



**Analysing mobile advergaming effectiveness: The role of game repetition, flow, and brand familiarity**

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## Analysing mobile advergames effectiveness: The role of game repetition, flow, and brand familiarity

### Abstract:

- **Purpose:** This paper seeks to explain the effect of flow, game repetition, and brand familiarity on players' brand attitude and purchase intention in the context of mobile advergames.
- **Design/methodology/approach:** Data from 227 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 the independent variables (i.e. game repetition and brand familiarity) significantly influence the dependent variables explored in this study (i.e. brand attitude and purchase intentions of players). Results also show that brand familiarity influences players' flow experience, which in turn significantly affects players' purchase intentions.
- **Practical implications:** The findings of this study are important for advertising practitioners and advergames' developers as understanding the determinants of mobile advergames effectiveness is crucial to designing successful 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 empirical evidence of the effects of game repetition, flow, and brand familiarity on mobile advergames effectiveness.

**Keywords:** Advergames; Mobile advergames; Game repetition; Flow; Brand familiarity; Brand attitude; Purchase intention

## 1. Introduction

The use of advergames, electronic games created with the specific purpose of promoting a brand or a product (Winkler and Buckner, 2006), has received increased attention in the literature due to their persuasive power (Roettl et al., 2016). In recent years, an increasing effort has been made to understand the determinants of advergaming effectiveness. Previous research has analysed different aspects that could affect the success of this tool, including both factors related to the advergame, such as game-brand and game-product congruity (Gross, 2010; Hernández et al., 2004; Lee et al., 2017; Martí-Parreño et al., 2013; Okazaki and Yagüe, 2012; Ping et al., 2010; Sreejesh et al., 2018; Wise et al., 2008), prominence of the brand placement (Cauberghe and De Pelsmacker, 2010; Van Reijmersdal et al., 2012; Vashisht and Royne, 2016; Winkler and Buckner, 2006), and interactivity (Gurau, 2008; Ping et al., 2010; Sreejesh and Anusree, 2017; Sukoco and Wu, 2011); as well as individual factors of players, such as persuasion knowledge (Ham et al., 2016; Van Reijmersdal et al., 2012; Vanwesenbeeck et al., 2016, 2017; Vashisht and Royne, 2016), and involvement (Bellman et al., 2014; Cauberghe and De Pelsmacker, 2010; Van Reijmersdal et al., 2012; Vanwesenbeeck et al., 2017). However, still more effort is needed to achieve a better knowledge about which variables related to the advergame and the player can influence brand-related outcomes.

In recent years, advergames have gained recognition in large part because mobile devices have become an increasingly popular way to access to them (Tuten and Ashley 2016). Mobile devices are carried everywhere. Thus, players can access mobile advergames in situations where they cannot access other devices, such as computers. Because of their different characteristics, recent research has found that online and mobile advergames influence brand related outcomes differently (Çadirci and Gungor,

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3 2018). However, even in the last few years, the majority of studies on advergames has  
4 focused on advergames played through a console (Vashisht and Pillai, 2017a) or a  
5 computer (e.g., Ham et al., 2016; Lee et al., 2017; Sreejesh and Anusree, 2017;  
6 Vanwesenbeeck et al., 2016; Vashisht and Royne, 2016; Wanick et al., 2018).  
7 Therefore, there is a need to further analyse mobile advergame effectiveness (Çardici  
8 and Gungor, 2018).  
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11 As mobile advergames are a form of branded entertainment, it is important that they  
12 produce a significant level of enjoyment to players (Martí-Parreño et al., 2013; Wanick  
13 et al., 2018), creating fun. Previous studies have shown that advergames are more  
14 successful and engaging when they facilitate the flow experience (Roettl et al., 2016).  
15 This flow experience refers to the holistic sensation that people feel when they act with  
16 total involvement (Csikszentmihalyi, 1990) and has been related to positive marketing  
17 consequences, such as attitude formation and purchase intentions (Ham et al., 2016;  
18 Hoffman and Novak, 2009). In the mobile advergaming context, it is therefore  
19 worthwhile to analyse whether flow while playing an advergame influences brand-  
20 related persuasion outcomes (Çardici and Gungor, 2018). These insights are particularly  
21 important due to the shortage of studies examining the impact of flow on the persuasive  
22 power of advergames.  
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45 Compared to online advergames designed for computers or consoles, mobile  
46 advergames provide more opportunities for repetitive game play during the day (Çardici  
47 and Gungor, 2018). This continuous repetition might be advantageous for companies, as  
48 consumers are more exposed to the advertising content. However, the effect of repeated  
49 exposure to a mobile advergame on its effectiveness has received limited attention in  
50 the literature. In addition, although previous studies have suggested that repetition in  
51 video games influences players' flow experience (Chou and Ting, 2003), to the best of  
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our knowledge this relationship has not been analysed in the context of mobile advergaming. This study aims to fill this gap too.

Besides game repetition and flow, familiarity with the brand promoted in the advergaming has been found to have an impact on its effectiveness, especially on players' attitudes and behaviours (Kinard and Hartman, 2013; Waiguny et al., 2013), as well on players' gaming experience (Wanick et al., 2018). Thus, it is critical to explore the role played by this variable.

Therefore, the aim of this research is to shed further light on the determinants of mobile advergaming effectiveness. In particular, this study investigates the effects of flow, game repetition and brand familiarity on mobile advergaming effectiveness. In line with previous research, brand attitude and purchase intentions are the dependent variables used as measures of advergaming effectiveness (Vanwesenbeeck et al., 2017). In addition, this study explores the impact of game repetition and brand familiarity on players' flow experience.

The paper is organized as follows. It opens with a discussion of the advergaming concept. Then, the research hypotheses are developed. This is followed by the methodology and analysis of empirical findings. Then, the paper outlines the conclusions and implications for research, ending up with the limitations of the study and the directions for further research.

## **2. Theoretical framework and hypotheses formulation**

### ***2.1. Advergaming***

Over the last few years, gamification has gained momentum as an innovative and promising tool that can be applied within a variety of contexts to motivate people

(Ritcher et al., 2015; Sailer et al., 2017). Although there is no universally accepted definition of gamification, the central idea behind it is to harness the motivational power of games by applying game design elements into non-game contexts (Deterding et al., 2011; Seaborn and Fels, 2015). If players are deeply attracted by games because games are engaging and motivating, then, by inducing game-like motivation in non-game contexts, it is possible that people get the same levels of motivation and engagement. As well as increasing motivation and engagement, gamification offers other important benefits, such as raising brand awareness, enhancing individuals' experiences, and improving customer loyalty (Xu et al., 2017).

The potential of gamification for business is of great importance (Xu et al., 2017), especially for marketing (Bittner and Schipper, 2014; Hamari, 2013, 2017; Hofacker et al., 2016; Terlutter and Capella, 2013; Xu et al., 2015, 2017). Within this field, advertising is a promising area to apply gamification (Yang et al., 2017). Traditional media is saturated with advertising messages, so advertisers are looking for new advertising formats (Küster and Castillo, 2012). Therefore, by adding motivation incentives that increase the enjoyment of consumers, gamification can make advertising more interesting (Bittner and Schipper, 2014).

In this regard, *advergaming* results from the combination of the words *advertising* and *gaming* and refers to electronic games, known as *advergames*, created to deliver advertising messages (Hernández et al., 2004) to promote a brand or a product (Winkler and Buckner, 2006). This form of advertising has to be distinguished from *in-game advertising*, which refers to product-placement within commercial video games (Kim and Leng, 2017). The main difference between these two concepts is that in in-game advertising advertisers buy space in the background of an existing video game to insert their ads on it (Gross, 2010), such as billboards appearing on the street in a racing game

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3 or around the pitch on a football game, so the focus is not the commercial message, but  
4 the game itself (Steffen et al., 2013). On the contrary, the brands and products are  
5  
6 central features of advergames (Winkler and Buckner, 2006), as the main objective is to  
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8 communicate the advertising message (Steffen et al., 2013).  
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12 Although the term *advergame* seems to be relatively new in the advertising literature,  
13 the first advergames date from 1983 (Martí-Parreño et al., 2015). An example of those  
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15 games is *Pepsi Invaders*, a shooting advergame developed by Atari and commissioned  
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17 by The Coca-Cola Company. Since the very beginning, the development of advergames  
18  
19 has been parallel to the video game industry development. The first generation of  
20  
21 advergames was inspired by successful commercial computer and console games, such  
22  
23 as *Super Mario*. With the change of millennium and the development of new  
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25 technologies, video games could be played online, which also provided a new platform  
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27 for advergames. Compared to computer or console advergames, the second generation  
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29 of advergames (online advergames) reaches broader audiences as they are available  
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31 24/7 and, therefore, present almost no geographical or time limitations (de la Hera,  
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33 2014). The most common platform to access to online advergames is brands' official  
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35 websites (Terlutter and Capella, 2013), although they can also be distributed through  
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37 social media or gaming portals.  
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45 In the last few years, with the proliferation of mobile devices such as smartphones,  
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47 tablets, and 'phablets' (Hofacker et al., 2016), the attention of the advergame industry  
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49 has turned into the direction of mobile advergames. This third generation of advergames  
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51 presents numerous advantages over previous generations. First, as mobile devices are  
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53 carried everywhere, players can access mobile advergames in situations where they  
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55 cannot access other devices such as computers (e.g., waiting for the bus, sitting in the  
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57 sofa, during short breaks within working hours, in bed before going to sleep...).

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3 Secondly, they can be used in combination with location-based data to provide  
4 individuals pervasive interactions, connecting digital media and individuals' everyday  
5 experience (Wanick et al., 2014). Thirdly, mobile advergaming can also include elements  
6 of social interaction (Çadirci and Gungor, 2018). Mobile advergaming has also  
7 benefitted from a phenomenon that has marked the video game industry: the  
8 popularisation of casual games. Casual games, such as *Angry Birds* or *Candy Crush*,  
9 usually have a simple design and can be easily played during short breaks in the day  
10 (Terlutter and Capella, 2013). In fact, most mobile advergaming are designed as casual  
11 games thought to be played repeatedly in a way that allows the brand message to be  
12 repeated easily.  
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15 The use of advergaming has been related to positive marketing outcomes. Compared to  
16 traditional advertising, advergaming is more effective because it better captures  
17 consumers' attention (Edwards, 2003) and, therefore, consumers are more receptive to  
18 the advertising message (Winkler and Buckner, 2006). While different forms of  
19 traditional advertising, such as TV ads or banners, can be easily skipped or quickly  
20 forgotten, advergaming can create hours of engagement (Cicchirillo and Mabry, 2016).  
21 Advergaming offer consumers interactive experiences with the brand, which has an  
22 effect on the attention they pay to the brand as well as their brand memory (Sreejesh  
23 and Anusree, 2017). In addition, researchers often refer to advergaming in terms of  
24 blurring the boundaries between entertainment and commercial messages  
25 (Vanwesenbeeck et al., 2016). In fact, the complete integration of a brand or product  
26 into the entertainment experience facilitates the transfer of positive affect from the game  
27 to the brand (Redondo, 2012; Wise et al., 2008). The rationale behind the potential of  
28 advergaming is, therefore, that the positive feelings gained when playing them could be  
29 transferred to the brand (Okazaki & Yagüe, 2012). Extant research has shown that  
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entertainment in advergames drives positive attitudes toward the brand promoted (Martí-Parreño et al., 2013), and advergames which provide good experiences also influence purchase intentions (Vanwesenbeeck et al., 2017). Advergames are also related to positive WOM (Tuten and Ashley, 2016), offering product information and building brand awareness (Hernández et al., 2004), and increasing the adoption of product innovation (Müller-Stewens et al., 2017). Likewise, advergames can increase the perceived value of the embedded brand (Okazaki & Yagüe, 2012). Therefore, advergames constitute a powerful tool for advertisers to send their messages to their target audiences, having great impact on their brand-related outcomes.

## **2.2. Flow experience**

Flow has been found to be one of the most important factors of persuasiveness of advergames (Roettl et al., 2016; Steffen et al., 2013). Flow theory has its roots in Csikszentmihalyi's attempt to understand enjoyment experienced by people performing activities that provided no apparent external reward, but were extremely fulfilling and rewarding. Those activities were characterised to be intrinsically motivating, and the optimal experience derived from performing them was labelled "flow" (Csikszentmihalyi, 1975). Games are unquestionable flow activities and play is "*the flow experience par excellence*" (Csikszentmihalyi, 1975; p. 36-37).

The primary objective of advergames is to deliver the brand message in a way that is fun and entertaining in order to keep people engaged (Ham et al., 2016). In this context, it is expected that the entertaining experience while playing the advergame will elicit a pleasurable experience transferred to the brand. This is in line with the idea of affect transfer theory, which suggests that the positive feelings the advergame elicits can

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2  
3 impact the featured brand (Waiguny *et al.*, 2012). For instance, Martí-Parreño *et al.*  
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5 (2013) found that entertainment when playing the advergame has a positive influence  
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7 on the attitude toward the brand placed in the advergame. Likewise, Wanick *et al.*  
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9 (2018) posited that enjoyment, humour and arousal experienced in the advergaming  
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11 context positively impact advergame effectiveness.  
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15 Previous studies have analysed the impact of flow on players' cognitive, affective, and  
16  
17 conative responses. The findings show that players who experience a state of flow while  
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19 playing an advergame have more positive attitudes towards the advergame (Ham *et al.*,  
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21 2016; Hernández, 2011), and also tend to communicate to more people than those who  
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23 find the advergaming boring (Gurau, 2008). In addition, playing an advergame  
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25 positively affects the perception of brand personality of players who are in flow (Lee *et*  
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27 *al.*, 2017; Wang *et al.*, 2015). Likewise, experiencing flow in an advergaming context  
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29 has been related to players' personal data sharing and game forwarding (Zhao and  
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31 Renard, 2018), as well as to greater knowledge of the game's persuasive intent  
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33 (Vanwesenbeeck *et al.*, 2016). The flow experience has also been associated with brand  
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35 attention, brand recall and brand recognition (Sreejesh *et al.*, 2018). In addition,  
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37 previous research has shown that experiencing flow while playing advergames can be a  
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39 facilitator of brand attitude (Gurau, 2008; Ham *et al.*, 2016; Steffen *et al.*, 2013;  
40  
41 Waiguny *et al.*, 2012) and buying behaviour (Gurau, 2008; Ham *et al.*, 2016). In the  
42  
43 specific context of mobile advergames, Çardici and Gungor (2018) posited that mobile  
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45 advergames provide opportunities for entering the state on flow, which is reflected in  
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47 higher brand recall and more positive brand attitudes. Therefore, based on previous  
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49 evidence, we postulate that:  
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57 ***H1a. Flow has a positive influence on brand attitude***

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59 ***H1b. Flow has a positive influence on purchase intention***  
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### 2.3. Game repetition

The effects of repetition on consumers' responses to advertising have been widely studied in traditional media. One of the first theories in explaining these effects was the mere exposure theory (Zajonc, 1968), which postulates that the mere repeated exposure to an object makes it more familiar to individuals, which in turn produces positive attitudes. Berlyne's (1970) two-factor theory provides an alternative explanation of the effect of repeated exposure to an ad, by considering that response to advertising exposure is nonlinear and follows an inverted-U shape comprising two phases. In the first one –known as *wear-in*–, the individual becomes familiar with the brand message due to repetition, which is reflected in positive attitude toward the brand (Cox and Cox, 1988). The second phase –known as *wear-out*– is characterised by increasing boredom and irritation due to repetition, which results in diminished positive attitudes (Berlyne, 1970). However, other studies have demonstrated that wear-out effects do not necessarily happen and that individuals who are more exposed to an ad show greater brand and message credibility (Lim et al., 2015), better attitudes toward it (McCoy et al., 2017), and greater purchase intentions (Burton et al., 2018). Chen et al. (2016) found that creativity of the ad could account for this effect. In particular, they found that creative ads, such as mobile advergames, presented immediately a wear-in effect, showing little sign of wearing-out over repeated exposures (Chen et al., 2016).

In the gaming literature, the effect of game exposure on brand-related outcomes has received scarce attention, with most of the existing work focusing on in-game advertising (e.g., Kim and Leng, 2017; Martí-Parreño et al., 2017) rather than on pure advergaming. With some exceptions (see Cauberghe and De Pelsmacker, 2010), findings from previous research show that there is a positive relationship between game

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3 repetition and effectiveness. For instance, Pascoal (2013) found that children who were  
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5 repeatedly exposed to an advergame showed more preferences for the brand embedded  
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7 in the advergame, so that the more exposure to the advergame, the more positive their  
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9 brand preferences and brand selection. More recently, Martí-Parreño et al. (2017) found  
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11 that brands that were more repeated in video games were associated with higher levels  
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13 of players' brand recall and brand recognition. Similarly, Kim and Leng (2017) showed  
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15 that repetitive game play was positively related to brand recall and recognition rates,  
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17 attitudes toward the brand, and intentions to purchase the brands embedded in the game.  
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20 Compared to other advertising tools, such as TV ads or banners, mobile advergames  
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22 provide more opportunities for repetitive game play during the day than any other  
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24 device (Çardici and Gungor, 2018). In addition, as players are voluntarily exposed to  
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26 the advertising message (Roettl et al., 2016), it is expected that they will be more  
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28 receptive to it. Therefore, based on previous evidence, we propose that game repetition  
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30 as a result of repeatedly playing the mobile advergame will enhance brand attitude and  
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32 purchase intention. Thus, we hypothesised that:  
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39 *H2a. Game repetition has a positive influence on brand attitude*

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41 *H2b. Game repetition has a positive influence on purchase intention*  
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46 Besides increasing the effectiveness of mobile advergames, repetitive game play could  
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48 be also related to players' flow experience. The study developed by Chou and Ting  
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50 (2003) was one of the first in analysing the relationship between repetitive behaviours  
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52 and the flow experience in a gaming context. They observed that the amount of time  
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54 spent by players in online games was correlated with the flow experience, although the  
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56 direction of causation was not clear. On the one hand, flow theorists believed that  
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58 people who experience flow during an activity developed a tendency to repeat the  
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3 activity (Csikszentmihalyi, 1990; Webster et al., 1993). Therefore, the motivation to  
4 repeatedly play games came from the flow experience while playing them (Sun et al.,  
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6 2015; Qin et al., 2007). On the other hand, other researchers considered that the more  
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8 repetitive or immersive the playing experience was, the higher the likelihood of  
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10 becoming engaged or in flow (Seah and Cairns, 2008). Therefore, people who spent  
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12 more time playing video games were more likely to experience flow (Khang et al.,  
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14 2013; Nah et al., 2014). After empirically comparing two models with the two possible  
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16 directions, Chou and Ting (2003) concluded that repetition is the facilitator of the  
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18 experience of flow. Based on this, we propose that game repetition will increase  
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20 players' likelihood of experiencing flow during the game. Therefore, we hypothesise:  
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26 ***H3. Game repetition has a positive influence on flow***  
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#### 32 ***2.4. Brand familiarity*** 33 34

35 In addition to game repetition and flow, familiarity with the featured brand is also  
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37 crucial in determining the effectiveness of advergames (Wanick et al., 2018). In  
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39 traditional advertising research, previous studies have found that, compared to familiar  
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41 brands, ads for unfamiliar brands wear-out faster, showing decreased effectiveness  
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43 (Campbell and Keller, 2003).  
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46  
47 In the advergaming context, prior research has reported that players are mainly focused  
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49 on playing the advergame and not on processing the advertising content (Roettl et al.,  
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51 2016), which is in line with the Limited Capacity Model of Mediated Message  
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53 Processing (Lang, 2000). Therefore, in gaming environments, brand familiarity can act  
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55 as an orienting response and, therefore, can increase the attentional capacity for  
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3 processing brand elements embedded in the game (Martí-Parreño et al., 2017), such as  
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5 logos, images of the products, or slogans, among others.  
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8 Therefore, previous studies suggest that advergames might work more effectively for  
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10 brands that are already known to the player in some way (Winkler and Buckner, 2006).  
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12 For instance, Kim and Leng (2017) and Martí-Parreño et al. (2017) found that brand  
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14 familiarity is positively related to measures of players' brand memory, such as brand  
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16 recall and brand recognition. Mau et al. (2008) also found that familiar brands placed  
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18 within video games were recall to a greater extent than unfamiliar brands. Likewise,  
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20 familiarity has also been related to attitudes toward the brand and intentions to share the  
21  
22 advergame (Wanick et al., 2018). Similarly, prior research has suggested that  
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24 individual's brand familiarity may affect attitude toward the brand as well as  
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26 behavioural intentions (Kinard and Hartman, 2013; Waiguny et al., 2013). Therefore,  
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28 we propose that:  
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34 ***H4a. Brand familiarity has a positive influence on brand attitude***

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37 ***H4b. Brand familiarity has a positive influence on purchase intention***  
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42 As noted earlier, different elements of advergames, such as representations of the brand,  
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44 colour schemes, storylines, game scenarios, or game objects promote familiarity among  
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46 players (Wanick et al., 2018). According to Wanick et al. (2018), familiarity with these  
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48 elements not only has a direct impact on advergame effectiveness, but also helps players  
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50 in having a higher level of gaming experience, showing higher levels of enjoyment,  
51  
52 humour, and arousal while playing (Wanick et al., 2018). As both enjoyment (Agarwal  
53  
54 and Karahanna, 2000; Bakker, 2005; Ghani et al., 1991; Guo and Ro, 2008; Koufaris,  
55  
56 2002; Shin, 2006) and arousal (Bridges and Florsheim, 2008; Fortin and Dholakia,  
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2005; Novak et al., 2000) have been described as dimensions of the flow experience, we can, therefore, expect that brand familiarity will be also related to the flow experience.

Based on this, we hypothesise the following:

**H5.** *Brand familiarity has a positive influence on flow*

### **2.5. Brand attitude and purchase intention**

Finally, previous research in advertising has found that a change in brand attitude can be a leading indicator of a change in purchase behaviour (Morris et al., 2002). In fact, the impact of brand attitude on purchase intention has been long analysed within the advertising literature, with attitudes towards the brand found to predict purchase intentions among individuals (Mitchell and Olson, 1981; Lutz et al., 1983; MacKenzie and Lutz, 1986). In the specific context of advergames, prior studies have demonstrated that players with favourable attitudes also show behavioural intentions (Vanwesenbeeck et al., 2017). Accordingly, we hypothesise that:

**H6.** *Brand attitude has a positive influence on purchase intention*

Figure 1 shows the proposed model underlying this research. As can be seen, the independent variables (i.e., game repetition and brand familiarity) are expected to have an impact on the dependent variables (i.e., brand attitude and purchase intention), and those effects are expected to be mediated by the flow experience.

[Figure 1 about here]

### 3. Methodology

#### 3.1. Stimuli

To test the hypotheses, the mobile advergame ‘*Oreo: Twist, Lick, Dunk!*’ from the well-known snack food company Oreo was used. Advergames are a common advertising strategy within this product category (Steffen et al., 2003), which is reflected in the increasing number of companies that are incorporating advergames as part of their marketing strategy (e.g., M&M’s, Pringles, Lays, Pepsi, Chips Ahoy). This study uses a real mobile advergame created by a real brand, which advances previous studies that used fictitious brands or invented advergames (e.g., Ham et al., 2016; Wang et al., 2015; Wanick et al., 2018).

The operating mode of ‘*Oreo: Twist, Lick, Dunk!*’ captures the fun and ritual of eating Oreo cookies (i.e., the twisting, the licking, the dunking), which has long been the focus of Oreo advertising. This advergame reminds one of two of the most popular gaming apps: *Fruit Ninja* (consisting of fruit slicing) and *Slam Dunk King* (consisting of dunking basketball balls). As shown in figure 2, in the advergame, the cookies are thrown into the air and players must swipe across them to separate one of the chocolate cookies from the Oreo. This corresponds to the “twist”. Then, they must swipe across them again to put the cream away, which corresponds to the “lick”. Finally, players must drag the cookie to a glass of milk appearing at the bottom of the screen. This corresponds to the “dunk”. To earn a higher score, which later turns into coins, players have to twist, lick, and dunk as many Oreo cookies as possible in every single set. Players can use the earned coins to purchase different screens as well as to unlock virtual Oreo cookies to play with (e.g., Golden Oreos, Green Tea Oreos). Likewise, players can make in-app purchases. Finally, as players can access the game via their



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3 Facebook accounts, they can also compare their scores with their friends' scores in a  
4  
5 ranking.  
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8 [Figure 2 about here]  
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### 13 **3.2. Procedure and sample**

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16 Data collection was based on a self-administered questionnaire. The participants were  
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18 selected from a large University in Ireland. Recent studies have reported that most of  
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20 young adults are players (Vashisht and Pillai, 2017b). Also, this age cohort is more  
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22 likely to access information via mobile devices (Nielsen, 2016). In addition, as Martí-  
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24 Parreño et al. (2017) note, college students are one of the most important groups of  
25  
26 video game players. Therefore, student samples are appropriate for video game research  
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28 and are frequently used in advergame research (e.g., Ham et al., 2016; Lee and Cho,  
29  
30 2017; Sreejesh et al., 2018; Steffen et al., 2013; Tuten and Ashley, 2016; Vashisht and  
31  
32 Royne, 2016). Therefore, the use of a student sample is appropriate for this study.  
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38 The main study was preceded by a pre-test and a pilot study. In particular, the  
39  
40 questionnaire was pre-tested using an independent sample of students ( $n = 10$ ) to check  
41  
42 the question order, the wording, and the ability of respondents to understand the  
43  
44 meaning of the questions. As a consequence, some of the questions were reworded.  
45  
46 Following this, an additional independent sample ( $n = 36$ ) was used for the pilot study  
47  
48 conducted during September 2017 to ensure the questionnaire's readability and  
49  
50 comprehension, as well as the time taken to answer the questionnaire.  
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54 The main study was developed during September and October 2017 across two phases.  
55  
56 First, researchers contacted participants during classes and gave them the link to  
57  
58 download the advergame from the app store (free to download). Participants were asked  
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3 to play the game in their free time as many times as they wanted (at least once). Then,  
4  
5 after one week, the same groups were contacted in the same classes and were given a  
6  
7 link to the survey questionnaire. Only those who had played the game were invited to  
8  
9 participate in the study. Participation was voluntary. As an incentive, those students  
10  
11 who participated in the study were included in a draw for four shopping vouchers of €50  
12  
13 each. A total of 227 completed questionnaires were collected for the main study during  
14  
15 October 2017. The sample consisted of 124 women (54.6% of the participants) and 103  
16  
17 men (45.4%), with ages ranging from 18 to 27 (Mean = 19.78; SD = 1.98).  
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### 25 **3.3. Measurement instrument**

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27 The questionnaire was developed using measures from relevant previous literature  
28  
29 which were carefully modified to ensure that the items fit the context. The measure of  
30  
31 flow was adopted from Novak et al. (2000). A narrative description of flow was  
32  
33 provided, followed by three items: (1) Do you think you have ever experienced 'flow'  
34  
35 while playing the game? (1=Not at all, 7= very much), (2) In general, how frequently  
36  
37 would you say you have experienced 'flow' while playing the game? (1=Not frequently,  
38  
39 7= very frequently), and (3) Most of the time I play this game, I feel I am in 'flow'  
40  
41 (1=strongly disagree, 7=strongly agree). Brand familiarity was measured using three  
42  
43 items adapted from Ping et al. (2010). Brand attitude was measured using a semantic  
44  
45 differential scale adapted from Wise et al. (2008), and purchase intention was measured  
46  
47 using three items adapted from Doods et al. (1991). In all cases, seven-point Likert  
48  
49 scales were used.  
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55 Participants were also asked to indicate the number of times they had played the  
56  
57 advergame before responding to the questionnaire at different intervals (i.e., "1 time",  
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3 “between 2 and 4 times”, “between 5 and 7 times”, “between 8 and 10 times”, and  
4  
5 “more than 10 times”). The distribution of responses is as follows. 57 individuals  
6  
7 (25.1% of the sample) indicated having played just 1 time; 96 (42.3%) played between  
8  
9 2 and 4 times; 40 (17.6%) played between 5 and 7 times; 13 (5.7%) played between 8  
10  
11 and 10 times; and, finally, 21 individuals (9.3% of the sample) played more than 10  
12  
13 times the advergame.  
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16  
17 Finally, a control question (“In which screen did you play the game?”) was included in  
18  
19 the questionnaire. We gave respondents four possible answers with only one valid  
20  
21 response. The purpose of the control question was to filter possible respondents based  
22  
23 on whether they had played the game. Therefore, only respondents who played the  
24  
25 advergame (those who answered correctly to the control question) participated in the  
26  
27 study.  
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30  
31 The composition of the scales and their references to prior works are shown in Table 1.  
32  
33 Information about means and standard deviations are also included.  
34  
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37 [Table 1 about here]  
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#### 42 43 **4. Analysis and results** 44

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46 The research model was tested using structural equation modelling (SEM), using the  
47  
48 partial least squares (PLS) technique with the software Smart PLS 3.0 (Ringle et al.,  
49  
50 2015). This methodology involves non-parametric procedures and therefore has less  
51  
52 restrictive assumptions about the distribution of data. In addition, it is particularly  
53  
54 suitable when the sample size is lower than 250 and the focus of the study, as in our  
55  
56 case, in on prediction and on theory development rather than on strong theory  
57  
58 confirmation (Reinartz et al., 2009).  
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3 PLS simultaneously assesses the reliability and validity of the measurement model and  
4 the estimation of the structural model. These two steps are described next.  
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7

#### 8 ***4.1. Measurement model*** 9

10 First, the reliability and validity of the research constructs was assessed (Table 2). All  
11 standardized factor loadings were above 0.7 and statistically significant at 0.01  
12 (Carmines and Zeller, 1979), which indicates that the individual item reliability was  
13 adequate. Moreover, all the constructs were internally consistent, since their composite  
14 reliabilities were greater than 0.7 (Nunnally and Bernstein, 1994). The constructs also  
15 met the convergent validity criteria, as the average variance extracted (AVE) values  
16 were above 0.5 (Fornell and Larcker, 1981). Finally, as Table 3 shows, the discriminant  
17 validity was also supported. In all cases, the square root of the AVE for any two  
18 constructs was greater than the correlation estimate among the constructs (Fornell and  
19 Larcker, 1981).  
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34 [Table 2 about here]

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37 [Table 3 about here]  
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#### 43 ***4.2. Structural model and hypotheses testing*** 44

45 The analysis of hypotheses was based on the examination of standardised paths. Besides  
46 the proposed paths, the structural model also included players' gender and gaming  
47 experience (measured as the frequency of engaging in gaming activities) as control  
48 variables. To test the hypotheses, a bootstrapping procedure with 5,000 iterations of  
49 resampling was used (Chin, 1998). The model accounted for 25.9% of variation in  
50 brand attitude and 51.7% of variation in purchase intention of the featured brand. The  
51 predictive relevance of the model was also assessed through the Stone-Geisser test. The  
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3 results showed that the  $Q^2$  value of this test for the dependent variables was positive.

4  
5 Therefore, it can be accepted that the dependent variables can be predicted by the  
6  
7 independent variables and that the model presents predictive relevance.  
8  
9

10  
11 The results indicated that flow was not significantly related to brand attitude ( $\beta = 0.06$ ;  
12  
13  $p = 0.27$ ). Thus, H1a was not supported. Therefore, players' attitude toward the brand  
14  
15 promoted in the advergame do not depend on flow experienced while playing the  
16  
17 advergame. On the contrary, as expected, flow had a positive effect on purchase  
18  
19 intentions ( $\beta = 0.11$ ;  $p = 0.03$ ). Therefore, H1b was supported, which indicates that  
20  
21 player's predisposition to buy products from the embedded brand depends on flow  
22  
23 experienced while playing the advergame.  
24  
25

26  
27 Regarding the impact of game repetition on advergame effectiveness, game repetition  
28  
29 was statistically significant in predicting both brand attitude ( $\beta = 0.10$ ;  $p = 0.06$ ) and  
30  
31 purchase intentions ( $\beta = 0.07$ ;  $p = 0.04$ ). Thus, H2a and H2b were supported. According  
32  
33 to this result, the more a player plays the advergame, the more positive his or her  
34  
35 attitude toward the brand promoted, and the higher his or her willingness to buy  
36  
37 products from the brand. Contrary to predictions, we could not find a significant effect  
38  
39 for the influence of game repetition on players' flow ( $\beta = 0.07$ ;  $p = 0.27$ ). Thus, H3 was  
40  
41 not supported.  
42  
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46  
47 Regarding the effects of brand familiarity, it was found to have a positive influence on  
48  
49 both brand attitude ( $\beta = 0.49$ ;  $p = 0.00$ ) and purchase intentions ( $\beta = 0.31$ ;  $p = 0.00$ ),  
50  
51 supporting H4a and H4b. According to this result, advergaming effectiveness depends  
52  
53 on the player's familiarity with the brand promoted in the advergame. Likewise, brand  
54  
55 familiarity had a positive influence on flow experienced by players ( $\beta = 0.16$ ;  $p = 0.01$ ),  
56  
57 which supports H5. This indicates that the higher the familiarity with the brand and their  
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59 products, the higher the probability of entering the state of flow.  
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3 Finally, the influence of brand attitude on purchase intention ( $\beta = 0.46$ ;  $p = 0.00$ ), was  
4 statistically significant, supporting H6. Results of the structural model are shown in  
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8 Table 4.

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10 [Table 4 about here]  
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## 16 **5. Discussion**

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19 Due to the increasing popularity of mobile devices and the development of gaming  
20 apps, any time of day and any location can provide a gaming context (Wei and Lu,  
21 2014). Advertisers are trying to benefit from this opportunity, creating mobile  
22 advergames through which to engage consumers with the advertising content. As the  
23 use of advergames has been related to potential benefits for marketing (Lee and Cho,  
24 2017), understanding which variables affect mobile advergaming effectiveness has  
25 become a priority among advertisers and advergence developers. This study has  
26 empirically investigated the effects of game repetition, flow and brand familiarity on  
27 players' brand attitude and purchase intention using a mobile advergence from a real  
28 brand.  
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42 The analysis reveals that flow experience while playing the mobile advergence  
43 positively influences purchase intentions of players, which is in line with previous  
44 studies in online advergames (Gurau, 2008; Ham et al., 2016). However, contrary to  
45 predictions, the flow experience did not have a significant impact on players' brand  
46 attitude. A possible explanation for this could be that, within this context, the effect of  
47 flow is eclipsed by the stronger effects of game repetition and brand familiarity.  
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56 The analysis also reveals that game repetition has a positive effect on brand attitude and  
57 purchase intention of players. Thus, the more times the consumer plays the advergence,  
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3 the more positive his or her attitude toward the brand promoted in the advergaming, and  
4 the higher his or her intention to buy the products from the brand. This finding concurs  
5 with findings from earlier studies on traditional advertising (Burton et al., 2018; McCoy  
6 et al., 2017; Zajonc, 1968), as well as studies on in-game advertising (Kim and Leng,  
7 2017). However, game repetition does not influence players' flow experience. Thus,  
8 while being exposed to the advertising content during more time increases its  
9 effectiveness, it has no effect on inducing players in a state of flow. Therefore, the  
10 optimal experience might depend on other variables related to how engaging the  
11 advergaming is or it is designed to induce flow, but not on the number of times the  
12 advergaming is played.

13  
14 Additionally, the analysis shows that familiarity with the brand positively influences  
15 brand attitude and purchase intention of players. This finding is in line with previous  
16 studies which reported that brand familiarity can affect attitude toward the brand as well  
17 as behavioural intentions (Kinard and Hartman, 2013; Waiguny et al., 2013). Thus,  
18 advergaming is more effective for brands that consumers are more familiar with. In  
19 addition, players' familiarity with the brand positively influences players' flow  
20 experience as they are able to recognise elements of the brand placed in the advergaming,  
21 which enhances the gaming experience. Finally, as expected, players' brand attitude  
22 positively influences their purchase intentions.

23  
24 This study offers a number of theoretical contributions to research. First, past research  
25 has focused primarily on online advergaming played on personal computers (e.g., Ham et  
26 al., 2016; Lee et al., 2017; Sreejesh and Anusree, 2017; Vanwesenbeeck et al., 2016;  
27 Vashisht and Royne, 2016; Wanick et al., 2018) and little attention has been paid to  
28 advergaming played on mobile devices (Çardici and Gungor, 2018). This platform is  
29 worthwhile research, as mobile devices are carried everywhere and players are able to  
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3 access mobile advergaming in situations where they cannot access other devices, such as  
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5 computers. Thus, the current research advances knowledge by analysing the  
6  
7 effectiveness of advergaming within mobile phone apps. Second, this research advances  
8  
9 knowledge on mobile advergaming by empirically investigating the effects of game  
10  
11 repetition, flow, and brand familiarity on advergaming's effectiveness. Third, it also  
12  
13 explores the effect of game repetition and brand familiarity on players' flow, which has  
14  
15 received scarce (if almost none) attention in mobile advergaming literature. Finally, in  
16  
17 contrast to previous studies which used invented advergaming or fictitious brands (e.g.,  
18  
19 Ham et al., 2016; Wang et al., 2015; Wanick et al., 2018), this study uses a real mobile  
20  
21 advergaming created by a real brand to analyse the impact of game repetition, flow, and  
22  
23 brand familiarity on players' brand attitude and purchase intentions on a real market  
24  
25 situation.

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31 This study also provides important managerial implications for advertisers as well as for  
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33 mobile advergaming developers. First, previous research had stated that mobile  
34  
35 advergaming provide more opportunities for repetitive game play than any other type of  
36  
37 advergaming (Çardıci and Gungor, 2018). This study empirically demonstrates that the  
38  
39 more times the mobile advergaming is played, the higher its effectiveness. Therefore,  
40  
41 advertisers should create engaging and appealing advergaming that not only easily attract  
42  
43 but also maintain players' interest in keeping playing. For instance, designing the game  
44  
45 with increasing levels of game play could encourage players in continuing playing the  
46  
47 advergaming. In addition, mobile advergaming should also be created in a way that  
48  
49 challenges players. As with any casual game, mobile advergaming should be designed to  
50  
51 be easy to play at the beginning, but difficult to master. This will have an impact on  
52  
53 their likelihood of continuing playing. Second, this study empirically demonstrates that  
54  
55 experiencing flow while playing the mobile advergaming increases players' disposition to  
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3 buy the products from the brand embedded in the game. Thus, mobile advergAMES  
4 should be designed to favour this optimal experience. Finally, as the analysis has  
5  
6 revealed, players' familiarity with the featured brand is a key variable for increasing the  
7  
8 effectiveness of mobile advergAMES as well as for promoting the flow experience. Thus,  
9  
10 it is more desirable to create advergAMES to promote products from well-known brands  
11  
12 than from less-known brands. For less-known brands, marketers should create a two-  
13  
14 phased campaign where they first create familiarity with the brand, and then use  
15  
16 advergAMES to affect responses.  
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22 While the study contributes to the advergaming literature, it also has some limitations.  
23  
24 First, data was collected through a two-phase process in which people had to play the  
25  
26 advergAME first, and then answer the survey. So, the two phases make it more  
27  
28 challenging to collect larger samples. Thus, although the sample was highly appropriate  
29  
30 for the purpose of the study, a broader sample would enhance generalisability. Findings  
31  
32 of this study could be also extended and further tested in other countries and within  
33  
34 different generations of players. For instance, it would be interesting to focus on  
35  
36 different targets, such as families, particularly moms, as they not only represent the  
37  
38 primary purchasers of the Oreo brand, but also are the majority of casual mobile players  
39  
40 (Eklund, 2016). Another limitation of this study is that it only focuses on one specific  
41  
42 brand, which is well-known for consumers. Therefore, future research could benefit  
43  
44 from analysing different mobile advergAMES from brands with different levels of  
45  
46 familiarity to consumers. Another possible limitation of this paper is that it was not  
47  
48 possible to have access to the app to monitor actual usage. As such, game repetition was  
49  
50 measured relying on consumers' memory. In addition, respondents were asked to  
51  
52 indicate the number of times, but not when they played. Thus, future research could  
53  
54 measure game repetition based on an external, objective, and more reliable measure  
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(e.g., information provided by the app), taking into consideration both the number of times the respondents play as well as when do they play. In addition, while brand attitudes and purchase intentions merit examination, research needs to be conducted to see whether advergames can impact actual purchase behaviour of players. Finally, it would be interesting to analyse in-app purchases behaviour of players when playing a mobile advergame.

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**Table 1. Composition of the scales and descriptive statistics**

Constructs, items and sources		Mean	SD
<b>Flow (Novak et al., 2000)</b>			
<i>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.</i>			
F1	Do you think you have ever experienced “flow” while playing the game? <i>(Not at all/Very much)</i>	3.57	1.98
F2	In general, how frequently would you say you have experienced “flow” while playing the game? <i>(Not frequently/Very frequently)</i>	3.32	2.02
F3	Most of the time I play this game, I feel I am in “flow”. <i>(Strongly disagree/Strongly agree)</i>	3.34	1.84
<b>Brand familiarity (Ping et al., 2010)</b>			
BF1	How familiar are you with OREO’s products? <i>(Not at all familiar/Very familiar)</i>	5.98	1.32
BF2	How often have you purchased OREO’s products in the past? <i>(Not often/Very often)</i>	4.64	1.89
BF3	How knowledgeable are you about OREO’s products? <i>(Not very knowledgeable/Very knowledgeable)</i>	4.57	1.78
<b>Brand attitude (Wise et al., 2008)</b>			
My attitude toward the brand OREO is...			
BA1	Unfavourable – Favourable	5.78	1.31
BA2	Bad – Good	5.95	1.21
BA3	Negative – Positive	6.00	1.20
<b>Purchase intention (Doods et al., 1991)</b>			
PI1	My likelihood of purchasing OREO’s products is... <i>(Very low/Very high)</i>	5.10	1.69
PI2	The probability that I would consider buying OREO’s products is... <i>(Very low/Very high)</i>	5.26	1.65
PI3	My willingness to buy OREO’s products is... <i>(Very low/Very high)</i>	5.18	1.69
<b>Game repetition</b>		<b>No. individuals</b>	<b>% sample</b>
How many times have you played before answering the questionnaire?			
1	<i>1 time</i>	57	25.1%
2	<i>Between 2 and 4 times</i>	96	42.3%
3	<i>Between 5 and 7 times</i>	40	17.6%
4	<i>Between 8 and 10 times</i>	13	5.7%
5	<i>More than 10 times</i>	21	9.3%
<b>Gaming experience (Gross, 2010)</b>		<b>No. individuals</b>	<b>% sample</b>
How often do you engage in gaming activities?			
1	<i>Every day</i>	45	19.8%
2	<i>Some days a week</i>	22	9.7%
3	<i>About once a week</i>	38	16.7%
4	<i>About two or three times per month</i>	35	15.4%
5	<i>About once a month</i>	62	27.3%
6	<i>Rarely or never</i>	25	11.0%

**Table 2. Factor loadings and quality criteria**

<b>Construct</b>	<b>Item</b>	<b>Loadings</b>	<b>Composite reliability</b>	<b>AVE</b>
Flow	F1	0.908	0.93	0.81
	F2	0.890		
	F3	0.908		
Brand Familiarity	BF1	0.766	0.83	0.62
	BF2	0.859		
	BF3	0.733		
Brand Attitude	BA1	0.909	0.95	0.87
	BA2	0.936		
	BA3	0.947		
Purchase Intention	PI1	0.950	0.96	0.90
	PI2	0.939		
	PI3	0.959		



**Table 3. Discriminant validity results**

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>1. Game repetition</b>	<b>N.A.</b>				
<b>2. Flow</b>	0.08	<b>0.90</b>			
<b>3. Brand familiarity</b>	0.03	0.16	<b>0.79</b>		
<b>4. Brand attitude</b>	0.11	0.14	0.49	<b>0.93</b>	
<b>5. Purchase intention</b>	0.13	0.22	0.56	0.64	<b>0.95</b>

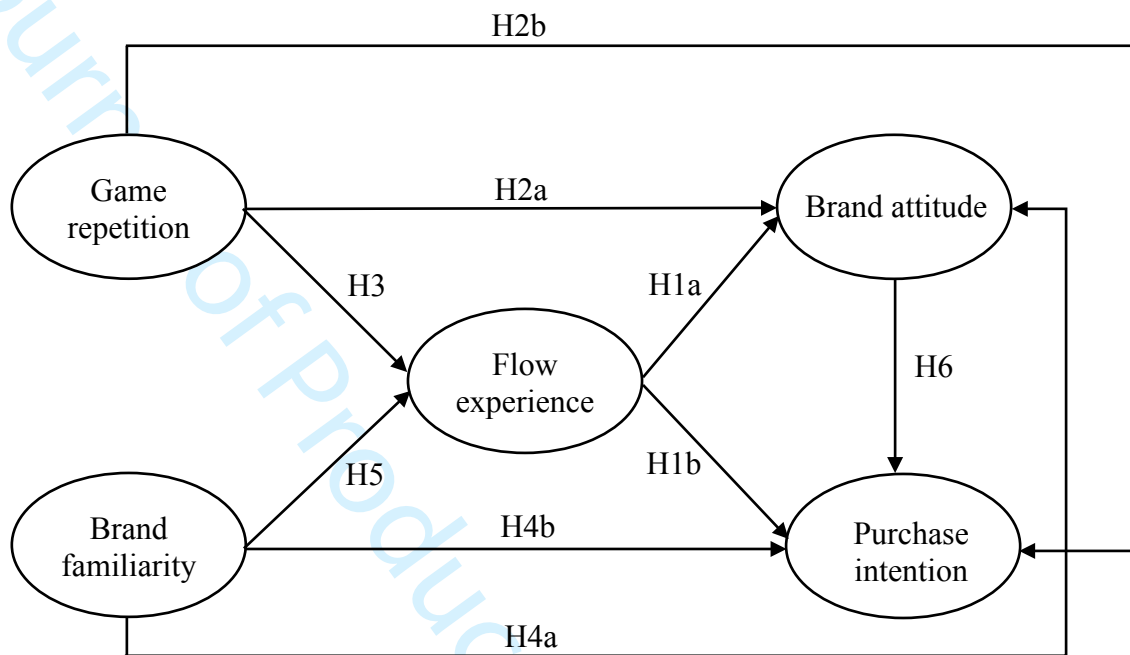
Note: Values on the diagonal are the square root of the AVE. Off-diagonal elements are the correlations among constructs. N.A.: not applicable.

**Table 4. Structural model results**

	Hypotheses	$\beta$	T statistic	P value	Supported?
H1a	Flow → Brand attitude	0.06	1.10	0.27	No
H1b	Flow → Purchase intention	0.11	2.24	0.03**	Yes
H2a	Game repetition → Brand attitude	0.10	1.90	0.06*	Yes
H2b	Game repetition → Purchase intention	0.07	2.05	0.04**	Yes
H3	Game repetition → Flow	0.07	1.10	0.27	No
H4a	Brand familiarity → Brand attitude	0.49	8.38	0.00***	Yes
H4b	Brand familiarity → Purchase intention	0.31	5.52	0.00***	Yes
H5	Brand familiarity → Flow	0.16	2.45	0.01***	Yes
H6	Brand attitude → Purchase intention	0.46	7.70	0.00***	Yes
<i>Control variables</i>					
	Gender → Brand attitude	-0.03	0.50	0.62	
	Gender → Purchase intention	0.03	0.66	0.51	
	Gaming experience → Brand attitude	-0.07	1.13	0.26	
	Gaming experience → Purchase intention	-0.10	1.81	0.07	

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Figure 1: Proposed model



*Control variables: Gender and Gaming experience*