interfaces and higher motivation for such future interactions (Kim & Moon, 1998; Webster, Trevino, & Ryan, 1993).

When advertising their brands, marketers are particularly interested in engaging consumers with the brands (Wang & Calder, 2006) so that consumers can form positive feelings about these brands (Mayes, 1992). In line with the engagement theory, interactivity with brand components is considered as an important factor that can increase individuals' engagement levels. Moreover, the relevance of the advertisement context is found in the advertising literature to be a primary antecedent of consumers' engagement (Wang, 2006). Similarly, extending from the IS literature in e-commerce and website design (Cyr, Head, Larios, & Pan, 2009; Lombard & Ditton, 1997; Palmer, 2002; Van der Heijden, 2003), the fit between the type of advergame and the brand image of a product being advertised is posited as an important antecedent to engagement levels and thus consumer attitudes toward advergames and brands. Further, a novel, creative yet unconventional element or idea in an ad can enhance engagement with the ad or brand. Hence, expectancy of the advertisement is identified as an important element to engage consumers (Wells, Moriarty, & Burnett, 1992).

2.2. Transportation Theory

Theoretically, the concept of transportation is "a convergent process, where all mental systems and capacities become focused on events occurring in the narrative" (Green & Brock, 2000). In other words, transportation into a narrative world is to become fully engaged in an activity, resulting in an "integrative melding of attention, imagery and feelings" (Green & Brock, 2002; Green et al., 2004). This theory suggests that the enjoyment gained from the experience of being engaged can affect individuals' attitude and beliefs in the real world (Green et al., 2004). Specifically, the underlying mechanisms of transportation affect individuals in the following way. First, transportation reduces negative cognitive responses in individuals. Transported individuals are less likely to disbelieve or counter-argue narrative claims, and thus their beliefs may be influenced. Next, transportation leads to narrative experiences to seem more like real experiences through the use of mimicry. Finally, transportation can create strong feelings toward characters in narratives; the experiences or beliefs of those characters may then have an enhanced effect on individuals' beliefs and attitudes.

Originally proposed in the realm of reading written materials or narratives, transportation theory has been however construed to encompass the listening, viewing, receiving, and participating in the action of narrative information from a variety of media channels or content such as video games and virtual reality simulations (Green et al., 2004). The transformative potentials of transportation might be especially prominent with digital interactive media or content such as advergames in online or virtual world platforms because individuals in such platforms are provided with the capacity to place themselves into an interactive narrative context that allows them to go beyond their usual role as a passive audience or consumer, and to shape and control the flow of events in the online virtual world (Nah et al., 2011; Suh & Lee, 2005). Indeed, achieving a transportation experience in an online virtual world is akin to the "telepresence" notion in the IS literature (Nah et al., 2011; Suh & Lee, 2005) where individuals with a sense of telepresence are "focused on the virtual or mediated environment to the extent that their stimulus field is limited to just that environment, while the physical environment is disregarded" (Nah et al., 2011). However, we argue that a transportation experience transcends the concept of telepresence in that transportation goes beyond the feeling of just being present in a mediated environment. Transported individuals are not only present but also highly involved and engaged in a pleasurable manner with an object or process in a mediated environment with narrative elements (e.g., game plots in video games) to the extent that they may feel as if they are participating in the action of a narrative (Green et al., 2004).

A transportation experience requires a high level of engagement from the individual involved (Wang & Calder, 2006). Specifically, media content consumption such as playing games usually involves a high level of engagement in the entertainment process such that this process is deemed pleasurable and enjoyable by consumers or game players (Brock & Livingston, 2004; Escalas, 2004). Accordingly, consumers playing advergames are put in a position to be more likely transported into the narrative world portrayed. As a result, positive feelings and enjoyment evoked by mental simulation in the transportation experience can be transferred to the advertised brand in the advergame (Glass, 2007; Homer, 2006). Thus, the advertised brand can benefit from consumers' pleasurable transportation experience, such that consumers with more immersive positive transportation experiences can have more favorable attitudes toward the advertised brand (Wang & Calder, 2006). In the IS literature, it has been similarly reported that enjoyment has a positive influence on attitude toward an online vendor or website (Lee, Cheung, & Chen, 2005; Van der Heijden, Verhagen, & Creemers, 2003) and on shoppers' propensity to return to a site (Koufaris, 2002). Therefore, to sum up, the transportation theory implies that an advergame's advertising effectiveness depends on how the advergame can engage consumers with a pleasurable and enjoyable transportation experience during the game play. In particular, we posit in this paper that the three advergame design factors of interactivity, fit, and expectancy can influence the extent of engagement and enjoyment by consumers playing advergames, which can then be transferred to consumers' attitudes.

2.3. Interactivity

Computer or video games have an important defining feature of interactivity (Berman & Weitzner, 1995; Bezjian-Avery, Calder, & Iacobucci, 1998; Nicovich, 2005). Interactivity has received much attention in the HCI literature (Jiang et al., 2010; Palmer, 2002; Shneiderman & Plaisant, 1998). Many

researchers from different disciplines define interactivity from distinct angles (Blattberg & Deighton, 1991; Deighton, 1996; Hoffman & Novak, 1996; Rafaeli, 1988; Rafaeli & Sudweeks, 1997; Steuer, 1992; Steuer, Biocca, & Levy, 1995). These definitions can be classified into three categories; namely, user-machine interaction, user-user interaction, and user-message interaction (Cho & Leckenby, 1997). In the context of advergame, advertisers aim to persuade consumers with advertising messages. Thus, the interaction occurs between consumers and advertising messages. By reviewing the interactivity literature, Liu & Shrum (2002) further specify three dimensions of interactivity: active control, two-way communication, and synchronicity. For synchronicity, in the context of advergame, all the actions are synchronized since consumers' input and the game responses occur in the same time frame. Thus, we omit synchronicity in our interactivity conceptualization. In accordance with the nature of gameplay, control and feedback are two dominant features for game designs (Kafai, 1995; Salen & Zimmerman, 2004; Sweetser & Wyeth, 2005). For active control, consumers are able to customize their actions in advergames, such as deciding whether to interact with the in-game brand components. For two-way communication, consumers get consequent feedback according to their actions with the game components. For example, advertising messages are conveyed to consumers when they are interacting with the brand components.

In the context of advergames, we combine the dimensions of active control and two-way communication for our interactivity conceptualization. Therefore, we define interactivity as the extent to which consumers can interact with brand components and get feedback of advertising messages accordingly. In this study, high interactivity refers to consumers interacting extensively with brand components and receiving sufficient feedback of advertising messages in an advergame. Low interactivity refers to consumers having only limited interactions with brand components and getting few feedbacks of advertising messages.

2.4. Fit

In the IS literature, the theory of cognitive fit posits that an individual's performance on a task will be enhanced when there is a match between the information conveyed in the problem representation and the problem-solving task (Vessey, 1991; Vessey & Galletta, 1991). When there is such a match, individuals can use the same mental representation and decision processes for both the representation and the task, which thus produces enhanced task outcomes. A similar notion of task-technology fit is "the degree to which a technology assists an individual in performing his or her portfolio of tasks" (Goodhue & Thompson, 1995). Prior researches has emphasized that technologies should have a good fit with the work tasks that they support. Beyond the context of tasks in work places, related research in this area has evolved to include tasks in group support systems (Dennis, Wixom, & Vandenberg, 2001), group communication (Sarker & Valacich, 2010), and e-commerce (Liu & Goodhue, 2012; Suh & Lee, 2005). Further, in this paper, we extend the concept of task-technology fit to the context of online advertising, where the advergame is the "technology" in focus, while the "task" involves, from a brand marketer perspective (rather than from an end-user perspective), communicating the theme or image of the advertised brand. Indeed, the proposed fit construct here for advergames is also similar to the "made-for-the-medium" construct used in the HCI literature of website usability (Agarwal & Venkatesh, 2002), where the "made-for-the-medium" construct relates to the extent of tailoring a website to fit a specific user's needs.

Advertising research suggests that contextual relevancy is a critical factor that influences advertisements' effectiveness (Heckler & Childers, 1992; Lee & Mason, 1999). Relevancy reflects "how information contained in the stimulus contributes to or detracts from the clear identification of the theme or primary message being communicated" (Heckler & Childers, 1992). Fit, when applied in the context of advergame, refers to the extent to which the advergame matches with the theme or image of the advertised brand. In conventional advertisements, relevant components in the ad contain informative or persuasive elements that support or fit with the theme of the advertised brand (Muehling & McCann, 1993). For advergames, a fitting relevant design requires the context of the game to match with the theme or image of the advertised brand. For example, sports games are more appropriate for a sports brand compared to puzzle games. High fit refers to the scenario in which the context of the advergame can clearly fit or match with the theme of an advertised brand, while a low fit situation is such that the advergame context hardly reflects the primary brand message or theme.

2.5. Expectancy

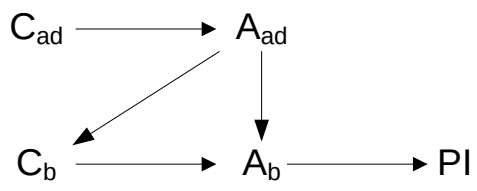
Typically, a person will be aroused when presented with a novel object (Berlyne, 1960). As such, expectancy is critical to novelty since unexpected information is delivered and received in a unique or unusual mode (Lee & Mason, 1999). In the marketing literature, the construct of expectancy is the "degree to which an item or piece of information falls into some predetermined pattern or structure" evoked by the marketing message or communication (Heckler & Childers, 1992), Developed based on the theoretical underpinnings of research in social cognition and information processing, this construct was proposed in order to investigate how the nature of incongruencies may affect the processing of complex marketing communications. In particular, prior research has found that relevant objects highlighted in advertisements were more easily recalled than irrelevant ones if they were also expected in the stimulus context. However, this difference was not observed when the objects were unexpected (Heckler & Childers, 1992).

In this paper, we define expectancy of advergames as the extent to which the design of an advergame is within the expectation of consumers compared to the existing knowledge or preconceptions in similar conventional games. Advergames with high expectancy refer to those games that are more similar to existing conventional games, while advergames with low expectancy have certain elements (e.g., game characters, components, plots, or rules) that are novel or distinct and yet unconventional or unanticipated compared to traditional games.

In sum, we try to investigate different combinations of the three factors (interactivity, fit, and expectancy). We believe that, with optimal design combinations of these factors, an advergame can fully engage consumers and facilitate a pleasurable transportation experience. Thus, in this situation, a positive transportation experience will be associated with the advergame and the advertised brand (Green et al., 2004). Ideally, positive attitudes toward a brand would also influence consumer behavioral intention in purchasing the brand.

3. Hypotheses Development

We use a dual mediation hypothesis (Homer, 1990; MacKenzie et al., 1986) (see Figure 1) to portray the relationship between our two dependent variables: attitude toward advergame (Aad) and attitude toward brand (Ab). The dual mediation model proposes that attitude toward advergame (Aad) influences attitude toward brand (Ab) both directly and indirectly through its effect on brand cognitions in consumers. Note that both the brand cognition (Cb) and ad cognition (Cad) are not the focal constructs of interest in our research model or hypotheses. Nevertheless, we do measure and control for both in our data analysis (see Table 3). We also postulate a direct one-way causal influence from Ab to purchase intention (PI) in the dual mediation model. In this study, we propose two-way interaction effects between advergames' interactivity, fit, and expectancy on Aad and main effects of these three variables on Ab. Further, we explore the causal effect from Aad to Ab, and that from Ab to PI to examine the consequent effects. Figure 2 shows our research model.



C_{ad} – ad cognition
C_b – brand cognition
A_{ad} – attitude toward advergame
A_b – attitude toward brand
PI – purchase intention

Figure 1. Dual Mediation Hypothesis

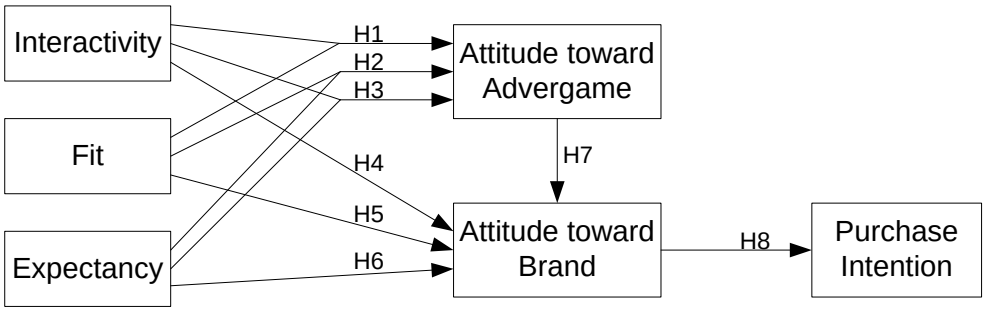


Figure 2. Research Model

3.1. Interactivity and Fit

In advergames, different from traditional passive media, brand identifiers are inserted as active game components and become brand components in the game environment (Nelson, 2002; Wu, 1999). Here, brand identifiers refer to those logos and stylized texts that have the advertising messages embedded. The essential characteristic of advergames is that consumers, in assuming the game character or role, can play with the brand components and receive feedback of advertising messages according to their actions. These brand components usually serve as tools or equipment that can help consumers to win the game or gain extra advantages (Lee, Choi, Quilliam, & Cole, 2009). Increased interactivity in an advergame enables consumers to have extensive control in playing with the brand components and to receive ample feedback of advertising messages. Since interacting with the brand components can help consumers to gain advantages in a typical advergame, consumers have an intrinsic interest and motivation in engaging with these brand components. Hence, highly interactive gameplay makes it conducive for consumers to generate positive affective responses and vivid mental imageries of the brand advertised, and thus to be transported into the advergame's narrative (Nicovich, 2005). Research in online shopping also reveals that consumers' enjoyment, as an intrinsic motivation for adopting technologies (Davis, Bagozzi, & Warshaw, 1992), is an influential factor that affects consumer attitudes (Jarvenpaa & Todd, 1996; Van der Heijden, 2003). Thus, it is likely the enjoyment from playing a highly interactive advergame will be associated with a favorable attitude toward the advergame (Jiang et al., 2010; Sweetser & Wyeth, 2005).

When an advertisement matches the theme of the brand advertised in it (i.e., there is a high fit), consumers need little effort to process the advertising information (Hastie, 1980, 1981; Scrull, 1981; Srull, Lichtenstein, & Rothbart, 1985). In an advergame with a high level of fit, the gameplay, context, and plot match with the theme of the advertised brand, and thus the advertised brand will not appear out of advergame's context. Consumers who play the advergame can easily understand the connection between the game context and the advertised brand's message or imagery. Compared to an advergame of low fit, which requires a lot of cognitive resources to decode the irrelevant advertising information, consumers are more involved or engaged when the advertised brand appears to be congruent with the game context (Hernandez, Chapa, Minor, & Maldonado, 2004). Consumers can therefore focus their attention on the gameplay and are more likely to be engaged in the advergame. When consumers engage themselves in the advergame, we expect a more positive attitude toward the advergame when the advergame context highly matches with the theme of the advertised band (Green, et al., 2004; Russell, 2002; Shamdasani, Stanaland, & Tan, 2001; Wise et al., 2008).

Given a relevant and fitting advertising context, the positive transportation experience triggered by interactivity can further enhance an individual's attitude toward an advergame. In the high fit and high interactivity condition, consumers can be totally engaged in an immersive context because the relevant advertising exposure does not disrupt the transportation experience. In particular, transported individuals have a greater affinity for the main characters of a narrative and thus are more likely to be influenced by the positive emotions or affective responses associated with these characters (Green & Brock, 2000). The presence of rich realistic details in a high fit and high interactivity scenario of advergames can also allow consumers to form more vivid and convincing mental images of brands (Green et al., 2004). However, when fit is low, the inappropriate or poorly matched ad elements are

likely to interrupt the consumers' gaming experience regardless of the extent of interactivity, such that consumers cannot fully engage in the advergame. Thus, with a lack of positive emotional reaction to the game, an optimal transportation experience is hampered. Accordingly, the low fit impedes the development of a favorable attitude (Jiang et al., 2010) toward the advergame. Therefore, we propose:

> **H1:** *There is an interaction effect between an advergame's interactivity and fit on the attitude toward the advergame. Under a high fit condition, high interactivity results in a better attitude toward the advergame than that in a low interactivity condition. However, under a low fit condition, both high and low interactivity conditions result in the same level of attitude toward the advergame.*

3.2. Fit and Expectancy

A low level of advergame's expectancy refers to the situation when certain game elements in the advergame do not meet consumers' expectations. In this situation, the game elements (e.g., game components, game plot, or game rules) in the advergame appear out of sync with conventional expectations of gaming experiences and are unique compared to conventional game designs. Compared to advergames that are more similar to conventional games, we expect that novel advergames with unique or unanticipated design or creative elements will elicit greater cognitive elaboration (Lee & Mason, 1999). When consumers encounter unforeseen or surprising game elements in the advergame, they will be curious about these game elements and be eager to explore how the novel or unconventional game elements pan out. Further, the increased elaboration of curiosity can be engaging to the extent that consumers are likely to evaluate the advergame positively when exploring fun game elements and when participating as an actor in the narrative game structure of a low expectancy nature (Lee & Mason, 1999). Consequently, we believe the enjoyment gained from the exploration of a low expectancy advergame can lead to a positive effect on attitude toward advergame.

An assumption underlying the positive effects of an unexpected stimulus is that the consumer must successfully understand the advertising message (Lee & Mason, 1999). In other words, for unexpected information to generate favorable attitudes, the advergame must be able to provide consumers with a relevant or appropriate context. If the advergame context does not match the advertised's brands theme, consumers are more likely to recognize the advertising messages' attempts to persuade them (Raney, Arpan, Pashupati, & Brill, 2003). In such a case, consumers can become suspicious of brand messages that overtly sell them products and thus be skeptical of the ads in the advergame. Further, the resistance to ad messages in advergames can impede consumers' transportation experiences. In addition, prior research on transportation theory has also documented that consumers of fictional programs are less concerned with its objective truth status, but are more concerned with whether the content meets some plausibility criterion (e.g., whether an advergame's characters, setting, or plot are plausible) (Busselle & Greenberg, 2000). In cases where advergames have low fit, such advergames tend to be less plausible to consumers, and thus result in consumers experiencing a much smaller degree of transportation or pleasure. Therefore, in sum, the positive attitude (Jiang et al., 2010) generated from low expectancy can be negated by low fit in advergames.

However, in advergames with a high fit condition, consumers are provided with a seamless, plausible game context. Consumers do not feel the advertising messages to be too prominent or incongruent, and are able to engage themselves in the advergame. Thus, coupled with high fit, an advergame's low expectancy can engender consumer pleasure and emotional resonance with the advertised brand, and thus generate a more positive attitude toward the advergame when consumers are transported seamlessly to the narrative world of the advergame. We expect that, when the advergame has a high fit with the theme of the advertised brand, a low level of expectancy helps to engage consumers in the advergame to generate a better attitude (Jiang et al., 2010) toward the advergame as compared to the high expectancy case. Therefore, we hypothesize that:

> **H2:** *There is an interaction effect between an advergame's fit and expectancy on the attitude toward the advergame. Under a high fit condition, low expectancy results in a better attitude toward the advergame than that in a high expectancy condition.*

However, under a low fit condition, both high and low expectancy conditions result in the same level of attitude toward the advergame.

3.3. Interactivity and Expectancy

When the interactivity level is high in an advergame, consumers have extensive control to play with the brand components and receive sufficient feedback of advertising messages. In a highly interactive game context, consumers are likely to fully focus and pay attention to the game play and be transported into the advergame's narrative world (Nicovich, 2005). Further, when an advergame is designed with low expectancy, consumers perceive the novel and unconventional game elements as pleasurable, surprising, and unanticipated (Berlyne, 1971). Consumers are likely to be enthused by a gratifying and entertaining engagement when they are exploring the novel and unanticipated elements in an advergame. Thus, the enjoyable experience of exploring the low expectancy elements in an advergame is further enhanced when consumers are engaged in an immersive manner in a highly interactive advergame that accentuates the active mental imagery of the advertised brand. Consequently, with the components of a transportation experience being activated (i.e., positive emotional reaction, mental imagery, and attention), an individual's transportation can be facilitated. Consequently, we expect a more favorable attitude (Jiang et al., 2010) toward advergames in both a high interactivity and a low expectancy condition (Lee, 2000).

In contrast, when the level of interactivity in an advergame is low, consumers do not have much interaction with the brand components. Consumers cannot be engaged thoroughly in a low interactivity advergame when they have fewer interactions with the brand components in the game. Even when the advergame is of low expectancy, consumers may not have an adequately engaging and pleasurable experience with the brand components in the state of a low interactivity advergame. Therefore, without the transportation phenomenon being heightened, in the low interactivity condition, we do not expect that the low expectancy in an advergame can positively impact the attitude (Jiang et al., 2010) toward advergame, relative to the high expectancy baseline.

H3: *There is an interaction effect between an advergame's interactivity and expectancy on the attitude toward the advergame. Under a high interactivity condition, low expectancy results in a better attitude toward the advergame than that in a high expectancy condition. However, under a low interactivity condition, both high and low expectancy conditions result in the same level of attitude toward the advergame.*

3.4. Main Effects on Attitude Toward Brand

When an advergame is designed with a high level of interactivity, consumers have more motivation to interact with the brand components and perform better in the advergame's gameplay. During an advergame's gameplay, advertising messages are typically shown to consumers as feedbacks of their interaction with the brand components. These advertising messages are found to be more persuasive when consumers are fully engaged in an advergame (Raney, et al., 2003). Further, if the mental simulation while playing an advergame evokes positive feelings, these feelings can get transferred to the advertised brand through a transportation experience (Glass, 2007; Green et al., 2004; Homer, 2006; Jiang et al., 2010; Suh & Lee, 2005). Thus, we hypothesize:

H4: *The interactivity of an advergame positively influences an individual's attitude toward the brand advertised in the advergame.*

When an advergame is of high fit, the gameplay, context, and plot match with the theme of the advertised brand in a coherent, seamless manner. Consumers can therefore easily understand the implied connections between the game's context and the advertised brand. Past research shows that, in electronic video games, consumers positively evaluate the advertised product when the advertised product appears in the game context in a coherent or intelligible manner (Hernandez et al., 2004). Compared to the low fit condition, an advertised brand in the high fit condition is thus able to receive a better consumer appreciation of the fit between the advertised brand and the game context, which enhances the advergame player's affective response, mental imagery, and engaged focus with the brand. We argue that this translates to a superior attitude (Jiang et al., 2010; Suh & Lee, 2005)

toward the brand through the activation of a transportation experience by a consumer (Green & Brock, 2000; Green et al., 2004). Therefore, we posit that:

H5: *The fit of an advergame positively influences an individual's attitude toward the brand advertised in the advergame.*

When an advergame is designed with a low level of expectancy, the game components are uniquely different from the conventional games consumers have played before. Such novel and unanticipated game components will increase consumers' processing effort to encode this information (Srull et al., 1985; Srull & Wyer, 1989). When consumers encounter such game components, they will be aroused and will try to explore the source of low expectancy in the gaming context. The exploration and stimulation of surprising, unconventional game elements in low expectancy, hedonic entertainment advergame platforms can thus generate positive affective responses in consumers, as has been demonstrated in the designs of web navigation systems (Webster & Ahuja, 2006). Consequently, consumers' positive affect and pleasurable feelings during gameplay can be transported to the advertised brand when they are engaged in the advergame (Green et al., 2004). Therefore, we expect that, in advergames with a low expectancy, a more positive attitude toward the advertised brand will emerge. Thus, we hypothesize:

H6: *The expectancy of an advergame negatively influences an individual's attitude toward the brand(s) advertised in the advergame.*

3.5. Impacts of Attitude Toward Advergame and Attitude Toward Brand

An advergame's ultimate goal is to advertise the brand and/or its product(s) and convince consumers to purchase the brand's product(s). Thus, it is important to investigate whether the attitude toward advergame impacts the attitude toward the brand advertised in it. Further, it is crucial to understand whether the attitude toward a brand can eventually influence purchase intention.

Our research model proposes that attitude toward advergame positively influences attitude toward brand. When consumers have a positive attitude toward an advergame, their favorable attitude is expected to be transported to the advertised brand in the advergame (Green et al., 2004). Thus, we hypothesize:

H7: *Attitude toward advergame positively influences attitude toward the brand advertised in the advergame.*

The model also postulates that attitude toward brand will eventually affect consumers' purchase intention (Homer, 1990; Jiang et al., 2010; Koufaris, 2002; Nah, Eschenbrenner, DeWester, & Park, 2010; Suh & Lee, 2005). We expect consumers' brand evaluation from an advergame to have a positive impact on their purchase intention of that brand. Therefore, we believe these two causal relationships both hold in the advergame context.

H8: *Attitude toward a brand resulting from an individual playing the advergame positively influences that individual's purchase intention.*

4. Research Methodology

4.1. Experiment Design

We designed a car racing game for this study in an online 3D virtual world platform. In the advergame, we set up four large billboards around a racing track. These billboards show the advertising messages of the advertised brand. The four billboards were large in size and were set up strategically around the track so that at least one billboard could be seen anywhere in the track. Individuals who finished the required number of laps in the minimum time were considered winners of the advergame.

We tested our proposed hypotheses in a laboratory experiment using the described advergame with a 2×2×2 between-subject design (i.e., two levels of interactivity × two levels of fit × two levels of

expectancy). Thus, the experiment compises eight treatment groups. Table 1 summarizes the eight experiment treatments. We elaborate below the operationalization of experiment treatments for the three independent variables related to the advergame's design factors.

Table 1. Breakdown of Experiment Treatments

		Expectancy (high)	Expectancy (low)
Interactivity (high)	Fit (high)	Red Bull Cans + Red Bull Billboards + Racing Car	Red Bull Cans + Red Bull Billboards + Crab Vehicle
	Fit (low)	Marigold Milk Packs + Marigold Billboards + Racing Car	Marigold Milk Pack + Marigold Billboards + Crab Vehicle
Interactivity (low)	Fit (high)	Red Bull Billboards + Racing Car	Red Bull Billboards + Crab Vehicle
	Fit (low)	Marigold Billboards + Racing Car	Marigold Billboards + Crab Vehicle

4.1.1. Interactivity

In the advergame, we manipulated interactivity by the extent to which consumers could interact with brand components by controlling the car and receive corresponding feedback of advertising messages. In the low interactivity condition, consumers could only drive the vehicle around the race track to view the billboards and be exposed to the advertising messages. Figure 3 shows an example of the advertising billboards.

In the high interactivity condition, besides the four billboards, there were four enlarged samples of the advertised product brand scattered around the race track. When traversing around the race track, in addition to receiving advertising messages from the billboards, consumers could control the vehicle to come into contact with the advertised products and receive a speed boost. The acceleration due to the speed boost was designed to be large so that consumers could easily discern the acceleration. Along with the boost, the logo of the advertised brand flashed at the top of consumer's avatar. The boost and the flash lasted for five seconds. Figure 4 shows an example of the product placement on the track and the interactive ad message displayed. Besides the advertising messages from the billboards, we consider the acceleration as an additional feedback of advertising messages when consumers interact with brand components. Since the speed boost helped consumers to drive faster, they had the intrinsic motivation to "hit" the advertised products to win the game. Therefore, consumers were likely to engage themselves in an immersive manner with the brand components in the advergame.

4.1.2. Fit

For the advergame's fit treatment, we used two brands: Red Bull (energy drink) and Marigold HL (milk). We associate Red Bull with the high fit treatment since Red Bull is an energy drink brand. The context of the racing game matches with the advertising theme of Red Bull because it gives the consumer an additional boost of energy after drinking it. In contrast, Marigold HL is a milk brand whose brand promise is about drinking milk as a healthy beverage. Our gaming context thus did not fit the brand image. Thus, Marigold HL is appropriate for the low fit treatment.

In the high fit situation (Red Bull), all the in-game advertising was about Red Bull, and the four billboards showed Red Bull advertising messages (see Figure 3). The products placed on the track in the high interactivity condition were enlarged depictions of cans of Red Bull, while, in the low interactivity condition, no products were placed on the track. When consumers drove their cars to strike the Red Bull cans on the track, they received a speed boost and saw the real-life commercial advertising message of "Red Bull gives you wings" flashed on the top of their avatar during the acceleration.

In the low fit condition, all the billboards showed the ad messages of Marigold HL milk (see Figure 5). In the high interactivity condition, the advertised products placed on the tracks were Marigold HL milk packs with a triangular top. On receiving a speed boost when the car struck the milk packs, the ad message shown was "The perfect balance of highs and lows" (i.e., balance of high nutrients and low

fats), the same one used in the product's real ad campaigns. In the low interactivity condition, there were no packages of milk on the track.

4.1.3. Expectancy

We manipulated the expectancy treatment by controlling the design of the vehicle in the racing game. When consumers enter the advergame setting, they saw only the racing track without the vehicle in sight. Consumers could only see the vehicle (either a car or a crab) after choosing the color of their vehicle. The car or crab selected was then used for the entire experiment without the possibility of switching.

For the high expectancy condition, we designed the vehicle to resemble a Formula One racing car as in those of racing games of a similar game genre (see Figures 3 and 6). For the low expectancy condition, we designed the vehicle to resemble a crab-like creature (see Figures 4 and 5). Our premise was that such a crab-liked creature is seldom used as a vehicle in conventional racing games, and thus game players would not expect to see such a unique, non-standard vehicle design in an advergame, which befits the low expectancy treatment. For both the Formula One racing car and the crab-like vehicle, participants used the same controls (four arrow keys on the keyboard) to maneuver. Similarly, the racing vehicles' speed were identical across both conditions of expectancy in the advergame.

Finally, Figures 3 to 6 show the screen shots of the four representative experiment treatments in our advergame using the criteria elaborated in this section.

Figure 3. Low Interactivity * High Fit * High Expectancy

Figure 4. High Interactivity * High Fit * Low Expectancy

Figure 5. Low Interactivity * Low Fit * Low Expectancy

Figure 6. High Interactivity * Low Fit * High Expectancy

4.2. Experimental Procedures

4.2.1. Pilot Test

We conducted a pilot test to ensure all the treatments were manipulated according to our experimental design (Perdue & Summers, 1986). We recruited 40 undergraduates and distributed them evenly to the eight treatment groups. The subjects completed a pre-experiment questionnaire soliciting information on mainly personal identification attributes. Then, we asked them to play the advergame we designed. Afterwards, we administered another questionnaire to gather data on their perceptions of the advergame and brand. We performed a manipulation check with this questionnaire, which also gathered subjects' demographic information. After the questionnaire, we obtained subjects' feedback and suggestions to improve the experiment. We revised the advergame's design and the questionnaire accordingly for the main test.

4.2.2. Participants

We recruited a total of 126 undergraduate students from a large publicly funded university. We only told subjects that they were participating in a consumer decision making experiment; we did not reveal the experimental task of playing an advergame beforehand during recruitment. Each subject received the equivalent of USD$8 as an incentive for participation. For the data analysis, we used the

responses of 121 subjects whose perceptions of the experiment treatments passed the manipulation checks (i.e., having correctly recalled the brands and vehicle types used in the experiment), and scored correctly (i.e., within one standard deviation of mean value) in all manipulation check measurement scales for interactivity, fit, and expectancy conditions specific to the treatment assigned. Among the 121 subjects used for data analysis, 72 were males (59.5%) and 49 (40.5%) were females. Subjects were on average 22.4 years old. There was no significant difference in gender and age distributions across the treatments.

4.2.3. Experiment Procedure

We randomly assigned all the subjects to a treatment group. For each session of the experiment, we paired two subjects from the same treatment group to race against each other in the advergame. Before the start of play, subjects were asked to fill in a pre-experiment questionnaire. Then, we gave them instructions on how to play the advergame. Before the actual race, we asked subjects to have a test drive in the assigned treatment condition for three rounds around the race track to grow accustomed to the advergame's race vehicle responses and interactions with the brand components (if applicable in a treatment). They were told to drive as fast as they could as an internal timer recorded the track lap time. After completing the racing game, the subjects then completed the final questionnaire, which captured various measurements of advertising effectiveness and other covariates such as brand familiarity (where the measured attributes (e.g., brand) is specific to the assigned treatment).

4.2.4. Measures

We list the measures for the manipulation check in Table 2. Our subjects' may have had different levels of brand knowledge before the experiment, which can affect their perception of the advergame and the brand advertised in the advergame (Kent & Allen, 1994; Lutz, 1985; Monroe, 1976). To control for the effect of subjects' prior brand knowledge, we measured attitude toward brand before the experiment, brand familiarity, and attitude towards ads in general. Prior studies have shown that experience in previous similar games may influence the perception of the game played (Castel, Pratt, & Drummond, 2005; Green & Bavelier, 2007). To control for the potential effect of prior game experience on attitude toward the advergame, we also captured subjects' experience in racing games. Table 3 lists the measurement items for the three outcome dependent variables of advertising effectiveness and other covariates. We captured all the measures in Table 3 in the post-game questionnaire, except for the measures for brand familiarity, attitude toward ads in general, attitude toward brand (before experiment) and experience in racing games, which we captured in the pre-game questionnaire.

Table 2. Measures for Manipulation Check

Construct	Measures
Interactivity	1. I think I had interacted with the brand information in this advergame. 2. I think I had interactive exposure to the brand information in this advergame. 3. I think I had interactive experience with the brand information in this advergame.
Fit	1. I think the theme of racing game is relevant to the Red Bull / Marigold brand. 2. I think the brand image of Red Bull / Marigold is relevant to the racing game. 3. I think the use of a racing game is appropriate for the Red Bull / Marigold brand.
Expectancy	1. I think the racing / crab car I drove is within my expectation before playing this advergame. 2. I think the design of the racing / crab car I drove is within my expectation before playing this advergame. 3. I think the design of the racing / crab car I drove is the same as conventional designs available in other racing games.

Note: 1-7 Likert scales are used: 1 = strongly disagree, 7 = strongly agree.

Table 3. Measuremenet Items for Constructs	
Construct	**Measures**
Attitude toward Advergame (attAd) (Huang, Su, Zhou, & Liu, 2013; MacKenzie & Lutz, 1989; MacKenzie et al., 1986)	What is your opinion of this advergame? 1. Extremely unfavorable / extremely favorable 2. Extremely boring / extremely interesting 3. Extremely bad / extremely good 4. Extremely unpleasant / extremely pleasant 5. Extremely dislike / extremely like 6. Extremely uninteresting / extremely interesting
Attitude toward brand (after experiment) (attBD_af) (Homer, 2006; MacKenzie & Lutz, 1989; Miniard, Bhatla, & Rose, 1990; Mittal, 1990)	After playing this advergame, what is your overall feeling about Red Bull / Marigold? 1. Extremely unfavorable / extremely favorable 2. Extremely bad / extremely good 3. Extremely unpleasant / extremely pleasant 4. Extremely undesirable / extremely desirable 5. Extremely negative / extremely positive 6. Extremely dislike / extremely like
Purchase intention (pur_int) (MacKenzie et al., 1986)	What is the probability that you will try Red Bull / Marigold after playing this advergame? 1. Extremely unlikely / extremely likely 2. Extremely improbable / extremely probable 3. Extremely impossible / extremely possible
Attitude toward ads in general (attAdG) (Huang et al., 2013)	What is your general opinion of advertisements by companies? 1. Extremely bad / extremely good 2. Extremely unpleasant / extremely pleasant 3. Extremely unfavorable / extremely favorable
Attitude toward brand (Before Experiment) (attBd_bf) (Homer, 2006; MacKenzie & Lutz, 1989; Miniard et al., 1990; Mittal, 1990)	What is your overall feeling about Red Bull / Marigold? 1. Extremely unfavorable / extremely favorable 2. Extremely bad / extremely good 3. Extremely unpleasant / extremely pleasant 4. Extremely undesirable / extremely desirable 5. Extremely negative / extremely positive 6. Extremely dislike / extremely like
Brand familiarity (fam) (Chang, Chen, & Tan, 2012; Kent & Allen, 1994)	1. With regard to my familiarity with Red Bull / Marigold, I am Extremely unfamiliar / extremely familiar 2. With regard to my experience with Red Bull / Marigold, I am Extremely inexperienced / extremely experienced 3. With regard to my knowledge with Red Bull / Marigold, I am Extremely not knowledgeable / extremely knowledgeable
Experience in racing games (expRG)	1. How much experience do you think you have in car track racing games? (1-7 Likert scales are used, 1 = left hand expression, 7 = right hand expression)
Note: 1-7 Likert scales are used. 1 = Strongly disagree, 7 = Strongly agree	

5. Data Analysis

5.1. Manipulation Checks

Using questionnaire item responses collected from the subjects, we checked the validity of the manipulation of the three independent variables. Simple t-tests on the different levels for each independent variable showed significant differences between the means for different levels of the treatments (see Table 4). Therefore, the manipulations for interactivity, fit, and expectancy were all successful.

Table 4. Manipulation Checks

Independent variable	Levels	N	Mean	Std. dev.	T-statistics
Interactivity	High	60	5.00	1.25	t = -6.738 p < 0.001
	Low	61	3.42	1.34	
Fit	High	59	5.29	1.30	t = -10.809 p < 0.001
	Low	62	2.88	1.16	
Expectancy	High	62	4.08	1.11	t = -10.740 p < 0.001
	Low	59	2.19	0.78	

5.2. Measurement Validation

We carried out all statistical tests at a 5 percent level of significance. In particular, we conducted both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to assess the survey instrument's convergent and discriminant validity for perceptual constructs. Table 5 reports the EFA results with principal component analysis and varimax rotation. We found a six-factor structure with eigenvalues greater than 1.0. All constructs explained 75.32 percent of the total variance. All measure items loaded on the target factors respectively and scored above 0.718, which indicates excellent construct validity (Cook, Campbell, & Day, 1979).

Table 6 reports the results of testing reliability and validity in CFA. Using Cronbach's alpha (Cronbach, 1951), we assessed the constructs for reliability. A value of at least 0.70 indicates adequate reliability (Nunnally, Bernstein, & Berge, 1994). The Cronbach's alphas for all constructs were well above 0.7, which indicates that all the measurement items in this study had achieved high reliability, as was the case from the results of the composite reliability metrics. All the metrics of composite reliability were greater than those of the average variance extracted (AVE) in Table 6. In addition, as is generally recommended (Fornell & Larcker, 1981), all our AVE statistics were greater than 0.5. Thus, from the factor loadings, Cronbach's alphas, and AVE, there is strong evidence of convergent validity in our measurement items.

In assessing the discriminant validity, we looked at the factor loadings and the AVE recommendation that the square root of the AVE for each construct should be greater than the construct's correlations with the other constructs (Chin, Marcolin, & Newsted, 2003). This was indeed the case (see Table 6): the smallest AVE square root was 0.822, larger than any of the inter-construct correlations (see Table 7). After the measurement validation, we took the average values across the items for each construct as a measure of the target construct.

Table 5. Results of Exploratory Factor Analysis

Variables	Items	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6
Attitude toward advergame (attAd)	attAd1	***0.760***	0.094	0.238	0.053	-0.004	-0.084
	attAd2	***0.817***	0.138	-0.083	-0.120	-0.018	0.161
	attAd3	***0.804***	0.218	0.145	0.000	-0.015	-0.027
	attAd4	***0.809***	0.045	0.096	0.125	0.115	-0.037
	attAd5	***0.871***	0.181	0.063	-0.023	-0.002	-0.129
	attAd6	***0.761***	0.250	-0.095	0.013	-0.048	0.036
Attitude toward brand (after experiment) (attBD_af)	attBd_af1	0.242	***0.790***	0.129	0.156	0.109	0.203
	attBd_af2	0.170	***0.850***	0.183	0.075	0.230	0.076
	attBd_af3	0.166	***0.820***	0.221	0.148	0.238	0.090
	attBd_af4	0.121	***0.718***	0.244	-0.107	0.154	0.237
	attBd_af5	0.240	***0.816***	0.218	0.105	0.173	-0.074
	attBd_af6	0.212	***0.818***	0.254	0.026	0.230	0.059
Purchase intention (pur_int)	pur_int1	0.135	0.387	***0.860***	-0.053	0.111	0.015
	pur_int2	0.075	0.378	***0.875***	-0.047	0.119	0.001
	pur_int3	0.106	0.301	***0.870***	-0.038	0.157	-0.026
Attitude toward ads in general (attAdG)	attAdG1	0.100	0.042	0.044	***0.836***	-0.044	0.051
	attAdG2	0.019	0.066	-0.034	***0.867***	0.136	0.121
	attAdG3	-0.089	0.128	-0.120	***0.829***	0.152	0.000
Attitude toward brand (before experiment) (attBd_bf)	attBd_bf1	-0.011	0.216	-0.037	0.050	***0.846***	0.166
	attBd_bf2	-0.036	0.228	0.014	0.096	***0.844***	0.184
	attBd_bf3	0.121	0.141	-0.003	0.159	***0.849***	0.169
	attBd_bf4	0.093	0.063	0.194	-0.036	***0.762***	0.115
	attBd_bf5	-0.047	0.203	0.147	0.067	***0.874***	0.111
	attBd_bf6	-0.073	0.133	0.122	0.013	***0.805***	0.139
Brand familiarity (fam)	fam1	0.013	0.174	-0.090	0.070	0.268	***0.795***
	fam2	-0.042	0.053	0.097	0.044	0.452	***0.765***
	fam3	-0.064	0.136	0.005	0.088	0.175	***0.837***

Table 6. Results of Confirmatory Factor Analysis

Constructs	Cronbach's alpha	Composite reliability	AVE
attAd	0.904	0.926	0.676
attBd_af	0.942	0.955	0.778
pur_int	0.959	0.973	0.924
attAdG	0.821	0.893	0.737
attBd_bf	0.933	0.947	0.750
fam	0.840	0.904	0.758

Table 7. Correlation of Variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) attAd	1.000								
(2) ttBd_af	0.404	1.000							
(3) pur_int	0.248	0.593	1.000						
(4) attAdG	0.038	0.181	-0.035	1.000					
(5) ttBd_bf	0.053	0.427	0.273	0.185	1.000				
(6) fam	-0.020	0.299	0.092	0.178	0.516	1.000			
(7) expRG	0.003	0.069	0.073	0.010	0.179	0.213	1.000		
(8) age	-0.046	-0.093	-0.097	-0.235	0.102	0.204	0.092	1.000	
(9) male	-0.074	0.045	-0.086	-0.121	0.066	0.136	0.199	0.215	1.000

5.3. Results of ANCOVA on Attitude Toward Advergame

We conducted MANCOVA on both attitude toward advergame and attitude toward brand (measured after playing the advergame). Results show that the treatment effects were significant ($p < 0.05$). Thus, we further conducted ANCOVAs on the two dependent variables separately. Table 8 presents the descriptive statistics of the experiment treatment results on attitude toward advergame. The results of an ANCOVA test on attitude toward advergame show that all the two-way interaction effects between the three independent variables were significant (see Table 9). None of the covariates have a significant effect. To study the interaction effects, we used a simple main effect analysis.

Table 8. Descriptive Statistics of Attitude Toward Advergame

Mean (N, SD)		Expectancy (high)	Expectancy (low)
Interactivity (high)	Fit (high)	5.27 (16, 0.88)	5.39 (14, 0.69)
	Fit (low)	5.02 (16, 0.91)	4.44 (14, 0.98)
Interactivity (low)	Fit (high)	3.96 (14, 0.86)	5.11 (15, 0.48)
	Fit (low)	5.10 (16, 0.94)	5.02 (16, 0.99)

Table 9. Results of ANCOVA on Attitude Toward Advergame, R^2 = 21.9%						
Source		**B**	**SE#**	**df**	**Mean Sq.**	**F**
Covariates	Brand familiarity	0.014	0.077	1	0.027	0.035
	Attitude toward ads in general	0.004	0.109	1	0.001	0.001
	Attitude toward brand (Bef Expt)	0.078	0.122	1	0.315	0.408
	Experience in racing games	-0.015	0.056	1	0.052	0.068
	Male	-0.035	0.178	1	0.030	0.039
	Age	-0.010	0.047	1	0.035	0.045
Main Effect	Interactivity (Int)	-0.582	0.330	1	1.241	1.608
	Fit (Fit)	0.141	0.323	1	0.112	0.146
	Expectancy (Exp)	0.084	0.315	1	0.841	1.090
Interaction Effect	Int * Fit	0.833	0.466	1	8.810	11.415
	Int * Exp	0.474	0.458	1	4.172	5.406
	Fit * Exp	-1.272	0.458	1	6.954	9.011
	Int * Fit * Exp	0.565	0.650	1	0.583	0.755
Notes: *p < 0.05, **p < 0.01 ; # SE: Standard error						

In support of H1, the interaction effect between fit and interactivity was significant ($F = 11.415$, $p < 0.01$). In the condition of high fit, attitude toward advergame was significantly higher ($F = 1.685$, $p < 0.05$) in the high interactivity condition ($N = 30$, Mean = 5.33, SD = 0.784) than in the low interactivity condition ($N = 29$, Mean = 4.56, SD = 0.892). In the condition of low fit, we detected no significant main effect for interactivity ($F = 0.017$, $p > 0.05$). Therefore, H1 is supported (see Figure 7).

In support of H2, the interaction effect between fit and expectancy was significant ($F = 9.011$, $p < 0.01$). In the condition of high fit, attitude toward advergame was significantly higher ($F = 14.893$, $p < 0.05$) in the low expectancy condition ($N = 29$, Mean = 5.25, SD = 0.595) than in the high expectancy condition ($N = 30$, Mean = 4.66, SD = 1.081). In the condition of low fit, we detected no significant main effect for interactivity ($F = 0.166$, $p > 0.05$). Therefore, H2 is supported (see Figure 8).

As for H3, the interaction effect between interactivity and expectancy was significant ($F = 4.172$, $p < 0.05$). However, contrary to our hypothesis, in the condition of high interactivity, we detected no significant main effect for expectancy ($F = 0.019$, $p > 0.05$). However, in the condition of low interactivity, attitude toward advergame was significantly higher ($F = 8.362$, $p < 0.05$) in the low expectancy condition ($N = 31$, Mean = 5.07, SD = 0.775) than in the high expectancy condition ($N = 30$, Mean = 4.57, SD = 1.058). Therefore, H3 is not supported (see Figure 9).

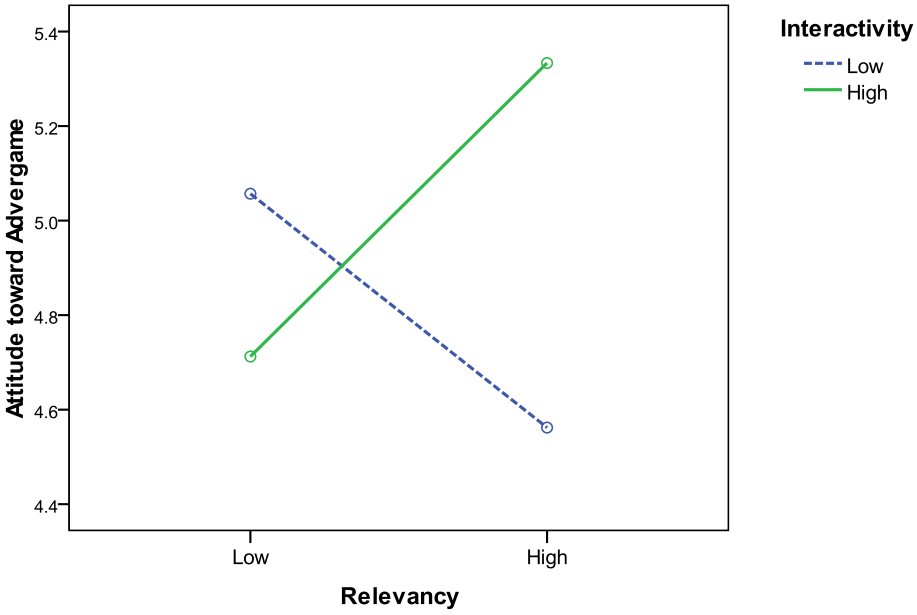


Figure 7. Interaction Effect (Fit * Interactivity)

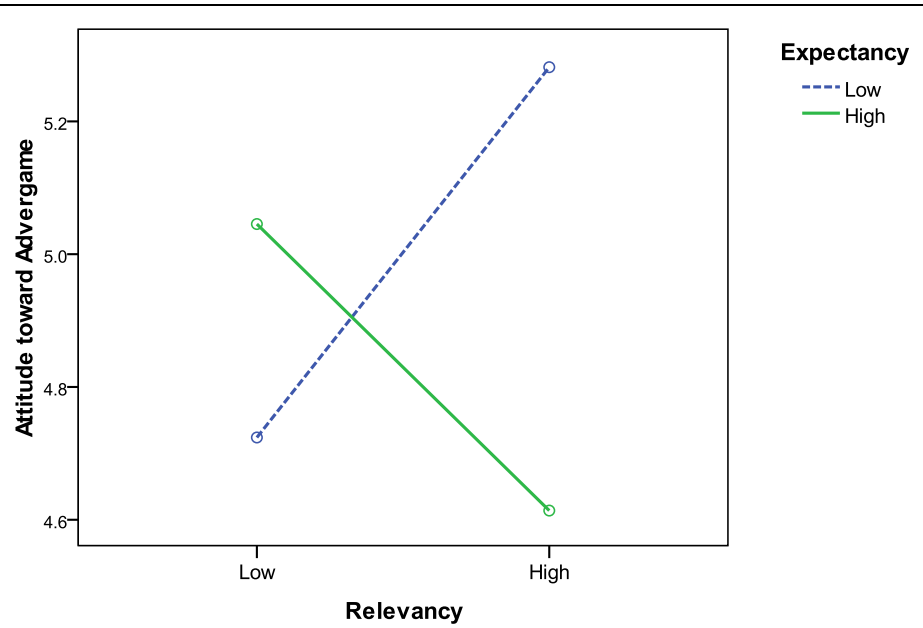


Figure 8. Interaction Effect (Fit * Expectancy)

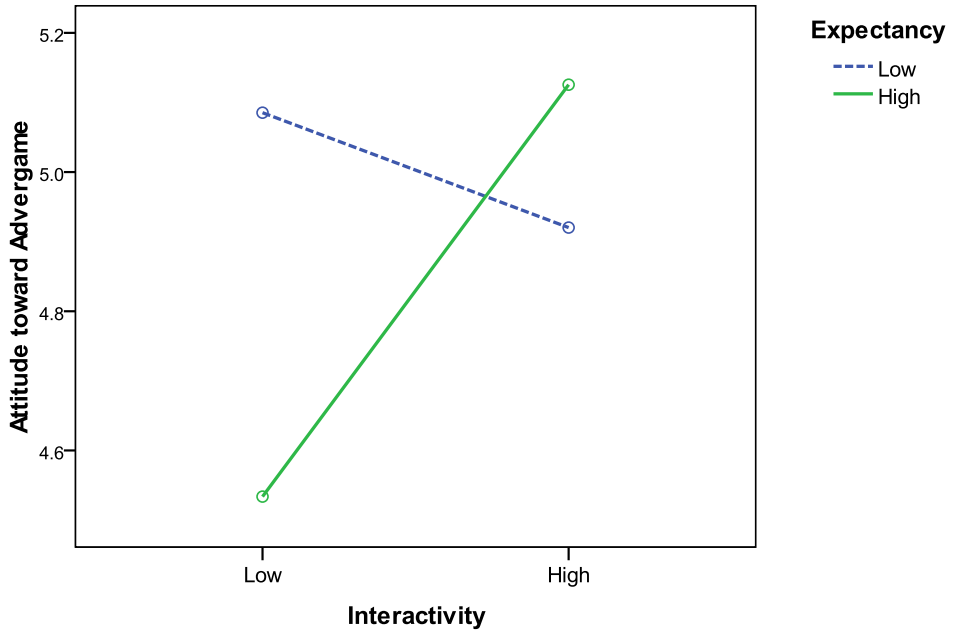


Figure 9. Interaction Effect (Interactivity * Expectancy)

5.4. Results of ANCOVA on Attitude Toward Brand

Table 10 shows the descriptive statistics of attitude toward brand (after the experiment). The results of an ANCOVA test on the dependent variable attitude toward brand show that only the main effect of interactivity was significant (see Table 11). One covariate, attitude toward brand (before the experiment), was significant ($F = 15.217$, $p < 0.05$).

Table 10. Descriptive Statistics of Attitude Toward Brand

Mean (N, SD)		Expectancy (high)	Expectancy (low)
Interactivity (high)	Fit (high)	4.98 (16, 0.72)	5.30 (14, 0.69)
	Fit (low)	4.98 (16, 1.00)	4.88 (14, 0.84)
Interactivity (low)	Fit (high)	4.69 (14, 0.90)	4.50 (15, 0.88)
	Fit (low)	4.69 (16, 0.81)	4.94 (16, 0.64)

In support of H4, the main effect of interactivity was significant ($F = 5.652$, $p < 0.05$). However, the main effects for fit and expectancy were not significant ($F = 0.612$, $p > 0.05$; $F = 1.823$, $p > 0.05$ respectively). Thus, H5 and H6 are not supported.

Table 11. Results of ANCOVA on Attitude Toward Brand

Source		B	SE#	df	Mean Sq.	F	Sig.
Covariates	Brand familiarity	0.058	0.065	1	0.435	0.810	0.370
	Attitude toward ads in general	0.064	0.091	1	0.265	0.493	0.484
	Attitude toward brand (Bef Expt)	0.399	0.102	1	8.175	15.217	0.001**
	Experience in racing games	-0.015	0.047	1	0.053	0.098	0.755
	Male	0.176	0.149	1	0.749	1.395	0.240
	Age	-0.067	0.040	1	1.529	2.847	0.094
Main effect	Interactivity (Int)	0.007	0.276	1	3.036	5.652	0.019*
	Fit (Fit)	-0.182	0.270	1	0.329	0.612	0.436
	Expectancy (Exp)	-0.257	0.263	1	0.979	1.823	0.180
Interaction effect	Int * Fit	0.739	0.389	1	0.889	1.656	0.201
	Int * Exp	0.299	0.382	1	0.053	0.098	0.755
	Fit * Exp	0.225	0.382	1	0.180	0.336	0.563
	Int * Fit * Exp	-0.769	0.543	1	1.078	2.006	0.160

Notes: *p < 0.05, **p < 0.01 ; # SE: Standard error

5.5. Results of PLS Analysis on Overall Model

In addition to the ANCOVA analysis, we also used the partial least squares (PLS) analysis to evaluate the structural model proposed in Figure 2. We conducted bootstrap resampling on the structural model to examine path significance. Overall, as Figure 10 shows, the PLS analysis revealed very good model fit statistics for the models of attitude toward advergame (R2 = 22.0%), attitude toward brand (R2 = 39.7%), and purchase intention (R2 = 36.5%).

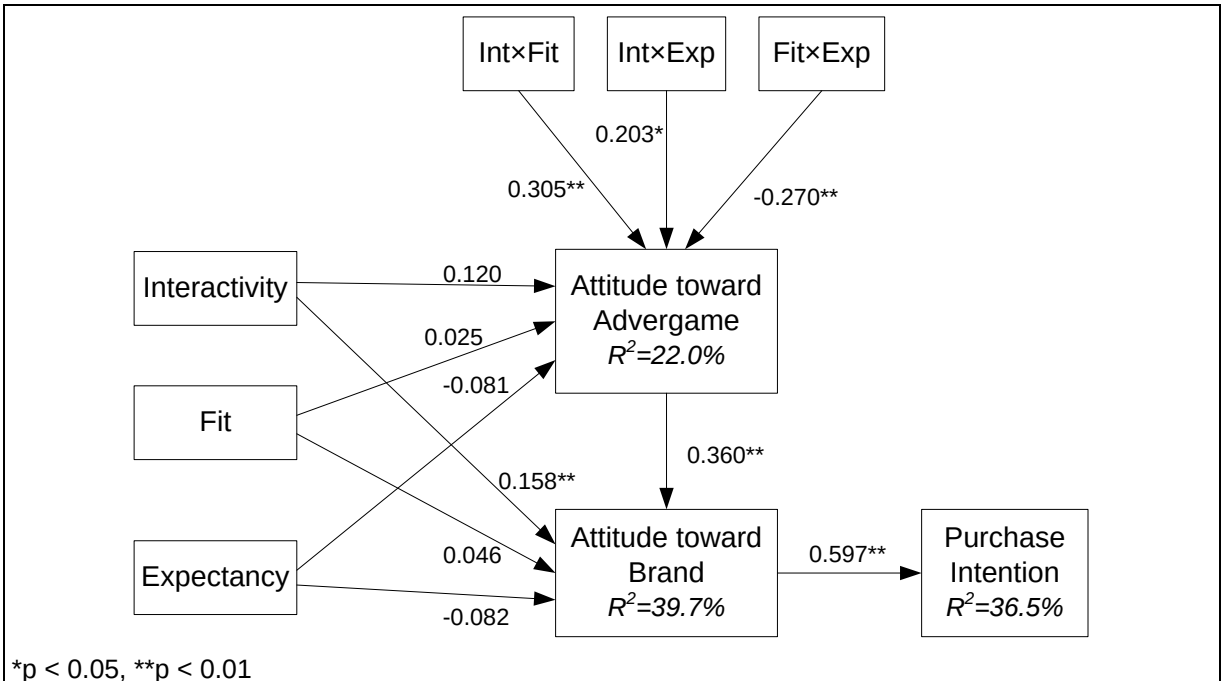


Figure 10. Partial Least Squares (PLS) Analysis Results (n = 121)

Results of the PLS analysis on attitude toward advergame as Table 12 shows essentially confirm the ANCOVA results of significant two-way interaction effects between interactivity, fit, and expectancy of advergame ($p < 0.01$). As such, the PLS analysis confirms the support of H1 and H2 but does not find support for H3. None of the other covariates included in the PLS model was significant.

Table 12. Results of PLS on Attitude Toward Advergame (R^2 = 22.0%)

Source		Path coefficient	T-statistics	Hypothesis testing
Main effect	Interactivity (Int)	0.120	1.270	
	Fit (Fit)	0.025	0.270	
	Expectancy (Exp)	-0.081	0.930	
Interaction effect	Int * Fit	0.305**	4.274	H1 supported
	Fit * Exp	-0.270**	2.825	H2 supported
	Int * Exp	0.203*	2.516	H3 not supported
Covariates	Brand familiarity	0.006	0.055	
	Attitude toward ads in general	0.014	0.134	
	Attitude toward brand (Bef Expt)	0.070	0.572	
	Experience in racing games	-0.027	0.252	
	Male	-0.002	0.020	
	Age	-0.013	0.151	

Notes: *p < 0.05, **p < 0.01. Two-tailed tests.

Results in Table 13 for attitude toward brand also reaffirm the ANCOVA results. Specifically, we uncovered a significant positive relationship between the interactivity of advergame and attitude toward brand ($p < 0.01$), but not for the fit and expectancy attributes of advergame. Thus, H4 is supported but not H5 and H6. In support of H7, we also find that attitude toward advergame had a significant positive effect on attitude toward brand ($p < 0.01$). One of the included covariates, attitude toward brand (before experiment) was statistically significant and had a path coefficient (0.373, $p < 0.01$) comparable to that of attitude toward advergame (0.360, $p < 0.01$). Lastly, results in Table 14 show that the causal effect from attitude toward brand to purchase intention was also significant ($p < 0.01$). Thus, H8 is supported.

Table 13. Results of PLS on Attitude Toward Brand (R^2 = 39.7%)

Source		Path coefficient	T-statistics	Hypothesis testing
Main effect	Interactivity (Int)	0.158**	2.618	H4 supported
	Fit (Fit)	0.046	0.647	H5 not supported
	Expectancy (Exp)	-0.082	1.283	H6 not supported
	Attitude toward advergame	0.360**	4.431	H7 supported
Covariates	Brand familiarity	0.097	0.978	
	Attitude toward ads in general	0.061	0.868	
	Attitude toward brand (Bef Expt)	0.373**	3.406	
	Male	0.101	1.332	
	Age	-0.150	1.677	

Notes: *p < 0.05, **p < 0.01. Two-tailed tests.

Table 14. Results on PLS on Purchase Intention (R^2 = 36.5%)				
Source		**Path coefficient**	**T-statistics**	**Hypothesis testing**
Main effect	Attitude toward brand	0.597**	7.993	H8 supported
Covariates	Male	-0.018	0.641	
	Age	-0.109	1.254	
Notes: *p < 0.05, **p < 0.01. Two-tailed tests.				

6. Discussion and Implications

6.1. Discussion

This study investigates the impact of three advergame design factors (interactivity, fit, and expectancy) on advertising effectiveness outcomes of attitudes toward advergame and brand. Overall, we find that all the two-way interactions between these three factors on attitude toward advergame were significant. Our findings also suggest that interactivity had a significant positive main effect on attitude toward brand. Interestingly, we find that attitude toward advergame was positively related to attitude toward brand, which, in turn, influenced consumers' purchase intention. Table 15 summarizes the results of the research hypotheses tests.

Table 15. Hypotheses Testing Results	
Hypotheses	**Supported?**
H1: Interaction effect of interactivity & fit on attitude toward advergame	Yes
H2: Interaction effect of fit & expectancy on attitude toward advergame	Yes
H3: Interaction effect of interactivity & expectancy on attitude toward advergame	No, but sig.
H4: Positive effect of interactivity on attitude toward brand	Yes
H5: Positive effect of fit on attitude toward brand	No
H6: Negative effect of expectancy on attitude toward brand	No
H7: Positive effect of attitude toward advergame on attitude toward brand	Yes
H8: Positive effect of attitude toward brand on purchase intention	Yes

First, the impact of interactivity in an advergame was contingent on the level of fit. In the high fit condition, high (low) interactivity led to a more (less) favorable attitude toward advergame. In contrast, in the low fit condition, interactivity seemed immaterial in changing the attitude toward advergame. Our findings are consistent with past literature that shows that fit is an important premise in forming a favorable ad evaluation (Lee & Mason, 1999). Similar to previous studies (Jiang & Benbasat, 2007; Suh & Lee, 2005), our results affirm that an increase in interactivity can also lead consumers to be more engaged in a task (i.e., the gameplay in our advergame context) and consequently form a more favorable attitude toward the advergame in question.

Second, the impact of expectancy of an advergame was contingent on the level of fit. In the high fit condition, low (high) expectancy led to a more (less) favorable attitude toward advergame. However, in the low fit condition, consumers' expectancy of the advergame did not influence the attitude toward advergame. This result confirms the finding from prior research that unanticipated information from ad exposures aid in consumers' attitude formation only when it is relevant to the main advertising messages (i.e., the message is perceived to be coherent or intelligible) (Lee & Mason, 1999).

Third, the interaction effect between interactivity and expectancy in an advergame was significant. Contrary to our hypothesis, in the low interactivity condition, rather than the high interactivity condition, low (high) expectancy drew a more (less) favorable attitude toward advergame. However, in the high

interactivity condition, low expectancy did not arouse a significantly better attitude toward advergame compared to high expectancy. We conducted post-hoc interviews with several subjects to generate some insights for this result. The outcome of these interviews suggested that, in the high interactivity condition, subjects were highly immersed in the gameplay such that a majority of their attention was focused on the interactive aspects of the advergame. Thus, a negligible amount of the subjects' cognitive evaluation was dedicated to the expectancy feature (Grigorovici & Constantin, 2004; Lee & Faber, 2007). However, in the low interactivity condition, subjects did not need to constantly interact with the brand components in the advergame (i.e., maneuvering the race vehicle to strike the advertised product in order to get a speed boost). Thus, subjects were able to afford a higher level of cognitive and affective evaluations on the low expectancy element (i.e., novel and creative game design) of the advergame, leading to a better attitude toward advergame.

Fourth, interactivity in an advergame had a significant impact on consumers' attitude toward brand. As put forward by the engagement theory, when individuals are involved in a highly interactive task, they are more likely to be engaged in the task (Kearsley & Shneiderman, 1998). Our finding is consistent with the transportation theory, which posits that, if an engaging experience of an advergame generates a positive attitude toward that advergame, this favorable attitude can then be transferred to the advertised brand (Green et al., 2004).

Fifth, fit of ad message in an advergame showed no significant direct effect on attitude toward brand. A possible explanation is that, in the high fit condition, even though consumers could easily relate to the connection between the game context and the advertised brand, they were still skeptical of the ad messages' credibility in relation to the gameplay in the advergame (Scott, 1994) or due to their lack of personal knowledge of the advertised brands. Besides, we measured the attitude toward brand right after subjects finished their experiment. With the skepticism about the advertised brand fresh in mind, it might have been hard for subjects to form a favorable attitude toward the advertised brand. The effect of the fit in an advergame on attitude toward brand could be further investigated in future by selecting or manipulating other advertised brands or ad messages of the brands highlighted in the advergame.

Sixth, the direct effect of expectancy of an advergame on attitude toward brand was not significant. Attitude toward brand is regarded as a long-term memory of consumers (Mitchell, 1986). The attitude toward brand in consumers' long-term memory is typically affected after an exposure to a marketing communication. In addition, only limited information in consumers' short-term memory (i.e., attitude toward advergame) can be transferred to a long-term memory (i.e., attitude toward brand) (Anderson, 1996). Thus, the positive effect of low expectancy on the attitude toward brand might only be observable or measured after a prolonged period. This effect could be tested in future research where attitudes toward brand can be measured in a delayed time window after the completion of the experiments.

Seventh, we acknowledge that attitude toward brand before experiment (coefficient = 0.373) had a large effect on attitude toward brand after experiment, which is intuitive and expected. However, we also note that the direct total effects of interactivity (coefficient = 0.158) and attitude toward advergame (coefficient = 0.360) were larger than the single impact of attitude toward brand before experiment. Thus, we conclude that there was still substantial significant influence of the impacts of attitude toward advergame and also interactivity of advergame on attitude toward brand after experiment, although the latter's impact was about half of that of the prior attitude toward brand (before experiment). These results thus do still provide evidence on the usefulness of engaging customers using advergames to influence their brand attitudes.

Lastly, although two of the main effects on attitude toward brand were not significant, our results show that attitude toward advergame had a positive effect on attitude toward brand. This finding indicates that the positive relationship between attitude toward ads and attitude toward brand in the previous research is valid in the advergame context, too (Homer, 1990; MacKenzie et al., 1986). Further, our results show that the attitude toward brand has a positive influence on consumers' purchase intention. This evidence affirms advergames' value proposition and effectiveness in increasing consumer purchase intentions of the advertised brand.

6.2. Implications for Theory

This study examines the effects of three important design factors for advergames: interactivity, fit, and expectancy. Based on the engagement theory and transportation theory, we explain the underlying mechanisms of how these three factors influence the advertising effectiveness of advergames. Transportation theory provides a lens for understanding how attitude toward advergame and attitude toward brand can be influenced by the design factors of interactivity, fit, and expectancy. Specifically, transportation theory contributes to the conceptual understanding of advergame efficacy and advertising effectiveness by helping to specify mechanisms underlying favourable attitudes toward an advergame and a brand. These mechanisms include the phenomenological experience of enjoyment through immersion in a narrative mediated environment, engagement, and enjoyment through the beneficial consequences of advergame exposure, and the circumstances under which attitudes toward an advergame and a brand are enhanced or reduced. This study highlights that, in the context of advergames, transportation itself is a tripartite formulation (based on attention, imagery, and feelings) of persuasive communication both in an advertising and gaming context.

This study identifies interactivity as advergames' unique characteristic compared to conventional advertisements. In the advergame context, we conceptualize interactivity as the extent to which consumers can interact with brand components and receive feedback of advertising messages accordingly. Through interaction with brand components in the advergame, the role of consumers' receiving advertising messages has been changed from a passive viewer to an active player. Interactivity in advergames allows individuals to easily leave their physical and psychological realities behind in a narrative gaming context and become fully engaged as an active participant in an advergame's plot. Our findings extend the theoretical boundary in the HCI literature (Jiang & Benbasat, 2007; Jiang et al., 2010) by incorporating interactivity into the online advertising context. Studying the effects of interactivity in the advergame context is important because consumers' interaction with brand components is a dominant feature of advergames.

In addition, we also extend the concept of task-technology fit in the IS literature (Goodhue & Thompson, 1995; Liu & Goodhue, 2012) to the context of online advertising from the perspective of the brand marketer. Beyond the task-technology fit theory, which only focuses on the mental representation or imagery of tasks involved, our application of the transportation theory in this paper highlights the pivotal roles of emotion and attention as driven by an IT artifact. Importantly, we clarify how the fit of an advergame in terms of its game elements or components with the theme or image of an advertised brand can influence the responses, attention, and mental imagery created by the advergame, and how these can affect the extent of a consumer's transportation experience. Examining the effects of fit of an advergame is instrumental since this design factor is crucial in determining the plausibility of the brand engagement and the persuasive capability of the advertising message embodied in the advergame.

This study also incorporates another crucial factor in the advertising literature (i.e., expectancy in advergames) (Heckler & Childers, 1992). We extend previous research in the advertising literature and demonstrate the combined effects of expectancy together with interactivity and fit of advergames on consumers' attitudes toward advergames and brands. By bringing together the engagement theory and transportation theory to shed light on the underlying mechanism of how interactivity, fit, and expectancy of advergames can influence the components of emotion, mental imagery, and attention in a transportation experience, this study provides theoretical underpinnings to understand the interaction effects among the three design factors of advergames. This is an important contribution to the extant literature of both HCI and advertising (Jiang & Benbasat, 2007; Jiang et al., 2010; Lee & Mason, 1999).

Based on the dual mediation hypothesis (Homer, 1990), our data validates the causal effect from attitude toward advergame to attitude toward brand in the advergame context. In accordance with the transportation theory, the positive attitude toward advergame was transferred to the advertised brand. This study goes one step further by investigating whether the beneficial effects of the advergame influence consumers' purchase intention. The result supports our hypothesis and contributes more evidence for the dual mediation hypothesis. In sum, this study uncovers the underlying mechanisms of how the proposed design factors of interactivity, fit, and expectancy influence the advertising effectiveness of an advergame in terms of consumer attitudes and purchase intention.

6.3. Implications for Practice

We provide practical implications for advertisers and game developers to improve the design of advergames in order to promote their brand and/or product in an effective manner. With proper design combinations of the three proposed factors of advergames (e.g., high fit with high interactivity, high fit with low expectancy, or low interactivity with low expectancy), advertisers can optimally design an advergame that best fits their advertised brand or product according to their objective(s).

First, our results show that the design combination of high fit coupled with high interactivity of an advergame can enhance individual's attitude toward that advergame, relative to a low interactivity baseline. This implies that advergame designers and advertisers should strive to achieve a good fit between the image or theme of the advertised brand and an advergame's game elements. A particular manner of achieving such high fit is to carefully identify the target segment of consumers who are likely to have a strong affinity to the brand or product category, and then select appropriate advertising messages that appeal to the target segment and have a strong fit to the gaming context. In addition, advergame designers should also put in place message strategies, in relation to the game play, that clearly identify the consumer benefits of a brand and that can capture and hold the target market's attention. In terms of the level of interactivity in an advergame, marketers and advergame designers can customize appropriate genres of games in relation to the brand advertised or the ad message communicated. For example, action arcade-style games high interactivity requirements (i.e., those games that require the player to control a central game character using quick reflexes, accuracy, and timing to overcome obstacles in various platforms; e.g., Donkey Kong and Super Mario) could be appropriate for brands with well-known mascots such as the Michelin tire man.

Second, our findings reveal that the design combination of high fit coupled with low expectancy of an advergame can increase the attitude toward advergame, relative to a high expectancy condition. This result implies that, besides aiming for high fit in advergame elements, advergame designers should also strive to achieve consumer delight and gratification in novel game play elements (i.e., through low expectancy). This can be accomplished by: 1) designing unique, creative, or even wacky game elements (e.g., refreshing game plots, character designs, gameplay, interaction modes, etc.), 2) combining different game genres into a single game such that the best and most unique aspects of the genres are fused into unconventional gameplay in the advergame, and 3) optimizing the creative concept in the advergame to capitalize on an alternative avant-garde idea that can bring the ad message strategy to life and resonate in the consumers' minds.

Third, our results demonstrate that, contrary to our hypothesis, the design combination of low interactivity coupled with low expectancy of an advergame can increase the attitude toward advergame. This result points to the value proposition of casual games (i.e., those with simple rules, easy play techniques, and a low degree of strategy needs) designed with a low to moderate amount of user interaction with the game or brand components. Such casual games that also incorporate novel creative game elements not in players' familiar expectations would suffice to enhance consumers' attitudes toward advergames. In particular, this genre of low interactivity casual games is already riding high on the popularity of mobile phones and games developed for mobile platforms such as the iPhone and iPhone apps based on Apple Inc's iOS. As such, marketers and advergame designers could capitalize on the popularity of mobile casual games to engage and enthuse customers with advergames that include unique game play elements. A good example of such an approach is Rovio's development of the Angry Birds Season game with a unique mid-autumn moon cake festival theme for the Chinese market, coupled with an ad campaign of Angry Birds moon cake pastries (Takahashi, 2011).

Fourth, we find that high interactivity of an advergame can help individuals to have a positive attitude toward a brand advertised in the advergame. As such, instead of locating the brand components such as logos, trademarks, or mascots in the game's background, advergame designers could embed brand components explicitly into the forefront of interactive game components so that consumers can interact frequently with the brand components in an intuitive manner during gameplay. These brand components should also be designed in a manner that can help players to achieve winning advantages in the game in order to highlight the brand usage or consumption benefits. In such a scenario, consumers would have more intrinsic motivation to interact with the brand components, and thus enhance their attitude toward the brand and/or product.

Fifth, our study documented both a positive effect of attitude toward advergame on attitude toward brand, and of attitude toward brand on consumer's purchase intention. These results suggest that consumers may have a good likelihood of purchasing the advertised product or brand after playing advergames. Advertisers and advergame designers can thus incorporate appropriate call-to-action elements in the advergame in order to convert the game player to a brand customer. For example, at the conclusion of gameplay, consumers can be shown a prominent featured link to the e-commerce website of the advertised brand, or a toll-free phone number for taking orders on the phone. Such time-critical exposures to stimuli for consumer calls-to-actions can drive consumers with high purchase intention or probability to complete a purchase transaction on a website or via the phone.

6.4. Limitations and Future Research

Of course, our study has limitations, which create various avenues for future studies. First, the brands we used in our experiment are real commercial brands and are familiar to most of the experiment subjects. Participants' attitude toward the brand may thus have been influenced by their prior knowledge of the brand. In our data analysis, however, we controlled both the attitude toward the brand before the experiment and brand familiarity as covariates. Nevertheless, future studies could use hypothetical unknown brands. By using hypothetical unknown brands, consumers' attitude toward a brand and brand familiarity are equalized and controlled for prior to the start of the experiment.

Second, we manipulated the fit of the advergame in our experiment across the high and low fit conditions by using the Red Bull energy drink and Marigold milk, respectively. Consequently, any differences in the attitude toward brand detected across the high and low fit conditions may have been due to the different choice of brands (i.e., Red Bull or Marigold) or beverage types (i.e., energy drink or milk), rather than the difference in fit of the advergame in our experiment. Nevertheless, it is instructive to note that the choice of the energy drink (and thus the Red Bull brand) to correspond to the high fit condition is crucial since it directly relates to a car racing game (e.g., due to the Red Bull drink providing energy or speed boosts in sporting activities). Similarly, the choice of the milk drink (and thus the Marigold brand) is appropriate in the low fit condition since milk as a beverage is generally not known as an energy-providing drink and milk brands are very seldom seen as sponsoring brands in sporting events compared to other beverage or drink brands such as Gatorade, Coke, Minute Maid, and so on. To the extent that the fit of the advergame reported in this study does not have an impact on attitude toward brand, this possible confounding of the advergame fit factor with the brand or beverage type used in the experiment may be less of a concern here in our reported results.

Third, to keep the manipulation on expectancy robust, we manipulated the low expectancy condition in terms of driving a crab-liked creature in the advergame. However, in relating the low expectancy treatment condition to the actual Red Bull energy drink brand, a bullriding game may be a more ideal advergame gaming context since the bull is used as a part of the Red Bull brand logo and trademark. A bull riding game may render the game context more relevant to the brand image of Red Bull. However, we did not use a bull riding game scenario in the experiment because the graphical depiction of two bulls in the Red Bull brand logo may confound the effect of the fit treatment in our experiment.

Fourth, a car racing game requires much of the consumer's attention toward the game itself and less attention may be paid to the advertising messages communicated in the advergame. Consequently, consumers may not have enough time or cognitive resources to evaluate the advertising messages. Thus, a more leisurely casual game with more focus on entertainment and less demand for cognitive resources could be customized into an advergame for further investigation.

7. Conclusion

In conclusion, this study examines the roles of interactivity, fit, and expectancy on the advertising effectiveness of advergames. Based on the engagement theory and the transportation theory, this study focuses on three design factors of advergames and develops a comprehensive and integrated model for the advergame environment. The findings suggest that the interactivity element is an important factor that can trigger the transportation experience and shows positive effects on both attitude toward advergame and attitude toward brand. In addition, our data validates robust interaction effects of the three factors as proposed by our hypotheses (i.e., high interactivity and low

expectancy both lead to a higher attitude toward advergame under a high level of fit). One interesting finding contrary to our hypothesis was that low expectancy lead to a more favorable attitude toward advergame under a low level of interactivity. The data also confirms the causal effects from attitude toward advergame to attitude toward brand. Further still, the data validates the positive influence of attitude toward brand on purchase intention for an advergame environment. In sum, our study provides important insights on the kind of digital advertising that consumers want to participate in or be engaged by, rather than be annoyed or disturbed by.

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References

Agarwal, R., & Venkatesh, V. (2002). Assessing a firm's web presence: A heuristic evaluation procedure for the measurement of usability. *Information Systems Research*, *13*(2), 168-186.

Anderson, J. R. (1996). *The architecture of cognition*. Cambridge, MA: Harward University Press.

Berlyne, D. E. (1960). *Conflict, arousal, and curiosity.* New York: McGraw-Hill.

Berlyne, D. E. (1971). *Aesthetics and psychobiology*. New York: Meredeth.

Berman, J., & Weitzner, D. (1995). Abundance and user control: Renewing the democratic heart of the First Amendment in the age of interactive media. *Yale Law Journal*, *104*(7), 1619-1637.

Bezjian-Avery, A., Calder, B., & Iacobucci, D. (1998). New media interactive advertising vs. traditional advertising. *Journal of Advertising Research*, *38*(4), 23-32.

Blattberg, R., & Deighton, J. (1991). Interactive marketing: Exploiting the age of addressability. *Sloan Management Review*, *33*(1), 5-14.

Brock, T., & Livingston, S. (2004). The need for entertainment scale. In L. J. Shrum (Ed.), *The psychology of entertainment media: Blurring the lines between entertainment and persuasion* (pp. 255-274). Mahwah, NJ: Erlbaum.

Buckner, K., Fang, F., & Qiao, S. (2002). Advergaming: A new genre in internet advertising. *SoCbytes Journal*, *2*(1).

Busselle, R. W., & Greenberg, B. S. (2000). The nature of television realism judgments: A reevaluation of their conceptualization and measurement. *Mass Communication and Society*, *3*(2-3), 249-268.

Castel, A., Pratt, J., & Drummond, E. (2005). The effects of action video game experience on the time course of inhibition of return and the efficiency of visual search. *Acta Psychologica*, *119*(2), 217-230.

Chang, K. T. T., Chen, W., & Tan, B. C. Y. (2012). advertising effectiveness in social networking sites: Social ties, expertise, and product type. *IEEE Transactions On Engineering Management*, *59*(4), 634-643.

Chapman, P., Selvarajah, S., & Webster, J. (1999). *Engagement in multimedia training systems*. Paper presented at the 32nd Hawaii International Conference on System Sciences, Hawaii.

Chin, W. W., Marcolin, B. L., & Newsted, P. R. (2003). A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic mail emotion/adoption study. *Information Systems Research*, *14*(2), 189-217.

Cho, C., & Leckenby, J. (1997). *Internet-related programming technology and advertising.* Paper presented at the Conference of the American Academy of Advertising, Cincinnati, Ohio: University of Cincinnati.

Cook, T., Campbell, D., & Day, A. (1979). *Quasi-experimentation: Design & analysis issues for field settings*. Boston: Houghton Mifflin.

Cronbach, L. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297-334.

Cyr, D., Head, M., Larios, H., & Pan, B. (2009). Exploring human images in website design: A multi-method approach. *MIS Quarterly*, *33*(3), 539.

Dahl, S., Eagle, L., & Ba'ez, C. (2009). Analyzing advergames: Active diversions or actually deception. An exploratory study of online advergames content. *Young Consumers*, *10*(1), 46-59.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology*, *22*(14), 1111-1132.

Deighton, J. (1996). The future of interactive marketing. *Harvard Business Review*, *74*(6), 151-161.

Dennis, A. R., Wixom, B. H., & Vandenberg, R. J. (2001). Understanding fit and appropriation effects in group support systems via meta-analysis. *MIS Quarterly*, *25*(2), 167-193.

Escalas, J. (2004). Imagine yourself in the product: Mental simulation, narrative transportation, and persuasion. *Journal of Advertising, 33*(2), 37-48.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50.

Gardner, M. P. (1985). Does attitude toward the ad affect brand attitude under a brand evaluation set? *Journal of Marketing Research*, *22*(2), 192-198.

Glass, Z. (2007). The effectiveness of product placement in video games. *Journal of Interactive Advertising*, *8*(1), 1-27.

Goodhue, D. L., & Thompson, R. L. (1995). Task-technology fit and individual performance. *MIS Quarterly*, *19*(2), 213-236.

Green, C. S., & Bavelier, D. (2007). Action-video-game experience alters the spatial resolution of vision. *Psychological Science*, *18*(1), 88.

Green, M. C., & Brock, T. C. (2000). The role of transportation in the persuasiveness of public narratives. *Journal of Personality and Social Psychology*, *79*(5), 701-721.
Green, M. C., & Brock, T. C. (2002). *In the mind's eye: Transportation-imagery model of narrative persuasion*. Mahwah, NJ: Erlbaum.
Green, M. C., Brock, T. C., & Kaufman, G. (2004). Understanding media enjoyment: The role of transportation into narrative worlds. *Communication Theory*, *14*(4), 311-327.
Grigorovici, D. M., & Constantin, C. D. (2004). Experiencing interactive advertising beyond rich media: Impacts of ad type and presence on brand effectiveness in 3D gaming immersive virtual environments. *Journal of Interactive Advertising*, *5*(1), 1-26.
Guest. (2011). *Advergaming*. Retrieved June 13, 2011, from http://marketinomics.com/branding/advergaming-2/
Hastie, R. (1980). *Memory for information which confirms or contradicts a general impression person memory: The cognitive basis of social perception* (Vol. 1, pp. 155-177). Hillsdale, NJ: Erlbaum.
Hastie, R. (1981). *Schematic principles in human memory social cognition: The Ontario symposium* (Vol. 1, pp. 155-177). Hillsdale, NJ: Erlbaum.
Heckler, S. E., & Childers, T. L. (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.
Hernandez, M. D., Chapa, S., Minor, M. S., & Maldonado, C. (2004). Hispanic attitudes toward advergames: A proposed model of their antecedents. *Journal of Interactive Advertising*, *5*(1).
Higgins, E. T. (2006). Value from hedonic experience and engagement. *Psychological Review*, *113*(3), 439.
Hoffman, D., & Novak, T. (1996). Marketing in hypermedia computer-mediated environments: Conceptual foundations. *The Journal of Marketing*, *60*(3), 50-68.
Homer, P. M. (1990). The mediating role of attitude toward the ad: Some additional evidence. *Journal of Marketing Research*, *27*(1), 78-86.
Homer, P. M. (2006). Relationships among ad-induced affect, beliefs, and attitudes: Another look. *Journal of Advertising*, *35*(1), 35-51.
Huang, J., Su, S., Zhou, L., & Liu, X. (2013). Attitude toward the viral ad: Expanding traditional advertising models to interactive advertising. *Journal of Interactive Marketing*, *27*(1), 36-46.
Jarvenpaa, S. L., & Todd, P. A. (1996). Consumer reactions to electronic shopping on the world wide web. *International Journal of Electronic Commerce*, *1*(2) 59-88.
Jiang, Z., & Benbasat, I. (2007). Investigating the influence of the functional mechanisms of online product presentations. *Information Systems Research*, *18*(4), 454-470.
Jiang, Z., Chan, J., Tan, B. C. Y., & Chua, W. S. (2010). Effects of interactivity on website involvement and purchase intention. *Journal of the Association for Information Systems*, *11*(1), 34-59.
Jordan, P. W. (1998). Human factors for pleasure in product Use. *Applied Ergonomics*, *29*(1), 25-33.
Kafai, Y. (1995). *Minds in play: Computer game design as a context for children's learning*. Mahwah, NJ: Lawrence Erlbaum.
Kanth, K. R. (2010). *Advergaming: The new buzzword.* Retrieved July 29, 2011, from http://business.rediff.com/report/2010/jan/07/advergaming-the-new-buzzword.htm
Kearsley, G., & Shneiderman, B. (1998). Engagement theory: A framework for technology-based teaching and learning. *Educational Technology*, *38*(5), 20-23.
Kent, R. J., & Allen, C. T. (1994). Competitive interference effects in consumer memory for advertising: The role of brand familiarity. *The Journal of Marketing*, *58*(3), 97-105.
Kim, J., & Moon, J. Y. (1998). Designing towards emotional usability in customer interfaces—trustworthiness of cyber-banking system interfaces. *Interacting with Computers*, *10*(1), 1-29.
Koufaris, M. (2002). Applying the technology acceptance model and flow theory to online consumer behavior. *Information Systems Research*, *13*(2), 205-223.
Lee, M., Choi, Y., Quilliam, E. T., & Cole, R. T. (2009). Playing with food: Content analysis of food advergames. *Journal of Consumer Affairs*, *43*(1), 129-154.
Lee, M., & Faber, R. J. (2007). Effects of product placement in on-line games on brand memory. *Journal of Advertising*, *36*(4), 75-90.
Lee, M. K., Cheung, C. M., & Chen, Z. (2005). Acceptance of Internet-based learning medium: The role of extrinsic and intrinsic motivation. *Information & Management*, *42*(8), 1095-1104.
Lee, Y. H. (2000). Manipulating ad message involvement through information expectancy: Effects on attitude evaluation and confidence. *Journal of Advertising*, *29*(2), 29-43.

Lee, Y. H., & Mason, C. (1999). Responses to information incongruency in advertising: The role of expectancy, relevancy, and humor. *Journal of Consumer Research*, *26*(2), 156-169.
Liu, B. Q., & Goodhue, D. L. (2012). Two worlds of trust for potential e-commerce users: Humans as cognitive misers. *Information Systems Research*, *23*(4), 1246-1262.
Liu, Y., & Shrum, L. (2002). What is interactivity and is it always such a good thing? Implications of definition, person, and situation for the influence of interactivity on advertising effectiveness. *Journal of Advertising*, *31*(4), 53-64.
Lombard, M., & Ditton, T. (1997). At the heart of it all: The concept of presence. *Journal of Computer-Mediated Communication*, *3*(2).
Lutz, R. J. (1985). Affective and cognitive antecedents of attitude toward the ad: A conceptual framework. In L. Alwitt & A. Mitchell (Eds.), *Psychological processes and advertising effects* (pp. 45-65). Hillsdale, NJ: Lawrence Erlbaum.
MacKenzie, S. B., & Lutz, R. J. (1989). An empirical examination of the structural antecedents of attitude toward the ad in an advertising pretesting context. *Journal of Marketing*, *53*(2), 48-65.
MacKenzie, S. B., Lutz, R. J., & Belch, G. E. (1986). The role of attitude toward the ad as a mediator of advertising effectiveness: A test of competing explanations. *Journal of Marketing Research*, *23*(2), 130-143.
Mallinckrodt, V., & Mizerski, D. (2007). The effects of playing an advergame on young children's perceptions, preferences, and requests. *Journal of Advertising*, *36*(2), 87-100.
Mayes, J. T. (1992). The “M”word: Multimedia interfaces and their role in interactive learning systems. In A. D. N. Edwards & S. Holland (Eds.), *Multimedia interface design in education* (pp. 1-22). Berlin: Springer-Verlag.
Miniard, P. W., Bhatla, S., & Rose, R. L. (1990). On the formation and relationship of ad and brand attitudes: An experimental and causal analysis. *Journal of Marketing Research*, *27*(3), 290-303.
Mitchell, A. A. (1986). The effect of verbal and visual components of advertisements on brand attitudes and attitude toward the advertisement. *Journal of Consumer Research*, *13*(1), 12-24.
Mittal, B. (1990). The relative roles of brand beliefs and attitude toward the ad as mediators of brand attitude: A second look. *Journal of Marketing Research*, *27*(2), 209-219.
Monroe, K. (1976). The influence of price differences and brand familiarity on brand preferences. *Journal of Consumer Research*, *3*(1), 42-49.
Muehling, D. D., & McCann, M. (1993). Attitude toward the ad: A review. *Journal of Current Issues and Research in Advertising*, *15*(2), 25-58.
Nah, F. F.-H., Eschenbrenner, B., & DeWester, D. (2011). Enhancing brand equity through flow and telepresence: A comparison of 2D and 3D virtual worlds. *MIS Quarterly*, *35*(3), 731-747.
Nah, F. F.-H., Eschenbrenner, B., DeWester, D., & Park, S. R. (2010). Impact of flow and brand equity in 3D virtual worlds. *Journal of Database Management*, *21*(3), 69-89.
Nelson, M. R. (2002). Recall of brand placement in computer/video games. *Journal of Advertising*, *42*(2), 80-92.
Nicovich, S. (2005). The effect of involvement on ad judgment in a video game environment: The mediating role of presence. *Journal of Interactive Advertising*, *6*(1), 38-51.
Nunnally, J., Bernstein, I., & Berge, J. (1994). *Psychometric theory*. New York: McGraw-Hill.
Obringer, L. A. (2011). *How advergaming works*. Retrieved July 29, 2011, from http://money.howstuffworks.com/advergaming5.htm
Palmer, J. W. (2002). Web site usability, design, and performance metrics. *Information Systems Research*, *13*(2), 151-167.
Perdue, B., & Summers, J. (1986). Checking the success of manipulations in marketing experiments. *Journal of Marketing Research*, *23*(4), 317-326.
Rafaeli, S. (1988). *Interactivity: From new media to communication*. Newbury Park, CA: Sage.
Rafaeli, S., & Sudweeks, F. (1997). Networked interactivity. *Journal of Computer-Mediated Communication*, *2*(4), 1997.
Raney, A., Arpan, L. M., Pashupati, P., & Brill, D. A. (2003). At the movies, on the net: An investigation of the effects of entertaining and interactive web content on site and brand evaluations. *Journal of Interactive Marketing*, *17*(4), 38-53.
Russell, C. (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.

Salen, K., & Zimmerman, E. (2004). *Rules of play: Game design fundamentals.* Cambridge, MA: MIT Press.
Sandelands, L. E. (1988). Effects of work and play signals on task evaluation. *Journal of Applied Social Psychology*, *18*(12), 1032-1048.
Sarker, S., & Valacich, J. S. (2010). An alternative to methodological individualism: A non-reductionist approach to studying technology adoption by groups. *MIS Quarterly*, *34*(4), 779-808.
Scott, L. M. (1994). Images in advertising: The need for a theory of visual rhetoric. *Journal of Consumer Research*, *21*(2), 252-273.
Scrull, T. K. (1981). Person memory: Some tests of associative storage and retrieval models. *Journal Experimental Psychology: Human Learning and Memory*, *7*(6), 440-463.
Shamdasani, P. N., Stanaland, A. J. S., & Tan, J. (2001). Location, location, location: Insights for advertising placement on the web. *Journal of Advertising Research*, *41*(4), 7-21.
Shneiderman, B., & Plaisant, C. (1998). *Designing the user interface*. Reading, MA: Addison-Wesley.
Srull, T. K., Lichtenstein, M., & Rothbart, M. (1985). Associative storage and retrieval processes in person memory. *Journal of Experimental Psychology: Learn, Memory and Cognition*, *11*(2), 316-345.
Srull, T. K., & Wyer, R. S. (1989). Person memory and judgment. *Psychological Review*, *96*(1), 58-83.
Steuer, J. (1992). Defining virtual reality: Dimensions determining telepresence. *Journal of Communication, 42*(4), 73-93.
Steuer, J., Biocca, F., & Levy, M. (1995*). Defining virtual reality: Dimensions determining telepresence.* Hillsdale, NJ: Lawrence Erlbaum.
Suh, K. S., & Lee, Y. E. (2005). The effects of virtual reality on consumer learning: An empirical investigation. *MIS Quarterly*, *29*(4), 673-697.
Sweetser, P., & Wyeth, P. (2005). Gameflow: A model for evaluating player enjoyment in games. *Computers in Entertainment*, *3*(3), 3-3.
Takahashi, D. (2011). *Rovio finds a partner to get Angry Birds to fly to China*. Retrieved Aug 14, 2011, from http://venturebeat.com/2011/07/29/rovio-finds-a-partner-to-get-angry-birds-to-fly-to-china/
Van der Heijden, H. (2003). Factors influencing the usage of websites: The case of a generic portal in the Netherlands. *Information & Management*, *40*(6), 541-549.
Van der Heijden, H., Verhagen, T., & Creemers, M. (2003). Understanding online purchase intentions: Contributions from technology and trust perspectives. *European Journal of Information Systems*, *12*(1), 41-48.
Vessey, I. (1991). Cognitive fit: A theory-based analysis of the graphs versus tables literature. *Decision Sciences*, *22*(2), 219-240.
Vessey, I., & Galletta, D. (1991). Cognitive fit: An empirical study of information acquisition. *Information Systems Research*, *2*(1), 63-84.
Wang, A. (2006). Advertising engagement: A driver of message involvement on message effects. *Journal of Advertising Research*, *46*(4), 355-368.
Wang, J., & Calder, B. (2006). Media transportation and advertising. *Journal of Consumer Research*, *33*(2), 151-162.
Webster, J., & Ahuja, J. S. (2006). Enhancing the design of web navigation systems: the influence of user disorientation on engagement and performance. *MIS Quarterly*, *30*(3), 661-678.
Webster, J., Trevino, L. K., & Ryan, L. (1993). The dimensionality and correlates of flow in human-computer interactions. *Computers in Human Behavior*, *9*(4), 411-426.
Wells, W. D., Moriarty, S., & Burnett, J. (1992). *Advertising: Principles and practice*. Englewood Cliffs, NJ: Prentice-Hall.
Wise, K., Bolls, P., Kim, H., Venkataraman, A., & Meyer, R. (2008). Enjoyment of advergames and brand attitudes: The impact of thematic relevance. *Journal of Interactive Advertising*, *9*(1), 27-36.
Wu, G. (1999). *Perceived interactivity and attitude toward web sites.* Paper presented at the Annual Conference of the American Academy of Advertising, Albuquerque, New Mexico.

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