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The effect of ad integration and interactivity on young teenagers' memory, brand attitude and personal data sharing

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ABSTRACT

Contemporary online advertising is characterized by the integration of advertising in other content and brand interactivity. *Integrated advertising* embeds a persuasive message into informative or entertaining content. *Brand interactivity* refers to interactions consumers have with brands in advertising messages. A two (integration vs. no integration) x two (brand interactivity vs. no brand interactivity) between subjects experiment (n = 576) examines the effect of online advertising's brand interactivity and its integration in other content on young teenagers' (11–14 years) brand memory, awareness of selling intent, critical processing, brand attitude, and their personal information sharing. Brand interactivity has a positive effect on memory, awareness of selling intent, brand attitude and personal information sharing. Integration of advertising in other content has a negative effect on memory, but has no effect on awareness of selling intent, brand attitude and personal information sharing. Surprisingly, awareness of selling intent leads to less critical processing. The main contribution of the study is that it disentangles the effects of brand interactivity and message integration in contemporary advertising formats, and suggests adaptations to well-known theories, such as the Affect Transfer Mechanism and the Persuasion Knowledge Model, in the context of young teenagers' responses to these formats.

1. Introduction

Nowadays the average household is equipped with a variety of media devices, including traditional ones (radio, television), and laptops, smartphones and tablets that are connected to the online world. As the media landscape and media use changes, advertisers adjust their advertising formats to it (De Pauw, De Wolf, Hudders, & Cauberghe, 2018). Contemporary online advertising differs from traditional advertising formats in that it is characterized by two important features: integration of advertising in other content, and brand interactivity (Daems, De Pelsmacker, & Moons, 2017; De Pauw et al., 2018; Hudders et al., 2017). *Integrated advertising* is advertising that embeds a persuasive message into informative or entertaining content resulting in advertising formats with a simultaneous exposure to both the media content and the integrated advertising message (Hudders et al., 2017; Panic, Cauberghe, & De Pelsmacker, 2013). Brand placement, '*the paid inclusion of brand identifiers in media content (television programs, movies, games)*' (Karrh, 1998) is an example of integrated advertising. For instance, James Bond drinks Belvedere vodka and Bollinger Champaign, wears Tom Ford suits and drives an Aston Martin (Sauer, 2015). American Apparel billboards are integrated in the Second Life game, as are Axe deodorant billboards in Splinter Cell Chaos Theory and Metal Gear Solid Series, and Playboy in Mafia II (Gonzalez, 2010). *Brand interactivity* refers to interactions consumers can have with brands or advertising messages, by clicking on banners or pop-ups that contain brand-related information or by clicking on or using brands in games (De Pauw et al., 2018; Lee, Park, & Wise, 2014). For instance, BMW, Aston Martin and Mercedes have been used in interactive placements in the racing game Gran Turismo (Duran, 2017).

Both children and teenagers are heavy users of online media. For instance, in the U.K. 94% of the children between 8 and 11 years old are active online (Ofcom, 2017). The average teenager (12–15 years) spends 21 h per week online and uses the mobile phone for an average of 18 h per week. American teenagers (13–18 year) use on average media for 9 h per day during their leisure time (not including work for school), whereas this is 6 h for tweens (8–12 years) (Common Sense Media, 2017). In Flanders (Belgium), the context of the current study, children's and teenagers' media use follows a similar pattern (Apestaartjaren, 2018). Children and teenagers use online media for playing games, watching video content, listening to music, doing

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homework, searching for information, interacting with friends, and accessing news content (Apestaartjaren, 2018; Common Sense Media, 2017; Ofcom, 2017).

As today's children and teenagers are growing up in a world dominated by online media, advertising is ubiquitously present in their lives (Common Sense Media, 2017). Advertisers specifically target their advertisements to them as they consider them a relevant and important target group as influencers in the household consumer decision making and as the consumers of tomorrow. It is estimated that the digital advertising market for advertising aimed at children will reach $1.2 billion by 2019 (PWC, 2017).

The purpose of the current study is to investigate the effects of brand integration and brand interactivity in online advertising formats on young teenagers' (aged 11–14 years) brand information memory, brand attitude and sharing of personal data, and the mechanisms through which brand integration and brand interactivity lead to personal data sharing. Based on a two (integrated advertising versus non-integrated advertising) X two (brand-interactive advertising versus non-brand-interactive advertising) between subjects experiment, the study tries to answer the following research questions:

- What are the effects of the integration of brand information and brand interactivity in advertising stimuli on brand-related information memory, brand attitude, and the sharing of personal information by young teenagers?
- How can the effects of integration and interactivity on the sharing of personal information be explained by awareness of selling intent, critical processing and brand attitude?

The study offers several contributions. First, it disentangles the effects of two distinct features of contemporary online advertising formats often targeted at children and teenagers, i.e. brand integration and brand interactivity, on their ad responses, instead of focusing on one advertising format only, or by not disentangling the effects of interactivity and integration, as is done in most previous studies (for exceptions, see, (e.g. Rifon et al., 2014; Vyvey, Castellar, & Van Looy, 2018; Zhao & Renard, 2018)). Integrated advertising makes it harder to distinguish advertising from other media content as the advertising message is embedded in media content, especially for children due to their limited cognitive abilities (Zarouali et al., 2018). Brand-interactive advertising increases engagement with advertised brands and influences children's affective reactions to it, since the brand-interactive content can be perceived as playful and enjoyable without being aware that the content is advertising (Daems et al., 2017; De Pauw et al., 2018; Mallinckrodt & Mizerski, 2007; Zarouali, Ponnet, Walrave, & Poels, 2017). Moreover, websites that are popular amongst children often ask for personal information to register or to create an account, which is a cause of concern for parents, educators and public policy (Cai & Zhao, 2013; Daems et al., 2017; Walrave & Heirman, 2013; Zarouali et al., 2017). Minors' brand information memory, brand attitude, and the sharing of personal information may thus all be influenced by the integrated and interactive character of the advertising format (De Pauw et al., 2018; Lee & Faber, 2007), and children and teenagers are particularly susceptible to persuasion by these contemporary advertising formats (Daems et al., 2017; Panic et al., 2013).

Second, we focus on young teenagers (11–14 years). They are a crucial age group that has only seldom been studied in advertising research. However, they are confronted with contemporary advertising formats on a daily basis (e.g. playing games, visiting websites, using social media, etc.) as they spend lots of time online (Common Sense Media, 2017; Ofcom, 2017). According to advertisers, 13 year is considered as a reference age from which onwards advertising can be used without restrictions (Daems et al., 2017). Roedder (1981) states that children younger than 8 are *'limited processors'* that have not fully obtained information storage skills yet. *Cued processors*, children between 8 and 12 years old, have information processing skills, but they should be prompted to retrieve stored information. Teenagers from the age of 13 years onwards are *'strategic processors'*. They do not need to be prompted to retrieve stored information. According to John (1999), children's consumer socialization consists of a sequence of three cognitive stages: the perceptual stage (3–7 years), the analytical stage (7–11 years) and the reflective stage (11–16 years). Only from the reflective stage onwards children develop an in-depth and thorough advertising knowledge which makes them able to comprehend more subtle advertising intentions (e.g. this commercial message wants to influence my belief and attitudes about the brand to establish brand preference). It is thus generally assumed that, from around the age of 12–13 years onwards, children obtain the same level of advertising knowledge and consumer experience as adults (Tarabashkina, Quester, & Tarabashkina, 2018). However, research also indicates that children have more difficulties in understanding the persuasive and commercial nature of non-traditional, integrated and/or interactive advertising formats (Panic et al., 2013), and that even at age 12 children have not fully acquired an adult-like understanding of persuasive and selling intent (Rozendaal, Buijzen, & Valkenburg, 2010). The 11–14 age group is thus important as it is the crucial transition stage from cued analytical processors to strategic perceptual processors.

Third, besides cognitive (memory) and evaluative (brand attitude) ad responses, this study is one of the first to specifically focus on young teenagers' actual sharing of personal data as a behavioral response to advertising exposure instead of using data sharing intentions only, as in most previous studies (e.g. Heirman, Walrave, & Ponnet, 2013; Walrave & Heirman, 2013). Given the widespread practice of advertisers' online information collection and information sharing by minors, youngsters' sharing of personal information is an important dependent variable in this study.

Fourth, based on the Persuasion Knowledge Model (PKM) (Friestad & Wright, 1994), this study aims to unravel the mechanism behind the effect of online brand integration and brand interactivity on the sharing of personal information, by exploring the mediating role of awareness of selling intent, critical processing and brand attitude.

Finally, unlike many other studies, the current study is based on realistic integrated and/or interactive stimuli, developed by a professional game and website designer.

Our study informs advertisers about the effects of advertising format characteristics on advertising effectiveness in young teenagers, and makes them aware of their the vulnerability. Our study also provides implications for public policy, educators and parents. Our insights can be used in the debate on the appropriateness of integrated and interactive advertising formats aimed at minors and regulations and measures needed to protect them.

2. Literature review and hypotheses development

2.1. Memory, brand attitude and sharing of personal information

Consumer responses to advertising are often conceptualized as a hierarchy of effects consisting of three stages: cognitive, affective and conative (behavioral). In the first stage, consumers acquire knowledge about a product or a brand and remember it; in the second stage they develop positive or negative affect (brand attitude), and in the third stage, consumers act upon their knowledge and attitude (e.g. Bruner & Kumar, 2000). We follow this framework in that we develop hypotheses and measures for each of the three stages: memory effects, brand attitude responses and behavior (sharing of personal information). We develop these hypotheses based on several theoretical frameworks, such as the Limited Capacity Model of Motivated Mediated Message Processing (Lang, 2000), the Limited Capacity Model of Attention (Kahneman, 1973), Fluency Theory (Lee & Labroo, 2004); the Affect Transfer mechanism (Hang & Auty, 2011), the Privacy Paradox (Norberg, Horne, & Horne, 2007), and the Persuasion Knowledge Model (Friestad & Wright, 1994).

2.2. Memory

The Limited Capacity Model of Motivated Mediated Message Processing (Lang, 2000) starts from the premise that cognitive resources are limited, resulting in limited capacity to encode, store, and retrieve information. If the receiver of a message does not allocate sufficient resources required by a task, or the task requires more resources than the message receiver has available at the information processing moment, information will not be completely processed, leading to less memory. Additionally, the Limited Capacity Model of Attention (Kahneman, 1973) states that a person divides his or her cognitive resources or attention across different simultaneous tasks, devoting most attention to the most prominent or primary task. If the necessary cognitive resources for the other remaining tasks overrule the overall cognitive capacity of an individual, processing or fulfilment of the remaining tasks fails. If an advertisement is integrated into other entertaining or informational content, most of an individual's attention will be devoted to process this content, for instance reading online content on the web or playing a game (Lee & Faber, 2007). In such a context, processing brand information is a secondary task.

Based on both models, if brand-related information is integrated into entertaining or informative media context, cognitive capacity and attention will be devoted to the primary task, namely entertainment or information search, leaving little capacity for the secondary task (processing of brand information) (Lee & Faber, 2007; Rifon et al., 2014; Vyvey et al., 2018). Brand-related information will thus be remembered less easily in an integrated advertising format (e.g. a game) compared to a commercial message which appears stand alone, without being integrated into other media content (e.g. an online banner) (Lee & Faber, 2007; van Reijmersdal, Rozendaal, & Buijzen, 2012). This is especially the case for children and teenagers as their information processing skills are less developed than those of adults (Moses & Baldwin, 2005; Rozendaal et al., 2010). We expect:

H1a. Brand information that is not integrated in content is better remembered than brand information that is integrated in content.

According to Fluency Theory, processing fluency is an important parameter of stimuli processing (Reber, Fazendeiro, & Winkielman, 2002). Fluency encompasses perceptual fluency, the ease of processing stimuli based on its physical features, retrieval fluency, the ease of recalling stimulus information, and conceptual fluency, the ease of processing the meaning of stimuli. Compared to non-interactive advertising, brand-interactive advertising puts the advertising stimulus more central. Brand interactivity raises engagement with the brand information, leading to higher levels of attention devoted to this information. By interacting with the brand while playing a game or interacting with a banner, perceptual and conceptual processing fluency will be enhanced, and processing brand information will require less cognitive effort and consequently lead to better memory of brand information (Panic et al., 2013; Yeu, Yoon, Taylor, & Lee, 2013). We expect:

H1b. Brand information is better remembered if it is interactive than if it is not interactive.

We expect that the positive effects of brand interactivity and non-integration will interact to reinforce each other:

H1c. Brand information is better remembered if the information appears in a brand-interactive non-integrated advertising format than in a non-interactive non-integrated format or in integrated formats.

2.3. Brand attitude

The choice for in-game integrated advertising is often motivated by the innate enjoyable nature of games. Marketers hope that enjoyment resulting from gaming will lead to positive brand attitudes (Herrewijn & Poels, 2013; Siemens, Smith, Fisher, Thyroff, & Killian, 2015), because of the Affect Transfer Mechanism (Rifon et al., 2014; van Reijmersdal et al., 2012). The fun and enjoyable characteristics of a game are likely to spill over to the integrated brands (Mallinckrodt & Mizerski, 2007). This is even more the case with children and teenagers (John, 1999; Terlutter & Capella, 2013). We expect:

H2a. A brand integrated in a gaming content leads to a more positive brand attitude than a brand that is not integrated in content.

Fluency Theory and the Affect Transfer Mechanism can explain why brand interactivity leads to enhanced brand attitude. In the previous section, we stated that brand interactivity enhances processing fluency. Lee and Labroo (2004) found that this increased processing fluency leads to consumers having more favorable attitudes toward the brand. Lee et al. (2014) and van Reijmersdal, Jansz, Peters, and Van Noort (2010) found that brand interactivity enhances persuasion effects and established positive brand attitudes towards brands placed in content. This can again be explained by the Affect Transfer Mechanism (Hang & Auty, 2011; Rifon et al., 2014; van Reijmersdal et al., 2012). If an individual interacts with an entertaining context (e.g. a game or a banner), this creates a positive affect that will spill over to the brand (Nelson, Yaros, & Keum, 2006; van Reijmersdal et al., 2012). We expect:

H2b. Brand-interactive advertising formats lead to a more positive brand attitude than non-brand-interactive formats.

We expect that the positive effects of brand interactivity and integration will interact to reinforce each other. Previous research suggests that making integrated advertising brand-interactive results in more favorable attitudes towards the advertised brand (Dens, De Pelsmacker, Goos, & Aleksandrovs, 2016; Hang & Auty, 2011). Hence, we expect:

H2c. Brand attitude is more positive if the brand appears in an interactive integrated advertising format than in a non-interactive integrated format or in non-integrated formats.

2.4. Personal data sharing

Websites or games that are popular amongst minors often collect personal information (Cai & Zhao, 2013). Despite the importance of privacy in the digital era, even those holding strong privacy concerns often trade their personal data for online services and products (Apestaartjaren, 2018). This is referred to as the "*Privacy Paradox*", the dichotomy between expressed privacy concerns and actual online disclosure and sharing behavior (Norberg et al., 2007).

Several factors play a role in explaining the discrepancy between people's concerns and their online sharing behaviors. For instance, higher levels of trust lead to an increased willingness to provide personal information, and consumers were found to express a higher willingness to disclose personal information to well-known companies (Aguirre, Roggeveen, Grewal, & Wetzels, 2016; Kokolakis, 2017; Norberg et al., 2007). Another explanation is the privacy calculus, which postulates that people perform a calculus of the costs (i.e., loss of privacy) and benefits (i.e., gain from information disclosure). When the perceived benefits outweigh the perceived costs, people are likely to disclose information (Walrave & Heirman, 2013; Zhao & Renard, 2018). Children are found to rely more on the perceived benefits compared to the risks (costs) involved, and accordingly their willingness to share personal information increases when they are offered a gift in exchange (Heirman et al., 2013). Furthermore, modern data collection tactics make it difficult for consumers to undertake accurate cost–benefit trade-offs, particularly when firms collect information about customers covertly (Aguirre et al., 2016). One would expect that young teenagers are even more susceptible than adults to share their personal data when asked to do so in order to win a prize after playing an entertaining game in which brand information is integrated.

The characteristics of a website or an online stimulus, and more

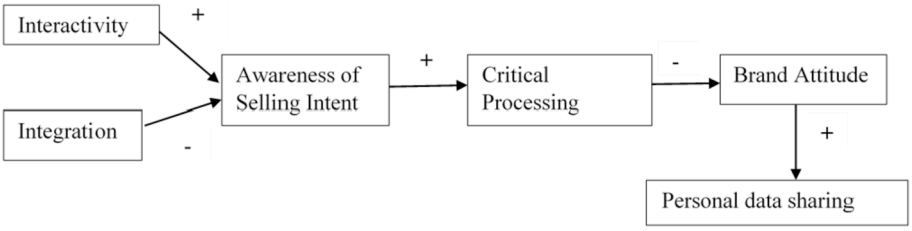

Fig. 1. How brand integration and brand interactivity affects personal data sharing: the mediating role of awareness of selling intent, critical processing and brand attitude.

particularly brand integration and brand interactivity, may affect the willingness of young teenagers to share personal information. Integrating brands in games is explicitly done to have the effect of a playful and enjoyable context spilling over to the advertised brand (van Reijmersdal et al., 2012). Consistent with the affect transfer mechanism, if an advertising stimulus is perceived as positive, this affective evaluation may be regarded as an intrinsic benefit in the privacy calculus and increase the willingness of an individual to share personal data with the advertiser (Zhao & Renard, 2018). We thus expect:

H3a. Integrated advertising formats lead to more personal information sharing than non-integrated formats.

Compared to a non-brand-interactive ad, brand-interactive advertising in which the receiver can interact with brand-related information, leads to more playfulness and engagement, resulting in a stronger involvement with the media and the brand (Rifon et al., 2014; Zhao & Renard, 2018). Involvement might enhance persuasion, making young teenagers more susceptible for advertising effects (van Reijmersdal et al., 2012). Again, based on the affect transfer mechanism, this could encourage young teenagers to share more personal information with the advertiser:

H3b. Brand-interactive advertising formats lead to more personal information sharing than non-brand-interactive formats.

Similar to our reasoning leading up to hypothesis 2c, we expect that the positive effects of brand interactivity and integration will interact to reinforce each other:

H3c. Personal information is more shared if the brand appears in an interactive integrated advertising format than in a non-interactive integrated format or in non-integrated formats.

2.5. The mediating role of awareness of selling intent, critical processing and brand attitude for personal data sharing

The Persuasion Knowledge Model (PKM) (Friestad & Wright, 1994), explains how consumers interpret, cope with and respond to persuasive attempts such as advertising. Over time consumers develop personal knowledge about the tactics used in these persuasion attempts. This knowledge helps them identify how, when, and why marketers try to influence them. It also helps them to adaptively respond to these persuasion attempts so as to achieve their own goals. This knowledge gradually develops throughout life, especially during childhood and adolescence (Hudders & Cauberghe, 2018; Hudders et al., 2017). As a consequence of this learning, over time the effects of certain actions (e.g., advertising) on people's attitudes and behavior will also change, because people's persuasion knowledge shapes how they respond as persuasion targets.

The PKM states that people first need to recognize and form beliefs about the stimulus as a persuasive attempt, in other words, they need to become aware of the selling intent of the stimulus (Moses & Baldwin, 2005). Subsequently, they need to apply this knowledge when confronted with advertising to critically reflect on it (Hudders et al., 2017). To date, researchers tend to emphasize that the main role of persuasion knowledge is to help consumers defend themselves against persuasion attempts and that persuasion knowledge usually implies skepticism toward advertising claims and raises consumers' cognitive defenses (Isaac & Grayson, 2017). Indeed, previous research has found evidence that awareness of selling intent leads the consumer to more critically processing the ad, and that this critical processing leads to negative brand evaluations and behavioral responses (e.g. Boerman, van Reijmersdal, & Neijens, 2014; Waiguny, Nelson, & Terlutter, 2014; Zarouali et al., 2018).

In this section we develop hypotheses about the mediating role of awareness of selling intent, critical processing and brand attitude to unravel the mechanisms through which brand integration and brand interactivity lead to personal information sharing by young teenagers. The conceptual serial mediation model underlying the hypotheses in this section is presented in Fig. 1. Mediators explain the mechanism behind the relation between a predictor (in this case interactivity or integration) and an outcome (in this case the sharing of personal information). They clarify what would otherwise remain a black box in terms of why a manipulated stimulus predicts an outcome. Serial mediation models unravel this mechanism by defining a sequence of cause-and-effects relations between several mediators (see for example (Diamantopoulos, Davydova, & Arslanagic-Kalajdzic, 2018; Valikhani, Ahmadnia, Karimi, & Mills, 2019)).

If an individual can interact with a brand, this will lead to more engagement with the stimulus and result in higher elaboration, more intense processing of the stimulus, and more processing fluency (Hang & Auty, 2011). This will trigger consumers' persuasion knowledge and awareness of selling intent. For instance, Rifon et al. (2014) found that interactivity (playing versus watching an advergame) activated greater persuasion knowledge. If an individual clicks on a banner and processes the brand information, it is likely that he or she becomes aware of the persuasive intent of the banner. Moreover, if youngsters have interactive control over a brand in a banner or a game (as is the case in our study), this will result in a high level of information processing such as higher brand recognition (Hang, 2016). This level of information processing might activate their persuasion knowledge as they start wondering about the intention of the brand in the banner or the game (Hang, 2016). We expect:

H4a. Brand interactivity has a positive effect on the awareness of selling intent.

Integrating a commercial message into media context results in subtle advertising (Panic et al., 2013). In order to be able to cope with advertising, the first premise is that one should be able to identify it as such (Friestad & Wright, 2005; Moses & Baldwin, 2005). However, integrating an advertising message into media content makes this identification more difficult, especially for children. It will thus be less likely that persuasion knowledge will be activated and awareness of selling intent might thus not be triggered (Friestad & Wright, 2005; Moses & Baldwin, 2005; Panic et al., 2013). We expect:

H4b. Brand integration will have a negative effect on the awareness of selling intent.

Based on the PKM arguments developed previously, we also propose the following hypotheses. If an individual's awareness of selling intent is activated, he or she will try to cope with the advertiser's intentions. This leads to critical processing (Friestad & Wright, 1994), which will negatively affect brand attitude (Boerman, van Reijmersdal, & Neijens, 2012, 2014). According to the hierarchy-of-effects principle, the attitude towards a brand is an antecedent of brand-related behaviors

Table 1
Four experimental conditions.

	Integrated ad for smartphone brand	Non-integrated ad for smartphone brand
Brand-interactive ad (interaction with smartphone brand)	Advergame smartphone (integrated – brand-interactive)	Interactive banner smartphone (non-integrated – brand-interactive)
Non-brand-interactive ad (no interaction with smartphone brand)	Advergame rollercoaster (integrated – non-brand-interactive)	Interactive banner rollercoaster (non-integrated – non-brand-interactive)

(Bruner & Kumar, 2000), such as sharing personal information. Zhao and Renard (2018) argue that positive responses towards components of online stimuli, such as a brand, will result in more actual sharing of personal data. Hence, we expect:

H5. Awareness of selling intent has a positive effect on critical processing.

H6. Critical processing has a negative effect on brand attitude.

H7. Brand attitude has a positive effect on an individual's sharing of personal information.

3. Method

3.1. Design and stimuli

A two (integrated advertising format vs. non-integrated advertising format) x two (brand-interactive advertising format vs. non-brand-interactive advertising format) between subjects experiment was conducted. The focal brand was the fictitious smartphone brand *Delta*. In Belgium, 92% of the 12–14 year old children have their own smartphone and 68% of them play games on a it, which makes the smartphone the most popular game device amongst this age group (Apestaartjaren, 2018). It is the most preferred and most indispensable media device among teenagers (Vanhaelewyn & De Marez, 2017). In the sample of the current study, 98.4% of the participants have their own smartphone and 83.9% indicates on a 5-point scale that their smartphone is 4 (important) or 5 (very important) to them. A fictitious brand was used to avoid potentially confounding effects of previous exposure or experience with existing brands (Geuens & De Pelsmacker, 2017).

In order to decide on the advertising formats to be developed for the study, three experts in contemporary advertising formats and four game developers were interviewed. In each of the developed formats, the focal brand *Delta* was used, as well as a filler brand called *Heidi the ride*, a rollercoaster attraction in an existing amusement park. In each of the conditions three characteristics of the smartphone were featured: three colors, three prices, and three phone memory capacity levels. These characteristics are amongst the most important ones that children consider when choosing a smartphone: 80% of them finds technical characteristics (such as phone memory capacity) important, 67% the price, and 65% the appearance (such as color) (Apestaartjaren, 2018).

Four different advertising stimuli were created by a professional website and game developer, i.e. two gaming (integrated in a puzzle game) and two banner (non-integrated) stimuli. The *integrated brand-interactive* condition was an advergame in which the participants played a game manipulating game elements related to the smartphone. On the left hand side, in a static banner, *'Heidi the ride'* was shown, featuring an equal number of characteristics of the attraction (speed, height and atmosphere of the roller coaster). The *integrated non-brand-interactive* condition was the same game, but in this case participants had to interact with *'Heidi the ride'*, while *'Delta'* was advertised by means of a billboard at the left hand side of the screen, again featuring the three phone characteristics. From the point of view of *'Delta'*, this corresponds to an in-game advertising condition. At the beginning of the games (both the *'Delta'* advergame and the *'Delta'* in-game advertising) the participants saw a 10 s demo instruction about how the game should be played before they could play the game themselves. Then, each participant had to play the puzzle game. At the end of the game, the logo of either the smartphone brand *'Delta'* or the *'Heidi the ride'* logo appeared on the background of the game board and the game started again. Each puzzle element in the game contained information about characteristics of either the smartphone (color, price or capacity) or the roller coaster (speed, height and atmosphere) depending on the experimental condition the participant was assigned to. After 70 s of game play, participants saw a ten seconds count down before they were automatically redirected to the survey.

In the non-integrated banner conditions, the participants were exposed to a website containing three different banners, each consisting of a clickable (interactive) part and a non-clickable (non-interactive) part. The *non-integrated brand-interactive* condition consisted of three banners featuring *'Delta'* and its characteristics on which the participants could click for further information shown in pop-ups. The pop-ups consisted of three different pictures with a short textual message (e.g. *'€199'*) that provided more information about the advertised brand, identical to the information in the gaming conditions (color, price and capacity of the smartphone). A static *'Heidi the ride'* message was also shown in the upper part of the clickable banner, featuring its three characteristics (speed, height and atmosphere of the roller coaster). The *non-integrated non-brand-interactive* banner condition consisted of three different banners featuring *'Heidi the ride'* and its characteristics on which the participants could click for further information, again shown in pop-ups. A static (non-clickable) *'Delta'* message was also shown in the upper part of the banner, featuring its three characteristics. Participants viewed the banners for 70 s.

Screen shots of the stimuli can be found in appendix. Table 1 gives an overview of the different experimental conditions.

3.2. Participants

Participants in the experiment were pupils of the 7th or 8th grade contacted via six different secondary schools spread across Flanders, Belgium. 576 Flemish children (53.30% boys) between 11 and 14 years old (M = 12.57 years; SD = 0.78) participated in the study. 85.1% of the pupils in the sample follow a general education track and 14.9% of the pupils follow a more practice-oriented track.

3.3. Procedure

The experiment took place in a computer room at school under the supervision of the researchers. The schools took care of parental consent, emphasizing the anonymity of the participants and the answers provided. Each participant had a computer at his or her disposal. At the start of the experiment the participants were given a short introduction and a test survey on how to answer the questions and how to interpret scale points. At the end of the test survey the participants were told that they would be exposed to a website and that they had to behave, read and click as if they would visit the website during their free time, and that afterwards they would be automatically redirected to the survey. They were also informed that they could terminate the survey whenever they wanted. Participants were randomly assigned to one of the four experimental conditions. Cell sizes are between 134 and 152. At

the end of the experiment, participants were debriefed and again informed that their responses were confidential and would be treated anonymously.

First, the attitude toward the stimulus ('the website') was measured. Subsequently, participants were asked to share personal information (date of birth, favorite color, telephone number, allow cookies). This was followed by brand recognition and measurement of brand information memory and the attitude towards the brand. Next, awareness of selling intent was measured, followed by critical processing. The questionnaire ended with demographic questions (gender, age and study track).

3.4. Measures

3.4.1. Independent variables

The independent variables of the study are the manipulated experimental conditions: integration of and interactivity with the smartphone brand.

3.4.2. Dependent variables

Brand recognition was measured by providing the participants with a list containing three existing (Samsung, iPhone and Huawei) and two fictitious (Zenith and Delta) brand names of smartphones and the answer option "*I don't remember the smartphone's brand name on the website*". Brand recognition was coded as 1 if 'Delta' was indicated and as '0' if one of the other options was indicated.

For *brand information memory*, respondents could select three options out of a list of nine smartphone characteristics (shape, color, in which store available, quality of the camera, matching smartphone covers, screen size, battery life, memory capacity and price) and the option *'I did not receive information about the characteristics of the smartphone'*. The answers color, price and memory capacity were correct. Each correctly remembered characteristic was labeled as 1 and the other options as 0. Additional memory questions went into more detail about the color, prices and memory capacity of the smartphone. The respondents could indicate three options out of a list of six characteristics or the option that they thought they did not receive information about a specific smartphone characteristic. For each of the three characteristics a variable was created coding the correctly remembered characteristic as 1 and the incorrect as 0. Finally, a 13-point (0-12) measure was created as an indication of *overall memory* across the different smartphone characteristics advertised. The measure included the three smartphone characteristics advertised and, for each of the three characteristics (color, price and memory capacity), the three correct variations (three different colors, three different prices and three different smartphone memory capacities). Each point on this measurement was either coded as 1 (if the respondent indicated this specific smartphone characteristic correctly) or as 0 if it was not indicated.

To measure *sharing of personal information*, the participants were asked: "*The website you saw contained information about a smartphone. This website also asks information about you. You can participate in a competition to win the smartphone. Fill in your date of birth, favorite color, telephone number and whether or not you would allow the website to follow which other websites you would visit (referring to the use of cookies) in order to have a chance to win the smartphone*". If the respondents did not want to share any of these information items, they could indicate: *"I do not want to share this information and thus I cannot win the smartphone."* A five-point measure (0–4) was created indicating how many of the four personal data characteristics the respondents were willing to share.

3.4.3. Mediating variables

Selling intent was measured as *"Does the website you just saw want you to desire the Delta smartphone?"* on a five-point scale ranging from (No, definitely not – Yes, definitely) (Mallinckrodt & Mizerski, 2007). *Critical processing* was measured by the following items on a five-point scale ranging from Strongly disagree – Strongly agree: "*While being on the website … a) I rather found it annoying that the Delta smartphone appeared"; b) I found the information about the Delta smartphone strange"; c) I found the Delta smartphone not appropriate in the website context"* (Boerman et al., 2014) ($\alpha = 0.72$). The *attitude towards the brand* was measured with one item ("*Do you like Delta, the smartphone you saw on the website?")* on a five-point scale ranging from ("I don't like it at all" - "I like it very much"), based on Holbrook and Batra (1987).

3.4.4. Covariate

The attitude towards the stimulus was measured by means of the item "*Do you like the website you just saw?", ranging from "I don't like it at all" - "I like it very much*" on a five-point scale (Panic et al., 2013).

For all scales and created measures, smileys were included in the survey to enhance children's comprehension of the scale points (Mallinckrodt & Mizerski, 2007; Panic et al., 2013).

4. Results

4.1. Memory

Brand name recognition is higher in the non-integrated advertising formats than in the integrated formats ($chi^2 = 50.11$, $p = < .001$), and higher in the brand-interactive formats than in the non-brand-interactive formats ($chi^2 = 36.07$, $p = < .001$), confirming hypotheses 1a and 1b with respect to brand recognition. Brand recognition is higher in the non-integrated interactive condition (interactive banner) (60.4%) than in the integrated non-brand-interactive (in-game advertising) (22.4%), the non-integrated non-brand-interactive (non-interactive banner) (21.0%), and the integrated interactive condition (advergame) (14.3%). This confirms hypothesis 1c.

A two (integration) x two (brand interactivity) ANCOVA was carried out, with the attitude towards the stimulus as a covariate and the 13-point brand information memory scale as the dependent variable (see Table 2 for descriptives and Table 3 for ANCOVA table). There is no significant effect of the covariate (F (1, 571) = 1.05, p = .306). Compared to non-integrated advertising (M = 6.00), integrated advertising lowers the number of product characteristics remembered (M = 4.93) (F (1, 571) = 21.18, $p < .001$), supporting hypothesis 1a. The main effect of brand interactivity is also significant (F (1, 571) = 154.35, $p < .001$) showing that, compared to advertising that is not brand-interactive (M = 3.98), brand interactivity has a positive effect on the number of product characteristics memorized (M = 7.03), confirming hypothesis 1b.

The interaction effect between integration and interactivity is significant (F (1, 571) = 30.18, $p < .001$) (Fig. 2). Simple effects analyses show that brand information that is both brand-interactive and not integrated (brand-interactive banner) leads to more remembered information (M = 8.27) than not integrated and non-brand-interactive (M = 3.89), integrated and non-brand-interactive (M = 4.07) and integrated and brand-interactive information (M = 5.78) (all p < .001). Hypothesis 1c is supported. Brand interactivity has the highest effect size.

Table 2
Mean and standard deviations for memory of brand information.

Experimental condition	Mean	SD
Advergame smartphone – integrated and interactive ad	5.79	2.82
Advergame rollercoaster – integrated and non-interactive ad	4.12	2.98
Interactive banner smartphone – non-integrated and interactive ad	8.22	2.93
Interactive banner rollercoaster – non-integrated and non-interactive ad	3.87	2.92
Total	5.44	3.37

Table 3
ANCOVA table memory for brand information.

	Type III sum of Squares	Df	Mean square	F	Sig	Partial Eta squared
Corrected Model	1682.162	4	420.541	49.472	< .001	.257
Intercept	882.955	1	882.955	103.870	< .001	.154
Covariate Attitude ad stimulus	8.933	1	8.933	1.051	.306	.002
Integration	180.031	1	180.031	21.179	< .001	.036
Interactivity	1312.056	1	1312.056	154.349	< .001	.213
Integration X Interactivity	256.552	1	256.552	30.181	< .001	.050
Error	4853.831	571	8.501			
Total	23588.000	576				
Corrected Total	6535.993	575				

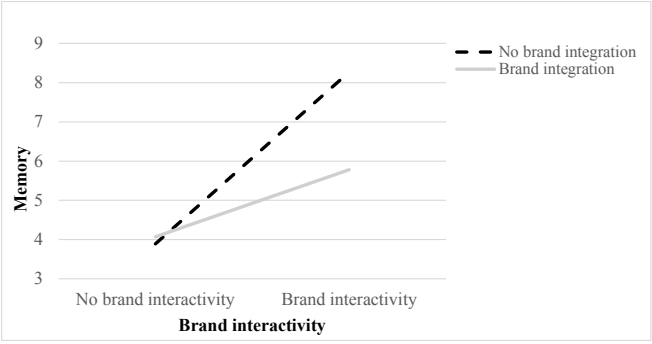

Fig. 2. Two-way interaction between integration and interactivity on memory.

4.2. Attitude towards the brand

A two (integration) x two (brand interactivity) ANCOVA was performed with brand attitude as the dependent variable and the attitude towards the stimulus as a covariate (see Table 4 for descriptives and Table 5 for ANCOVA table). The covariate has a significantly positive effect on brand attitude (F (1, 571) = 41.69, p < .001). The main effect of brand integration is not significant (F (1, 571) = 2.43, p = .120). Hypothesis 2a is not supported. The main effect of brand interactivity is significant (F (1, 571) = 17.91, p < .001). Compared to an advertisement without interactivity with the brand (M = 2.96), brand interactivity has a positive effect on brand attitude (M = 3.28). Hypothesis 2b is supported.

The interaction effect between integration and interactivity on brand attitude is marginally significant F (1, 571) = 3.32, p = .069 (Fig. 3). Simple effects analyses indicate that the brand-interactive and integrated stimulus (M = 3.15) does not lead to a significantly more positive brand attitude than the non-brand-interactive integrated stimulus (M = 2.97) (p = .223). A non-integrated and brand-interactive stimulus (M = 3.41) leads to a significantly more positive brand attitude than a brand-interactive and integrated stimulus (p = .019). A brand-interactive and integrated stimulus only leads to a marginally significantly better brand attitude than an non-integrated non-interactive stimulus (M = 2.97) (p = .080). Hypothesis 2c is not supported. Again, brand interactivity has the highest effect size. However, effect sizes are smaller than in the memory effects analysis.

Table 4
Mean and standard deviations for brand attitude.

Experimental condition	Mean	SD
Advergame smartphone – integrated and interactive ad	3.18	0.88
Advergame rollercoaster – integrated and non-interactive ad	3.06	0.89
Interactive banner smartphone – non-integrated and interactive ad	3.31	1.07
Interactive banner rollercoaster – non-integrated and non-interactive ad	2.92	0.88
Total	3.11	0.94

4.3. Sharing personal data

To investigate the effect of brand integration and brand interactivity on the sharing of personal data, a 2 (integration) x 2 (brand interactivity) ANCOVA was performed with the number of shared data (0–4) as the dependent variable and the attitude towards the stimulus as a covariate (see Table 6 for descriptives and Table 7 ANCOVA table). There is a significant positive effect of the covariate on information sharing (F (1, 571) = 26.35, p < .001). Neither the main effect of integration (F (1, 571) = 0.62, p = .432), nor the main effect of interactivity (F (1, 571) = 1.81, p = .179) is significant. The interaction effect between integration and interactivity is not significant either (F (1, 571) = 2.08, p = .150), and neither are any of the relevant simple effects (all p > .05). Hypotheses 3a,b,c are thus not supported.

4.4. The mediating role of awareness of selling intent, critical processing and brand attitude

Hayes' PROCESS macros have become the standard approach to test (serial) mediation processes (Hayes, 2013). To test the model in Fig. 1, Hayes' PROCESS macro model 6 was used with 5.000 bootstrap samples. The attitude towards the stimulus was used as a covariate. Two models were tested with sharing of personal information as the final outcome in each model, one with brand integration as the independent variable and one with interactivity as the independent variable. In addition to the hypothesized paths, all other paths between the constructs in the model were also estimated. Tables 8 and 9 show the descriptives of the mediators across the interactivity and integration conditions respectively.

There is a significant positive effect of brand interactivity on awareness of selling intent of the stimulus (b = 0.246, p = .036). Hypothesis 4a is supported. There is no significant effect of brand integration on awareness of selling intent of the stimulus (b = −0.166, p = .175). Hypothesis 4b is rejected. Awareness of selling intent has a negative effect on critical processing (b = −0.060, p = .030). Hypothesis 5 is not supported. Critical processing has a negative effect on brand attitude (b = −0.309, p < .001). Hypothesis 6 is supported. As expected in hypothesis 7, brand attitude has a positive effect (b = 0.389, p < .001) on personal data sharing. See Tables 10 and 11 for detailed results. The effect of brand interactivity on personal data sharing is fully mediated, since the direct effect of brand interactivity on the sharing of personal data is not significant (b = −0.049, p = .693, CI [-0.2978, 0.1980]) (Zhao, Lynch, & Chen, 2010).

Additionally, it has to be noted that the size of the effect of awareness of selling intent on critical processing is, although statistically significant, much smaller than the other effects in the serial mediation model.

5. Conclusion and discussion

The main contribution of the current study is that it disentangles the effects of brand integration and brand interactivity on the cognitive,

Table 5
ANCOVA table brand attitude.

	Type III sum of Squares	Df	Mean square	F	Sig	Partial Eta sqaured
Corrected Model	45.741	4	11.435	14.173	< .001	.090
Intercept	165.313	1	165.313	204.894	< .001	.264
Covariate Attitude ad stimulus	33.641	1	33.641	41.695	< .001	.068
Integration	1.960	1	1.960	2.429	.120	.004
Interactivity	14.450	1	14.450	17.910	< .0001	.030
Integration X Interactivity	2.681	1	2.681	3.322	.069	.006
Error	460.696	571	.807			
Total	6094.000	576				
Corrected Total	506.438	575				

attitudinal and behavioral (sharing personal information) responses of young teenagers to contemporary advertising formats. Brand interactivity has a positive effect on the awareness of selling intent, the recognition of product- and brand-related information, brand attitude and, indirectly, on personal data sharing. As to the latter, brand interactivity leads to more awareness of selling intent which leads to less critical processing of the stimulus and to a more positive brand attitude and more personal data sharing. Integration of advertising in other content has a negative effect on the recognition of product- and brand-related information, but has no effect on awareness of selling intent, brand attitude or the sharing of personal information. The study has implications for theories, such as the Persuasion Knowledge Model and the Affect Transfer Mechanism in the context of young teenagers' responses to contemporary advertising formats.

The memory results are consistent with the Limited Capacity model of Attention (Kahneman, 1973), the Limited Capacity Model of Motivated Mediated Message Processing (Lang, 2000) and Fluency Theory (Reber et al., 2002). The combination of brand interactivity and non-integration reinforces memory effects. This result has been found before in the context of contemporary advertising formats (e.g. Lee & Faber, 2007; Panic et al., 2013; Rifon et al., 2014; Vyvey et al., 2018). In the current study these results are thus replicated for young teenagers, and we also disentangle the effects of brand integration and brand interactivity, two angles that have seldom been used or combined in previous studies. Overall, the effect sizes show that brand interactivity rather than brand integration has the strongest effect on memory.

In line with van Reijmersdal et al. (2010), brand interactivity also has a stronger effect on brand attitude than brand integration. Integrating commercial messages into a media context that is entertaining and challenging, such as games, is often regarded as a technique that results in more positive brand attitudes, as a result of the Affect Transfer Mechanism (Rifon et al., 2014; van Reijmersdal et al., 2012). However, contrary to our expectations, there was no positive effect of brand integration on brand attitude. Previous studies have found that prominent brand integration into an entertaining context can lead to more negative attitudes (Dens, De Pelsmacker, Wouters, & Purnawirawan, 2012; Kinard & Hartman, 2013; van Reijmersdal, 2009). Brand placement is prominent if the brand is part of the game play or placed in the

Table 6
Mean and standard deviations for personal data sharing.

Experimental condition	Mean	SD
Advergame smartphone – integrated and interactive ad	1.65	1.60
Advergame rollercoaster – integrated and non-interactive ad	1.74	1.49
Interactive banner smartphone – non-integrated and interactive ad	1.77	1.62
Interactive banner rollercoaster – non-integrated and non-interactive ad	1.49	1.57
Total	1.66	1.57

Table 7
ANCOVA table personal data sharing.

	Type III sum of Squares	Df	Mean square	F	Sig	Partial Eta sqaured
Corrected Model	69.172	4	17.293	7.306	< .001	.049
Intercept	4.866	1	4.866	2.056	.152	.004
Covariate Attitude ad stimulus	62.374	1	62.374	26.353	< .001	.044
Integration	1.464	1	1.464	.619	.432	.001
Interactivity	4.292	1	4.292	1.813	.179	.003
Integration X Interactivity	4.915	1	4.915	2.077	.150	.004
Error	1351.488	571	2.367			
Total	3014.000	576				
Corrected Total	1420.660	575				

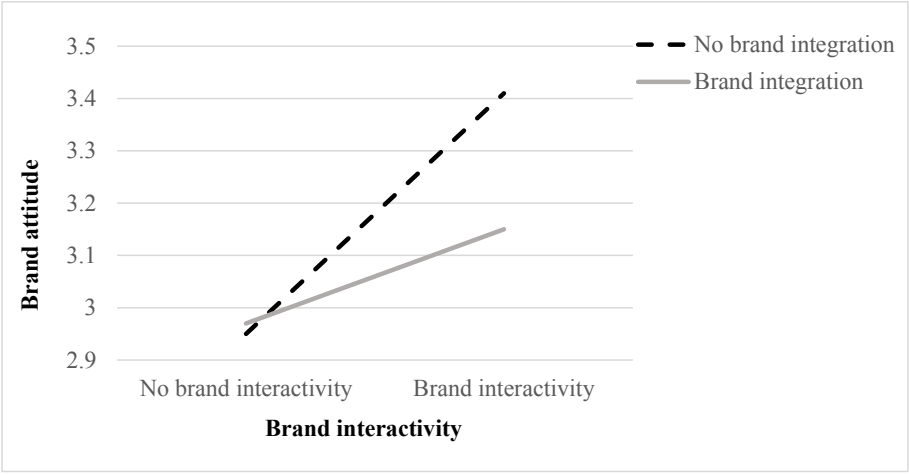

Fig. 3. Two-way interaction between integration and interactivity on brand attitude.

Table 8
Mean and standard deviations for three mediators and the dependent variable in the model with interactivity as independent variable.

Mediators	Experimental condition	Mean	SD
Selling intent	Interactive ad formats	3.16	1.39
	Non-interactive ad formats	2.93	1.40
	Total	3.05	1.40
Critical processing	Interactive ad formats	2.74	0.92
	Non-interactive ad formats	3.00	0.86
	Total	2.87	0.90
Brand attitude	Interactive ad formats	3.25	0.97
	Non-interactive ad formats	2.99	0.89
	Total	3.11	0.94
Sharing of personal data	Interactive ad formats	1.71	1.61
	Non-interactive ad formats	1.62	1.53
	Total	1.66	1.57

Table 9
Mean and standard deviations for three mediators and the dependent variable in the model with integration as independent variable.

Mediators	Experimental condition	Mean	SD
Selling intent	Integrated ad formats	2.99	1.43
	Non-integrated ad formats	3.10	1.37
	Total	3.05	1.40
Critical processing	Integrated ad formats	3.80	0.86
	Non-integrated ad formats	2.95	0.93
	Total	2.87	0.90
Brand attitude	Integrated ad formats	3.12	0.88
	Non-integrated ad formats	3.11	0.99
	Total	3.11	0.94
Sharing of personal data	Integrated ad formats	1.69	1.55
	Non-integrated ad formats	1.62	1.60
	Total	1.66	1.57

focal viewing area (Terlutter & Capella, 2013). This was the case in our experiment. An increase in placement prominence might result in the activation of negative feelings as the game player starts wondering why the placed element is presented in such a prominent manner (van Reijmersdal, 2009). This may have (partly) countered the positive Affect Transfer mechanism. Vyvey et al. (2018) argue that playing a game is a primary task that may provoke a high cognitive load. This may lead to the player failing to notice the advertising content because the game itself requires too many resources. Especially children may be easily overwhelmed by the immersive character of the game, which often results in a positive effect of the game itself and indifference towards the tactics used, including the integrated brand (De Pauw et al., 2018). Indeed, in the current study, brand memory was negatively affected by brand integration and the attitude towards the stimulus had a relatively strong effect on brand attitude, regardless of whether or not the brand was integrated in the stimulus. This suggests that the extent to which the brand was integrated in the content was less important than the attractiveness of the stimulus itself, and that more integrated formats lowered brand memory and may thus have hindered the affect transfer mechanism to the brand. This implies that future research should acknowledge that the Affect Transfer mechanism is only one of the factors at play when children are exposed to integrated advertising formats, and that the interplay between cognitive and affective responses towards the media stimulus and the integrated brand should be taken into account.

No direct effects of brand integration and brand interactivity were found on personal data sharing. A potential explanation is that actual sharing of personal information depends more on personality traits such as risk aversion, privacy concern etc. rather than on the specific characteristics of a certain stimulus.

The results of our study show that interactivity leads to higher awareness of selling intent. The active control the individual has over the interactive stimuli leads to more engagement and involvement, which in turns results in more elaborated processing of the information. We expected that brand integration would have a negative effect on the awareness of selling intent because integrating an advertising message into media content would make it more difficult to identify it as a persuasive attempt, and it would thus be less likely that persuasion knowledge would be activated and awareness of selling intent triggered. Our results do not confirm this expectation. We found that brand integration had a negative effect on memory. This might explain why no effect on awareness of selling intent was found. Evans and Park (2015) argue that embedded advertising may not be recognized as such and that in this case non-advertising schema will be triggered accordingly. Consequently, the stimulus (e.g. an advergame) will be processed as regular media content and no awareness of selling intent will occur. Children could be particularly susceptible to this type of interpretation due to their limited knowledge about integrated advertising formats and their limited cognitive abilities and the difficulties they may have to decode cognitively demanding integrated formats in which commercial messages are integrated in media content, and recognize the commercial intent of the game (Lee & Faber, 2007; Panic et al., 2013). Moreover, their motivation to decode these stimuli may also be lowered due to the entertaining and fun nature of contemporary advertising formats, e.g., when the commercial message is integrated in fun and exciting games (De Jans et al., 2018).

It was hypothesized that awareness of selling intent of a stimulus would lead to more critical processing (Boerman et al., 2014; Friestad & Wright, 1994) because children's advertising literacy implies their ability to recognize and critically reflect on advertising. However, although several studies find this effect (e.g. Waiguny et al., 2014), other studies found no effect (Mallinckrodt & Mizerski, 2007) or even a negative effect of persuasion knowledge on critical processing (e.g. Vanwesenbeeck, Walrave, & Ponnet, 2016). The latter is also the case in the current study. Our results show that awareness of selling intent has

Table 10
Serial mediation model with three mediators – effect of brand interactivity on personal data sharing.

	Consequent											
	M_1 (Selling Intent)			M_2 (Critical Processing)			M_3 (Brand attitude)			Y (Personal data sharing)		
Antecedent	Coeff.	SE	*p*	Coeff	SE	*p*	Coeff	SE	*p*	Coeff	SE	*p*
X (Interactivity)	0.246	0.117	0.036	−0.292	0.071	< 0.001	0.179	0.072	0.013	−0.049	0.126	0.693
M_1 (Selling intent)	—	—	—	−0.060	0.028	**0.030**	0.093	0.028	**0.001**	−0.009	0.042	0.819
M_2 (Critical Processing)	—	—	—	—	—	—	−0.309	0.050	< **0.001**	−0.273	0.076	< **0.001**
M_3 (Brand attitude)	—	—	—	—	—	—	—	—	—	0.389	0.074	< **0.001**
Constant	2.741	0.174	< **0.001**	3.767	0.128	< **0.001**	3.322	0.249	< **0.001**	0.912	0.428	**0.033**
Attitude towards the ad stimulus	0.033	0.026	0.196	−0.102	0.016	< **0.001**	0.056	0.017	**0.001**	0.068	0.028	**0.016**
	R^2 = 0.0098			R^2 = 0.101			R^2 = 0.177			R^2 = 0.131		
	F (1, 574) = 2.856, p = **.058**			F (1, 573) = 21.811, p = < **.001**			F (1, 572) = 27.276, p < **.001**			F (1, 571) = 21.701, p < **.001**		

Table 11
Indirect effects of serial mediation with three mediators of brand interactivity on personal data sharing.

	Indirect effect	[95% CI]
IAC → SI → personal data sharing	−0.0008 (0.0036)	[-0.0098, 0.0055]
IAC → SI → Critical processing→ personal data sharing	0.0013 (0.0010)	[0.0001, 0.0049]
IAC→ SI → brand attitude → personal data sharing	0.0029 (0.0017)	[0.0005, 0.0078]
IAC→ SI → Critical processing → brand attitude → personal data sharing	0.0006 (0.0005)	[0.0000, 0.0021]
IAC → Critical processing → personal data sharing	0.0258 (0.0095)	[0.0107, 0.0484]
IAC → Critical processing → brand attitude → personal data sharing	0.0114 (0.0040)	[0.0053, 0.0212]
IAC → Brand attitude → personal data sharing	0.0225 (0.0104)	[0.0053, 0.0467]

Note: Unstandardized B-coefficients (with boot SE between parentheses); CI = confidence interval using 5.000 bootstrap samples. Significant indirect effects are in bold.
IAC stands for 'interactivity', SI stands for 'selling intent'.

a negative effect on critical processing, or put the other way around, a significantly positive effect on perceived appropriateness, although this effect is rather weak. Isaac and Grayson (2017) argue that the frequently reported positive effect of persuasion knowledge on critical processing may be due to the selection of tactics for consumer experiments that have encouraged critical responses (e.g. suggesting profit motives, deception and manipulation). However, if the result of a persuasion attempt is that the consumer interprets the message as informative, useful, appropriate and believable, awareness of selling intent may well lead to a positive evaluation of the message and positive attitudinal and behavioral effects (Tarabashkina et al., 2018). This may have been the case in the context of the current study: participants were merely asked to play a simple game or to click on banners containing brand information.

Another reason for the positive effect of awareness of selling intent on critical processing is that children lack the cognitive abilities to formulate a judgement about an immersive and cognitively demanding brand placement. In that case, they may simply think that the brand is necessary for a proper making of game, or a necessary part of a banner on a website. Accordingly, the awareness of selling intent may lead to a perception of appropriateness, i.e. the perceived tactics are fair, respectful and not manipulative in its specific context in terms of topic and audience, and consequently to positive brand effects (De Pauw et al., 2018; Hudders & Cauberghe, 2018). Our results suggest that perceptions of appropriateness of the advertising tactics used play an important role in the relation between awareness of selling intent and brand evaluations. If an individual's awareness of selling intent is activated, the individual may perceive the presence of brand information within the mediated environment as appropriate because he or she understands the persuasive and commercial purpose behind the advertisement. Appropriateness may thus also be due to the perception of a 'natural' and necessary integration of branding in media content.

In line with Boerman et al. (2012, 2014), more critical processing has a negative effect on brand attitude, and brand attitude has a positive effect on sharing personal information. All in all, in the current study awareness of selling intent does not result in negative brand effects, but instead leads to a more positive brand attitude and more sharing of personal information through its positive effect of appropriateness of the brand used in the advertising stimulus.

The important role of brand interactivity and the largely insignificant role of brand integration in developing persuasion knowledge, and the positive effect of awareness of selling intent on perceptions of fairness, non-manipulativeness and appropriateness of advertising stimuli are important findings that should be integrated in the further refining of the conceptualization and empirical study of the Persuasion Knowledge Model, especially when applying it to children and teenagers and in the context of contemporary online advertising formats.

6. Limitations and future research

A limitation of the experimental stimuli used is that the smartphone brand was a fictitious, non-existing brand. Previous research has found that recall and recognition of brands placed in content are higher for familiar brands than for non-familiar ones (Nelson et al., 2006). Mahmoodi et al. (2018) highlighted the role of trust in well-known and highly regarded brands as an important factor for the willingness of people to share personal information online. In the current study, participants were willing to share a lot of information, although a fictitious brand was used. This raises the expectation that this sharing of personal data may even be more prominent in case of a well-known and trusted brand or company. Future research should therefore include familiar and trusted brands to explore the potentially different effects of novel advertising stimuli on new versus existing and well-known brands.

This study only investigated explicit memory effects. As integrated advertising formats are created to deliver a persuasive message in a subtle way, it is also relevant to study implicit memory effects (Yeu et al., 2013). Vyvey et al. (2018) measured both implicit and explicit memory as a result of playing a digital game, and conclude that some of her experimental manipulations only affect either implicit or explicit recall.

With respect to attitude effects, the current study relies on self-reports. However, such measures can be subject to social desirability and subjectivity biases (Casado-Aranda, Martínez-Fiestas et al., 2018; Wang et al., 2016). Furthermore, self-report tools cannot measure unconscious and automatic processes of which the person itself is not aware (Casado-Aranda, Sánchez-Fernández et al., 2018). Further research could use neuroscientific techniques to study cognitive and affective responses to advertising stimuli in more depth, applying neurological tools such as fMRI (functional Magnetic Resonance Imaging). Neuroscientific techniques in communication research can facilitate exploring the neural origin of advertising effects provoked and can shed light on the underlying mechanisms of these effects (Casado-Aranda, Martínez-Fiestas et al., 2018; Casado-Aranda, Sánchez-Fernández et al., 2018; Falk et al., 2016).

The participants were asked to read the information on the website attentively. However, consumers often try to avoid online advertising (Yeu et al., 2013). As a result, it is less likely that children and teenagers will click consciously on an online banner in a real life situation, if they are not specifically searching for particular information about a product or a brand. Our results should therefore be corroborated in a real-life context.

The level of interactivity of the banner and the advergame stimuli used in our experiment differs. For instance, playing an advergame poses different cognitive challenges compared to clicking on a banner (although interactivity in our study was simply defined as being clickable). This might affect the activation of persuasion knowledge. One can for instance argue that persuasion knowledge activation will occur more automatically when confronted with a clickable banner compared to when a teenager is playing a game. Future research should explore this.

The antecedents of sharing of personal data should be further

explored. Personal data sharing may depend more on personality traits such as risk aversion and privacy concern than on the characteristics of a stimulus. Future research should investigate which factors are the main drivers for children and teenagers to share personal information.

In the current study, the awareness of selling intent had a positive effect on the perception of appropriateness of the advertising stimuli. Future research should explore further under which circumstances the development of persuasion knowledge in children and teenagers leads to which type of coping responses: skepticism, critical processing, finding the format appropriate (Hudders et al., 2017; Tarabashkina et al., 2018).

For (young) teenagers, a smartphone is a highly involving product. Future research could investigate to what extent effects on brand attitudes, memory and sharing of personal information differs between high and low involvement products.

7. Managerial and public policy implications

Our results are relevant for advertising practitioners, parents, educators and public policy. Making a stimulus brand-interactive is essential for enhancing brand information memory and brand attitude in young teenagers and brand integration tends to have negative effects in terms of memory. In the target group of young teenagers studied here, this does not lead to more critical processing, but rather the opposite: once a stimulus is recognized as advertising, the presence of brand information is perceived as appropriate, resulting in a positive attitude and more personal data sharing with the advertiser. Advertisers to this target group are thus advised to not try to 'hide' their commercial intent, but rather disclose the persuasive nature of their formats, and make them as clear, appropriate and 'natural' as possible. Our results may also make advertisers more aware of the vulnerability of teenagers and the effects of new advertising formats on them and make them responsibly optimize their marketing communication strategy when aiming at young consumers. Additionally, the advertising industry should be actively engaged in the development and implementation of proper advertising disclosure. The implementation of such a disclosure could further result in more transparent and ethical advertising aimed at children (De Jans et al., 2018; De Pauw et al., 2018).

Our results show that even a short interactive exposure to information about a fictitious brand has a distinct effect on what they remember and how they feel about the brand. Across conditions, scores on the awareness of selling intent and critical processing barely reach the scale midpoint, indicating that the young teenagers in our study only developed a moderate persuasion knowledge level. In our sample, one in four participants share a lot of personal data in exchange for a chance to win the advertised fictitious smartphone. The number of children and teenagers who share personal information with advertisers may even be higher if the brand, the advertisers, the game or the website is familiar and trusted (Aguirre et al., 2016). This confirms previous findings that teenagers have a low concern regarding the safety and privacy risks related to the online collection of personal information (Zarouali et al., 2017). Public policy makers should be aware of these profound effects on young teenagers in order to establish guidelines, policies and regulations to make minors aware of and protect them from implicit persuasion by interactive and integrated advertising formats. It is generally assumed that, from the age of 12 onwards, teenagers are 'advertising literate'. However, this may not be the case for contemporary online advertising formats. Public policy and legislation could, for instance, impose stricter rules on which advertising formats advertisers should be allowed to use when targeting children (Hudders & Cauberghe, 2018), and how to disclose the persuasive nature of these formats (De Jans et al., 2018). As to the latter, disclosure rules should not just focus on persuasion knowledge, but also on stimulating critical processing of advertising formats (De Pauw et al., 2018).

In order to educate and inform children to become well-informed, critical and privacy-aware consumers, media- and advertising literacy education should be further encouraged (Zarouali et al., 2018). Hudders, Cauberghe, and Panic (2016) showed that training sessions at school accelerated children's persuasion knowledge and advertising literacy for advergames. Finally, also parents have a role to play, as a mediator of children's exposure to online. In order to assume this role, parents themselves will often have to be made advertising literate themselves first. Hence, policy makers and midfield organizations should provide parents with more information about effective strategies to teach their children how to cope with the impact of contemporary advertising formats (Hudders & Cauberghe, 2018).

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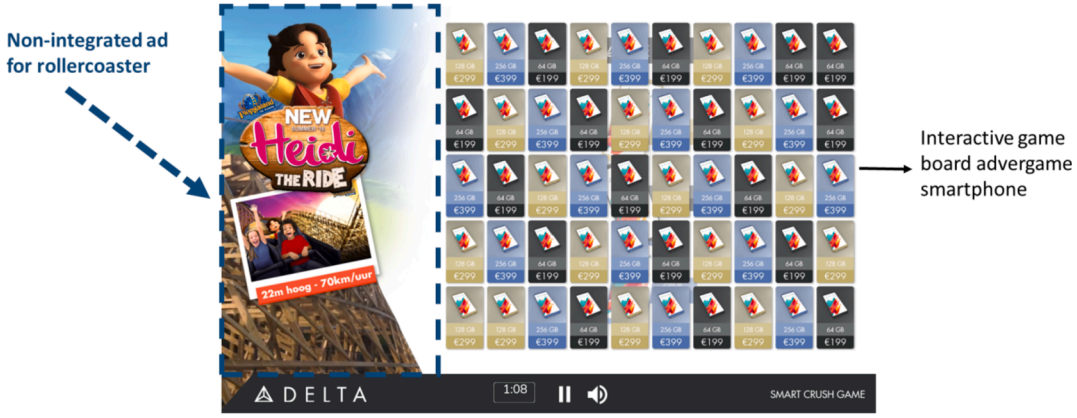
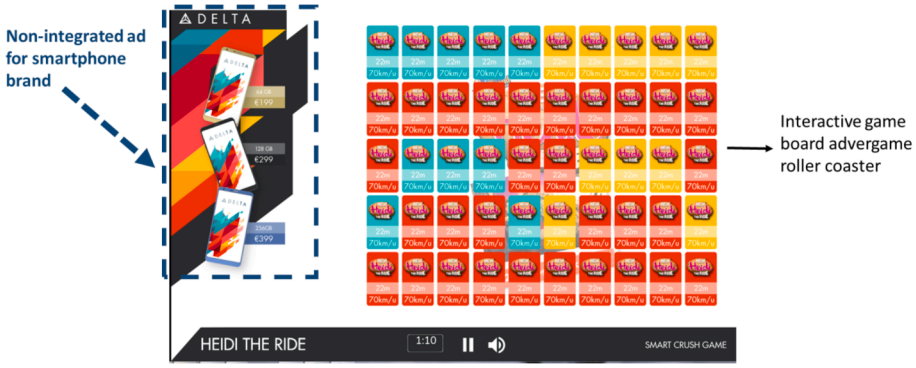
Appendix. Overview of stimuli used in the different experimental conditions

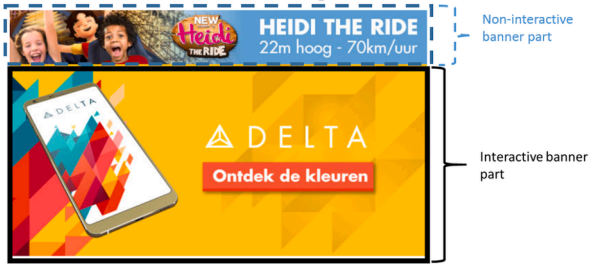
Condition 1: Advergame for the smartphone brand (Integrated ad & Interactive ad).



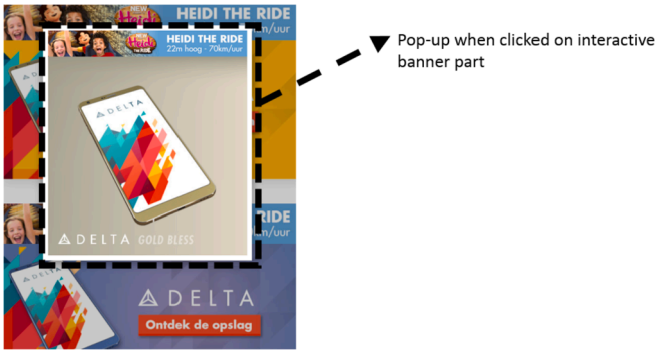
Condition 2: Advergame for the roller coaster (Integrated ad & non-interactive ad).



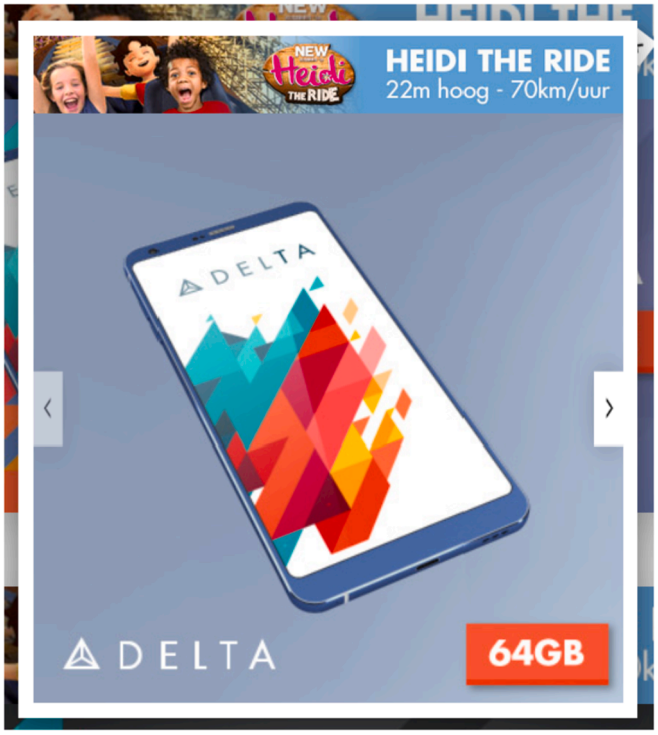
Condition 3: Interactive banner for the smartphone brand - Interactive banner about smartphone color.



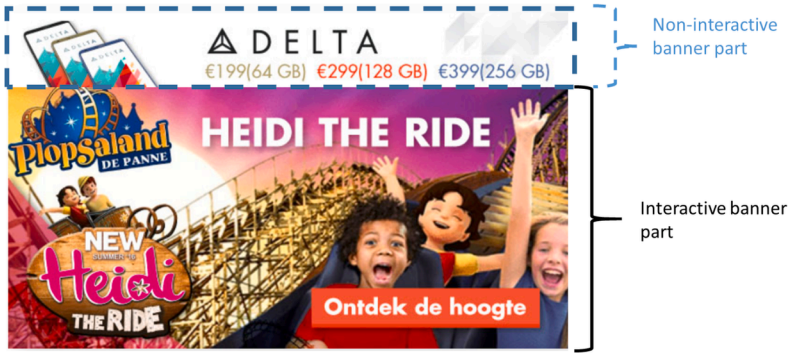
An example of pop-up appearance when clicked on the banner about the smartphone color.



Pop-up about smartphone capacity (64 GB) in detail.



Condition 4: Interactive banner for the roller coaster.



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