



The role of flow for mobile advergaming effectiveness

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Abstract

Purpose: Based on flow theory, this paper seeks to explain why the use of mobile advergaming 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 advergaming. Results also show that the greater the flow, the more positive the attitude toward the featured brand and the greater the purchase intention.

Practical implications: The findings of this study are important for advertising practitioners and advergaming developers as understanding the key game features that promote flow is crucial to designing engaging mobile advergaming 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 advergaming, which is an under researched area. Second, it offers a conceptual framework based on flow theory for understanding why the use of mobile advergaming can enhance players' brand perceptions and purchase intentions.

Keywords: Advergaming, Advergaming, Flow, Brand attitude, Mobile devices

1. Introduction

Advergaming is 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, advergaming can create hours of engagement. Defined as electronic games designed with the specific purpose of promoting a brand or product (Winkler and Buckner, 2006), advergaming represents 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 advergaming 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 toward the brand or product promoted (Terlutter and Capella, 2013).

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 advergaming (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 advergaming to capture players' full attention anytime and anywhere. Recently, Çardici and Gungor (2018) suggested that online and mobile advergaming might influence brand related outcomes differently as they have different characteristics. However, past research has focused primarily on online advergaming (e.g., Gross, 2010; Ham et al., 2016;

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3 Steffen *et al.*, 2013; Vashisht and Royne, 2016; Wang *et al.*, 2015), and little attention
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5 has been paid to mobile advergames. As such, mobile gaming platforms are an especially
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7 under researched area in this field (Terlutter and Capella, 2013), and, therefore, more
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9 investigation examining advergames within mobile phone apps has been required
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12 (Çardici and Gungor, 2018; Kinard and Hartman, 2013).
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15 Nowadays, with thousands of games available for download in the App Store, creating a
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17 successful mobile advergame is a challenge. Previous studies have shown that games are
18
19 most successful and engaging when they facilitate the flow experience (Kiili, 2005).
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21 Hence, flow theory is a particularly suitable framework for the study of mobile
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23 advergames. The flow experience refers to an optimal experience in which individuals
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25 are highly involved in a certain activity which is perceived as very pleasurable
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27 (Csikszentmihalyi, 1975). This optimal experience can lead to positive outcomes
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29 (Csikszentmihalyi and LeFevre, 1989). However, despite the relevance of flow theory to
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31 mobile advergaming, compared with other types of flow-inducing media experiences, few
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33 research studies on mobile advergames have been built on this theory.
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40 In this context, it is worthwhile to analyse whether players experience flow while they
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42 are playing a mobile advergame, and if such flow state influences brand-related
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44 persuasion outcomes. In addition, it is critical to understand which elements can promote
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46 flow within this context. Therefore, the purpose of this study is twofold. First, based on
47
48 the model of online flow proposed by Novak *et al.* (2000), we examine the influence of
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50 five flow antecedents– namely, skills, challenge, interactivity, focused attention and
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52 telepresence – on players' flow experience while playing a mobile advergame. Second,
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54 we investigate the impact of flow on players' attitude toward the brand promoted and
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56 purchase intention of their products.
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3 This study contributes to the extant literature in several ways. First, although mobile
4 devices (smartphones and tablets) are a growing way to access advergames (Tuten and
5 Ashley, 2016), they are an under researched area in this field (Cardici and Gungor, 2018;
6 Kinard and Hartman, 2013; Terlutter and Capella, 2013). Therefore, our empirical
7 findings provide new insights into the effectiveness of mobile advergames. Second,
8 although previous studies have emphasized the importance of experiencing flow in
9 gaming contexts (e.g., Badrinarayanan *et al.*, 2015; Procci *et al.*, 2012; Su *et al.*, 2016),
10 there is a shortage of studies examining the impact of flow on the persuasive power of
11 **mobile** advergames. Therefore, by drawing on online flow theory proposed by Novak *et*
12 *al.* (2000), we offer a conceptual framework for understanding why the use of mobile
13 advergames can enhance players' brand perceptions and purchase intentions. In addition,
14 despite the call of Terlutter and Capella (2013) to deep into the role of the five antecedents
15 of flow within an advergaming context, there is a lack of studies analysing the impact of
16 all flow prerequisites on the flow experience within this context. Therefore, the current
17 research sheds new light on the impact of flow antecedents of the flow experience in the
18 mobile advergaming context. Finally, contrary to previous studies that used fictitious
19 brands (e.g., Ham *et al.*, 2016) or invented games (e.g., Wang *et al.*, 2015) to analyse flow
20 in advergames, this study uses a real mobile advergame created by a real brand to analyse
21 the impact of flow on players' brand attitude and purchase intentions on a real market
22 situation.

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

The term *advergame* is the combination of the words *advertisement* and *video game* (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 of 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

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3 the brand (Redondo, 2012; Wise *et al.*, 2008). In addition, previous studies consider that
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5 advergaming is more effective than traditional advertising because it captures consumers'
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7 attention best (Edwards, 2003). Thus, players are very receptive to the advertising
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9 message or at least to the product or company that is displayed within the game (Winkler
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11 and Buckner, 2006). Advergames are also related to building brand awareness and
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13 offering product information (Hernández *et al.*, 2004), as well as persuading the consumer
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15 to form a positive attitude toward the brand promoted (Ping *et al.*, 2010).
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20 **3. Theoretical framework and research hypotheses**

21 22 23 **3.1. Flow experience**

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25 **Mobile** advergames are a form of branded entertainment, so it is important that they
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27 produce a significant level of enjoyment to players (Peters and Leshner, 2013). As noted
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29 earlier, one of the most popular constructs used to describe the subjective game
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31 experience is the concept of flow (Procci *et al.*, 2012). Flow theory has its origin in
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33 Csikszentmihalyi's desire to understand enjoyment. Csikszentmihalyi (1975) explored
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35 why some people—such as rock climbers or gamers—were willing to invest great
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37 amounts of time and effort in doing activities that provide no external reward or scarce
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39 material incentives. He found that this group of people felt rewarded by executing actions
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41 per se, experiencing high enjoyment and fulfilment from the activity in itself. Those
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43 activities were characterized to be autotelic (from Greek *auto* = self, *telos* = goal) or
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45 intrinsically motivating, and the optimal experience derived from performing them was
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47 labelled “flow” (Csikszentmihalyi, 1975). The flow construct was then described as a
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49 “*crucial component of enjoyment*” (Csikszentmihalyi, 1975; p. 11), and the flow
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51 experience was defined as “*the holistic sensation that people feel when they act with total*
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53 *involvement*” (Csikszentmihalyi, 1975; p. 36).
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3 Based on the work of Csikszentmihalyi, Hoffman and Novak (1996) proposed a model
4 of flow for the online environment. In particular, Hoffman and Novak (1996)
5 conceptualized flow as a cognitive state determined by high levels of skill and control,
6 high levels of challenge and arousal, focused attention, interactivity, and telepresence.
7
8 Following the conceptual model of flow by Hoffman and Novak (1996), Novak *et al.*
9
10 (2000) tested it empirically, finding direct paths to flow from skill, challenge,
11 telepresence, and interactivity, and indirectly from focused attention through
12 telepresence. This model has been widely used as the basis to analyse flow in different
13 gaming contexts, such as mobile gaming (Su *et al.*, 2016), and massively multiplayer
14 online role playing games (Badrinarayanan *et al.*, 2015). However, it has not yet been
15 used to investigate flow within mobile advergaming.

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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** advergence challenge, the player will experience boredom, which might also
result in game abandoning. Thus, **mobile** advergaming have to offer an optimal level of
challenge to engage players in an immersive, fun environment (Hernández, 2011). In fact,

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3 producing challenging advergimes is crucial to ensure that the advergimes will work and
4 show the promised effects of branding (Waiguny *et al.*, 2012). Once induced, the
5 maintenance of the state of flow requires a constantly evolving challenge, because the
6 player's skills are likely to improve after playing the game a few times. Thus, we
7 hypothesize that:
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15 **H1. A higher level of perceived skills at playing games will lead players to experience a**
16 **higher level of flow**
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21 **H2. A higher level of perceived challenge when playing the mobile advergime will lead**
22 **players to experience a higher level of flow**
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26 Besides a high level of skills and challenge, interactivity is another important source of
27 flow (Novak *et al.*, 2000). Csikszentmihalyi (1990) suggested that the most successful
28 websites are the ones that offer interactive experiences, and not simply content.
29 Interactive features in computer-mediated environments were also found to boost the
30 online flow experience (Hoffman and Novak, 2009), so that participants who perceived a
31 higher level of interactivity experienced more online flow (van Noort *et al.*, 2012).
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33 Interactivity is one of the most important defining characteristics of advergimes. While
34 playing an advergime, players can interact with the advertising message and the game
35 features (Ping *et al.*, 2010), which makes it more engaging. Interactivity within an
36 enjoyable advergime has a positive effect on players' brand related responses, increasing
37 brand recall and recognition (Sreejesh and Anusree, 2017), and enhancing brand attitude
38 (Ping *et al.*, 2010; Sukoco and Wu, 2011). In addition, contrary to traditional advertising
39 in which consumers are passively exposed to the content, advergimes evoke a certain
40 degree of activity with consumers, engaging them with the interactive content (Van
41 Reijmersdal *et al.*, 2012). Therefore, we postulate that:
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3 **H3. A higher level of perceived interactivity when playing the mobile advergaming will**
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5 **lead players to experience a higher level of flow**
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9 The presence of focused attention is also necessary to experience flow (Hoffman and
10 Novak, 1996). Within this state, players allocate their available cognitive resources to the
11 task at hand (playing the game) and do not reflect upon their actions consciously
12 (Csikszentmihalyi, 1977). When explaining the factors influencing human-technology
13 interactions, Csikszentmihalyi (1990) suggested that the individuals' attention should be
14 limited (or focused) to the narrow stimulus represented by the technology. Similarly,
15 within a mobile advergaming context, players are focused on playing the advergaming,
16 which is expected to increase their propensity of entering in a state of flow. Consequently,
17 we propose that:
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30 **H4. A greater focused attention when playing the mobile advergaming will lead players to**
31 **experience a higher level of flow**
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36 Finally, previous studies have suggested that within virtual environments, telepresence
37 leads to flow (Cauberghe *et al.*, 2011; Pelet *et al.*, 2015). Telepresence has been defined
38 as the sense of being there in a virtual environment, forgetting that you are actually sitting
39 in front of a TV or PC (Kim and Biocca, 1997). This characteristic is very representative
40 of videogames and advergaming, as they transport players to virtual worlds. Nelson *et al.*
41 (2006) found higher levels of telepresence for players than for spectators. Thus, a greater
42 level of telepresence can be expected when individuals play **mobile** advergaming too.
43 Previous studies have demonstrated that telepresence enhances the flow state (Hernández,
44 2011; Hoffman and Novak, 1996; Novak *et al.*, 2000), which in turns increases the
45 effectiveness of advertising (Cauberghe *et al.*, 2011; van Noort *et al.*, 2012). Therefore,
46 we hypothesize that:
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3 **H5. A greater level of telepresence when playing the mobile advergame will lead players**
4 **to experience a higher level of flow**
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8 **3.2. Mobile advergaming effectiveness**

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11 One of the ultimate goals of advertising is persuasion (Barry, 1987) and this is also true
12 for advergaming (Ping *et al.*, 2010). One of the most important factors of persuasiveness
13 of advergames is related to the flow experience or perceived entertainment (Roettl *et al.*,
14 2016). The primary objective of advergames is to deliver the brand message in a way that
15 is fun and entertaining to keep people engaged (Ham *et al.*, 2016). Advergames are
16 designed to trigger enjoyable experiences, and thus the concept of flow plays an important
17 role in explaining the effectiveness of advergames (Steffen *et al.*, 2013).
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29 Flow is considered as a highly enjoyable psychological state that can lead to positive
30 marketing consequences, including attitude formation, purchase intentions, and
31 behaviours (Chen *et al.*, 1999; Hoffman and Novak, 1996, 2009). **Insights from previous**
32 **studies analysing online advergames have demonstrated that playing these games**
33 **positively affects gamers' perceptions of brand personality, if the players experience flow**
34 **(Wang *et al.*, 2015). In addition, players who experience a state of flow have a positive**
35 **attitude towards advergames (Ham *et al.*, 2016; Hernández, 2011) and tend to**
36 **communicate to more people than those who find the advergame boring (Gurau, 2008).**
37 **Likewise, experiencing flow promotes brand attention, brand recall and brand recognition**
38 **(Sreejesh *et al.*, 2018). Entertainment has also been found as a factor contributing to a**
39 **more favourable attitude toward the brand placed in the advergame (Marti-Parreño *et al.*,**
40 **2013). Previous research has also shown that experiencing flow while playing online**
41 **advergames facilitates brand attitude and purchase behaviour (Gurau, 2008). More**
42 **precisely, Waiguny *et al.* (2012) found that brand attitudes were the highest for children**
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3 who were optimally challenged (in flow) in the game and lowest for those who were
4 underchallenged. Similarly, Ham *et al.* (2016), showed a positive impact of flow on
5 attitudes toward the online advergaming and on purchase intention.
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10 In the specific context of mobile advergaming, recent studies suggest that these games
11 promote the flow experience, which is reflected in higher brand recall and more positive
12 brand attitudes (Çardici and Gungor, 2018).
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18 Thus, taking all these arguments into account, we expect that experiencing flow while
19 playing the mobile advergaming will elicit a pleasurable experience transferred to the brand
20 embedded in the game, favouring more positive attitudes, and increasing the intention to
21 purchase the brand. This is in line with the idea of affect transfer theory, which suggests
22 that the positive feelings the advergaming elicits can impact the featured brand (Waiguny
23 *et al.*, 2012). Therefore, we postulate:
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33 **H6.** A higher level of flow when playing the mobile advergaming will lead players to have
34 a more positive brand attitude
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38 **H7.** A higher level of flow when playing the mobile advergaming will lead players to have
39 a higher purchase intention
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44 Furthermore, a change in brand attitude can be a leading indicator of a change in purchase
45 behavior (Bellman *et al.*, 2014; Morris *et al.*, 2002). Vanwesenbeeck *et al.* (2017) found
46 that children who had a more positive attitude toward an online advergaming were more
47 likely to report higher purchase intentions. Building on these ideas, we hypothesize the
48 following:
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56 **H8.** A more positive brand attitude will lead players to have a higher purchase intention
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3 Finally, this study includes individuals' familiarity with the featured brand as a control
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5 variable.
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8 Figure 1 shows the proposed model underlying this research.
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14 15 **4. Method**

16 17 **4.1. Stimuli**

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19 To test the hypotheses, a mobile advergaming of the well-known snack food company Oreo
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21 was used. Within this product category, advergaming constitutes a common advertising
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23 strategy (Steffen *et al.*, 2013). In fact, several companies within the food and beverage
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25 industry are incorporating advergaming on their websites (e.g., M&M's, Pringles, Lays,
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27 Pepsi, Chips Ahoy).
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31 For decades, the focus of Oreo advertising has been in the fun of eating Oreos: the
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33 twisting, the licking, the dunking. This worldwide known ritual has been transferred to
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35 the mobile advergaming 'Oreo: Twist, Lick, Dunk!'. 'Oreo: Twist, Lick, Dunk!' mostly
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37 resembles a combination of *Fruit Ninja* (one of the most popular gaming apps consisting
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39 on fruit slicing) and *Slam Dunk King* (a popular game to test players' basketball skills in
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41 dunking balls). In the game, Oreos are hurled into the air and players must swipe across
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43 them twice. The first swipe corresponds to the 'twist' – this separates one of the chocolate
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45 cookies from the Oreo –, while the second one corresponds to the 'lick' – putting the
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47 cream away –. This second swipe also puts the Oreos together, becoming a super Oreo
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49 that players must drag to the glass of milk appearing at the bottom of the screen. Each
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51 Oreo that is twist, lick, and dunk in every single set makes players earn a higher score
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53 that is turned into coins. Players can spend the earned coins to unlock virtual Oreos that
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3 have been commercialized over the years (e.g., Golden Oreos, Green Tea Oreos), as well
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5 as to purchase different screens to play (e.g., Paris, China, or the Biscuit World). Players
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7 can also make in-app purchases. In addition, there is a social component in the game, as
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9 players can access the game via their Facebook accounts, so they can compare their scores
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11 with their friends' ones in a ranking.
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14 15 **4.2. Procedure and sample** 16

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18 The main study was preceded by a pre-test and a pilot study, which were used to survey
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20 a small subset of the population to determine whether the research instrument and method
21
22 to collect data as well as the stimulus (the Oreo adverggame) were relevant, reliable, and
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24 appropriate for the purpose of the study.
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28 Data collection was based on a self-administered questionnaire. This instrument allows
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30 respondents to complete the survey on their own, which eliminates interviewers' bias and
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32 has the ability to reach large populations (Bhattacharjee, 2012). The main disadvantages
33
34 of self-administered questionnaires are the low response rates if they are disseminated via
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36 mail or e-mail, and the difficulty in obtaining large quantities if they are too long (Duffet,
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38 2015). To avoid this inconvenient, questionnaires were distributed on a face-to-face basis
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40 and participants were also told that the questionnaire took no longer than five minutes to
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42 complete.
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47 The participants of the pre-test, pilot test and main study were selected from a large Irish
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49 university. Recent studies have reported that most of young adults are gamers (Vashisht
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51 and Sreejesh, 2017). Therefore, the use of a student sample is appropriate for this study.
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53 In addition, OREO, the brand whose adverggame has been selected in this study, is well-
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55 known to Irish consumers.
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3 The questionnaire was pre-tested during June 2017 using an independent sample ($n = 10$)
4 to check the question order, the wording, and the ability of respondents to understand the
5 meaning of the questions. Once exposed to the advergaming, participants, who had
6 previously been informed about the purpose of the pre-test, responded to the survey. As
7 a result, some of the questions were reworded. Subsequently, a pilot study of an additional
8 independent sample ($n = 36$) was conducted during September 2017 to ensure the
9 readability and comprehension, as well as the time it took to answer the questionnaire.

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20 The data collection involved a two-step process. First, researchers contacted participants
21 during classes and give them the link to download the advergaming from the app store (free
22 to download). Participants were asked to play the game in their free time as many times
23 as they wanted (at least once). Second, after one week, the same groups were contacted
24 in the same classes and were given a link to the survey questionnaire, which was provided
25 on SurveyMonkey. As an incentive, those students who participated in the study were
26 included in a draw for four shopping vouchers of €50 each. A total of 212 completed
27 questionnaires were collected for the main study during October 2017. 55% of the
28 participants were women and the mean age was 20 ($SD = 3.43$).

41 **4.3. Measurement instrument**

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44 To measure the different variables included in this study, a questionnaire was developed
45 from relevant previous literature and carefully modified to ensure that the items fit this
46 context (see Table 1). The measures of the antecedents of flow (i.e., skills, challenge,
47 interactivity, focused attention, and telepresence) were adapted from Novak *et al.* (2000).
48 These include statements such as ‘I consider myself knowledgeable about playing games’
49 (skills), ‘Playing the game challenges me’ (challenge), ‘Interacting with the game is slow
50 and tedious’ (interactivity), ‘When I play the game I am totally absorbed in what I am
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3 doing' (focused attention), and 'Playing the game makes me forget where I am'
4 (telepresence). Participants were asked to indicate their degree of agreement with each
5 statement on a seven-point Likert scale ranging from 1 (Strongly disagree) to 7 (Strongly
6 agree). To measure feelings of flow, the measure of flow developed by Novak *et al.*
7 (2000) was also used. A narrative description of flow was provided and three items were
8 measured: (1) Do you think you have ever experienced 'flow' while playing the game?
9 (1=Not at all, 7= very much), (2) In general, how frequently would you say you have
10 experienced 'flow' while playing the game? (1=Not frequently, 7= very frequently), and
11 (3) Most of the time I play this game, I feel I am in 'flow' (1=strongly disagree, 7=strongly
12 agree).

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15 Regarding variables related to advergames effectiveness, brand attitude was measured
16 using a semantic differential scale adapted from Wise *et al.* (2008). The anchoring word
17 pairs were unfavorable/favorable, bad/good, negative/positive, rated on a seven-point
18 scale. Purchase intention was measured using three items adapted from Doods *et al.*
19 (1991). This includes statements such as 'My likelihood of purchasing OREO's products
20 is...', rated also on a seven-point scale (1=Very low, 7=very high). Finally, both a control
21 question and a control-variable were included in the questionnaire. The control question
22 ("In which screen did you play the game?") was aimed at removing respondents who had
23 not played the game. We gave respondents four possible answers with only one valid
24 response ("Kitchen"). Hence only responses from those who answered correctly to the
25 control question were used to test the proposed model. The control variable (i.e., brand
26 familiarity) was measured using three items adapted from Ping *et al.* (2010), including
27 the questions 'How familiar are you with the OREO's products?', 'How often have you
28 purchased OREO's products in the past?', and 'How knowledgeable are you about
29 OREO's products?'. Again, the items were measured on a seven-point scale with anchors
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3 not at all familiar/very familiar, not often/very often, not very knowledgeable/very
4 knowledgeable.
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8 (Table 1 about here)
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10 11 **5. Analysis and results**

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14 The research model was tested using partial least squares structural equation modelling
15 (PLS-SEM) with the software Smart PLS 3 (Ringle *et al.*, 2015). Compared to other
16 methods, such as the covariance-based structural equation method (CB-SEM), this
17 methodology is suitable when the focus of the study, as in our case, is on prediction and
18 on theory development rather than on strong theory confirmation (Reinartz *et al.*, 2009).
19 In addition, this methodology involves non-parametric procedures and therefore has less
20 restrictive assumptions about the distribution of data. Moreover, PLS is particularly
21 suitable when the sample size is lower than 250, as is the case in our study (Reinartz *et*
22 *al.*, 2009). PLS simultaneously assesses the reliability and validity of the measurement
23 model and the estimation of the structural model. These two steps are described next.
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38 **5.1. Measurement model**

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41 First, the reliability and validity of the research constructs were assessed. The indicator
42 reliability was evaluated based on the criterion that loadings should be higher than 0.7
43 (Churchill, 1979). Items S3 and I3 were eliminated because they had factor loadings lower
44 than 0.7. As Table 2 shows, all standardized factor loadings were above 0.7 and
45 statistically significant at 0.01 (Carmines and Zeller, 1979), which indicates that the
46 individual item reliability was adequate. Moreover, all the constructs were internally
47 consistent, since their composite reliabilities were greater than 0.7 (Nunnally and
48 Bernstein, 1994). The constructs also met the convergent validity criteria, as the average
49 variance extracted (AVE) values were above 0.5 (Fornell and Larcker, 1981). Finally, the
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3 discriminant validity was also supported. In all cases, the square root of the AVE for any
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5 two constructs was greater than the correlation estimate among the constructs (Fornell
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7 and Larcker, 1981).
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11 (Table 2 about here)
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14 **5.2. Structural model and hypotheses testing**

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17 The analysis of hypotheses and constructs' relationships was based on the examination
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19 of standardized paths. The path significance levels were estimated using a bootstrapping
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21 procedure with 5,000 iterations of resampling (Chin, 1998). The model accounted for
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23 34.7% of variation in flow state, 30.9% of variation in brand attitude, and 57.6% of
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25 variation in purchase intention of the featured brand. The predictive relevance of the
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27 model was also assessed through the Stone-Geisser test. The results showed that the Q^2
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29 value of this test for the dependent variables was positive. Therefore, it can be accepted
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31 that the dependent variables can be predicted by the independent variables and that the
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33 model presents predictive relevance. The results are summarized and presented in Figure
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(Figure 2 about here)

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, H3, 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,

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3 as well as the influence of brand attitude on purchase intention ($\beta = 0.465$; $t = 8.152$),
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5 supporting H6, H7, and H8.
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8 Concerning the control variable, brand familiarity affects both brand attitude ($\beta = 0.530$;
9 $t = 9.257$) and purchase intention ($\beta = 0.352$; $t = 6.378$). Therefore, players that are more
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11 familiar with the brand featured in the advergaming have a more positive attitude toward
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13 the brand and a higher purchase intention.
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17 18 19 **6. Discussion**

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21 Thanks to the growing popularity of mobile devices and apps, any time of day and any
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23 location can provide a gaming context (Wei and Lu, 2014). Marketers are taking full
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25 advantage of this, using mobile advergaming to create engaging experiences with
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27 consumers. This study is one of the first to associate the flow experience while playing a
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29 mobile advergaming with players' perceptions of the brand promoted in the game.
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34 The first objective of this study was to examine the influence of five flow prerequisites –
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36 namely, skills, challenge, interactivity, focused attention and telepresence– on players'
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38 flow experience while playing a mobile advergaming. The analysis indicates that the level
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40 of challenge of the game significantly promotes the flow experience among players. This
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42 finding is in agreement with a number of authors. For instance, Hernández (2011)
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44 reported that challenges offered by online advergaming are the most important predictor
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46 for flow experience. Su *et al.* (2016) also found that players are interested in mobile games
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48 that are challenging because that has a positive effect on perceived entertainment. Finally,
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50 Waiguny *et al.* (2012) revealed that producing challenging online advergaming is crucial
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52 to ensure that the advergaming will work. Besides game challenge, interactivity was also
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54 found to be a significant predictor of the flow experience. This is in line with previous
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56 studies who reported that perceiving interactivity within a technology-mediated
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3 environment was related with experiencing more flow (Hoffman and Novak, 2009; van
4 Noort *et al.*, 2012). Focused attention had also a significant impact on the optimal
5 experience. Hoffman and Novak (1996) proposed focused attention as one of the
6 prerequisites to experience flow. However, Novak *et al.* (2000) could not empirically find
7 a direct relationship between these constructs. This study, by contrast, provides empirical
8 support for the direct relationship between focused attention and flow experience. This is
9 a very interesting finding, as it advances existing knowledge by empirically confirming
10 the direct and positive relationship between focused attention and flow. Finally,
11 telepresence significantly promoted the flow experience among players, which confirms
12 findings from previous studies in which telepresence within virtual environments leads to
13 flow (Cauberghe *et al.*, 2011; Hernández, 2011; Hoffman and Novak, 1996; Novak *et al.*,
14 2000; Pelet *et al.*, 2015). Contrary to predictions, players' gaming skills did not have a
15 significant influence on flow state. This result can be explained because most mobile
16 advergaming are designed as casual games (Redondo, 2012). As such, they are created
17 with the intent that any individual can play the game without advanced experience of
18 gaming techniques (Cicchirillo and Mabry, 2016). Accordingly, this finding suggests that,
19 within a mobile advergaming context, players can experience flow independently of their
20 level of gaming skills.

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The second objective of the research was to examine the impact of flow on players' attitude toward 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 advergaming on branding, which is in line with previous studies **with online advergaming** (Gurau, 2008; Ham *et al.*, 2016; Terlutter and Capella, 2013), and consistent with the idea of affect

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3 transfer theory: the positive feelings the advergame elicits can impact the featured brand
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5 (Waiguny *et al.*, 2012). In addition, findings revealed that brand attitude has a positive
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7 influence on purchase intention. These findings confirm that brand attitude is a leading
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9 indicator of a change in purchase behavior (Bellman *et al.*, 2014; Morris *et al.*, 2002).

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13 Finally, a significant impact was revealed in terms of players' familiarity with the brand.
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15 This finding is in line with previous studies which reported that familiarity with the brand
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17 affects attitude toward the brand as well as behavioral intentions (Kinard and Hartman,
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19 2013; Waiguny *et al.*, 2013).

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23 From the theoretical viewpoint, this study makes several contributions to research. First,
24
25 despite the increasing use of smartphones and tables to access advergames (Tuten and
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27 Ashley, 2016), past research has focused primarily on **online advergames** –those played
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29 on personal computers– and little attention has been paid to **mobile advergames** –those
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31 played on smartphones and tablets– (Çardici and Gungor, 2018; Kinard and Hartman,
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33 2013; Terlutter and Capella, 2013). The empirical findings from this study advance
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35 knowledge by analysing the effectiveness of advergames within mobile phone apps.
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37 Second, it successfully applies flow theory to examine the impact of flow on the
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39 persuasive power of mobile advergames. Although previous studies had shown the
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41 importance of experiencing flow in gaming contexts (e.g., Badrinarayanan *et al.*, 2015;
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43 Procci *et al.*, 2012), few studies had examined how playing mobile advergames can
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45 enhance players' brand perceptions and purchase intentions. In addition, there is a
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47 shortage of studies examining the impact of all flow prerequisites on the flow experience
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49 within this context. Therefore, this study sheds new light on the impact of flow
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51 antecedents of the flow experience in the mobile advergaming context, as well as its
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53 impact on brand-related persuasion outcomes. Finally, this study advances knowledge by
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55 analysing the impact of flow on players' brand attitude and purchase intentions on a real
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3 market situation. This is, using a real mobile advergame created by a real brand, which
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5 increases the external validity of this study in comparison with those that use fictitious
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7 brands or invented products.
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11 This study has also practical implications for advertisers and mobile advergame
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13 designers. Understanding the key features that increase the effectiveness of **mobile**
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15 advergames is of main importance for practitioners. The findings of this study show that
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17 experiencing flow is a key variable affecting **mobile** advergames' success, promoting
18
19 more favourable attitudes and increasing the purchase intention toward the featured
20
21 brand. Based on this finding, we advocate that creating an engaging **mobile** advergame is
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23 vital for its later success. Players do not necessarily have to be aware of the commercial
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25 intent behind the game, but it has to be as entertaining as any other mobile gaming app.
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31 Another practical implication of this study is understanding game features that promote
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33 the flow experience. According to our findings, game challenge promotes flow. Although
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35 advergames are usually less complex than a 'real' videogame in which brands can be
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37 placed (Cauberghe and De Pelsmacker, 2010), game challenge within a mobile
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39 advergame is crucial for players to be engaged. Once induced, the maintenance of the
40
41 state of flow requires a constantly evolving challenge, because the player's skills are
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43 likely to improve after playing the game a few times. Special attention should be paid to
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45 the design of features that create increasing challenges to the players, which in turn would
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47 conduct to greater flow. One way to do this is designing the **mobile** advergame with
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49 progressive levels in which more difficult tasks are required. Another way to increase the
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51 challenge is to ask for the same task, but in a more difficult condition (e.g., having less
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53 time to complete it). Besides game challenge, other game features such as interactivity,
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55 focused attention, and telepresence also affect flow. This implies that **mobile** advergames
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57 should be created to let players interact with the advertising content in a way that makes
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3 them be completely focused in what they are doing. Finally, in order to reach a greater
4 telepresence, **mobile** advergame developers should enhance the quality of the game in
5 terms of graphics and audio to create a more realistic world in which players can be
6 transported into.
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12 While the study contributes significantly to the **mobile** advergaming literature, it also has
13 limitations. First, although the sample was highly appropriate for the purpose of the study,
14 a broader sample would enhance generalizability. In addition, since this research was
15 conducted in Ireland, findings of this study could be extended and further tested in
16 different countries. Moreover, it would be interesting to compare the use and effects of
17 playing a mobile advergame between players from countries with higher vs. lower usage
18 of non-traditional advertising media. Another limitation of this study is that only one kind
19 of advergame was selected for this study. Future studies should examine other genre types
20 of advergames (e.g., racing, shooting, puzzles...) to determine if this factor impacts flow.
21 Finally, research on **mobile** advergames needs to better address behavioural measures
22 after game play. While brand attitudes and purchase intentions are worthwhile of
23 examination, research needs to be conducted to see if **mobile** advergames can impact
24 actual purchase behaviour of players.
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Figure 1: Proposed model

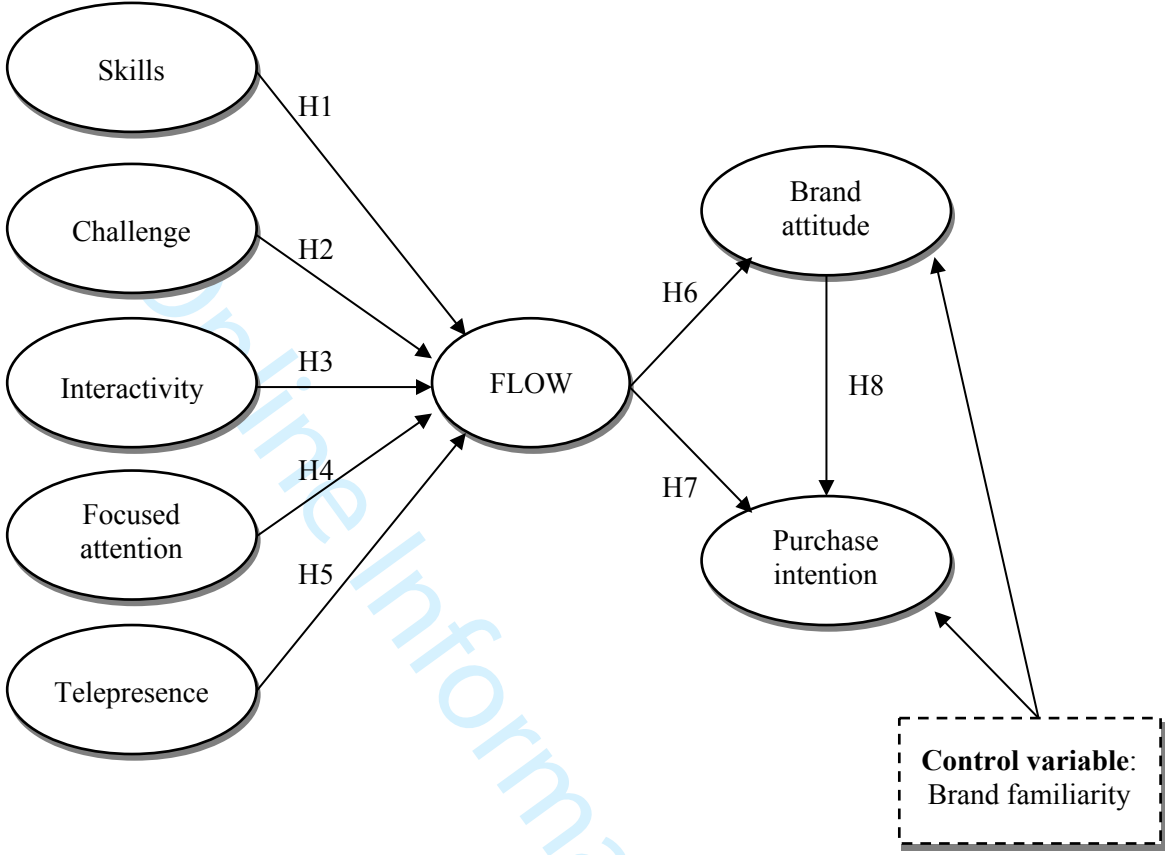
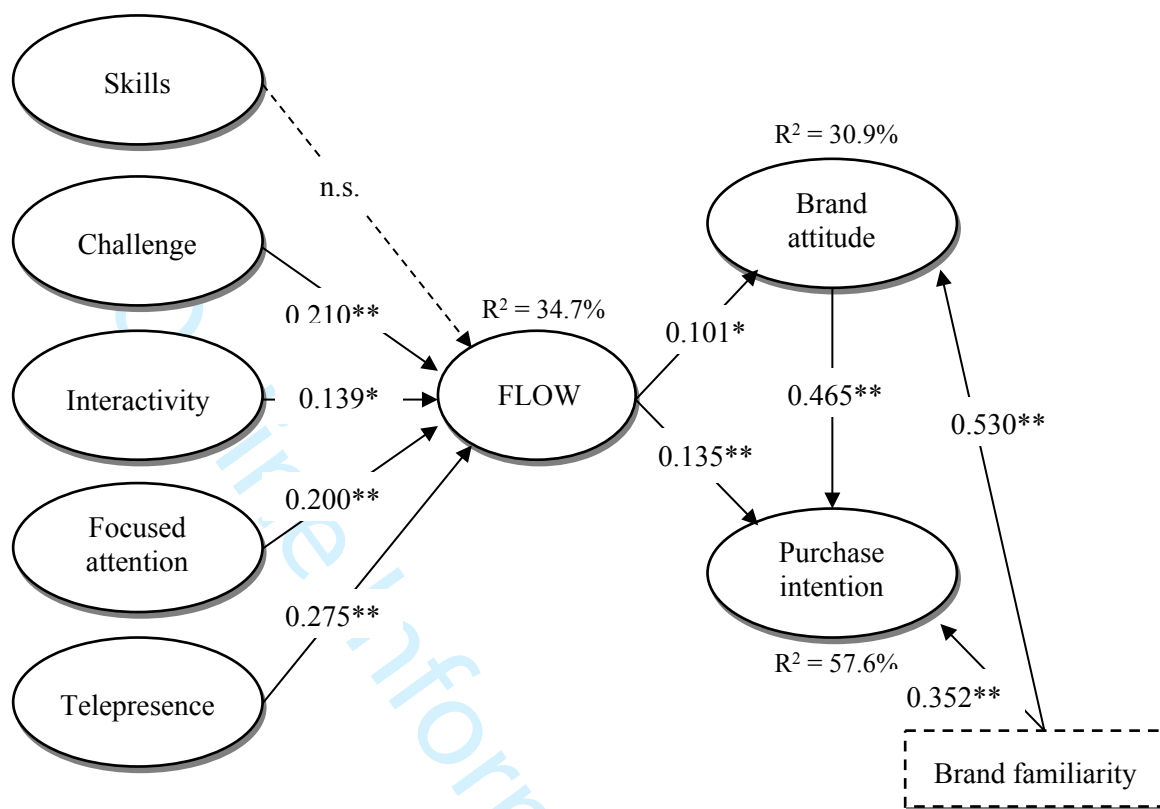


Figure 2: Structural model results



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

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Table 1. Constructs, items and sources

Constructs, sources, and items
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)
<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?
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?

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3 **BF2.** How often have you purchased OREO's products in the past?
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5 **BF3.** How knowledgeable are you about OREO's products?
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7 Note: (R) = reverse item
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Online Information Review

Table 2: Factor loadings and quality criteria

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		

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