Received 20 June 2018
Revised 2 January 2019
14 May 2019
Accepted 10 July 2019

The role of flow for mobile advergaming effectiveness

Sara Catalán and Eva Martínez
Dirección de Marketing e Investigación de Mercados, Facultad de Economia y Empresa, Universidad de Zaragoza, Zaragoza, Spain, and
Elaine Wallace
Department of Marketing, National University of Ireland Galway, Galway, Ireland

Abstract

Purpose – Based on flow theory, the purpose of this paper is to explain why the use of mobile advergames can enhance players' brand perceptions and purchase intentions, as well as the factors that affect players' flow experience.
Design/methodology/approach – Data from 212 participants who played a mobile advergame was analysed. Structural equation modelling with PLS was used to test the research model.
Findings – The results reveal that challenge, interactivity, focused attention and telepresence significantly influence the flow experience while playing mobile advergames. Results also show that the greater the flow, the more positive the attitude towards the featured brand and the greater the purchase intention.
Practical implications – The findings of this study are important for advertising practitioners and advergames developers as understanding the key game features that promote flow is crucial to designing engaging mobile advergames that persuade players most.
Originality/value – This study contributes to the literature in two ways. First, it provides new insights into the effectiveness of mobile advergames, which is an under-researched area. Second, it offers a conceptual framework based on flow theory for understanding why the use of mobile advergames can enhance players' brand perceptions and purchase intentions.

Keywords Flow, Mobile devices, Brand attitude, Advergaming, Advergames
Paper type Research paper

1. Introduction

Advergames are one of the newest tools through which advertisers are creating entertaining experiences to engage young adults (Cicchirillo and Mabry, 2016). While different forms of advertising, such as TV ads or banners, can be easily skipped or quickly forgotten, advergames can create hours of engagement. Defined as electronic games designed with the specific purpose of promoting a brand or product (Winkler and Buckner, 2006), advergames represent an effort to make the game itself the brand message by embedding brand-specific information into features central to the game play (Kinard and Hartman, 2013). The rapid growth of interest in advergames indicates that marketers acknowledge their potential benefits for marketing (Lee and Cho, 2017), such as building brand awareness, offering product information or persuading the consumer to form a positive attitude towards the brand or product promoted (Terlutter and Capella, 2013).

This study was supported by the Government of Spain and the European Regional Development Fund (Project Nos ECO2013-41257-P and ECO2017-82103-P), the Government of Aragón (GENERES Group S-54_17R) co-financed by FEDER 2014-2020 "Building Europe from Aragón", and by the Government of Aragón and the European Social Fund (Pre-doctoral Grant No. BOA 28/08/2014).

Online Information Review
Vol. 43 No. 7, 2019
pp. 1228-1244
Emerald Publishing Limited
1468-4527
DOI 10.1108/OIR-06-2018-0198

In recent years, mobile devices (smartphones and tablets), whose use is becoming almost compulsive among many people (Hsiao, 2017), have also become an increasingly popular way to access advergames (Tuten and Ashley, 2016). Smartphones reach 18-to 34-year-olds more than any other device (Google, 2014). Thus, mobile devices are a small but powerful screen when it comes to gain Millennials' attention, having the potential to create big impact. In addition, as mobile devices are usually carried everywhere, they can be accessed by players in situations where they cannot access other devices, such as consoles or computers. To take advantage of this opportunity, marketers are creating mobile advergames to capture players' full attention anytime and anywhere. Recently, Çardici and Gungor (2018) suggested that online and mobile advergames might influence brand-related outcomes differently as they have different characteristics. However, past research has focused primarily on online advergames (e.g. Gross, 2010; Ham *et al.*, 2016; Steffen *et al.*, 2013; Vashist and Royne, 2016; Wang *et al.*, 2015), and little attention has been paid to mobile advergames. As such, mobile gaming platforms are an especially under-researched area in this field (Terlutter and Capella, 2013), and therefore, more investigation examining advergames within mobile phone apps have been required (Çardici and Gungor, 2018; Kinard and Hartman, 2013).

Nowadays, with thousands of games available for download in the App Store, creating a successful mobile advergame is a challenge. Previous studies have shown that games are most successful and engaging when they facilitate the flow experience (Kiili, 2005). Hence, flow theory is a particularly suitable framework for the study of mobile advergames. The flow experience refers to an optimal experience in which individuals are highly involved in a certain activity which is perceived as very pleasurable (Csikszentmihalyi, 1975). This optimal experience can lead to positive outcomes (Csikszentmihalyi and LeFevre, 1989). However, despite the relevance of flow theory to mobile advergaming, compared with other types of flow-inducing media experiences, few research studies on mobile advergames have been built on this theory.

In this context, it is worthwhile to analyse whether players experience flow while they are playing a mobile advergame, and if such flow state influences brand-related persuasion outcomes. In addition, it is critical to understand which elements can promote flow within this context. Therefore, the purpose of this study is twofold. First, based on the model of online flow proposed by Novak *et al.* (2000), we examine the influence of five flow antecedents – namely, skills, challenge, interactivity, focused attention and telepresence – on players' flow experience while playing a mobile advergame. Second, we investigate the impact of flow on players' attitude toward the brand promoted and purchase intention of their products.

This study contributes to the extant literature in several ways. First, although mobile devices (smartphones and tablets) are a growing way to access advergames (Tuten and Ashley, 2016), they are an under-researched area in this field (Çardici and Gungor, 2018; Kinard and Hartman, 2013; Terlutter and Capella, 2013). Therefore, our empirical findings provide new insights into the effectiveness of mobile advergames. Second, although previous studies have emphasised the importance of experiencing flow in gaming contexts (e.g. Badrinarayanan *et al.*, 2015; Procci *et al.*, 2012; Su *et al.*, 2016), there is a shortage of studies examining the impact of flow on the persuasive power of mobile advergames. Therefore, by drawing on online flow theory proposed by Novak *et al.* (2000), we offer a conceptual framework for understanding why the use of mobile advergames can enhance players' brand perceptions and purchase intentions. In addition, despite the call of Terlutter and Capella (2013) to deep into the role of the five antecedents of flow within an advergaming context, there is a lack of studies analysing the impact of all flow prerequisites on the flow experience within this context. Therefore, the current research sheds new light on the impact of flow antecedents of the flow experience in the mobile advergaming context. Finally, contrary to previous studies that used fictitious brands (e.g. Ham *et al.*, 2016) or invented games (e.g. Wang *et al.*, 2015) to analyse flow in advergames, this study uses a real mobile advergame created by a real brand to analyse the impact of flow on players' brand attitude and purchase intentions on a real market situation.

This paper is organised as follows. It opens with a brief discussion of advergaming literature. The study's conceptual model and hypotheses are then presented. This is followed by the methodology, analysis of empirical findings, managerial implications and limitations, ending with suggested directions for future research.

2. Advergaming

The term advergame is the combination of the words advertisement and videogame (Grossman, 2005) and refers to the delivery of advertising messages through electronic games (Hernández *et al.*, 2004). More precisely, advergames are online games specifically designed to promote a brand or a product (Winkler and Buckner, 2006). They usually have a simple design and can be easily played during short breaks in the day, such as waiting times or breaks within working hours (Terlutter and Capella, 2013). As most mobile games, advergames usually take the form of casual games (Redondo, 2012) in which players are motivated for quick fun and repeated play.

Advergames can be differentiated from product placement within commercial games, known as in-game advertising (Winkler and Buckner, 2006). As advergames are specially created to promote a brand or product, the brand or product is the central feature of the game (Winkler and Buckner, 2006). Thus, communicating the advertising message is of primary importance (Steffen *et al.*, 2013). On the contrary, in in-game advertising, marketers buy product placement space within an existing commercial videogame (Gross, 2010), such as traditional product placement in TV series or films (Cauberghe and De Pelsmacker, 2010). Therefore, products or brands are typically placed in the background of the game (Winkler and Buckner, 2006), and the focus is the game itself and not the commercial message (Steffen *et al.*, 2013).

In contrast to traditional advertising, advergames are interactive and immersive and their use is related to positive marketing outcomes. Researchers often refer to advergaming in terms of blurring the boundaries between entertainment and commercial messages (Vanwesenbeeck *et al.*, 2016). Indeed, the complete integration of a brand or product into the entertainment experience facilitates the transfer of positive affect from the game to the brand (Redondo, 2012; Wise *et al.*, 2008). In addition, previous studies consider that advergaming is more effective than traditional advertising because it captures consumers' attention best (Edwards, 2003). Thus, players are very receptive to the advertising message or at least to the product or company that is displayed within the game (Winkler and Buckner, 2006). Advergames are also related to building brand awareness and offering product information (Hernández *et al.*, 2004), as well as persuading the consumer to form a positive attitude toward the brand promoted (Ping *et al.*, 2010).

3. Theoretical framework and research hypotheses

3.1 Flow experience

Mobile advergames are a form of branded entertainment, so it is important that they produce a significant level of enjoyment to players (Peters and Leshner, 2013). As noted earlier, one of the most popular constructs used to describe the subjective game experience is the concept of flow (Procci *et al.*, 2012). Flow theory has its origin in Csikszentmihalyi's desire to understand enjoyment. Csikszentmihalyi (1975) explored why some people – such as rock climbers or gamers – were willing to invest great amounts of time and effort in doing activities that provide no external reward or scarce material incentives. He found that this group of people felt rewarded by executing actions *per se*, experiencing high enjoyment and fulfilment from the activity in itself. Those activities were characterised to be autotelic (from Greek *auto* = self, *telos* = goal) or intrinsically motivating, and the optimal experience derived from performing them was labelled "flow" (Csikszentmihalyi, 1975). The flow

construct was then described as a "crucial component of enjoyment" (Csikszentmihalyi, 1975, p. 11), and the flow experience was defined as "the holistic sensation that people feel when they act with total involvement" (Csikszentmihalyi, 1975, p. 36).

Based on the work of Csikszentmihalyi, Hoffman and Novak (1996) proposed a model of flow for the online environment. In particular, Hoffman and Novak (1996) conceptualised flow as a cognitive state determined by high levels of skill and control, high levels of challenge and arousal, focused attention, interactivity, and telepresence. Following the conceptual model of flow by Hoffman and Novak (1996), Novak *et al.* (2000) tested it empirically, finding direct paths to flow from skill, challenge, telepresence and interactivity, and indirectly from focused attention through telepresence. This model has been widely used as the basis to analyse flow in different gaming contexts, such as mobile gaming (Su *et al.*, 2016), and massively multiplayer online role playing games (Badrinarayanan *et al.*, 2015). However, it has not yet been used to investigate flow within mobile advergames.

Novak *et al.* (2000) found that greater skills during the online navigation corresponded to greater flow. Likewise, greater challenges (consumers' opportunities for action during the navigation) were associated with greater flow (Novak *et al.*, 2000). Thus, as also predicted in other conceptualizations of flow (i.e. Csikszentmihalyi and Csikszentmihalyi, 1988), in order for flow to occur, both individuals' skills and the challenge presented during the activity have to be high. On the contrary, if the challenge is high but the skills are low, the situation leads to anxiety. Similarly, if the skills are high, but not the challenge, it leads to boredom (Nakamura and Csikszentmihalyi, 2002). In the mobile advergaming context, if the player's gaming skills are lower than the challenge proposed by the game, the player will be overloaded and will experience anxiety, resulting in abandoning the game. On the contrary, if the player's gaming skills are beyond the level of difficulty of the mobile advergame challenge, the player will experience boredom, which might also result in-game abandoning. Thus, mobile advergames have to offer an optimal level of challenge to engage players in an immersive, fun environment (Hernández, 2011). In fact, producing challenging advergames is crucial to ensure that the advergames will work and show the promised effects of branding (Waiguny *et al.*, 2012). Once induced, the maintenance of the state of flow requires a constantly evolving challenge, because the player's skills are likely to improve after playing the game a few times. Thus, we hypothesise that:

H1. A higher level of perceived skills at playing games will lead players to experience a higher level of flow.

H2. A higher level of perceived challenge when playing the mobile advergame will lead players to experience a higher level of flow.

Besides a high level of skills and challenge, interactivity is another important source of flow (Novak *et al.*, 2000). Csikszentmihalyi (1990) suggested that the most successful websites are the ones that offer interactive experiences, and not simply content. Interactive features in computer-mediated environments were also found to boost the online flow experience (Hoffman and Novak, 2009), so that participants who perceived a higher level of interactivity experienced more online flow (Van Noort *et al.*, 2012). Interactivity is one of the most important defining characteristics of advergames. While playing an advergame, players can interact with the advertising message and the game features (Ping *et al.*, 2010), which makes it more engaging. Interactivity within an enjoyable advergame has a positive effect on players' brand-related responses, increasing brand recall and recognition (Sreejesh and Anusree, 2017), and enhancing brand attitude (Ping *et al.*, 2010; Sukoco and Wu, 2011). In addition, contrary to traditional advertising in which consumers are passively exposed to the content, advergames evoke a certain degree

of activity with consumers, engaging them with the interactive content (Van Reijmersdal *et al.*, 2012). Therefore, we postulate that:

H3. A higher level of perceived interactivity when playing the mobile advergame will lead players to experience a higher level of flow.

The presence of focused attention is also necessary to experience flow (Hoffman and Novak, 1996). Within this state, players allocate their available cognitive resources to the task at hand (playing the game) and do not reflect upon their actions consciously (Csikszentmihalyi, 1977). When explaining the factors influencing human-technology interactions, Csikszentmihalyi (1990) suggested that the individuals' attention should be limited (or focused) to the narrow stimulus represented by the technology. Similarly, within a mobile advergaming context, players are focused on playing the advergame, which is expected to increase their propensity of entering in a state of flow. Consequently, we propose that:

H4. A greater focused attention when playing the mobile advergame will lead players to experience a higher level of flow.

Finally, previous studies have suggested that within virtual environments, telepresence leads to flow (Cauberghe *et al.*, 2011; Pelet *et al.*, 2015). Telepresence has been defined as the sense of being there in a virtual environment, forgetting that you are actually sitting in front of a TV or PC (Kim and Biocca, 1997). This characteristic is very representative of videogames and advergames, as they transport players to virtual worlds. Nelson *et al.* (2006) found higher levels of telepresence for players than for spectators. Thus, a greater level of telepresence can be expected when individuals play mobile advergames too. Previous studies have demonstrated that telepresence enhances the flow state (Hernández, 2011; Hoffman and Novak, 1996; Novak *et al.*, 2000), which in turns increases the effectiveness of advertising (Cauberghe *et al.*, 2011; Van Noort *et al.*, 2012). Therefore, we hypothesise that:

H5. A greater level of telepresence when playing the mobile advergame will lead players to experience a higher level of flow.

3.2 Mobile advergaming effectiveness

One of the ultimate goals of advertising is persuasion (Barry, 1987) and this is also true for advergaming (Ping *et al.*, 2010). One of the most important factors of persuasiveness of advergames is related to the flow experience or perceived entertainment (Roettl *et al.*, 2016). The primary objective of advergames is to deliver the brand message in a way that is fun and entertaining to keep people engaged (Ham *et al.*, 2016). Advergames are designed to trigger enjoyable experiences, and thus the concept of flow plays an important role in explaining the effectiveness of advergames (Steffen *et al.*, 2013).

Flow is considered as a highly enjoyable psychological state that can lead to positive marketing consequences, including attitude formation, purchase intentions and behaviours (Chen *et al.*, 1999; Hoffman and Novak, 1996, 2009). Insights from previous studies analysing online advergames have demonstrated that playing these games positively affects gamers' perceptions of brand personality, if the players experience flow (Wang *et al.*, 2015). In addition, players who experience a state of flow have a positive attitude towards advergames (Ham *et al.*, 2016; Hernández, 2011) and tend to communicate to more people than those who find the advergame boring (Gurau, 2008). Likewise, experiencing flow promotes brand attention, brand recall and brand recognition (Sreejesh *et al.*, 2018). Entertainment has also been found as a factor contributing to a more favourable attitude towards the brand placed in the advergame (Martí-Parreño *et al.*, 2013). Previous research has also shown that experiencing flow while playing online advergames facilitates brand attitude and purchase behaviour (Gurau, 2008). More precisely, Waiguny *et al.* (2012) found

that brand attitudes were the highest for children who were optimally challenged (in flow) in the game and lowest for those who were underchallenged. Similarly, Ham *et al.* (2016) showed a positive impact of flow on attitudes towards the online advergame and on purchase intention.

In the specific context of mobile advergames, recent studies suggest that these games promote the flow experience, which is reflected in higher brand recall and more positive brand attitudes (Çardici and Gungor, 2018).

Thus, taking all these arguments into account, we expect that experiencing flow while playing the mobile advergame will elicit a pleasurable experience transferred to the brand embedded in the game, favouring more positive attitudes, and increasing the intention to purchase the brand. This is in line with the idea of affect transfer theory, which suggests that the positive feelings the advergame elicits can impact the featured brand (Waiguny *et al.*, 2012). Therefore, we postulate:

H6. A higher level of flow when playing the mobile advergame will lead players to have a more positive brand attitude.

H7. A higher level of flow when playing the mobile advergame will lead players to have a higher purchase intention.

Furthermore, a change in brand attitude can be a leading indicator of a change in purchase behaviour (Bellman *et al.*, 2014; Morris *et al.*, 2002). Vanwesenbeeck *et al.* (2017) found that children who had a more positive attitude towards an online advergame were more likely to report higher purchase intentions. Building on these ideas, we hypothesise the following:

H8. A more positive brand attitude will lead players to have a higher purchase intention.

Finally, this study includes individuals' familiarity with the featured brand as a control variable.

Figure 1 shows the proposed model underlying this research.

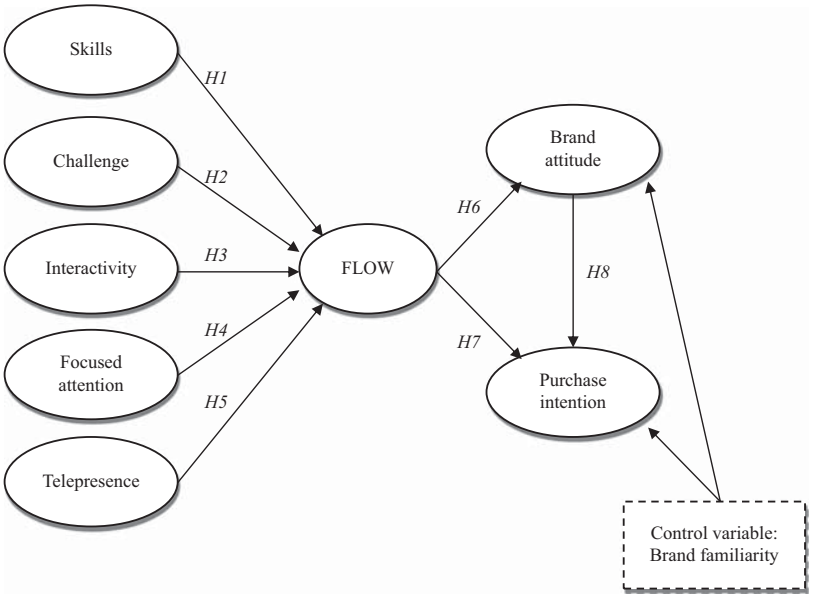

Figure 1.
Proposed model

4. Method

4.1 Stimuli

To test the hypotheses, a mobile advergame of the well-known snack food company Oreo was used. Within this product category, advergames constitute a common advertising strategy (Steffen *et al.*, 2013). In fact, several companies within the food and beverage industry are incorporating advergames on their websites (e.g. M&M's, Pringles, Lays, Pepsi, Chips Ahoy).

For decades, the focus of Oreo advertising has been in the fun of eating Oreos: the twisting, the licking, the dunking. This worldwide known ritual has been transferred to the mobile advergame "Oreo: Twist, Lick, Dunk!". "Oreo: Twist, Lick, Dunk!" mostly resembles a combination of Fruit Ninja (one of the most popular gaming apps consisting on fruit slicing) and Slam Dunk King (a popular game to test players' basketball skills in dunking balls). In the game, Oreos are hurled into the air and players must swipe across them twice. The first swipe corresponds to the "twist" – this separates one of the chocolate cookies from the Oreo –, while the second one corresponds to the "lick" – putting the cream away. This second swipe also puts the Oreos together, becoming a super Oreo that players must drag to the glass of milk appearing at the bottom of the screen. Each Oreo that is twist, lick, and dunk in every single set makes players earn a higher score that is turned into coins. Players can spend the earned coins to unlock virtual Oreos that have been commercialised over the years (e.g. Golden Oreos, Green Tea Oreos), as well as to purchase different screens to play (e.g. Paris, China or the Biscuit World). Players can also make in-app purchases. In addition, there is a social component in the game, as players can access the game via their Facebook accounts, so they can compare their scores with their friends' ones in a ranking.

4.2 Procedure and sample

The main study was preceded by a pre-test and a pilot study, which were used to survey a small subset of the population to determine whether the research instrument and method to collect data as well as the stimulus (the Oreo advergame) were relevant, reliable, and appropriate for the purpose of the study.

Data collection was based on a self-administered questionnaire. This instrument allows respondents to complete the survey on their own, which eliminates interviewers' bias and has the ability to reach large populations (Bhattacherjee, 2012). The main disadvantages of self-administered questionnaires are the low response rates if they are disseminated via mail or e-mail, and the difficulty in obtaining large quantities if they are too long (Duffet, 2015). To avoid this inconvenient, questionnaires were distributed on a face-to-face basis and participants were also told that the questionnaire took no longer than five minutes to complete.

The participants of the pre-test, pilot test and main study were selected from a large Irish university. Recent studies have reported that most of young adults are gamers (Vashisht and Sreejesh, 2017). Therefore, the use of a student sample is appropriate for this study. In addition, OREO, the brand whose advergame has been selected in this study, is well-known to Irish consumers.

The questionnaire was pre-tested during June 2017 using an independent sample ($n = 10$) to check the question order, the wording, and the ability of respondents to understand the meaning of the questions. Once exposed to the advergame, participants, who had previously been informed about the purpose of the pre-test, responded to the survey. As a result, some of the questions were reworded. Subsequently, a pilot study of an additional independent sample ($n = 36$) was conducted during September 2017 to ensure the readability and comprehension, as well as the time it took to answer the questionnaire.

The data collection involved a two-step process. First, researchers contacted participants during classes and give them the link to download the advergame from the app store (free to download). Participants were asked to play the game in their free time as many times as

they wanted (at least once). Second, after one week, the same groups were contacted in the same classes and were given a link to the survey questionnaire, which was provided on SurveyMonkey. As an incentive, those students who participated in the study were included in a draw for four shopping vouchers of €50 each. A total of 212 completed questionnaires were collected for the main study during October 2017. 55 per cent of the participants were women and the mean age was 20 (SD = 3.43).

4.3 Measurement instrument

To measure the different variables included in this study, a questionnaire was developed from relevant previous literature and carefully modified to ensure that the items fit this context (see Constructs, items and sources). The measures of the antecedents of flow (i.e. skills, challenge, interactivity, focused attention, and telepresence) were adapted from Novak *et al.* (2000). These include statements such as "I consider myself knowledgeable about playing games" (skills), "Playing the game challenges me" (challenge), "Interacting with the game is slow and tedious" (interactivity), "When I play the game I am totally absorbed in what I am doing" (focused attention), and "Playing the game makes me forget where I am" (telepresence). Participants were asked to indicate their degree of agreement with each statement on a seven-point Likert scale ranging from 1 (Strongly disagree) to 7 (Strongly agree). To measure feelings of flow, the measure of flow developed by Novak *et al.* (2000) was also used. A narrative description of flow was provided and three items were measured: Do you think you have ever experienced "flow" while playing the game? (1 = not at all, 7 = very much), in general, how frequently would you say you have experienced "flow" while playing the game? (1 = not frequently, 7 = very frequently), and most of the time I play this game, I feel I am in "flow" (1 = strongly disagree, 7 = strongly agree).

Constructs, items and sources.

Skills (Novak *et al.*, 2000):

- S1: I am extremely skilled at playing games.
- S2: I consider myself knowledgeable about playing games.
- S3: I know somewhat less than most gamers about playing games (*R*).

Challenge (Novak *et al.*, 2000):

- C1: Playing the game challenges me.
- C2: Playing the game challenges me to perform to the best of my ability.
- C3: Playing the game provides a good test of my skills.
- C4: I find that playing the game stretches my capabilities to my limits.

Interactivity (Novak *et al.*, 2000):

- I1: When I play the game there is very little waiting time between my actions and the game's response.
- I2: Interacting with the game is slow and tedious (R).
- I3: The game loads quickly.

Focused attention (Novak *et al.*, 2000):

- FA1: I don't think about other things when I play the game.
- FA2: When I play the game, I am totally absorbed in what I am doing.
- FA3: I cannot be easily distracted when I play the game.

Telepresence (Novak *et al.*, 2000):

- T1: I forget about my immediate surroundings when I play the game.
- T2: Playing the game makes me forget where I am.
- T3: After playing the game, I feel like I come back to the "real world" after a journey.
- T4: Playing the game creates a new world for me, and this world suddenly disappears when I stop playing.

Flow (Novak *et al.*, 2000).

The word flow is used to describe a state of mind sometimes experienced by people who are deeply involved in some activity. Many people report this state of mind when playing games, engaging in hobbies, or working. When one is in flow, time may seem to stand still, and nothing else seems to matter. Flow may not last for a long time on any particular occasion, but it may come and go over time. Flow has been described as an intrinsically enjoyable experience:

- F1: Do you think you have ever experienced "flow" while playing the game?
- F2: In general, how frequently would you say you have experienced "flow" while playing the game?
- F3: Most of the time I play this game, I feel I am in "flow".

Brand attitude (Wise *et al.*, 2008):

- BA1: Unfavourable – Favourable.
- BA2: Bad – Good.
- BA3: Negative – Positive.

Purchase intention (Doods *et al.*, 1991):

- PI1: My likelihood of purchasing OREO's products is […].
- PI2: The probability that I would consider buying OREO's products is […].
- PI3: My willingness to buy OREO's products is […].

Brand familiarity (Ping *et al.*, 2010):

- BF1: How familiar are you with the OREO's products?
- BF2: How often have you purchased OREO's products in the past?
- BF3: How knowledgeable are you about OREO's products?

Note: *R,* reverse item.

Regarding variables related to advergames effectiveness, brand attitude was measured using a semantic differential scale adapted from Wise *et al.* (2008). The anchoring word pairs were unfavourable/favourable, bad/good, negative/positive, rated on a seven-point scale. Purchase intention was measured using three items adapted from Doods *et al.* (1991). This includes statements such as "My likelihood of purchasing OREO's products is […]", rated also on a seven-point scale (1 = Very low, 7 = very high). Finally, both a control question and a control variable were included in the questionnaire. The control question ("In which screen did you play the game?") was aimed at removing respondents who had not played the game. We gave respondents four possible answers with only one valid response ("Kitchen"). Hence only responses from those who answered correctly to the control question were used to test the proposed model. The control variable (i.e. brand familiarity) was measured using three items adapted from Ping *et al.* (2010), including the questions "How familiar are you

with the OREO's products?", "How often have you purchased OREO's products in the past?", and "How knowledgeable are you about OREO's products?" Again, the items were measured on a seven-point scale with anchors not at all familiar/very familiar, not often/very often, not very knowledgeable/very knowledgeable.

5. Analysis and results

The research model was tested using partial least squares structural equation modelling (PLS-SEM) with the software Smart PLS 3 (Ringle *et al.*, 2015). Compared to other methods, such as the covariance-based structural equation method (CB-SEM), this methodology is suitable when the focus of the study, as in our case, in on prediction and on theory development rather than on strong theory confirmation (Reinartz *et al.*, 2009). In addition, this methodology involves non-parametric procedures and therefore has less restrictive assumptions about the distribution of data. Moreover, PLS is particularly suitable when the sample size is lower than 250, as is the case in our study (Reinartz *et al.*, 2009). PLS simultaneously assesses the reliability and validity of the measurement model and the estimation of the structural model. These two steps are described next.

5.1 Measurement model

First, the reliability and validity of the research constructs were assessed. The indicator reliability was evaluated based on the criterion that loadings should be higher than 0.7 (Churchill, 1979). Items S3 and I3 were eliminated because they had factor loadings lower than 0.7. As Table I shows all standardized factor loadings were above 0.7 and statistically significant at 0.01 (Carmines and Zeller, 1979), which indicates that the individual item reliability was adequate. Moreover, all the constructs were internally consistent, since their composite reliabilities were greater than 0.7 (Nunnally and

Construct	Item	FL	CR	AVE
Skills	S1	0.943	0.945	0.896
	S2	0.951		
Challenge	C1	0.753	0.901	0.696
	C2	0.845		
	C3	0.862		
	C4	0.872		
Interactivity	I1	0.826	0.833	0.714
	I2	0.863		
Focused attention	FA1	0.857	0.890	0.730
	FA2	0.868		
	FA3	0.837		
Telepresence	T1	0.822	0.913	0.725
	T2	0.870		
	T3	0.863		
	T4	0.849		
Flow	F1	0.915	0.927	0.809
	F2	0.869		
	F3	0.914		
Brand attitude	BA1	0.932	0.962	0.894
	BA2	0.947		
	BA3	0.958		
Purchase intention	PI1	0.959	0.971	0.919
	PI2	0.957		
	PI3	0.959		

Notes: FL, factor loadings; CR, composite reliability; AVE, average variance extracted

Table I.
Factor loadings and quality criteria

Bernstein, 1994). The constructs also met the convergent validity criteria, as the average variance extracted (AVE) values were above 0.5 (Fornell and Larcker, 1981). Finally, the discriminant validity was also supported. In all cases, the square root of the AVE for any two constructs was greater than the correlation estimate among the constructs (Fornell and Larcker, 1981).

5.2 Structural model and hypotheses testing

The analysis of hypotheses and constructs' relationships was based on the examination of standardized paths. The path significance levels were estimated using a bootstrapping procedure with 5,000 iterations of resampling (Chin, 1998). The model accounted for 34.7 per cent of variation in flow state, 30.9 per cent of variation in brand attitude, and 57.6 per cent of variation in purchase intention of the featured brand. The predictive relevance of the model was also assessed through the Stone–Geisser test. The results showed that the Q^2 value of this test for the dependent variables was positive. Therefore, it can be accepted that the dependent variables can be predicted by the independent variables and that the model presents predictive relevance. The results are summarised and presented in Figure 2.

The results indicate that challenge ($\beta = 0.210$; $t = 3.111$), interactivity ($\beta = 0.139$; $t = 1.792$), focused attention ($\beta = 0.200$; $t = 2.658$), and telepresence ($\beta = 0.275$; $t = 3.096$) were statistically significant in explaining the flow experience. Thus, *H2–H4*, and *H5* were supported. On the contrary, the relationship between skills and the flow state was not significant ($\beta = 0.054$; $t = 1.029$). Therefore, *H1* was not supported. In terms of the impact of flow on advergame effectiveness, the influence of flow on brand attitude ($\beta = 0.101$; $t = 1.922$) and purchase intention ($\beta = 0.135$; $t = 2.835$) was statistically significant, as well as the influence of brand attitude on purchase intention ($\beta = 0.465$; $t = 8.152$), supporting *H6–H8*.

Concerning the control variable, brand familiarity affects both brand attitude ($\beta = 0.530$; $t = 9.257$) and purchase intention ($\beta = 0.352$; $t = 6.378$). Therefore, players that are more familiar with the brand featured in the advergame have a more positive attitude towards the brand and a higher purchase intention.

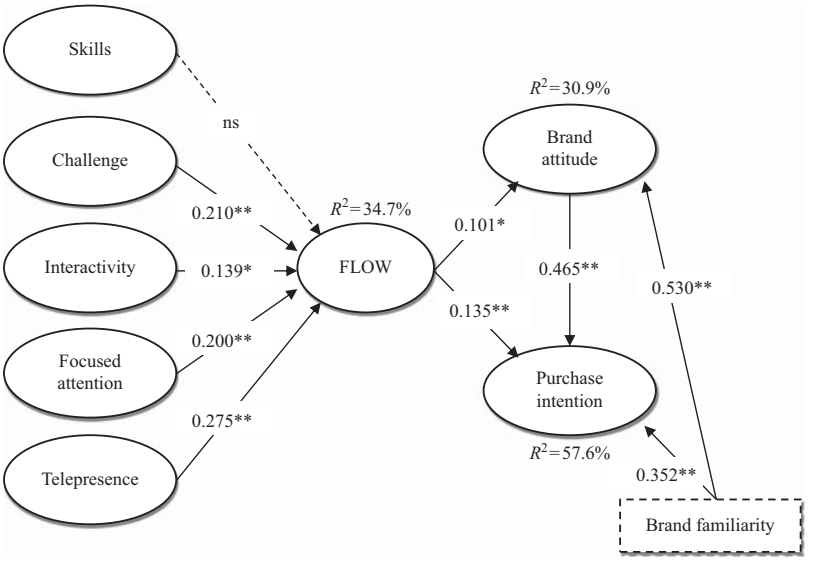

Figure 2.
Structural model results

Notes: *$p<0.05$; **$p<0.01$

6. Discussion

Thanks to the growing popularity of mobile devices and apps, any time of day and any location can provide a gaming context (Wei and Lu, 2014). Marketers are taking full advantage of this, using mobile advergames to create engaging experiences with consumers. This study is one of the first to associate the flow experience while playing a mobile advergame with players' perceptions of the brand promoted in the game.

The first objective of this study was to examine the influence of five flow prerequisites – namely, skills, challenge, interactivity, focused attention and telepresence – on players' flow experience while playing a mobile advergame. The analysis indicates that the level of challenge of the game significantly promotes the flow experience among players. This finding is in agreement with a number of authors. For instance, Hernández (2011) reported that challenges offered by online advergames are the most important predictor for flow experience. Su *et al.* (2016) also found that players are interested in mobile games that are challenging because that has a positive effect on perceived entertainment. Finally, Waiguny *et al.* (2012) revealed that producing challenging online advergames is crucial to ensure that the advergames will work. Besides game challenge, interactivity was also found to be a significant predictor of the flow experience. This is in line with previous studies who reported that perceiving interactivity within a technology-mediated environment was related with experiencing more flow (Hoffman and Novak, 2009; Van Noort *et al.*, 2012). Focused attention had also a significant impact on the optimal experience. Hoffman and Novak (1996) proposed focused attention as one of the prerequisites to experience flow. However, Novak *et al.* (2000) could not empirically find a direct relationship between these constructs. This study, by contrast, provides empirical support for the direct relationship between focused attention and flow experience. This is a very interesting finding, as it advances existing knowledge by empirically confirming the direct and positive relationship between focused attention and flow. Finally, telepresence significantly promoted the flow experience among players, which confirms findings from previous studies in which telepresence within virtual environments leads to flow (Cauberghe *et al.*, 2011; Hernández, 2011; Hoffman and Novak, 1996; Novak *et al.*, 2000; Pelet *et al.*, 2015). Contrary to predictions, players' gaming skills did not have a significant influence on flow state. This result can be explained because most mobile advergames are designed as casual games (Redondo, 2012). As such, they are created with the intent that any individual can play the game without advanced experience of gaming techniques (Cicchirillo and Mabry, 2016). Accordingly, this finding suggests that, within a mobile advergaming context, players can experience flow independently of their level of gaming skills.

The second objective of the research was to examine the impact of flow on players' attitude towards the brand promoted and purchase intention of their products. The findings revealed a significantly positive impact in that the more flow the players experienced, the more favourable attitudes and the higher purchase intention of the featured brand. These findings demonstrate the powerful entertaining impact of mobile advergames on branding, which is in line with previous studies with online advergames (Gurau, 2008; Ham *et al.*, 2016; Terlutter and Capella, 2013), and consistent with the idea of affect transfer theory: the positive feelings the advergame elicits can impact the featured brand (Waiguny *et al.*, 2012). In addition, findings revealed that brand attitude has a positive influence on purchase intention. These findings confirm that brand attitude is a leading indicator of a change in purchase behaviour (Bellman *et al.*, 2014; Morris *et al.*, 2002).

Finally, a significant impact was revealed in terms of players' familiarity with the brand. This finding is in line with previous studies which reported that familiarity with the brand affects attitude towards the brand as well as behavioural intentions (Kinard and Hartman, 2013; Waiguny *et al.*, 2013).

From the theoretical viewpoint, this study makes several contributions to research. First, despite the increasing use of smartphones and tables to access advergames (Tuten and Ashley, 2016), past research has focused primarily on online advergames – those played on personal computers – and little attention has been paid to mobile advergames – those played on smartphones and tablets – (Çardici and Gungor, 2018; Kinard and Hartman, 2013; Terlutter and Capella, 2013). The empirical findings from this study advance knowledge by analysing the effectiveness of advergames within mobile phone apps. Second, it successfully applies flow theory to examine the impact of flow on the persuasive power of mobile advergames. Although previous studies had shown the importance of experiencing flow in gaming contexts (e.g. Badrinarayanan *et al.*, 2015; Procci *et al.*, 2012), few studies had examined how playing mobile advergames can enhance players' brand perceptions and purchase intentions. In addition, there is a shortage of studies examining the impact of all flow prerequisites on the flow experience within this context. Therefore, this study sheds new light on the impact of flow antecedents of the flow experience in the mobile advergaming context, as well as its impact on brand-related persuasion outcomes. Finally, this study advances knowledge by analysing the impact of flow on players' brand attitude and purchase intentions on a real market situation. This is, using a real mobile advergame created by a real brand, which increases the external validity of this study in comparison with those that use fictitious brands or invented products.

This study has also practical implications for advertisers and mobile advergame designers. Understanding the key features that increase the effectiveness of mobile advergames is of main importance for practitioners. The findings of this study show that experiencing flow is a key variable affecting mobile advergames' success, promoting more favourable attitudes and increasing the purchase intention towards the featured brand. Based on this finding, we advocate that creating an engaging mobile advergame is vital for its later success. Players do not necessarily have to be aware of the commercial intent behind the game, but it has to be as entertaining as any other mobile gaming app.

Another practical implication of this study is understanding game features that promote the flow experience. According to our findings, game challenge promotes flow. Although advergames are usually less complex than a "real" videogame in which brands can be placed (Cauberghe and De Pelsmacker, 2010), game challenge within a mobile advergame is crucial for players to be engaged. Once induced, the maintenance of the state of flow requires a constantly evolving challenge, because the player's skills are likely to improve after playing the game a few times. Special attention should be paid to the design of features that create increasing challenges to the players, which in turn would conduct to greater flow. One way to do this is designing the mobile advergame with progressive levels in which more difficult tasks are required. Another way to increase the challenge is to ask for the same task, but in a more difficult condition (e.g. having less time to complete it). Besides game challenge, other game features such as interactivity, focused attention, and telepresence also affect flow. This implies that mobile advergames should be created to let players interact with the advertising content in a way that makes them be completely focused in what they are doing. Finally, in order to reach a greater telepresence, mobile advergame developers should enhance the quality of the game in terms of graphics and audio to create a more realistic world in which players can be transported into.

While the study contributes significantly to the mobile advergaming literature, it also has limitations. First, although the sample was highly appropriate for the purpose of the study, a broader sample would enhance generalisability. In addition, since this research was conducted in Ireland, findings of this study could be extended and further tested in different countries. Moreover, it would be interesting to compare the use and effects of

playing a mobile advergame between players from countries with higher vs lower usage of non-traditional advertising media. Another limitation of this study is that only one kind of advergame was selected for this study. Future studies should examine other genre types of advergames (e.g. racing, shooting, puzzles, etc) to determine if this factor impacts flow. Finally, research on mobile advergames needs to better address behavioural measures after game play. While brand attitudes and purchase intentions are worthwhile of examination, research needs to be conducted to see if mobile advergames can impact actual purchase behaviour of players.

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Corresponding author
Sara Catalán can be contacted at: scatala@unizar.es