Seeing, Remembering and Liking: The Impact of Media Multitasking on Advertising Attention, Memory and Attitudes Among Children and Adults.

Abstract

Multitasking with media is a prevalent media consumption behavior among youngsters. However, it has been argued that also children and adults (up to 65 years old) often engage in media multitasking. The current study examines children's versus adults' switching behavior when media multitasking (combination of tablet and laptop). In addition, it is investigated how media multitasking affects advertising avoidance (measured by eyetracking) and subsequently cognitive advertising effects. Finally, it is investigated how moral advertising literacy affects attitudinal advertising effects in a media multitasking context. A 2 (age category: children versus adults) by 2 (task: single tasking versus media multitasking) between-subjects experiment was conducted among 121 participants between 8 and 65 years old. The results show that children switch more often between different media devices than adults when media multitasking, both during the commercial and non-commercial content. In addition, both children and adults devoted less attention toward the ad when media multitasking compared to single tasking, although the effect was stronger for adults. Subsequently, this decreased attention towards the ad resulted in less brand recognition. Finally, although there was no difference in moral advertising literacy between children and adults, moral advertising literacy did decrease attitude toward the ad and increased ad irritation only in the single tasking context and not in the media multitasking context regardless of the age of the participants. The Limited Capacity Theory (Lang 2000) and insights related to ad avoidance in previous studies are used as theoretical frameworks.

Keywords: Media multitasking; age; advertising effectiveness; eye-tracking; attention toward advertising; advertising avoidance; moral advertising literacy

Media multitasking refers to the increasingly popular media consumption behavior of engaging in different media activities at once (e.g. Garaus et al. 2017). Using multiple media simultaneously implies that exposure to advertising significantly increases. Research revealed that advertising messages are differently processed and perceived in media multitasking compared to single tasking media contexts (C. M. Segijn, Voorveld, and Smit 2016; Yoon, Choi, and Song 2011). Moreover, the media multitasking trend does not only show among youngsters, but across all age categories (Voorveld & van de Goot 2013). Although it is known that children start media multitasking at a very young age nowadays (Kabali et al. 2015), empirical studies focused predominantly on youngsters so far, while overlooking children and adults (e.g. Xu, Wang, & David 2016). Hence, the current study examines the differences in media multitasking behavior, visual attention allocation and processing of embedded commercial content, and this among children (8-12 years old) versus adults. When engaging in media multitasking, one has to continuously relocate his attention from one medium to another, while ignoring other media as possible distractors. Cognitive psychologists have been arguing that age has a significant impact on how people deal with distractions (Wetzel, Widmann, and Schröger 2009). As such, it is argued that children are more easily distracted by irrelevant stimuli (e.g. Bunge, Dudukovic, Thomason, Vaidya, & Gabrieli 2002). This tendency to get distracted could have an impact on how media-users juggle with different media streams.

Moreover, multitasking with media demands media-users to constantly monitor and update their mindset by the incoming media information among which they are shuffling their attention (Baumgartner et al. 2014). As a result, performing two tasks instead of one evidently demands a lot of one's cognitive resources (Bunge et al. 2002). Consequently, it is argued that media multitasking negatively affects advertising memory (e.g. Angell, Gorton, Sauer, Bottomley, & White 2016). Furthermore, the media multitasking context offers the

opportunity to stimulate ad avoidance behavior in which it is nearly effortless to switch away attention from unsolicited commercial content (e.g. Chinchanachokchai, Duff, & Sar 2015). However, visual attention is a prerequisite for advertising processing and hence brand recall. In addition, when media users switch their visual attention away from commercial content, and the context is cognitively demanding, people's capabilities of critically processing and counterarguing the persuasive content of advertisements may be restrained (Keating and Brock 1974). This critical coping of advertisements has been referred to as advertising literacy (i.e. skills and abilities to recognize advertising and critical reflect upon it, Friestad & Wright 1994), a skill that is underdeveloped among children and increases when they mature as consumer (Opree et al. 2014). The cognitive demanding media multitasking context will make it even more difficult for children to activate their advertising literacy, and hence critically approach embedded commercial content. Despite the increasing amount of research investigating the consequences of media multitasking on advertising effectiveness among adults (e.g. Beuckels, Cauberghe, & Hudders 2017; Duff & Sar 2015), no research has been devoted to children (compared to adults) within this field, nor did previous research look at the role of advertising literacy. Therefore, the current study examines, by using eye-tracking technology, (1) children's versus adults' switching behavior and attention allocation when media multitasking, (2) how age moderates advertising avoidance in a single versus media multitasking context and what this consequently implies for cognitive advertising effectiveness, and (3) how advertising literacy affects attitudinal advertising effectiveness depending on tasking condition.

THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

Age and Switching Frequencies When Media Multitasking

Together with many other cognitive studies, an event-related fMRI study of Bunge, Dudukovic, Thomason, Vaidya and Gabrieli (2002) suggests that children are more

susceptible to interference and worse in inhibiting prepotent behavioral reactions compared to adults. These studies argue that children are less successful than adults in selecting relevant information and inhibiting the processing of irrelevant information (Wetzel, Widmann, and Schröger 2009). This might implicate that adults are more successful in focusing on one medium and ignoring the other when media multitasking, while it is harder for children to process information when they are constantly being interfered and distracted by another medium. This assumption was indeed supported by a study of Brasel and Gips (2011), which revealed that people's switching rate when media multitasking is very rapid and most likely unconscious. They used direct observations of media multitasking youngsters and adults, and revealed that younger participants switched more often between media than older participants. However, they did not include children within their sample. Another study revealed that very young children (12- to 36-month-olds) were highly disrupted by background television while playing with toys and consequently showed lower levels of focused attention to the toys (Schmidt et al. 2008). Altogether, these studies seem to suggest that age might have a significant negative impact on switching frequency when media multitasking:

> **H1:** Children switch more often between media devices when media multitasking than adults.

Age and Visual Attention Allocation Toward the Ad When Media Multitasking

A study of Guitart, Hervet and Hildebrand (2019) suggests that the way media-users allocate their visual attention between different media channels is an important factor in understanding advertising effectiveness when media multitasking. Academic research has been increasingly interested in how people cope with advertisements when consuming different media-streams at once (Duff & Segijn 2019; Jeong & Hwang 2016). Within single media consumption studies, there has been a long history of investigating media-users' tendencies to avoid advertisements (e.g. Abernethy 1991), either by physically removing

themselves from the media, by changing television channel or by shifting their cognitive focus to another activity (Speck and Elliott 1997). Following the theory of psychological reactance of (Brehm 1966), when individuals perceive their freedom to be threatened, they show resistance and have the natural urge to regain their freedom. This theory is often used to explain media users' reaction towards advertisements. It is argued that consumers often consider advertisements as depriving them of their liberty to enjoy media content, which consequently makes them want to avoid the commercial content (Bhattacharjee 2010). Even though advertising avoidance has been a major concern amongst academics and advertisers for decades, this behavior might take on a whole new dimension due to today's media landscapes. The constant proximity of media devices and content makes it much easier and almost effortless for the media-user to switch away his/her attention from the 'unwanted' commercial content. Therefore, it is a widespread assumption that media multitasking contexts encourage people to shift away their attention when they are being exposed to commercial content on a certain media (e.g. Bardhi et al. 2010). Shokrpour and Darnell (2017) observed the television watching behavior of several households during 72 hours and reported that seven out of ten respondents engaged in smartphone use during ads. Other common activities during advertising exposure were tablet use, going to take food or watching/talking to another person.

As discussed earlier children have more difficulties than adults to select relevant information and to inhibit the processing of irrelevant information (Wetzel, Widmann, and Schröger 2009). In addition, children and teenagers are known to be less successful in detecting advertising content as such and understanding its commercial intentions compared to adults (Rozendaal et al. 2010; Zarouali et al. 2018). It might therefore be expected that children will be less determined to engage in advertising avoidance (allocating less attention to the commercial), as they do not recognize the advertising content to the same extent as

adults. Besides, children are less exposed to advertising messages in general during their lifetime compared to adults. This might imply that they experienced less irritation towards the ad and consequently are less likely to avoid them. Hence, the strategy of advertising avoidance is less routinized among children compared to adults. However, we expect that a media multitasking compared to a single tasking context will offer a better opportunity for adults to avoid the advertisement as plural media can be attended to. Therefore, the following interaction is hypothesized:

> **H2:** Media multitasking (versus single tasking) will decrease the visual attention to the ad for adults to a greater extent compared to children.

Age and Visual Attention Allocation toward the Ad, Cognitive Advertising Outcomes When Media Multitasking

A theory that is often used to explain advertising effects in a media multitasking context is the 'limited capacity model of mediated message processing' of Lang (2000). This model argues that every person only has a limited amount of cognitive resources at hand to process, and thus to understand, store and retrieve media messages. When a person is consuming multiple media at once, it is possible that the required processing resources will exceed the amount that is available at that moment in time, resulting into a brief period of cognitive overload (Lang 2000; Segijn & Eisend 2019). A cognitive overload in its turn is argued to inhibit the level of information processing, which evidently has some consequences for the effectiveness of the advertisements consumers are exposed to while media multitasking (Jeong & Hwang 2016; Segijn, Voorveld, & Smit 2017). However, even though almost all media multitasking studies are explaining advertising recognition from a cognitive load perspective, Duff and Sar (2015) suggest that there are a lot of other aspects that are not accounted for in these cognitive load frameworks. While these theories are clearly important, there are other aspects related to the media content and media-user that might explain the

decreasing cognitive advertising outcomes in a media multitasking context as well. A possible alternative explanation for the negative cognitive advertising outcomes that are often associated with media multitasking behavior might be the aforementioned fact that people often engage in advertising avoidance. Interestingly, research has been revealing that engaging in multitasking reduces the breadth of one's visual field (Pomplun, Reingold, and Shen 2001). Furthermore, the eye-tracking study of Guitart and colleagues (2019) provides evidence for the assumption that it is not multitasking as such that negatively affects advertising memory, but more specifically whether participants looked directly to the advertisement or not. Hence, advertising attention will most likely positively affect advertising memory.

In hypothesis 2, we suggest that ad avoidance would occur when media multitasking (compared to single tasking), but that this effect will be less apparent for children compared to adults. Following the study of Guitart and colleagues (2019), we might furthermore expect that advertising avoidance will negatively affect advertising memory. Building up on this knowledge, we now propose the following moderated mediation hypothesis (see figure 1):

> **H3:** Media multitasking (versus single tasking) will negatively affect advertising memory (i.e. brand recognition) due to a decrease in visual attention allocation to the ad, for adults but not for children.

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Age and Moral Advertising Literacy, Attitudinal Advertising Outcomes When Media Multitasking

Past research on advertising literacy among children has been mainly considered from a cognitive perspective, looking at children's recognition and understanding of advertising (i.e. cognitive advertising literacy). It was assumed that especially children's recognition and

understanding of advertising makes them less susceptible to attitudinal advertising effects (Rozendaal, Slot, and van Reijmersdal 2013). However, several studies found no effects, or even a positive impact of cognitive advertising literacy on attitudinal advertising effects (Mallinckrodt and Mizerski 2007). Therefore, it was argued that the conceptual knowledge of advertising might not be sufficient to critically process advertising (Rozendaal et al. 2011; Rozendaal, Opree, and Buijzen 2016). Some authors indicate that affective mechanisms are more likely to be efficient in the processing of contemporary advertising (e.g. Hudders, Cauberghe, & Panic 2016), as the affective processing of advertising requires less effort. Therefore, we believe that susceptibility to attitudinal advertising effects mainly depends on the ability to reflect on the appropriateness (i.e. credibility and honesty) of the advertising (Friestad and Wright 1994), defined as moral advertising literacy (Hudders et al. 2017).

Advertising literacy in general and more specifically moral advertising literacy develops during the life span based on consumer socialization influences, and cognitive and moral development (John 1999). The theory of moral development of Kohlberg (1971) discusses the sense of right and wrong, and encompasses the formation of a personal consciousness and the self-regulation of emotions. Hence, children for example first need to be able to distinguish good from bad, before they can develop the capacity to morally assess advertising. As children, compared to adults, have had less encounters with advertising, and consequently had less opportunities to learn from previous experiences, we expect that moral advertising literacy will be higher for adults.

We could further expect that this moral advertising literacy, which develops according to age, will make consumers less susceptible to attitudinal advertising effects (Hudders, Cauberghe, and Panic 2016; Rozendaal et al. 2011). However, we expect that moral advertising literacy will only negatively affect attitudinal advertising effects in a single

tasking context, as the complex nature of a media multitasking context might prevent media-users from actually applying their advertising literacy.

This may also be explained by limited resource models, such as Lang's (2000) limited capacity model of mediated message processing. It is assumed that people need a significant amount of cognitive resources to critically process advertising messages and to resist persuasion (Haslett 1976; Slater and Rouner 2002). However, these resources are being highly employed by the monitoring and processing of different media channels when media multitasking. Hence, people will mainly allocate their resources to the processing of the different media devices at once in a media multitasking context. Therefore, even when media-users posit moral advertising literacy, they will not have sufficient resources at hand to activate that knowledge in order to critically process the advertising and protect themselves against it. In a single tasking context, consumers will have resources available to retrieve and use their moral advertising literacy to critically assess the advertising, whereby it is assumed that moral advertising literacy will result in more negative attitudinal advertising effects (i.e. more negative attitude toward the ad and more ad irritation).

Besides, possessing moral advertising literacy in a media multitasking context does not necessarily need to result into negative advertising attitudes, as media-users have the occasion to focus their attention on one medium when they disapprove the content on the other. In a single tasking context, however, there is no other medium to attend to, by which it is plausible to expect that the media-users will be more irritated and develop negative attitudes toward the advertisement. Based on these insights we hypothesize the following (see figure 2):

H4: Children will have less moral advertising literacy compared to adults. Furthermore, moral advertising literacy will negatively affect attitude toward the ad in a single tasking context, but not in a media multitasking context.

H4b: Children will have less moral advertising literacy compared to adults. Furthermore, moral advertising literacy will positively affect ad irritation in a single tasking context, but not in a media multitasking context.

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METHOD

Design and Procedure

A 2 (age category: children versus adults) X 2 (task: single media tasking versus media multitasking) between-subjects experimental design was conducted. All participants were randomly assigned to the single media tasking or media multitasking condition. In the media multitasking condition, the participants were given a brief introduction about the fact that people often tend to media multitask nowadays. Afterwards, the participants were asked to surf on a website on the tablet while simultaneously watching a television fragment that was playing on the laptop. In the single media tasking context, participants were only exposed to the television fragment on the laptop. All experiments were conducted individually. After the media exposure, the participants were guided to an adjacent room where they could fill in a questionnaire on a tablet. One researcher recruited the respondents in a public library, one researcher conducted the experiment in the media lab, and one researcher was always present in the adjacent room to answer questions about the survey if necessary.

Stimulus Material

In the media multitasking condition, the participants had to simultaneously watch a TV fragment on a laptop and surf on a website on a tablet. On the laptop, a three minutes fragment of the Belgian version of the television show 'The Voice' was displayed (see figure 3 for a screenshot of the fragment of The Voice). This fragment of 'The Voice' did not contain any obvious or hidden forms of advertising such as product placement. At the end of the fragment, a 30-second traditional TV commercial for the fairly unknown brand 'Rockit

Apples' was included (see figure 4 for a screenshot of the TV commercial). We chose the brand Rockit Apples, a brand of apples, as this brand is gender and age neutral. In the TV commercial, both adults and children are displayed interacting with and eating the apples. On the tablet, the participants had to surf on the website of the non-profit organization WWF (see figure 5 for a screenshot of the website of WWF). The website of WWF did not contain any advertising. In the single media tasking condition, the participants were solely exposed to the television fragment and the TV commercial on the laptop. To manipulate age category (children versus adults), we recruited both children between the age range of 8 and 12, and adults between the age of 18 and 65 years. As two children just turned 13, they were also allowed to participate in the study. In addition, one participant of 66 years was also included in the study.

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Participants

In total, 121 participants participated in the study, of which 55.4% was female. We recruited respondents between the age range of 8 and 65 years old (M_{age} = 20.84, *SD* = 14.18). We consciously set the minimum age at 8 years old as children's knowledge of advertising then becomes more sophisticated and because they are in a transitional phase in terms of their responses to advertising (Calvert 2008). All the participants received an incentive for participation: the adult participants received €5 cash, while the children received a goodie bag worth €5 (including a sandwich box, balloons, pencils, etc.). Furthermore, adults' consent was requested before their participation in the study. For the children, active parental consent was asked.

Apparatus and Measures

First, *switching behavior* was measured during the media exposure through manual coding and used as an indicator of how visual attention was divided between the tablet and the

laptop screen. A video camera was used to record the switching behavior of the participants. Two researchers manually coded these videos by indicating per second whether the participant was looking at the laptop (i.e. the TV program) or the tablet (i.e. website). By doing so, the researchers could extract the *total number of switches*, *the number of switches during the TV program* and *the number of switches during the TV commercial*. This manual method was used, as we only had one eye-tracking device which was attached to the laptop. This implies that the data could not inform us whether an attentional switch was directed to the other medium or elsewhere. Besides, the applied method allowed us to detect all miniscule switches of attention, which might have been coded as blinks by the eye-tracking device.

The eye-tracking measures (i.e. attention toward the ad and attention toward the TV program) were extracted through the SMI Mobile Eye Tracking Device IViewX Red, which allowed for recording at a frequency of 250 Hz. The eye-tracker was attached to a portable laptop. To present the stimuli and collect the data, Experiment Center software SMI Experiment Suite 360° was used. Before each recording session, a five-point calibration was performed. The data was transmitted to SPSS 24 to conduct the analyses. The eye-tracking measures that were extracted were attention toward the advertisement block and attention toward the TV program. These measures were extracted by defining two Areas of Interest (AOI): the TV commercial and the TV program. Hence, these were both AOI's of the entire screen. *Attention toward the ad* was extracted as net dwell time ad [%], which is the sum of sample durations for all gaze data samples that hit the AOI. In addition, *attention toward the TV program* was extracted by the same indices, but now for the TV program AOI.

In addition, the respondents filled in a questionnaire where we measured product recognition, brand recognition, attitude toward the ad, ad irritation and moral advertising literacy. Firstly, in order to gauge *advertising memory* as hypothesized in H2, we tested whether the respondents remembered which brand was advertised in the television fragment

they were exposed to. In particular, *brand recognition* was measured by asking the participants to indicate the brand they saw. They could choose from five different brands and the answer "I don't know." This item was also coded into correct or incorrect. 59.5% of the participants were able to correctly recognize the brand. *Attitude toward the ad* was then measured with one item on a 5-point Likert-type scale ranging from "not at all" to "very much": "How much did you like the advertisement for Rockit Apples?" (M = 2.94, SD = .87). Furthermore, four items on a 5-point Likert-type scale ranging from "definitely not" to "definitely" were used to measure *ad irritation*, following Fennis and Bakker (2001): "I think the advertising for Rockit Apples was disturbing", "I think the advertising for Rockit Apples was irritating", "I think the advertising for Rockit Apples was annoying" and "I think the Rockit Apples commercial was a nice break from the TV program." The last item was recoded before the construct was computed (α = .75, M = 2.87, SD = .72). This scale of Fennis and Bakker (2001) originally consisted of seven items; however, only four items were used so that the questionnaire did not become too extensive for the children. Finally, *moral advertising literacy* was measured using three 5-point semantic differentials: "wrong/good," "unfair/fair," "forbidden/allowed" ("While watching the video, I found the advertisement for Rockit Apples …"). These items were adapted from Rozendaal et al. (2016) and Campbell (1999). The items were recoded, so a higher score refers to a more critical, skeptical attitude toward the advertisement (α = .67, M = 2.29, SD = .72).

RESULTS

Age and Switching Frequencies When Media Multitasking

The following analyses were only conducted for the media multitasking condition since in the simple tasking condition no switching data are recorded. An independent-samples t-test showed that the children (M = 64.89, SD = 29.00), in general, switched more between the two media devices compared to the adults (M = 43.23, SD = 17.13, $t(51) = 3.29$, p = .002).

In particular, children (M = .31, SD = .14) switched more often during the television program than adults (M = .21, SD = .09, $t(51) = 3.05$, p = .004), and the children (M = .25, SD = .14) also switched more between the two media devices during the television commercial compared to the adults (M = .13, SD = .09, $t(52) = 3.42$, p = .001). Hence, when media multitasking, children switch more often between the media devices than adults, confirming hypothesis 1.

Age and Visual Attention Allocation Toward the Ad When Media Multitasking

To test hypothesis 2, we investigated the interaction effect of tasking condition and age category on visual attention toward the ad (Hayes, 2019; PROCESS, model 1, 5000 bootstrap samples). As explained above, this eye-tracking variable is the sum of sample durations for all gaze data samples that hit the advertising. The results show a marginally significant interaction effect of tasking condition and age category on visual attention toward the ad (B = -27.89, SE = 14.44, t = -1.93, p = .056). The conditional effects indicate that both the children (B = -63.34, SE = 10.17, t = -6.23, $p < .001$) and the adults (B = -91.23, SE = 10.25, t = -8.90, $p < .001$) had less visual attention toward the ad in the media multitasking condition compared to the single tasking condition; however, this effect is stronger for the adults than for the children. Hence, adults avoided the advertising more than children when media multitasking compared to when single tasking. This result is in line with hypothesis 2.

As we wanted to exclude the possibility that the difference in advertising avoidance, as established above, would be a result of different media preferences among the different age groups (children versus adults), we also tested whether the interaction effect of tasking condition and age category would take place during the TV program content (instead of the TV advertisement fragment as in the analyses before). The interaction effect (Hayes, 2019; PROCESS, model 1, 5000 bootstrap samples) of age and tasking condition on attention toward the TV program was not significant (B = -14.56, SE = 59.24, t = -.25, p = .806). This

result shows that the difference in advertising avoidance is not a result of different media preferences among the children versus the adults.

Age and Visual Attention Allocation toward the Ad, Cognitive Advertising Outcomes When Media Multitasking

A moderated mediation analysis (Hayes, 2019; PROCESS, model 7, 5000 bootstrap samples) was conducted to examine the mediating role of visual attention toward the ad for the effect of tasking condition on brand recognition, taking into account age category (*i.e.* as a moderating variable). The index of the moderated mediation analysis was not significant (B = -.26, SE = .23, 95%CI = [-.8354, -.0231]). However, there was a marginally significant interaction effect of tasking condition and age category on attention toward the ad (B = -27.89, SE = 14.44, t = -1.93, p = .056). As indicated above, the results of the conditional effects show that both the children (B = -63.34, SE = 10.17, t = -6.23, p < .001) and the adults (B = -91.23, SE = 10.25, t = -8.90, p < .001) devoted less attention to the ad when media multitasking compared to when single tasking. These results also show that this effect is stronger for the adults than for the children. Subsequently, attention toward the ad had a positive impact on brand recognition (b = .01, SE = .00, z = 1.98, p = .048). In sum, this is in line with hypothesis 3. The direct effect of tasking condition on brand recognition was not significant (c' = -.09, SE = .52, z = -.17, p = .869).

Age and Moral Advertising Literacy, Attitudinal Advertising Outcomes When Media Multitasking

Attitude Toward the Ad as Dependent Variable

We conducted a moderated mediation analysis (Hayes, 2019; PROCESS, model 14, 5000 bootstrap samples) to examine the mediating impact of moral advertising literacy on the

effect of age category (children versus adults) on attitude toward the ad, taking into account tasking condition (single versus media multitasking condition) as a moderating variable. The index of the moderated mediation analysis was not significant (B = -.01, SE = .07, 95%CI = [-.1638, .1169]), as age category had no significant impact on moral advertising literacy (a = -.02, SE = .13, t = -.17, p = .864). However, the analysis showed a significant interaction effect of moral advertising literacy and tasking condition on attitude toward the ad (B = .47, SE = .22, t = 2.15, p = .033). More specifically, the conditional effects indicated that moral advertising literacy only decreased attitude toward the ad in the single tasking condition (B = -.39, SE = .15, t = -2.67, p = .009), and not in the media multitasking condition (B = .07, SE = .16, t = .46, p = .647). This partly confirms hypothesis 4a. There was no direct effect of age category on attitude toward the ad (c' = .01, SE = .15, t = .09, p = .929).

Ad Irritation as Dependent Variable

A similar moderated mediation analysis (Hayes, 2019; PROCESS, model 14, 5000 bootstrap samples) was conducted to examine the mediating impact of moral advertising literacy on the effect of age category on ad irritation, taking into account tasking condition. The index of the moderated mediation was not significant (B = .01, SE = .05, 95%CI = [-.0893, .1328]), as age category had no significant impact on moral advertising literacy (as indicated above). Nonetheless, the interaction effect of moral advertising literacy and tasking condition on advertising irritation was significant (B = -.35, SE = .18, t = -1.99, p = .050). In particular, only in the single tasking condition did moral advertising literacy positively affect ad irritation (B = .44, SE = .12, t = 3.62, p < .001). This effect was not significant in the media multitasking condition (B = .08, SE = .13, t = .65, p = .517). This also partly confirms hypothesis 4b. There was no direct effect of age category on ad irritation (c' = .14, SE = .13, t = 1.11, p = .267).

DISCUSSION

Today's advanced technologies and media devices are appealing to an increasingly young public, which is reflected in youngsters' personal media device ownership (Ofcom 2019). Besides, the growing interactivity and mobility of media devices is encouraging people to multitask with media. The fact that both age and multitasking behavior have been shown to highly affect susceptibility toward advertising (De Jans et al. 2019; Kazakova et al. 2016) urged for research addressing this issue. Therefore, the main aim of the current study was to investigate how children versus adults media switching behavior and ad attention allocation differs, and how they are differently affected by advertisements in a media multitasking compared to a single tasking context.

The first goal of the study was to investigate how children's versus adults' attention was divided between different media when engaging in media multitasking. As expected, we found that children switched their attention between the laptop and tablet significantly more often than adults did. This was the case during both the TV program and the advertisement. As theorized above, this might have been the case because children are more easily distracted and less able to inhibit automatic behavior compared to adults (Wetzel, Widmann, and Schröger 2009). The consequent analyses of our study revealed that both children and adults devoted less visual attention toward the ad when media multitasking compared to single tasking. More interestingly, as hypothesized, this effect was stronger for the adults, which might suggest that adults avoid advertising more compared to children when media multitasking. According to previous research this effect might be explained by the fact that higher levels of advertising detection among adults might serve as a cue to actively avoid the advertising message (Rozendaal et al. 2016; Zarouali et al. 2018).Besides, as children most likely encountered less advertising messages in their life compared to adults, which makes them less experienced in avoiding them. Furthermore, in line with a recent eye-tracking study

of Guitart and colleagues (2019), more attention toward the advertisement led to better brand memory in terms of brand recognition. Altogether the model suggest that in media multitasking settings children are better in memorizing advertising information through higher levels of attention toward the ad. As we wanted to exclude the possibility that these findings were due to a stronger interest toward one of the two media types depending on age, we tested whether adults were also paying less attention toward the computer screen during the program content. Interestingly, there was no difference in attention toward the computer screen depending on age category during the TV program. These results suggest that the established findings are not due to an inherent higher interest toward the computer among children, but that adults actively avoided the computer screen when media multitasking by cause of the advertising content.

Moreover, the current study also investigated how moral advertising literacy affected respondents' attitudinal advertising outcomes in a media multitasking versus single tasking context. Our assumption that moral advertising literacy, which refers to assessing the fairness and appropriateness of advertising, would be higher among adults compared to children was, however, not confirmed. This may be explained by the fact that the respondents were exposed to a traditional television commercial. It has been regularly shown that children's advertising literacy is generally higher for traditional advertising compared to more embedded advertising (Hudders, Cauberghe, and Panic 2016; Verhellen et al. 2014). This also suggests that children reach an adult-level of advertising literacy sooner for traditional advertising compared to non-traditional advertising (Rozendaal, Buijzen, and Valkenburg 2010; Zarouali et al. 2018a). We should mention, though, that the respondents' level of moral advertising literacy was rather low in general, indicating that both the children and adults perceived the advertising as rather fair. This may also be due to the specific advertising format the participants were exposed to, as a traditional television commercial is clearly distinguishable from the media content

(compared to embedded advertising), and media users (both children and adults) are familiar with traditional advertising. However, we do have to emphasize that, even though the second part our results did not show a difference in moral advertising literacy among children versus adults, the first part of the study did reveal that adults engage significantly more in ad avoidance when media multitasking compared to children. This indicates that, even though children do recognize the persuasive intent of an advertising, they do not necessarily want to avert their visual attention. As argued above, this might suggest that, even though all ages recognized the persuasive intent of the advertisement, children might not be as irritated towards ads as they have been less frequently bothered with them during their shorter life. Besides, adults have had the opportunity to gain more experience in exercising advertising avoidance.

Finally, as expected, we found that moral advertising literacy only resulted in more negative attitudinal advertising outcomes when respondents were single tasking, and not when they were media multitasking. This might be explained by the assumption that people's resources are limited when processing mediated messages (Lang 2000). When people media multitask, it is thus very likely that they have to allocate all there resources to the simultaneous processing of the different media types. Therefore, they might not be capable to activate their advertising literacy to critically process the advertising. Resources remain available when people only have to process one media type at a time, whereby they will be able to use and apply their advertising literacy to critically cope with the advertising. In addition, when multitasking, the second media stream is the perfect distractor to avoid the commercial content, hence the motivation to critically process the ad is less apparent. In contrast, in the single media task, media users are 'forced' to watch the advertisement, and thereby are motivated and able to produce counterarguments towards the persuasive

intentions of the commercial content as part of a natural tendency as human beings not like to be persuaded (cf. reactance theory).

IMPLICATIONS

The current study has several implications for advertisers. First, up to now, the majority of advertisers and academic researchers investigated advertisements under the assumption of full attention toward the media platform it is placed on. However, this study shows that media multitasking behavior and the subsequent lower attention toward the advertising among adults has a significant effect on advertising effectiveness. Hence, advertisers should take this into account in the future. Moreover, it should be noted that for advertisers, media multitasking might be especially problematic in the case of adults, but not in the case of children. This is because adults are actively avoiding the advertising when media multitasking by focusing their attention on the other media stream . This lower attention toward the ad further results in lower advertising memory, namely brand recognition. Hence, media multitasking behavior among adults poses a threat for advertisers in terms of cognitive advertising effectiveness. On the other hand, as previous research suggested (e.g. Jeong & Hwang 2016) media multitasking behavior among consumers might also be advantageous for advertisers in terms of attitudinal advertising effectiveness. Our study additionally suggests that this is the case because media multitasking behavior prevents consumers from activating and using their advertising literacy. In a single tasking context, consumers' advertising literacy is triggered and applied, which results in negative attitudinal advertising effects, such as more negative attitudes toward the advertising and more ad irritation.

In addition, this study also has implications for public policy. First, children are more susceptible to advertising in a media multitasking context (compared to a single tasking context), as they are less capable than adults to actively avoid the advertising, whereby they

show higher levels of advertising memory. Therefore, children should be informed about their media behavior and the fact that they risk being exposed to advertising more frequently when media multitasking. Children could be trained in recognizing and understanding different types of advertising (both traditional and embedded) when engaging in media multitasking. Hence, we do not necessarily want children to turn away their attention from the advertising in media multitasking contexts, we want them to first recognize the advertising and further critically reflect on it (Hudders et al. 2017). Media multitasking and the associated advertising susceptibility could be included into the school curriculum as being part of existing media literacy training programs.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This was the first media multitasking study to investigate the impact of age (children versus adults) on attention switching behavior, visual attention allocation and (cognitive and attitudinal) advertising effectiveness. Even though this is an interesting starting point for future research, some limitations and suggestions for the future need to be mentioned. First of all, as the eye-tracking technology that was used within this study is mounted on a portable computer, the TV show was played on a portable computer screen instead of a traditional television screen. Even though this might seem rather unusual, Ofcom (2019) reports that TV watching on an actual TV set is declining, as children are increasingly consuming content solitary on a portable device. However, this tendency might be less popular among adults, which would imply that some participants were more familiar with watching TV content on a portable computer than others. In addition, traditional TV viewing often takes place on a screen of larger scale. Screen size could be considered in future research to have an influence on the perception of a primary versus secondary task. Given that we wanted to film every participant in order to code their attention switching behavior, both the laptop and tablet were placed on a table and participants took place on a chair. This might not be the setting in which

one would usually consume media, which might have had an impact on how people allocated their attention. The commercial content in the current study was a traditional 30 seconds TV advertisement. Both children and adults already have a lot of experience with this type of advertising, which might have had an impact on their attention toward the advertising when media multitasking. The results of the current study would probably be different if the participants were exposed to an embedded form of advertising (e.g. online banner advertising or brand placement). Therefore, future research could examine the impact of age on advertising effectiveness in a media multitasking context when being exposed to embedded advertising. It could be that older participants would not be able to actively avoid the advertising in the case of embedded advertising when media multitasking, as they have less experience with embedded advertising, and subsequently their advertising literacy for this type of advertising is more limited. The first analysis of the study revealed that children switch their attention more often between different media devices when media multitasking compared to adults. Previous task switching research suggests that frequent switching between different tasks leads to higher cognitive costs (Monsell 2003). More specifically, it is argued that every time we switch from one task to another, it demands us to reconfigure the task-sets in our minds and to inhibit the other task as a distraction (Kazakova, Cauberghe, Pandelaere, & De Pelsmacker 2015). Besides, cognitive load has been shown to significantly affect advertising responses in media multitasking studies (Beuckels, Kazakova, Cauberghe, Hudders, & De Pelsmacker 2019; Vohs & Faber 2007). Therefore, it might be interesting for future cognitive research to implicitly investigate whether media-users are more cognitively depleted when media multitasking due to their more intensive switching behavior compared to adults and whether this affects their responses to advertising.

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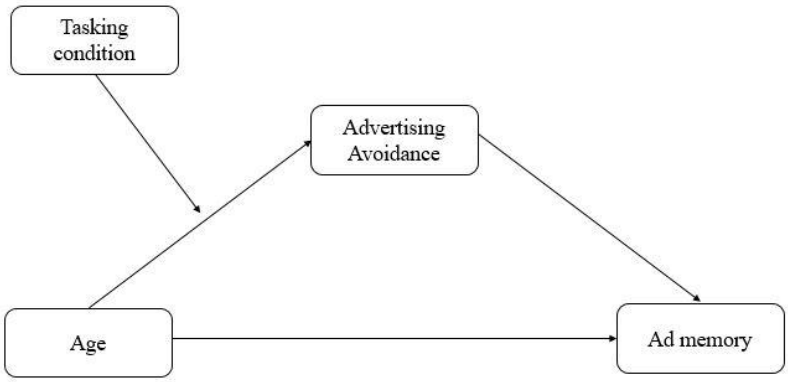

Figure 1. Conceptual model hypotheses 2 and 3

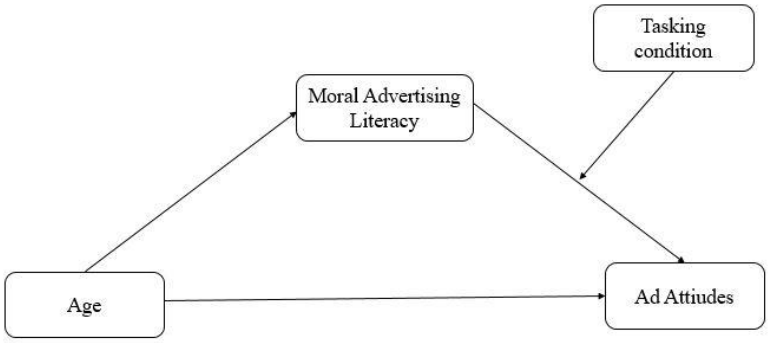

Figure 2. Conceptual model hypothesis 4

Figure 3. Fragment of the Belgian version of The Voice

Figure 4. TV commercial for Rockit Apples

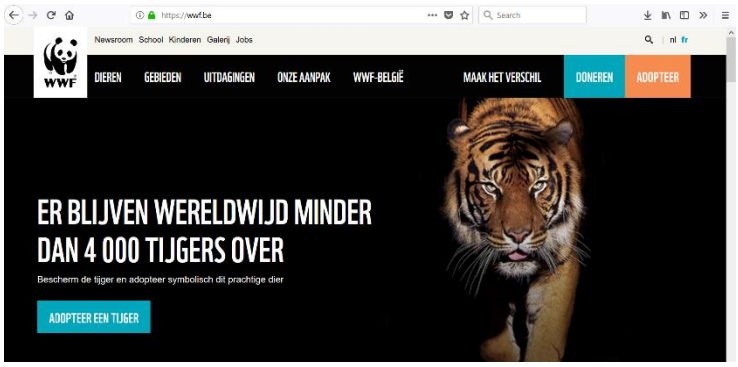

Figure 5. The website of the non-profit organization WWF