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Adolescents and handheld advertising: The roles of brand familiarity and smartphone attachment in the processing of mobile advergames

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Abstract

Many adolescents are inseparable from their smartphones on which they are often confronted with covert advertising-like mobile advergames. This study explores the roles of brand familiarity and smartphone attachment in adolescents' abilities to recognize the commercial intent of advergames. Moreover, it considers the potential indirect effects of brand familiarity and smartphone attachment on the susceptibility of young consumers to mobile advergames. An experiment ($N = 98$) was conducted, which showed that brand familiarity moderates the effect of playing advergames on the recognition of the commercial intent of advergames. Furthermore, smartphone attachment was found to facilitate the recognition of the commercial intent of advergimes, such that adolescents who experienced higher levels of smartphone attachment (when compared to lower levels) were better able to differentiate between advergimes and non-commercial games (games without advertising). Interestingly, no association between smartphone attachment and brand responses were found—suggesting that smartphone attachment did not affect adolescents' compliance with the advertised message.

1 | INTRODUCTION

Smartphones are an important part of everyday life for many adolescents. Whether they use their smartphones to connect to their social networks (Xie, 2014), as a source of entertainment (Martí-Parreño, Sanz-Blas, Ruiz-Mafé, & Aldás-Manzano, 2013), or as a status symbol (Vanden Abeele, Antheunis, & Schouten, 2014), a lot of adolescents indicate that they cannot picture a world without them (Walsh, White, & Young, 2008). This human–computer relationship, more commonly referred to as smartphone attachment, manifests itself as a strong emotional (Vincent, 2006) and cognitive (Ward, Duke, Gneezy, & Bos, 2017) connection between adolescents and their smartphones. A connection that is often characterized by feelings of emotional closeness toward a smartphone with which one is constantly preoccupied.

Most research into smartphone attachment has been focused on the consequences of problematic smartphone use, for example, in the context of educational performance (Sánchez-Martínez & Otero, 2009) or psychological wellbeing (Lemola, Perkinson-Gloor, Brand, Dewald-Kaufmann, & Grob, 2015)—linking excessive smartphone use to decreased academic performance (Sánchez-Martínez & Otero, 2009) and poor sleep quality (Lemola et al., 2015). Where these studies primarily focus on the disrupting effect of excessive smartphone use on adolescents' lives and cognitions, others argue that smartphone attachment can also help adolescents cope with negative cognitions. Carolus et al. (2019), for example, showed that smartphone attachment can serve as a psychological mechanism that helps adolescents cope with smartphone-related cognitions like stress.

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The idea that smartphone attachment could help adolescents cope with smartphone related cognitions seems especially interesting to explore in the context of consumer socialization—and consumers' ability to recognize the commercial intent of covert advertising messages they encounter on their smartphones. Consumer socialization, as a process, can be described as the gradual acquisition of skills and knowledge relevant for the recognition and critical processing of advertising messages and the subsequent formation of advertising related attitudes.

In this study, we aim to examine how well adolescents are able to differentiate between commercial and noncommercial mobile content and explore the roles of brand familiarity and smartphone attachment in adolescents' abilities to recognize the commercial intent of advergames. Moreover, we will consider the potential indirect effects of brand familiarity and smartphone attachment on the susceptibility of adolescents to mobile advergames (i.e., brand recall, brand attitude, and purchase intention).

2 | LITERATURE REVIEW

2.1 | Advergames as covert advertising messages

Mobile advergames are advertising messages that are often used by advertisers to reach young consumers on their smartphones (Dias & Agante, 2011). They are a type of gamified advertising, which means that they are advertising messages that are enhanced using game thinking and game mechanics to drive engagement with the commercial content (Terlutter & Capella, 2013). Concretely, advergames often look like regular games with brand logos or products from a single brand embedded into the gameplay.

When playing advergames, consumers are not always aware that they are interacting with an advertisement. This is often attributed to the covert nature of advergames and the lack of clear advertising cues they feature (Skiba, Petty, & Carlson, 2019). Like other covert advertising techniques (e.g., advertorials), advergames are designed to look like editorial content with the aim to disguise their commercial nature (Evans, Wojdyski, & Hoy, 2018). This can be problematic, because according to the *persuasion knowledge model* (Friestad & Wright, 1994), recognizing the commercial intent of a message is a prerequisite for any subsequent coping response—and enables consumers to deal with the persuasive message (Knowles & Linn, 2004).

In addition to the lack of advertising cues, Campbell and Kirmani (2000) suggest that also the lack of available cognitive resources to process the cues could affect adolescents' abilities to recognize the commercial intent of advergames. According to the *limited capacity model of motivated mediated message processing* (Lang, 2000), people's cognitive capacity is finite and limits the amount of cognitive tasks a person can (successfully) perform concurrently.

The allocation of cognitive capacity is believed to be driven by a person's motivation to process certain information (Buijzen, Van Reijmersdal, & Owen, 2010). In the context of advergames, this means that the processing of advertising cues will likely compete for

cognitive capacity with the processing of the entertaining and often interactive gameplay of the advergame (Vanwesenbeeck, Ponnet, & Walrave, 2016). Considering that players are expected to be more motivated to allocate cognitive capacity to the processing of the gameplay, the allocation of sufficient cognitive capacity for the processing of advertising cues might be jeopardized.

2.2 | The role of brand familiarity in recognizing covert advertising

Brand logos (or products) are generally the only advertising cues featured in advergames and therefore likely play an important role in enabling consumers to recognize the commercial intent of advergames. In order for consumers to recognize advergames as advertising, it seems vital that they identify the commercial intent of the embedded brand. Brand familiarity is therefore considered an important moderator of this effect, because familiarity with the source of the advergame is expected to facilitate players to recognize its commercial nature. Similarly to previous studies that considered the role of brand familiarity in the context of advergaming (e.g., Lin, 2014; Waiguny, Nelson, & Marko, 2013) in this study, brands are considered familiar brands whenever consumers have existing knowledge of them and unfamiliar brands whenever consumers have no existing knowledge of them.

Under the assumption of limited cognitive capacity, we would expect that consumers' familiarity with a brand featured in an advergame would facilitate the recognition of the advergames' commercial intent. Familiar brands are expected to be easier to recognize than unfamiliar brands, implying that the processing of familiar brands would require less cognitive capacity than the processing of unfamiliar brands. This assumption is in line with findings by Campbell and Keller (2003), who showed that recognizing the commercial nature of familiar brands in television commercials and banner ads required less cognitive capacity than recognizing the commercial nature of unfamiliar brands.

They explained this by stating that existing associative structures a person has with a familiar brand facilitate the retrieval of relevant advertising cognitions that could facilitate the recognition of the commercial intent of the brand and subsequently the advergame (Campbell & Keller, 2003). These existing associative structures make that for familiar brands, relevant advertising cognitions are easily available, meaning that they require little cognitive capacity to retrieve. Following the same logic, the lack of existing associative structures for unfamiliar brands suggests that relevant advertising cognitions are less easily accessible and would require more cognitive capacity to retrieve. With gameplay of the advergame competing for cognitive capacity, this could ultimately complicate the recognition of the commercial intent of advergames from unfamiliar brands—when the cognitive capacity required to access the relevant advertising cognitions is allocated to the processing of the game instead.

In sum, we hypothesize that brand familiarity facilitates the processing of advertising cues featured in advergames and moderates

the recognition of commercial intent. In other words, we expect adolescents to be better able to differentiate advergames featuring familiar brands from noncommercial content, than advergames featuring unfamiliar brands from noncommercial content.

H1 *Familiar brands featured in advergames facilitate the recognition of commercial intent of the advergame more than unfamiliar brands featured in advergames, when compared to a baseline measurement.*

2.3 | The role of smartphone attachment in adolescents' consumer socialization

In addition to brand familiarity, we also expect smartphone attachment to be positively associated with the recognition of commercial intent of advergames. Or in other words, we expect smartphone attachment to influence consumer socialization. The relationship between smartphone attachment and the acceptance of mobile advertising, one of the elements of consumer socialization, was first established by Sultan, Rohm, and Gao (2009). They found that adolescents who experience higher levels of smartphone attachment generally show more favorable attitudes toward mobile advertising. From their work it remains unclear, however, whether smartphone attachment also affects adolescents' acquisition of skills and knowledge that are relevant for the processing of mobile advertising messages; however, we expect smartphone attachment to moderate adolescents' ability to recognize the commercial nature of advergames.

We propose two complementing arguments supporting our expectation, which are in line with the persuasion knowledge model (Friestad & Wright, 1994) and the cognitive capacity model (Lang, 2000). First, we expect adolescents who experience higher levels of smartphone attachment (compared to lower levels) to have a better understanding of advergames as a mobile advertising technique and second to allocate more cognitive capacity to their smartphones and to the processing of the advertising cues featured in advergames.

In line with the persuasion knowledge model (Friestad & Wright, 1999), our first argument is based on the idea that when people become more knowledgeable about and accustomed to a specific type of advertising, they will also gradually learn to recognize the advertising cues in these media formats. Adolescents who are more attached to their smartphones are expected to be more knowledgeable about and accustomed to mobile advertising techniques, as a consequence of their relatively high smartphone usage. This means that they are expected to be better able to identify advertising cues in advergames and ultimately are better able to recognize the commercial intent of advergames than their counterparts who are less attached to their smartphones and consequently spent less time on their smartphones.

Our second argument fits in with the limited cognitive capacity framework and complements our previous argument by suggesting that smartphone attachment does not only facilitate the recognition

of advertising cues but also the processing of them. Adolescents who experience higher levels of smartphone attachment are believed to be more motivated to use their smartphones than adolescents who are less attached to their smartphones, which would suggest that they also allocate more cognitive capacity to their smartphones.

According to Lang (2000), an increased motivation to process certain information, in this case information regarding one's smartphone, coincides with a greater allocation of cognitive capacity. Consequently, this would suggest that adolescents who are more attached to their smartphones would allocate more cognitive capacity to their smartphones—and potentially more cognitive capacity for the processing of the advertising cues featured in advergames. Note, however, that a potential increase in allocated cognitive capacity to the advergame does not necessarily mean that more capacity is allocated to the processing of advertising cues in advergames. Other cognitive tasks will still compete for cognitive capacity, including the gameplay itself.

In sum, we expect adolescents who experience higher levels of smartphone attachment to have more mobile advertising and advergame-related conceptual persuasion knowledge than adolescents who are less attached to their smartphones. In addition, they are expected to be more motivated to allocate cognitive capacity to their smartphones, potentially resulting in a larger allocation of capacity available to the processing of advertising cues in advergames. This would ultimately be reflected by increased rates of successful recognition of commercial intent for adolescents playing either one of the two advergames and concurrently decreased rates of false recognition of commercial intent for adolescents playing the noncommercial baseline game. We propose the following moderation hypothesis:

H2a *The effect of brand familiarity on the recognition of commercial intent is moderated by smartphone attachment.*

H2b *The relationship between smartphone attachment and both levels of brand familiarity is expected to be cleaved.*

2.4 | The role of smartphone attachment in advertising susceptibility

Finally, we will also consider the potential influence of smartphone attachment on adolescents' mobile advertising susceptibility. We do this by estimating the effect of smartphone attachment as a moderator of the indirect effect of playing advergames on brand responses mediated by the recognition of commercial intent. To get a complete overview of the effects on brand responses, we consider cognitive, affective, and conative measures (Friestad & Wright, 1994).

In terms of cognitive brand responses, we would expect smartphone attachment to indirectly improve brand recognition. A study by Van Reijmersdal, Lammers, Rozendaal, and Buijzen (2015), for example, showed that the activation of persuasion knowledge attracts attention to the brand, which in turn leads to better brand recognition. Lin (2014) found similar positive effects for recognition of

commercial intent on brand recognition for both unfamiliar and familiar brands, when placed within mobile games. Smartphone attachment is expected to strengthen this effect, due to its facilitating role in the recognition of commercial intent, leading to better retrieval of the brands from memory.

Concerning affective and conative responses, most advertising theories traditionally assumed that persuasion knowledge functions as a filter when processing advertising messages (see Livingstone & Helsper, 2006). In this so-called cognitive defense view, the recognition of commercial intent is associated with the critical processing of advertisements and ultimately with less positive brand attitudes and lower purchase intentions (Friestad & Wright, 1994).

In the contemporary academic debate, however, this assumption is increasingly contested when integrated advertising formats (like advergames) are concerned (Nelson, 2018). For example, recently, in a study examining the effectiveness of a media literacy training for children, Sekarasih, Scharrer, Olson, Onut, and Lant-horn (2018) reported that the boys participating in the study were found *less* critical toward covert advertising techniques after learning about these techniques, compared to before the training. Moreover, the empirical evidence for a clear link between age-dependent susceptibility to persuasive attempts and actual brand responses remains inconclusive (for an overview, see Mizerski, Wang, Lee, & Lambert, 2017).

Most studies examining the effects of young consumers' susceptibility to integrated advertising formats did not find support for the cognitive defense view. They found either no effect (e.g., Mallinckrodt & Mizerski, 2007; Van Reijmersdal, Rozendaal, & Buijzen, 2012; Waiguny & Terlutter, 2011) or found a negative effect (e.g., Isaac & Grayson, 2016; Rozendaal, Buijzen, & Valkenburg, 2009; Van Reijmersdal, Rozendaal, & Buijzen, 2015; Vanwesenbeeck, Walrave, & Ponnet, 2017). Vanwesenbeeck, Ponnet, and Walrave (2017), for example, found that the understanding of the persuasive intent of in-game advertising positively influenced young adolescents' purchase intention, but had no effect on their attitudes toward the advertised brand.

In sum, when considering the current academic debate, we would expect the recognition of commercial intent to lead to higher brand recall, less positive brand attitudes, and a lower purchase intention. In line with our second hypothesis, we would then expect smartphone attachment to moderate the indirect effect of playing advergames on brand responses via the recognition of commercial intent. We propose the following moderated-mediation hypothesis:

H3 *The indirect effect of playing advergames via the recognition of commercial intent is moderated by smartphone attachment, such that higher (vs lower) levels of smartphone attachment will increase (a) brand recall, though decrease, (b) brand attitudes, and (c) purchase intention.*

Our conceptual model is included as Figure 1 and gives a visual overview of the hypothesized relationships.

3 | METHOD

3.1 | Participants and procedure

To test the hypotheses, we conducted an experiment at schools using a one-factor between-subjects design (brand familiarity: game without a brand, game with an unfamiliar brand, game with a familiar brand) with smartphone attachment measured as a second independent variable. The sample consisted of 98 adolescents ($M = 14.95$, $SD = 1.25$, range = 13–18, female = 44.0%) from four high schools. A raffle was introduced in order to increase participation rates. Two randomly selected participants per school were awarded with a ten euro gift card for participating. The stimulus games ran exclusively on the Android operating system, meaning that only adolescents who had an Android smartphone were able to participate.

After a short introduction by one of the researchers, the participants were randomly assigned to one of the three brand familiarity conditions: game without a brand ($n = 38$), game with an unfamiliar

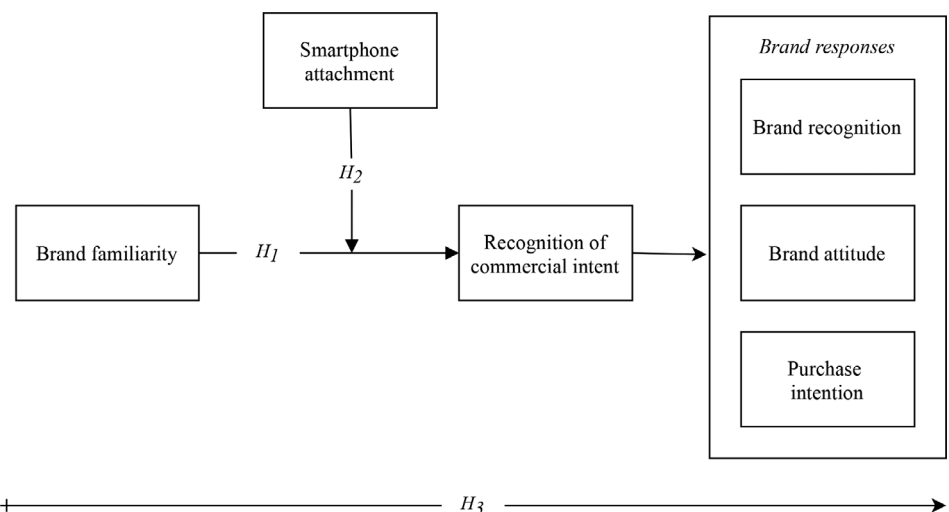


FIGURE 1 The figure above shows our conceptual model containing all hypothesized relationships

brand ($n = 33$), and game with a familiar brand ($n = 27$). They were asked to download one of three versions of a stimulus game directly from the Google Play Store and play it for 4 min. Redondo (2012) showed that 4 min can be considered “extended exposure” and is enough time to get accustomed to the advergaming. Participants were asked to play the game individually and were unaware of the other conditions. Afterward, the respondents were asked to fill out a questionnaire containing questions measuring our independent and dependent constructs, descriptive information, and two control variables. Afterward, the respondents were thanked for their participation and debriefed by the researcher.

3.2 | Compliance with ethical standards

The experiment was approved by the ethics committee of the university. Both the schools and the participants were asked for their informed consent prior to participating in the experiment. Moreover, because some participants were younger than 16, we obtained passive consent from the parents of all participants as well.

3.3 | Stimulus material: Advergaming

The game that was used as stimulus material for this study was developed by a professional game designer, who had extensive experience in developing mobile games for adolescents. Three versions of the game were developed of which two featured a logo from either an

unfamiliar or a familiar brand. The third version featured no brand logo and served as a baseline condition. The aim of the game was to pick the right combination of toppings for a pizza from a conveyor belt, while discarding the incompatible ones. The gameplay started off slowly and gradually became more difficult as the speed of the conveyor belt increased. In the familiar brand condition, the logo of a popular pizza brand (i.e., Domino's Pizza) was prominently shown in the middle of the screen; both on the pizza boxes and on the background wall. For the unfamiliar brand condition, a fictional brand was created and was used instead (i.e., Nonna's Pizza). By using a fictitious brand, we would assure that no one could be familiar with the brand. Both logos were shown during the entirety of the gameplay and took up about one fifth of the screen. No logo was shown on the pizza boxes or the background wall in the baseline condition. See Figure 2 for examples of the stimulus material for the baseline and unfamiliar brand condition.

We conducted a pretest prior to the development of the stimulus material, in order to determine which fast food brand to include as familiar brand. Our pretest ($N = 17$) was conducted among the same target group as our main experiment: adolescents between 13 and 17 years old. Based on the results, we chose the brand Domino's Pizza to serve as familiar brand. This decision was based on three insights: (a) 70.6% of the adolescents participating in the pretest knew the brand, (b) 35.4% of the adolescents had experience with the brand, and (c) the adolescents had a neutral attitude toward the brand ($M = 3.08$, $SD = 0.57$). The latter was important to avoid potential confounding effects on brand attitude and purchase intention, resulting from strong preexisting brand attitudes (Mackay, Ewing, Newton, & Windisch, 2009).

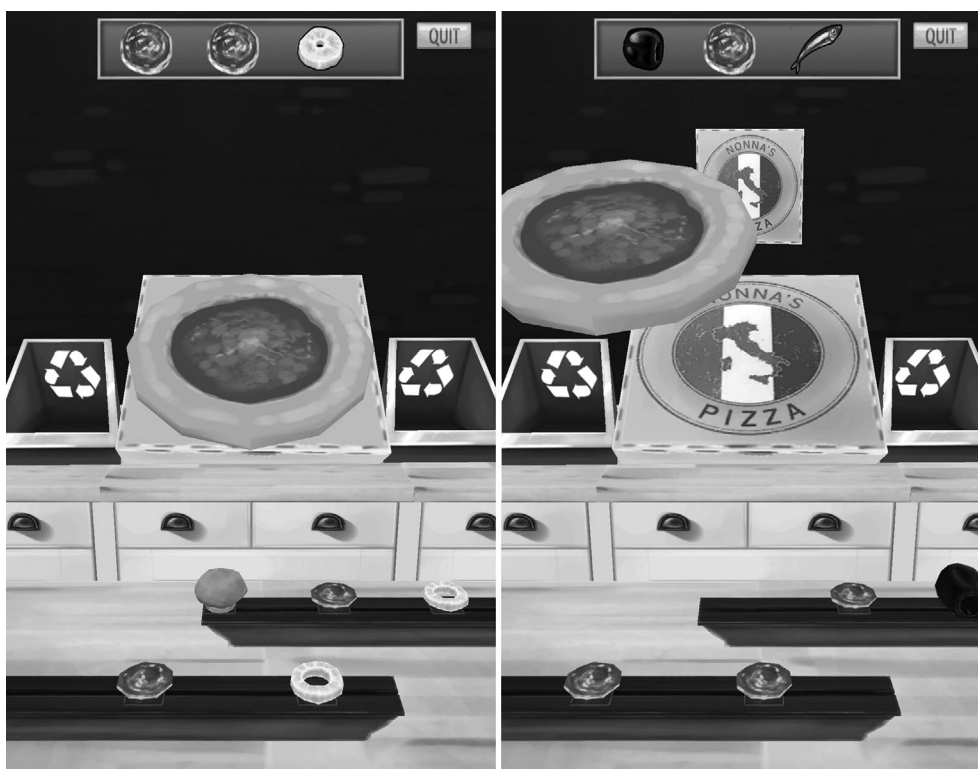


FIGURE 2 The figure above shows two screenshots from the gameplay of the stimulus games. On the left a screenshot is shown from the game without a brand and on the right a screenshot is shown from the game with an unfamiliar brand

3.4 | Measures

3.4.1 | Manipulation check

As a manipulation check, we asked all participants to indicate on a seven-point scale, ranging from 1 (*Very unfamiliar*) to 7 (*Very familiar*), how familiar they were with the brands used in this study (Wauguny et al., 2013). This was done for both the unfamiliar ($M = 1.27$, $SD = 0.82$) and the familiar brands ($M = 5.80$, $SD = 1.79$). Note that in order to avoid any confounding effects, both manipulation check questions were asked concurrently with the brand response questions at the end of the questionnaire.

3.4.2 | Smartphone attachment

We measured smartphone attachment on an eight-item seven-point scale ranging from 1 (*Totally disagree/Never*) to 7 (*Totally agree/Always*), with four items for *smartphone self-connection* (e.g., "My smartphone is part of who I am," "I have a personal connection with my smartphone"), and four on *smartphone preoccupation* (e.g., "I think about my smartphone all the time," "I always carry my smartphone on me") was based on a scale by Park, Macinnis, Priester, Eisingerich, and Iacobucci (2010). A factor analysis showed that one item ("I find it hard to give an opinion about my smartphone") failed to load and after careful consideration this item was omitted due to its bad fit (both statistically and conceptually). All remaining scores were averaged and one valid and reliable measure for smartphone attachment was created ($EV = 3.87$, $R^2 = .55$, Cronbach's $\alpha = .86$, $M = 4.50$, $SD = 1.39$).

3.4.3 | Recognition of commercial intent

Recognition of commercial intent (Tutaj & Van Reijmersdal, 2012) was measured with a four-item seven-point scale (e.g., "the mobile game contains advertising," "the goal of the mobile game is to persuade people to buy pizza of a particular brand"), ranging from 1 (*Totally disagree*) to 7 (*Totally agree*). Item scores were averaged to create a single valid and reliable construct ($EV = 3.16$, $R^2 = .79$, Cronbach's $\alpha = .91$, $M = 3.37$, $SD = 1.92$).

3.4.4 | Brand responses

For this study, we considered three brand responses: brand recognition, brand attitude, and purchase intention. Brand recognition was measured by asking the participants whether they saw one of four pizza brands while playing the game. We coded answers either as 0 ("incorrect recognition of the brand") or as 1 ("correct recognition of the brand") for both the unfamiliar (27.3% correct recognition) and the familiar brand (88.9% correct recognition).

Finally, in a randomized order, the participants were shown the logos of both the unfamiliar brand and the familiar brand. They were

asked to answer several questions about their familiarity with the brand (manipulation check), their attitudes toward the brand, and their intention to purchase a pizza from this brand in the near future. Attitudes toward both the unfamiliar and the familiar brand were measured on a seven-point Likert scale (Van Reijmersdal et al., 2012) on five attributes (i.e., good, stupid, boring, great, bad). For both brands, we averaged the item scores (unfamiliar brand: $EV = 2.59$, $R^2 = .52$, Cronbach's $\alpha = .74$, $M = 4.08$, $SD = 1.28$; familiar brand: $EV = 2.99$, $R^2 = .60$, Cronbach's $\alpha = .83$, $M = 5.42$, $SD = 1.32$). Additionally, we measured purchase intention by asking the participants to indicate on a single-item seven-point scale, ranging from 1 (*Totally disagree*) to 7 (*Totally agree*), how much they agreed with the statement "I intend to eat a pizza by [brand] this week." This was done for both the unfamiliar ($M = 3.04$, $SD = 2.16$) and the familiar brands ($M = 4.89$, $SD = 2.38$).

3.4.5 | Control variables and demographic information

In addition to the age and biological sex of the participants, we measured game attitude and hunger as control variables. Game attitude was measured because previous research (Martí-Parreño et al., 2013) has shown that the evaluation of the game can influence affective brand responses. We asked participants to indicate their attitude toward the game on a five-item attitude scale similar to the brand attitude scale (Van Reijmersdal et al., 2012), after which we averaged all scores and created a valid and reliable scale ($EV = 3.03$, $R^2 = .61$; Cronbach's $\alpha = .84$, $M = 3.76$, $SD = 1.44$). Moreover, since the stimulus brands were fast food brands, we measured hunger ($M = 3.41$, $SD = 1.98$; Folkvord, Anschutz, Wiers, & Buijzen, 2015) with a seven-point single-item question (i.e., "How hungry are you right now?") ranging from 1 (*Not at all hungry*) to 7 (*Very hungry*).

4 | RESULTS

4.1 | Manipulation check

To test whether the manipulation of brand familiarity was successful, we estimated a paired-samples *t*-test between the familiarity scores reported for both brands. The participants indicated to be significantly more familiar with the familiar brand ($M = 5.80$, $SD = 1.79$) than with the unfamiliar brand ($M = 1.27$, $SD = 0.82$), $t(97) = 23.80$, $p < .001$. This indicates that brand familiarity was successfully manipulated.

4.2 | Randomization

To test whether the sample data were distributed equally across conditions, we performed several randomization checks. For the variables age, $F(2, 95) = 0.10$, $p = .906$, game attitude, $F(2, 95) = 0.25$, $p = .776$, and hunger, $F(2, 95) = 0.26$, $p = .937$, we conducted analyses of

variance. Additionally, two chi-square tests were used to check for equal distribution across conditions for the schools ($\chi^2 = 4.43$, $p = .619$) and biological sex ($\chi^2 = 1.97$, $p = .374$). These results indicated that there were no issues with the distribution of the sample data and that the participants were successfully randomly assigned to the different conditions.

4.3 | Age as covariate

Age was included as a covariate for all analyses because the age range of the adolescents in the sample was considerable. Several studies (Boush, Friestad, & Rose, 1994; John, 1999) have shown that the cognitive development of adolescents is a gradual process that is closely related to one's age. Moreover, age is known to affect adolescents' abilities to recognize the commercial intent of advertising. By including age as a covariate, we can account for individual differences in cognitive development between adolescents in our sample. This, ultimately, is believed to improve our inferences by reducing the error in our estimation of recognition of commercial intent (Meyvis & Van Osselaer, 2018).

4.4 | Main analysis

To test hypothesis 1, we conducted an ANOVA with brand familiarity as independent variable and recognition of commercial intent as

dependent variable. The model was significant, $F(2, 94) = 5.79$, $p = .004$. As shown in Figure 3, pairwise comparisons with a Bonferroni correction revealed that the scores for recognition of persuasive intent in the familiar brand condition ($M = 4.28$, $SD = 2.07$) differed significantly from baseline ($M = 2.76$, $SD = 1.55$, $p = .003$). Nonsignificant differences were found neither between the unfamiliar brand condition ($M = 3.33$, $SD = 1.94$) and baseline ($p = .556$) nor between the unfamiliar and familiar brand conditions ($p = .121$). This means that when compared to a game without brand indicators, adolescents reported higher rates of recognition of the commercial intent for the advergaming when it contained familiar brand, but not when it contained unfamiliar brand. In sum, the data show partial supports for Hypothesis 1.

To test Hypothesis 2, a moderation model was estimated with brand familiarity and smartphone attachment as predictor variables, age as a control variable, and recognition of commercial intent as the dependent variable. We used the PROCESS macro (v. 3.0; Hayes, 2013) to estimate the parameters. A multicategorical model (Hayes' Model 1; Hayes & Preacher, 2014) was estimated using a bootstrap procedure (10,000 bootstraps) and 95% confidence intervals.

The results, as shown in Table 1, demonstrated a significant interaction effect for unfamiliar brand exposure and smartphone attachment ($b = 0.84$, $p = .009$) on the recognition of commercial intent. This means that when playing an advergaming containing unfamiliar brand, higher levels of smartphone attachment led to higher recognition of commercial intent. A similar significant interaction effect was found

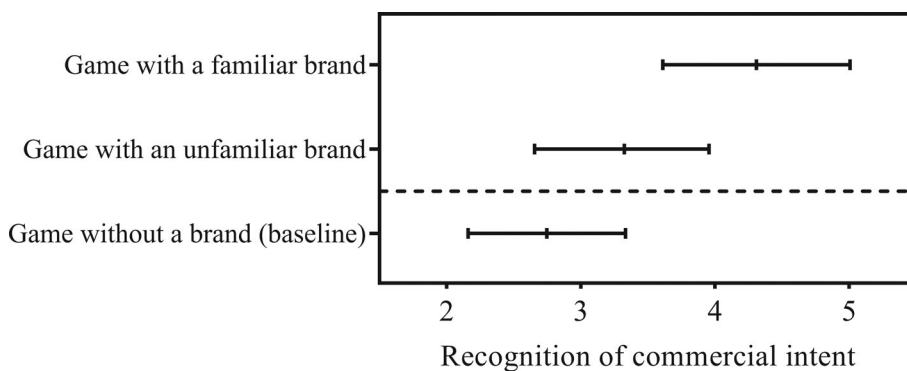


FIGURE 3 The figure above shows the mean estimates for the recognition of commercial intent scores across the three experimental conditions (i.e., game without a brand, game with an unfamiliar brand, game with a familiar brand) and their 95% confidence intervals. Age was included as a covariate when estimating these scores

TABLE 1 Regression table of effects on the recognition of commercial intent of advergaming

	<i>b</i>	SE	<i>t</i>	95% CI
Unfamiliar brand (X1)	0.61	0.42	1.44	[-0.23, 1.45]
Familiar brand (X2)	1.51	0.45	3.36	[0.62, 2.40]
Smartphone attachment (M)	-0.45	0.22	-2.07	[-0.89, -0.02]
Interaction 1 (X1 x M)	0.84	0.31	2.68	[0.22, 1.46]
Interaction 2 (X2 x M)	0.70	0.32	2.15	[0.05, 1.34]
Age (covariate)	-0.25	0.15	-1.68	[-0.54, 0.05]

Note: The game without a brand condition (baseline) is the reference condition for the effects shown in the table. Age was included as a covariate in the model. Regression coefficients in bold are significant for an α -level of .05.

FIGURE 4 The figure above summarizes the recognition of commercial intent scores across the three experimental conditions (i.e., game without a brand, game with an unfamiliar brand, game with a familiar brand) and shows the moderating effect of smartphone attachment. Age was included as a covariate when estimating these scores

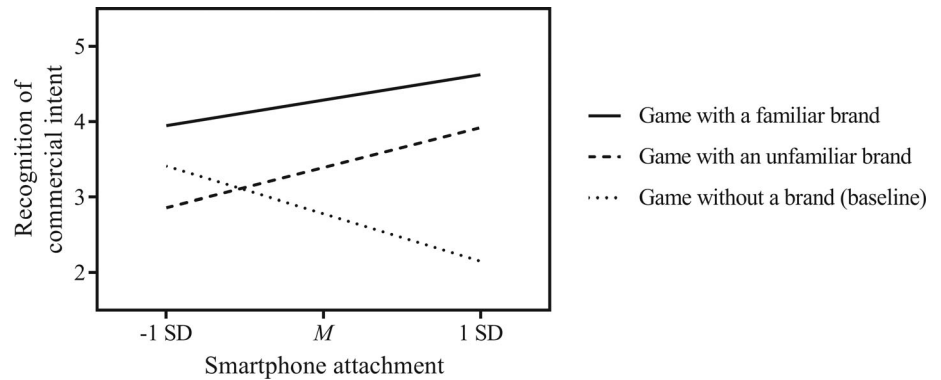


TABLE 2 Means (standard error) and contrast effects for dependent variables per condition

	Game without a brand (baseline)	Game with an unfamiliar brand	Game with a familiar brand
Recognition of commercial intent	2.76 ^a (1.55)	3.33 ^{ab} (1.94)	4.28 ^b (1.92)
Responses unfamiliar brand			
Brand recognition	7.9% ^a	27.3% ^b	0.0% ^a
Brand attitude	4.25 ^a (1.22)	4.13 ^a (1.27)	3.79 ^a (1.39)
Purchase intention	2.95 ^a (2.09)	3.18 ^a (2.35)	3.00 ^a (2.08)
Responses familiar brand			
Brand recognition	34.2% ^a	36.4% ^a	88.9% ^b
Brand attitude	5.42 ^a (1.27)	5.44 ^a (1.26)	5.39 ^a (1.51)
Purchase intention	4.76 ^a (2.42)	4.82 ^a (2.37)	5.15 ^a (2.40)

Note: Means in the same row that do not share a superscript differ from each other with $p < .030$. Age was included as a covariate when estimating these scores.

for familiar brand exposure and smartphone attachment ($b = 0.70$, $p = .034$) on the recognition of commercial intent. We included a visualization of the effects as Figure 4.

Furthermore, the results show a negative effect of smartphone attachment on recognition of commercial intent for participants in the baseline condition ($b = -0.45$, $p = .041$). This means that higher levels of smartphone attachment led to lower recognition of commercial intent scores for participants that played the game without brand indicators. Adolescents who experienced higher levels of smartphone attachment, compared to those who experienced lower levels of smartphone attachment, seemed better able to recognize that the mobile game without any embedded brand was not developed with the aim to sell products. These findings support Hypothesis 2.

Finally, to test Hypotheses 3, we estimated six moderated-mediation models with brand familiarity as independent variable, recognition of commercial intent as the mediator variable, smartphone attachment as the moderator variable, age as a control variable, and brand responses (i.e., brand recognition, brand attitude, and purchase intention) for both the unfamiliar and familiar brand as the dependent variables. We estimated all models (Hayes' Model 7; Hayes, 2013) using a bootstrap procedure (10,000 bootstraps) and 95% confidence intervals. In order to facilitate the interpretation of the models, means

TABLE 3 Moderated-mediation indices for the indirect effect of playing advergames via the recognition of commercial intent, moderated by smartphone attachment

	Index	SE	95% CI
Responses unfamiliar brand			
Brand recognition	-0.10	0.20	[-0.71, 0.10]
Brand attitude	-0.03	0.07	[-0.19, 0.11]
Purchase intention	0.11	0.12	[-0.09, 0.40]
Responses familiar brand			
Brand recognition	0.21	0.32	[-0.39, 0.87]
Brand attitude	0.03	0.06	[-0.08, 0.15]
Purchase intention	0.03	0.11	[-0.17, 0.28]

Note: Age was included as a covariate when estimating the moderated-mediation indexes. The game without a brand condition served as a baseline for the effects shown in this table.

and standard deviations of the dependent variables (per experimental condition) are given in Table 2.

As shown in Table 3, all six moderated-mediation indices indicated that the indirect effect of recognition of commercial intent on brand responses was not moderated by smartphone attachment. With respect to the effects of recognition of commercial intent on brand

responses, the analyses indicated no effect on brand recognition for the unfamiliar brand ($b = -0.21$, $SE = 0.21$, $p = .321$) and a significant positive effect on brand recognition for the familiar brand ($b = 0.78$, $SE = 0.18$, $p < .001$). Furthermore, the results showed no evidence for the effect on brand attitude for neither the unfamiliar ($b = 0.02$, $SE = 0.06$, $p = .887$) and the familiar brand ($b = 0.04$, $SE = 0.08$, $p = .615$), nor on purchase intention for the unfamiliar ($b = 0.14$, $SE = 0.12$, $p = .272$) and the familiar brand ($b = 0.05$, $SE = 0.14$, $p = .722$). In sum, the data show no support for Hypothesis 3.

5 | DISCUSSION

In this study, we examined the roles of brand familiarity and smartphone attachment in adolescents' abilities to differentiate between commercial and noncommercial content and to recognize the commercial intent of advergames. Moreover, we considered the potential indirect effects of brand familiarity and smartphone attachment on advertising susceptibility. This results in three main conclusions.

5.1 | Brand familiarity and the recognition of commercial intent of advergames

First, we found that brands in advergames can serve as advertising cues that enable adolescents to recognize the commercial intent of advergames. Notably, however, brand familiarity moderates this effect. More specifically, brand cues seemed to facilitate the recognition of the advergame's commercial nature *only* when adolescents were familiar with the brand—and not when they were unfamiliar with the brand. Our results suggest that consumers' familiarity with an embedded brand influences adolescents' abilities to differentiate between commercial and noncommercial mobile content.

5.2 | Smartphone attachment and consumer socialization

Second, our study showed a positive association between smartphone attachment and adolescents' ability to identify the commercial nature of advergames. We found that adolescents who are more attached to their smartphones are better able to differentiate between commercial and noncommercial mobile messages, than their less attached counterparts. In other words, adolescents who experienced higher levels of smartphone attachment (compared to those who were not) were better able to recognize and understand that advergames were advertising (and have commercial intent) and that the baseline game was not.

These findings show evidence for our preposition that adolescents who experience higher levels of smartphone attachment have a better understanding of mobile advertising. This is for example reflected by the reported higher recognition of commercial intent in

the advergame conditions and lower recognition of commercial intent in the baseline condition, for adolescents who are more (compared to less) attached to their smartphones. In addition, the improved ability to recognize the commercial intent of advergames among adolescents who played the advergame containing unfamiliar brands also suggests that smartphone attachment facilitates the processing of advertising cues when playing advergames.

Earlier we found that adolescents who play advergames generally do not allocate sufficient cognitive capacity for the successful processing of brands as advertising cues, when adolescents are unfamiliar with these brands. When taking into account smartphone attachment, however, we found that adolescents who experience higher levels of smartphone attachment were able to recognize the commercial intent of these advergames, despite them only containing unfamiliar brands. This suggests that adolescents who are more attached to their smartphones allocate more cognitive capacity to the processing of the advertising cues that are embedded in mobile advergames. In sum, this study shows that smartphone attachment not only affects adolescents' understanding of mobile advertising but also seems to facilitate the processing of commercial information under the assumption of limited capacity.

5.3 | Smartphone attachment and advertising susceptibility

Third, when examining the potential consequences of smartphone attachment on adolescents' mobile advertising susceptibility, we did not find any indication that smartphone attachment moderates the indirect effect of playing advergames on brand responses (i.e., brand recognition, brand attitude, and purchase intention) via the recognition of commercial intent. This suggests that even though smartphone attachment increases adolescents' ability to recognize the commercial intent of advergames, it does not seem to (indirectly) affect their susceptibility to this type of advertising.

These results should, however, be interpreted with caution, considering that we did not find an association between the recognition of commercial intent and either brand attitude or purchase intention. This would suggest that recognizing the commercial nature of advergames might have not triggered any coping responses, which then would also explain why no indirect effects of smartphone attachment were found.

Notably, several studies into coping behaviors of children (e.g., Rozendaal, Oprea, & Buijzen, 2016; Wang & Mizerski, 2019) suggest that young children are unlikely to use their activated conceptual persuasion knowledge (i.e., the ability to recognize and understand advertising messages) as a critical defense when confronted with integrated advertising formats (e.g., advergames). Instead, they suggest that children's advertising susceptibility is more likely to be explained by their attitudinal persuasion knowledge (i.e., having a critical attitude toward advertising) instead. This idea was first introduced by Rozendaal, Lapierre, Van Reijmersdal, and Buijzen (2011), who attributed children's inability to employ their conceptual advertising

knowledge to mount a coping reaction to the children's still underdeveloped cognitive skills (i.e., executive functioning and emotion regulation). Even though these cognitive skills are expected to reach adult levels around middle to late adolescence (Zelazo & Cunningham, 2007), and most of the children in our sample qualify as such, we cannot rule out this explanation.

5.4 | Limitations and suggestions for further research

With the current study, we show that smartphone attachment plays an important role in the effects of advergames on adolescents; however, it is unknown whether these effects are similar for people from different age groups. In addition to adolescents, children younger than 12 are also an interesting group to consider from a digital consumer empowerment perspective. Young children generally have less understanding of the commercial intent of advertising messages compared to adolescents and adults, and more often struggle when trying to differentiate between commercial and noncommercial messages (John, 1999; Rozendaal, Buijzen, & Valkenburg, 2010). Examining the effects of smartphone attachment (and the processing of covert advertising messages) among younger children might thus offer valuable insights that could be used when developing implementations for consumer empowerment (like media literacy training).

Moreover, considering that younger children are generally less able to critically reflect on a persuasive episode, because they are in a different cognitive developmental phase (John, 1999), it seems important to examine whether smartphone attachment has similar effects for them on recognition of commercial intent and subsequently their compliance with mobile advertising messages. We would assume that also for younger children smartphone attachment would (at least to some extent) facilitate the recognition of commercial intent and processing of advertising cues in advergames. It remains unclear, however, whether these children will then also be able to critically reflect on these persuasive messages and cope with them, or whether they would simply become more susceptible to them, since they might still lack a skeptical attitude toward advertising (John, 1999).

In addition to studying the effects of smartphone attachment among different age groups, future research might also want to explore the role of smartphone attachment in relation to other characteristics of advertising cues in covert advertising contexts. A characteristic that might be valuable to explore (potentially in combination with brand familiarity) is the proximity of a featured brand. In the current study, all brands were featured centrally—meaning that the brands were featured in the middle region of the screen (if hypothetically one were to divide the screen into nine equally sized regions).

Brand placement proximity is according to Yegiyian and Lang (2010), an important boundary condition for the successful processing of particular content in advertising messages. They found that centrally placed content is more likely to be processed and

encoded than peripherally placed content, which implies that if we would have featured the brands peripherally, this might have influenced our results. Future research would, however, be needed to test this assumption and to further examine the roles of advertising cue characteristics, such as brand familiarity and brand placement proximity, in facilitating the recognition of commercial intent for adolescents that experience higher levels of smartphone attachment.

5.5 | Theoretical implications

The findings of this study contribute to the advertising literature in two distinct ways. First, our findings extend the proposition made by Evans and Park (2015), on the conditions under which advertising schema are activated when confronted with covert advertising (like advergames). They stated that when consumers are confronted with covert advertising messages, the recognition of commercial intent is primarily hindered by the absence of conceptual persuasion knowledge. Our results are generally in line with their proposition, although we found that in addition to consumers' level of conceptual persuasion knowledge, their familiarity with the embedded brand can also influence the activation of advertising schema and the subsequent recognition of commercial intent. This means, for future studies, that it is important to take into account that brands that are familiar to participants might trigger the activation of persuasion knowledge, even when the advertising message is covert.

Second, our results extend the work by Sultan et al. (2009), who were the first to examine the relationship between smartphone attachment and consumer socialization. They found that smartphone attachment increases adolescents' acceptance of mobile advertising. With our study, we demonstrated that smartphone attachment does not only influences adolescents' acceptance of mobile advertising but also helps adolescents with the recognition of commercial intent of advergames and the differentiation between commercial and noncommercial mobile content.

5.6 | Concluding remarks

Let it be clear that this paper does not suggest that smartphone attachment should be promoted, or should be considered a positive development—considering its obvious negative effects for adolescents in a multitude of contexts other than digital consumer empowerment (e.g., Lee et al., 2018; Sánchez-Martínez & Otero, 2009). At the same time, we do believe that a better understanding of the role of smartphone attachment in adolescents' abilities to differentiate between commercial and noncommercial on their smartphones ultimately contributes to the better understanding of the consumer socialization of young consumers.

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