Everyday multiscreening

How the simultaneous usage of multiple screens affects information processing and advertising effectiveness

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Chapter 6

The Facilitating Role of Task Relevance

ABSTRACT

The use of multiple screens, also known as multiscreening, is assumed to have detrimental consequences for advertising outcomes. However, many people are engaging in this form of media multitasking on a daily basis. Therefore, it is important to focus on how to improve the effectiveness of advertisements when multiscreening. The aim of this study is to examine a key facilitator of advertising effects when multiscreening, namely task relevance. In an online (n = 280) and a laboratory (n = 185) experiment with different multiscreening settings, we showed that people who engage in related multiscreening have better brand memory and more positive brand attitudes than people who engage in unrelated multiscreening via attention and subsequent program involvement. The results of the current study contribute to our understanding of multiscreening and advertising effects by showing that multiscreening does not always have to be detrimental to advertising effects. Furthermore, this study is unique because it combines methodological approaches of two schools of multiscreening research.

INTRODUCTION

Recent research has shown that the use of multiple screens simultaneously, also known as multiscreening, has negative consequences on advertising outcomes. Particularly studies that examined cognitive outcomes consistently show detrimental effects of multiscreening, for example on brand and ad memory (e.g., Angell, Gorton, Sauer, Bottomley, & White, 2016; Kazakova et al., 2016). An explanation for this effect is the limited cognitive capacities of people that they have to divide between the different screens (Lang, 2000; Lang, 2006). Despite these negative consequences, research continually shows that a large proportion of society engages in some sort of multiscreening (Deloitte Development LLC, 2015; eMarketer, 2016; Nielsen, 2013). Therefore, it is important to focus on possibilities for improving information processing and advertising effects when multiscreening. The results of the current study contribute to this knowledge by examining relatedness as a possible facilitator of advertising effects when multiscreening.

Multiscreening is extremely suitable for combining related tasks (Segijn, 2016); the (interactive) nature of the screens involved in multiscreening makes it relatively easy to combine screens and tasks. It is argued that multiscreening with two related tasks is less cognitively demanding than multiscreening with two tasks that are not related, and it may, therefore, be less detrimental for cognitive effects (Wang et al., 2015). Indeed, a recent meta-analysis showed that the negative effects of multitasking on cognitive outcomes were greater when the tasks were unrelated (Jeong & Hwang, 2016). However, most research that directly manipulated relatedness has found no direct differences between related and unrelated multiscreening (Study 1 of Kazakova et al., 2016; Van Cauwenberge et al., 2014). Because of the difference in results between the meta-analysis and the experiments in which relatedness was manipulated, scholars have called for more research looking at the role of relatedness (Jeong & Hwang, 2016). The aim of the current study is to test the effect of related/unrelated multiscreening on brand memory and brand attitude. More specifically, we will take a closer look at this process by examining the underlying mechanisms of this effect. We argue that the effect of related multiscreening on advertising outcomes is mediated by attention toward the television show and subsequently program involvement.

By examining this phenomenon, the current study contributes to our theoretical understanding of multiscreening effects, task relevance, and the underlying mechanisms of multiscreening effects. Additionally, the results will benefit advertisers by providing insight into whether to stimulate related multiscreening activities. Finally, this study is innovative because it makes use of two different methodological approaches used

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by two schools in multiscreening research. The first school of research examines multiscreening on a split screen with computer tasks (Chinchanachokchai et al., 2015; Duff & Sar, 2015; Van Cauwenberge et al., 2014; Wang et al., 2012). The second school examines multiscreening with separate tasks on multiple screens (Kazakova et al., 2016; Segijn, Voorveld, & Smit, 2016). The current study is the first multiscreening study that combines the approaches of both schools. Combining these approaches is considered critically important because both types of multiscreening exist in real life. However, it is not known how the different approaches of the schools of research could influence multiscreening effects and whether the results of these schools are complementary.

THEORETICAL BACKGROUND

The Multi-Layered Concept of Relatedness

It is a popular assumption that related multiscreening would result in better message processing and advertising effects than unrelated multiscreening. However, what is meant by related multiscreening? In the literature, different concepts are used to indicate some sort of relatedness, namely task relevance, congruency, congruity, redundancy, and repetition. These concepts indicate relatedness on slightly different levels and could therefore have different consequences for multiscreening effects. To organize these different concepts, we suggest a typology of the different levels of relatedness from general to specific. We argue that these different concepts are not mutually exclusive and could coincide, i.e., overlap. We will illustrate this idea by means of the following example: Someone is watching the television show The Voice, and this person is using a tablet simultaneously. Advertisements are shown on both screens. In this case, there could be relatedness on three different levels: 1) The tasks of the different screens could be related, 2) the advertisement could be related to the context of one of the two messages on the screens, and 3) the messages on the screens could be the same versus different on both screens. See Table 6.1 for an example to illustrate the multi-layered concept of relatedness.

First, the goals of the messages on the screens might be related. This is also known as *task relevance* and is considered the first, and most general, level of relatedness. Task relevance is defined as "whether the tasks involved in media multitasking serve closely related goals (or a single overarching goal)" (Wang et al., 2015, p. 109). The focus is on the goals of the different tasks. Thus, for example, the tasks are considered relevant when people are watching The Voice and simultaneously using The Voice app to vote on which contestant will progress to the next round. However, it is not considered relevant when

someone is watching The Voice and checking Facebook on the tablet at the same time.

Second, the advertisement shown on the screen could be related to its context. This idea is often called *congruency* or congruity and is the second level of relatedness. Congruency is defined as "the degree to which two stimuli match or fit together" (Garretson & Niedrich, 2004, p .27). This concept is also used in fields other than multitasking, indicating relatedness of a message within its context, for instance, product placement and its plot connection (Russell, 2002), the product of an advertisement in a magazine genre (Moorman, Neijens, & Smit, 2002), or brands in (adver)games (e.g., Lee & Faber, 2007; Peters & Leshner, 2013). In our multiscreening example, the brand advertised on one of the screens can be congruent (e.g., Dr. Dre headphones) with The Voice when the product fits the television show or incongruent (e.g., Cheaptickets) when it does not fit the television show.

Third, the messages on the screens could be the same versus different on both screens. This level of relatedness is also known as *repetition* or redundancy and is the third most specific level of relatedness. Repetition involves simply repeating (part of) a message.

This is, for example, the case with cross-media advertising when a similar message is communicated through different media (Chang & Thorson, 2004; Neijens & Voorveld, 2015; Voorveld & Valkenburg, 2015). In our multiscreening example, the messages are related on this level when both the television show and the app on the tablet are sponsored by the same brand (i.e., Dr. Dre – Dr. Dre or Cheaptickets – Cheaptickets, but not Dr. Dre – Cheaptickets).

Table 6.1 Example to illustrate the multi-layered concept of relatedness.

Multiscreening				Levels of Relatedness		
Screen A	Screen B	Brand	Ad placement	Task relevance	Congruency	Repetition
The Voice	The Voice app	Dr. Dre headphones	Both screens	+	+	+
The Voice	The Voice app	Dr. Dre headphones	One screen	+	+	-
The Voice	The Voice app	Cheaptickets	Both screens	+	-	+
The Voice	The Voice app	Cheaptickets	One screen	+	-	-
The Voice	Facebook	Dr. Dre headphones	Both screens	-	+	+
The Voice	Facebook	Dr. Dre headphones	One screen	-	+	-
The Voice	Facebook	Cheaptickets	Both screens	-	-	+
The Voice	Facebook	Cheaptickets	One screen	-	-	-

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In the current study, we focus on the first level of relatedness – task relevance – and how this affects advertising outcomes. This level is particularly relevant in the multiscreening literature because it involves tasks carried out on different media devices simultaneously. Following the definition of Wang et al. (2015), we operationalize task relevance as two messages that serve an overarching or closely related goal on the same topic.

Task Relevance and Cognitive Capacities

It is argued that multiscreening could decrease consumer memory of advertising messages compared to single screening. This assumption is mainly based on the Limited Capacity Model of Motivated Mediated Message Processing (LC4MP, Lang, 2006). This theory states that people process information by perceiving it, turning it into mental representations, storing these mental representations in their memories, and retrieving them from their memories (Lang, 2000; Lang, 2006). Cognitive resources are necessary to process, for example, advertising messages and to store, recall and recognize the messages/brands from these messages afterward. However, the cognitive resources of people to process these messages are limited (Lang, 2000). When watching television, people can use cognitive resources to process the messages on television. However, when multiscreening, people must divide their cognitive resources between the messages on the different screens. Because people have a limited amount of these cognitive resources, this division of cognitive resources comes at the expense of processing the messages on both screens.

Combining tasks that are relevant to each other is assumed to be less cognitively demanding than combining two tasks that are not relevant to each other (Wang et al., 2015). Thus, watching a television show and chatting about this show on a tablet is supposed to be less cognitively demanding than watching a television show and chatting about different topics simultaneously. This assumption is based on the Theory of Threaded Cognition (Salvucci & Taatgen, 2008). This theory states that people have different cognitive threads. Each thread serves a different goal. Having multiple goals at the same time may increase cognitive demands as multiple threads compete for resources. However, when one has multiple tasks with a similar goal (i.e., chatting about the television show), the threads do not have to compete for cognitive resources. As a result, tasks with the same goal will be more efficiently processed, requiring fewer resources and resulting in better memory of the media content, than tasks that serve different goals. Therefore, task relevance could be seen as a facilitating factor of advertising effects when multiscreening.

Task Relevance as a Facilitator of Advertising Effects

Recently, a meta-analysis showed that task relevance is a moderating factor of effects when media multitasking (Jeong & Hwang, 2016). In this meta-analysis, 49 studies on media multitasking and its effects on cognitive (e.g., comprehension, recall, task performance) and affective (e.g., agreement, attitude, reduced counterarguing) outcomes were examined. Each of the studies was coded afterward regarding whether or not the tasks in the study were relevant to each other. The results showed that the negative cognitive effects of multitasking were stronger when combining two unrelated tasks compared to two related tasks.

However, until now, most research that directly manipulated task relevance showed no difference between related and unrelated multitasking (study 1 of Kazakova et al., 2016; Van Cauwenberge et al., 2014). These studies compared single tasking with related and unrelated multitasking. The results showed differences in comprehension, memory, and attitude between the single tasking and multitasking conditions; however, no differences between the two multitasking conditions were observed. Only one study found a difference between related and unrelated multiscreening (Angell et al., 2016). In this study, the authors examined related tweeting/texting during a broadcasted soccer match and how many brands of the banners on the soccer field participants could remember. The authors compared four multiscreening groups: 1) sending related messages, 2) reading related messages, 3) sending unrelated messages, and 4) reading unrelated messages. Their results showed that the participants who sent the related messages recalled and recognized more brands than in all the other conditions. Thus, they did not find an effect of all the related compared to all the unrelated conditions, and they did not include a single screening condition in their study. Because of the difference in results between the meta-analysis and the experiments in which relatedness was manipulated, this study will take a closer look at multiscreening, task relevance, and advertising effects by examining a possible underlying mechanism of this effect, namely attention and program involvement.

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Attention and Program Involvement as Underlying Mechanisms

We argue that the effect of related versus unrelated multiscreening on advertising outcomes is mediated by attention and subsequently program involvement. Attention must be divided when engaging in multiple tasks (Jeong, Hwang, & Fishbein, 2010; Salvucci & Taatgen, 2011). How attention is divided is determined by two types of processes. First, bottom-up processes are guided by features of the media content (e.g., Pieters & Wedel, 2004; Smit, Neijens, & Heath, 2013). Thus, these processes are driven by external factors, such as noises, camera changes, and arousing content

(Lang, Park, Sanders-Jackson, Wilson & Wang, 2007). Second, top-down processes are guided by personal factors (e.g., Eysenck & Keane, 2005). These processes are driven by internal factors, such as goals. The latter may drive attention allocation in related multiscreening. When a task is relevant to achieving a personal goal, then more attention will be allocated to this task. Task relevance may drive automatic selection to process the message in the encoding stage because the information is at that point relevant to the goals and needs of this person (Lang, 2000). For example, when a consumer is chatting about a television show, more attention might automatically be allocated to this show because this show is relevant to achieving this person's goals. However, when the same person is chatting about something else, the television show becomes less relevant and fewer cognitive resources will be devoted to encoding the content of the show. A study on conversations while co-viewing a television show found that when the conversation was about the content or context of the television show, people's attention was focused on the show. However, when people had a conversation about other topics, this distracted them from the show (Ducheneaut, Moore, Oehlberg, Thornton, & Nickell, 2008). Attention to the television show was increased when people talked about related topics. In sum, task relevance could be seen as a factor that drive attention allocation when multiscreening through top-down processes.

Attention to the television show might not directly influence advertising effects but could stimulate program involvement. Additionally, program involvement has previously been associated with advertising effects (Krugman, 1983; Moorman et al., 2007; Tavassoli et al., 1995). Program involvement is defined as "an active, motivated state, signifying interest and arousal induced by a television program" (Moorman et al., 2007, p. 131). Program involvement is thought to lead to enhanced processing of the message (Krugman, 1983), which will lead to better memory (e.g., Moorman et al., 2007; Tavassoli et al., 1995) and more positive attitudes (e.g., Krugman, 1983; Tavassoli et al., 1995). To this end, we formulate the following hypotheses:

H1: Multiscreening leads to less brand memory and less favorable brand attitudes via attention to the television content and subsequently program involvement than single screening.
H2: Related multiscreening leads to better brand memory and more favorable brand attitudes via attention to the television content and subsequently program involvement than unrelated multiscreening

Testing the Conceptual Model by Two Schools of Multiscreening Research

The conceptual model is presented in Figure 6.1. To test this model, we will conduct
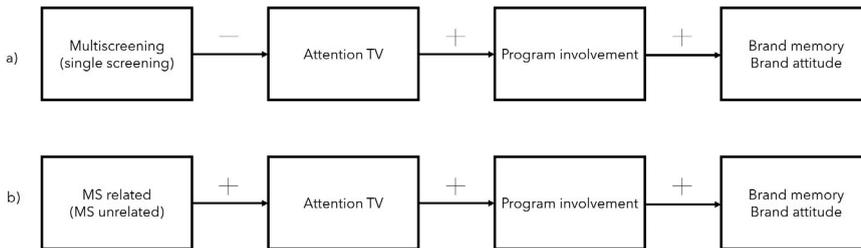
Figure 6.1 Conceptual model: Effect of (related) multiscreening on brand memory and brand attitude via attention to the television content and subsequent program involvement.

two separate studies, each by another methodological approach. Two schools of multiscreening research can be distinguished. The first school examines multiscreening on a split screen with computer tasks (Chinchanachokchai et al., 2015; Duff & Sar, 2015; Van Cauwenberge et al., 2014; Wang et al., 2012). The second school examines multiscreening with separate tasks on multiple screens (Kazakova et al., 2016; Segijn et al., 2016). The current study is the first to test the same conceptual model by both methodological approaches. This is important because both types of multiscreening exist in real life. Moreover, it should be examined whether the different approaches of the schools of research could influence multiscreening effects and whether the results of the schools are complementary.

STUDY 1

METHOD

Sample

The participants were recruited through an online panel of the ISO-certified research company PanelClix. At first, 447 participants clicked on the link to participate. Of these participants, 22.6% (n = 101) did not complete the questionnaire. Furthermore, participants were excluded because of technical reasons (e.g., could not play the television clip, no sound, or screen size too small; n = 42) and because they did not follow the instructions or did not take the questionnaire seriously (e.g., did not try to solve the anagrams, repeated response patterns; n = 24). The final sample consisted of 280 participants (M_{age} = 29.13, SD_{age} = 6.68, 52.9% female)[5]. They received a financial reward from PanelClix for participation. The total duration of participation was 15 minutes, which included watching the television clip and filling out the questionnaire.

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Design and Procedure

The experiment consisted of a single factor between-subjects design with four media conditions, namely two multiscreening conditions and two single screening conditions. In all the media conditions, the participants had to watch a video and answer questions afterward. Multiscreening was manipulated by solving anagrams (Ie, Haller, Langer, & Courvoisier, 2012). These anagrams (Table 6.3) were presented under the video and consisted of words that were related to the video content (MS related, $n = 65$) or words that were unrelated to the video content (MS unrelated, $n = 59$). In the single screening conditions, the participants only watched the video without any other task. The video was the same as that in the multiscreening conditions (SS full, $n = 76$). The fourth group was exposed to a different video without the target brand and functioned as control condition (SS control, $n = 80$). The participants were randomly assigned to one of the four conditions. Before the start of the experiment, they first had to read and sign an informed consent form. Then, the participants had to watch the television clip. When the television clip was finished, they had to fill out a questionnaire with questions displayed in the following order: brand memory, brand attitude, program involvement, attention, manipulation check, and control variables.

Stimuli and Pretests

Television Clip. The television clip consisted of an excerpt of an entertainment show. This entertainment show contained brand placement. To select an appropriate entertainment show, we selected four clips of entertainment shows that included brand placement. First, we conducted a pretest to test whether the different brands in the clips were appropriate for the study. In a pretest ($N = 32$, $M_{age} = 20.28$, $SD_{age} = 1.51$, % female = 78.1), we tested familiarity, brand attitude, and brand commitment. We needed a relatively unfamiliar brand to which people had a neutral attitude and low brand commitment. One of the brands met all the criteria (Table 6.2). Second, we tested the brand saliency of the brand in the television clip when single screening in an additional pretest ($N = 33$, $M_{age} = 30.85$, $SD_{age} = 14.13$, 69.7% female). The clip with the target brand was sufficiently salient. It had both brand recall and brand recognition of at least 50% when the participants paid full attention to the clip. The television clip had a duration of 9 minutes and 45 seconds and was an excerpt from the television show Maestro. This show featured a contest among celebrities who learn

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[5] No significant differences were observed between the included and excluded participants in terms of age, gender, and education.

to conduct an orchestra. The program is sponsored by a lottery that supports culture.

Anagrams. We used anagrams to manipulate related versus unrelated multiscreening (Ie et al., 2012). In this way, it was possible to manipulate multiscreening in an online environment and to manipulate related versus unrelated multiscreening. To select words that were related to the clip, we asked five participants in a separate pretest to watch the target video and write down all the words that came to mind. We selected the fourteen words (nouns and no (brand) names) that were mentioned by most participants. The unrelated anagrams were chosen based on the same numbers of syllables and letters as the related anagrams (Table 6.3).

Dependent Variables

Brand memory was calculated by a sum score of correct answers on four different memory questions (M = 1.28, SD = 1.46). First, we asked people to list all the brands they could remember from the clip. Second, we asked people if they could remember a brand in the product category of the brand. Third, we showed the participants a list of brands and asked if they could remember any of these brands from the clip. Finally, we showed a print screen of the clip where the brand was shown and asked them if they had seen this in the television clip. On every item, the participants scored 1 when they mentioned the correct brand and 0 when their answer was incorrect.

Brand attitude was asked about by six items on a 7-point semantic differential scale (Cronbach's alpha = .96, M = 3.68, SD = 1.48). The items were *not useful/useful*, *not valuable/valuable*, *not interesting/interesting*, *bad/good*, *unpleasant/pleasant*, *unappealing/appealing* (Chang & Thorson, 2004; Crites, Fabrigar, & Petty, 1994).

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Table 6.2 Means and standard deviations of brand attitude, familiarity, and commitment.

	Brand 1 Postcards	Brand 2 Grocery store	Brand 3[*] Lottery	Brand 4 Lottery
Brand attitude	4.73 (0.96) [a]	4.84 (0.90) [a]	3.58 (0.97) [b]	4.03 (1.11) [b]
Brand familiarity	4.00 (1.93) [b]	5.19 (1.53) [a]	2.90 (1.74) [c]	4.05 (1.67) [b]
Brand commitment	3.03 (1.58) [a]	2.98 (1.77) [a]	1.73 (0.99) [b]	2.70 (1.56) [a]

Note. All concepts were measured on a 7-point Likert scale (1 lowest score - 7 highest score). Different superscripts indicate significant differences between brands based on separate ANOVAs.
[*] This brand was chosen as the target brand based on the results of this pretest.

Table **6.3** Stimuli words – anagrams and answers.

Related words			Unrelated words		
Anagram	Word	Translation	Anagram	Word	Translation
ekorst	Orkest	Orchestra	rapeip	Papier	Paper
dinigret	Dirigent	Conductor	feetolon	Telefoon	Phone
Zemuik	Muziek	Music	ijrteg	Tijger	Tiger
ipona	Piano	Piano	nadega	Agenda	Calender
relpgijsd	Geldprijs	Cash prize	spohltict	Stoplicht	Traffic light
bupilek	Publiek	Audience	spakkot	Kapstok	Hallstand
croncent-begouw	Concert-gebouw	Concert hall	hiuhuseo-leijdk	Huishoude-lijk	Domestic
petnun	Punten	Points	stalen	Lasten	Burden
turcuul	Cultuur	Culture	grinves	Vingers	Fingers
rujy	Jury	Jury	doak	Kado	Present
okro	Koor	Choir	orso	Roos	Rose
rposana	Sopraan	Soprano	tirpern	Printer	Printer
plaapus	Applaus	Applause	ptalisc	Plastic	Plastic
rnainaw	Winnaar	Winner	reanknt	Kranten	Newspaper

Mediators

Attention was measured with two items by asking the participants how much attention they paid to the television clip (M = 60.78, SD = 29.29) and to the anagrams (M = 76.86, SD = 19.11) on a scale of 0 (no attention) – 100 (full attention) (Jeong & Hwang, 2012). Attention to the anagrams was only asked about in the two multiscreening conditions.

Program involvement was measured by three items (Cronbach's alpha = .91, M = 4.13, SD = 1.57*)* on a 7-point scale (*1 = totally disagree, 7 = totally agree*). The items were: *I found the TV clip fascinating*, *I was interested in the TV clip*, and *I watched the TV clip attentively* (Bryant & Comisky, 1978; Moorman et al., 2007; Norris & Colman, 1993).

Manipulation Check

We measured the perceived relatedness of the anagrams to the television clip by showing the correct answers of the anagrams (Table 6.3) and asking the participants to what extent they thought these words were related to the clip (1 = *totally unrelated*, 7 = *totally related; M* = 4.35, *SD* = 2.39).

Control Variables

Finally, we did a randomization check by conducting an ANOVA for the media conditions and participant age and separate chi-square analyses for the media conditions and the other control variables. The results showed that participant age (p = .611), gender (p = .623), education (p = .968), prior television clip exposure (p = .094), prior television show exposure (p = .111), and prior knowledge of the product placement (p = .938) were equally divided among the different conditions. Therefore, we did not include these variables as co-variates in the analyses.

RESULTS

Manipulation Check

A One-Way ANOVA was conducted to check whether the anagrams in the two multiscreening conditions were perceived by the participants to be related or unrelated to the television clip. As intended, the anagrams in the MS related condition were significantly more perceived as related to the television clip (M = 6.31, SD = 0.97) than the anagrams in the MS unrelated condition (M = 2.20, SD = 1.44), F (1, 122) = 350.37, p < .001.

Overview of Main Effects

All the means and standard deviations of the dependent variables and mediators are presented in Table 6.4. The table shows the difference between no exposure to the brand (SS control) versus the different exposure groups (i.e., MS related, MS unrelated, SS full). The table shows that the four media groups differed significantly on brand memory, F (3, 276) = 32.39, p < .001, η^2 = .26. As expected, participants who were not exposed to the brand had less brand memory than the participants in all the other media conditions. Additionally, the participant memory of the brand was the highest in the SS full condition. No significant difference was found among the four media conditions on brand attitude, F (3, 276), 0.65, p = .583.

Furthermore, a One-Way ANOVA showed significant differences between the media conditions in terms of attention paid to the television clip, F (3, 279) = 98.61, p < .001, η^2 = .52. In both single screening conditions, the participants paid more attention to the television clip than the participants in the two multiscreening conditions (Table 6.4). The difference between the two multiscreening conditions was marginally significant (p = .077)[6]. Finally, the results showed a significant difference in program involvement, F (3, 279) = 18.65, p < .001, η^2 = .17. The participants in both single

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screening conditions were more involved with the television clip than the participants in the multiscreening conditions. We will not include the SS control condition in any further analyses of hypotheses testing because we measured attention to/involvement with another clip in this condition.

Mediation Effects via Attention and Program Involvement

To test the mediation hypotheses, we used PROCESS model 6 of Hayes (Hayes, 2013). The model is presented in Figure 6.2. We used dummy coding to test the hypotheses for the three media conditions involved (i.e., MS related, MS unrelated, and SS full). We created dummies for MS related (MS related = 1, otherwise = 0) and for MS unrelated (MS unrelated = 1, otherwise = 0) and used the SS full condition as the reference group. First, we conducted the analyses for the MS related condition and included the MS unrelated dummy as a covariate. Second, we conducted the same analysis but this time used the MS unrelated dummy as the independent variable and the MS related dummy as the covariate. Finally, the same analysis with SS full dummy

Table 6.4 Overview of dependent variables and mediators per condition (study 1).

	Single screening (control) [1]	Multi-screening related	Multi-screening unrelated	Single screening (full)
Dependent variables				
Brand memory	0.19 (0.45) [c]	1.55 (1.48) [b]	1.34 (1.48) [b]	2.13 (1.45) [a]
Brand attitude	3.62 (1.43) [a]	3.57 (1.56) [a]	3.61 (1.62) [a]	3.88 (1.34) [a]
Mediators				
Attention television	79.61 (14.90) [a]	41.65 (26.90) [b]	32.76 (22.74) [b]	79.05 (17.01) [a]
Program involvement	4.75 (1.46) [a]	3.48 (1.38) [b]	3.34 (1.41) [b]	4.64 (1.48) [a]

Note. Cell entries are means with standard deviations in parentheses.
Different superscripts indicate significant differences between means.
[1] In the single screening control condition participants watched a different video clip. These participants were asked about the same brand as in the other two conditions. However, attention to the clip and involvement with the clip was measured about other content.

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[6] The two multiscreening conditions showed no significant difference in amount of attention to the anagrams, $F(1, 122) = 0.20$, $p = .660$.

as covariate was conducted to test the difference between related and unrelated multiscreening.

The hypothesis states that the difference between the related and unrelated multiscreening on brand memory and brand attitude could be due to differences in attention to the television clip and subsequently program involvement. The results of the separate PROCESS models showed significant indirect effects of media condition on brand memory and brand attitude (Table 6.5). Participants scored lower on brand memory in the MS related (indirect effect = -.31, boot SE = .14, 95% BCBCI [-0.60, -0.04]) and MS unrelated conditions (indirect effect = -.38, boot SE = .16, 95% BCBCI [-0.74, -0.09]) compared to participants in the single tasking condition. Even more noteworthy, the results of memory for the participants in the MS related condition were significantly higher than for the participants in the MS unrelated condition (indirect effect = .07, boot SE = .05, 95% BCBCI [0.02, 0.21]). The analyses showed that related multiscreening results in more attention to the television clip (b = 8.88, p = .028) and that more attention to the television clip correlates to more involvement (b = .04, p < .001). Finally, the results showed that more involvement correlates to better brand memory (b = .21, p = .018).

Comparable results were found for brand attitude. Participants scored lower on brand attitude in the MS related (indirect effect = -.55, boot SE = .14, 95% BCBCI [-0.87, -0.29]) and MS unrelated conditions (indirect effect = -.68, boot SE = .16, 95% BCBCI [-1.02, -0.38]) compared to the participants in the single tasking condition. Additionally, participants in the MS related conditions scored significantly higher on brand attitude compared to participants in the MS unrelated condition (indirect effect = .13, boot SE = .07, 95% BCBCI [0.01, 0.33]). The analyses again showed that related multiscreening results in more attention to the television clip (b = 8.88, p = .028) and that more attention to the television clip correlates to more involvement (b = .04, p < .001). Finally, more involvement is correlated to more positive brand attitude (b = .38, p < .001). Thus, the hypotheses were confirmed.
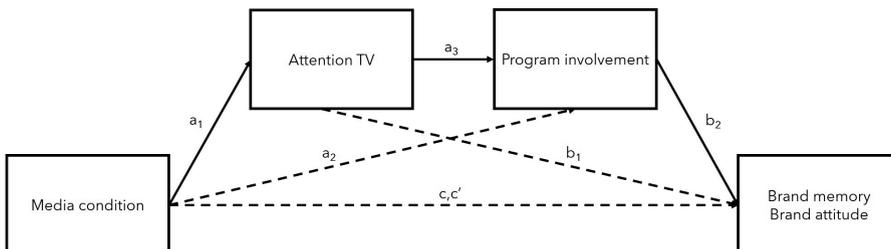

Figure 6.2. Indirect effect of multiscreening on brand memory and brand attitude via attention to the television clip and subsequent program involvement.

Table **6.5** Indirect effect of multiscreening (related/unrelated) on brand memory and brand attitude (study 1).

Dependent variable	Media condition (reference group)	Indirect effect (SE) [95% BCBCI]	a1	a2	a3	b1	b2	c (total)	c' (direct)
Brand memory									
	MS related (SS)	-0.31 (0.14) [-0.60, -0.04]	-37.41 (3.77)***	0.29 (0.24)	0.04 (0.00)***	0.01 (0.01)	0.21 (0.09)*	-0.48 (0.19)*	-0.09 (0.30)
	MS unrelated (SS)	-0.38 (0.16) [-0.74, -0.09]	-46.29 (3.87)***	0.49 (0.26)	0.04 (0.00)***	0.01 (0.01)	0.21 (0.09)*	-0.57 (0.23)*	-0.22 (0.33)
	MS related (MS unrelated)	0.07 (0.05) [0.02, 0.21]	8.88 (4.01)*	-0.20 (0.21)	0.04 (0.00)***	0.01 (0.01)	0.21 (0.09)*	0.09 (0.08)	0.13 (0.26)
Brand attitude									
	MS related (SS)	-0.55 (0.14) [-0.87, -0.29]	-37.41 (3.77)***	0.29 (0.24)	0.04 (0.00)***	-0.00 (01)	0.38 (0.09)***	-0.29 (0.21)	-0.01 (0.30)
	MS unrelated (SS)	-0.68 (0.16) [-1.02, -0.38]	-46.29 (3.87)***	0.49 (0.26)	0.04 (0.00)***	-0.00 (01)	0.38 (0.09)***	-0.31 (0.24)	0.04 (0.33)
	MS related (MS unrelated)	0.13 (0.07) [0.01, 0.33]	8.88 (4.01)*	-0.20 (0.21)	0.04 (0.00)***	-0.00 (01)	0.38 (0.09)***	0.02 (0.10)	-0.05 (0.26)

Note. The table represents the unstandardized coefficients (with boot SE between parentheses), BCBCI = bias corrected 1,000 bootstrap confidence interval. *** $p < .001$, ** $p < .01$, * $p < .05$.

DISCUSSION OF STUDY 1

The results of the first study were in line with the hypotheses. Compared to single screening, multiscreening has a negative effect on attention to the television clip, which results in low levels of program involvement, and finally worse brand memory and more negative brand attitudes. More importantly, related multiscreening leads to better brand memory and more favorable brand attitudes via attention to the television content and subsequently more program involvement than unrelated multiscreening.

These results are a first step in testing task relevance as a possible facilitator of multiscreening effects. This study has three strengths. First, the chosen approach (e.g., split screen with computer tasks) connects the findings to the results of previous studies on multiscreening conducted in this school of research (Chinchanachokchai et al., 2015; Duff & Sar, 2015; Van Cauwenberge et al., 2014). Second, it adds to the multiscreening theory by focusing on a possible facilitator of advertising effects. Third, it makes use of a general sample, which makes the results more externally valid.

However, this study has two limitations: task contiguity and user control. The first limitation – task contiguity – is about the physical distance between the two tasks. We chose to present the two tasks on a split-screen computer to be consistent with previous multiscreening research. However, presenting two tasks closely to each other may reduce switching time and cognitive research costs (Wang et al., 2015) compared to showing two tasks on separate screens. Second, user control was high because people could decide themselves when to solve the anagrams and when to pay attention to the television clip. However, consequently it is not certain whether people were multiscreening during exposure to the brand. It is important to address these limitations because a meta-analysis showed that both task contiguity and user control could influence multitasking effects (Jeong & Hwang, 2016).

Therefore, we will conduct a second study to be more confident that the found effects were due to the difference between related and unrelated multiscreening and not to other factors. In the second study, we will address the limitation of task contiguity by using two tasks (i.e., watching a television clip and chatting) on two different screens. Additionally, we will address user control by sending chat messages through an automatic script to ensure that people are multiscreening during brand exposure. An appurtenant benefit is that we can test the conceptual model in a more controlled environment, which will increase the internal validity of the findings. Additionally, answering chat messages is more ecologically valid than solving anagrams.

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STUDY 2

METHOD

Sample and Design

The sample of the laboratory experiment consisted of 185 undergraduates (M_{age} = 22.22, SD_{age} = 3.93, 82.7% female). They were recruited through the online subject pool of the university. The total duration of participation was approximately 15-20 minutes per participant. The participants were given 5 euro or 1 research credit for participating. We used a design with the three media conditions in which the participants were exposed to the same television clip to further disentangle the mediation effect of related/unrelated multiscreening on advertising outcomes. The participants were randomly allocated to one of the three conditions: MS related (n = 61), MS unrelated (n = 63), and a single screening condition (n = 61).

Procedure

First, the participants had to read and sign an informed consent form after which they received the instructions for the experiment. In all the conditions, the participants were asked to watch a video and answer questions about it afterward. The video was the same television clip as in study 1. In the single screening condition, it was stressed that they could not do other things while watching the video. In the multiscreening conditions, they were asked to read and answer chat messages that would appear on the tablet when the video was playing. These chat messages were about either the content of the video (MS related) or other content (MS unrelated).

To become familiar with sending the chat messages, the participants were asked to send a specific number presented on their computer screen before the video started. This number corresponded with their participation number. After the researcher received this number, they were told that they could continue to the video. They were reminded to read and answer the chat messages on the tablet when the video was playing. The first chat message when the video started was the same for every participant and sought to check whether they understood what was asked of them. This question was about the color of the jacket of a person in the video. After this question, the remaining nine chat messages were sent by a script that sent the messages automatically at intervals of 65 seconds. When the video was finished, the participants had to fill out a questionnaire that was similar to that in study 1.

Pretest chat messages

The chat messages were pretested on their relatedness to the video ($n = 9$, $M_{age} =$ 25.56, $SD_{age} = 2.60$, 77.8% female). We chose the 18 messages that had the highest and the lowest mean scores on the question "to what extent are these questions completely unrelated (1) or completely related (7) to the video?" after the participants in the pretest were exposed to the video. Examples of related questions are "What do you think of the comments of the jury?" and "How do you think [person in video] is conducting the orchestra?" Examples of unrelated questions are "What is your favorite thing to do in your spare time?" and "What is your best talent?"

Variables

We measured brand memory ($M = 1.93$, $SD = 1.36$), brand attitude (Cronbach's alpha = 92, $M = 3.40$, $SD = 1.16$), attention ($M = 71.12$, $SD = 19.60$), and program involvement (Cronbach's alpha = .87, $M = 4.86$, $SD = 1.34$), similarly to study 1. We measured *memory of the editorial content* as an additional dependent variable by posing 10 multiple choice questions about the content of the video (Oviedo et al., 2015). We added this question to check whether the hypotheses hold not only for a specific element (such as a brand) but also for the general information in a television clip. On every item, the participants scored a 1 when they provided the correct answer and a 0 when their answer was incorrect. We calculated a sum score of the 10 items for each participant ($M = 7.94$, $SD = 1.75$).

Manipulation Check

We measured the perceived relatedness of the chat messages to the television clip by asking the participants to what extent they thought the chat messages that they had to answer during the television clip were related to the television clip (1 = *totally unrelated*, 7 = *totally related*; $M = 3.60$, $SD = 2.35$).

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Control Variables

Finally, we did a randomization check by conducting an ANOVA for the media conditions and participant age and separate chi-square analyses for the media conditions and the other variables. Participant age ($p = .092$), gender ($p = .494$), prior television clip exposure ($p = .244$), prior television show exposure ($p = .623$), and prior knowledge of the product placement ($p = .244$) were equally divided among the different conditions. Therefore, none of these variables was added as a control variable to the analyses.

RESULTS

Manipulation Check

A One-Way ANOVA was conducted to check whether the chat messages in the two multiscreening conditions were perceived as related or unrelated to the television clip. The results showed, as expected, a significant difference in the perceived relatedness of the chat messages to the television clip, $F(1, 122) = 675.93$, $p < .001$. The messages in the MS related condition were perceived as more related ($M = 5.79$, $SD = 1.16$) than the messages in the MS unrelated condition ($M = 1.48$, $SD = 0.62$). The manipulation was successful.

Overview of Main Effects

An overview of the means and standard deviations of all the dependent and mediator variables is presented in Table 6.6. Similarly, to study 1, we found significant differences between the media conditions for brand memory, $F(2, 184) = 7.22$, $p = .001$, $\eta^2 = .07$. Again, the participants in the SS condition remembered more than the participants in the multiscreening conditions, and no difference was found between the two multiscreening conditions. Similar results were found for memory of the editorial content, $F(2, 184) = 18.85$, $p < .001$, $\eta^2 = .17$. The One-Way ANOVA for brand attitude again yielded no significant differences between the media conditions, $F(2, 184) = 1.83$, $p = .163$.

A One-Way ANOVA with attention to the television clip as dependent variable showed significant differences between the media conditions, $F(2, 184) = 74.37$, $p < .001$, $\eta^2 = .45$. A post hoc Bonferroni test showed that the participants in the SS condition paid significantly more attention to the television clip ($M = 89.79$, $SD = 10.11$) than participants in the MS related ($M = 62.74$, $SD = 61.16$, $p < .001$) and the MS unrelated condition ($M = 61.16$, $SD = 16.65$, $p < .001$). Contrary to the expectations, the multiscreening conditions showed no significant differences in the amount of attention to the television clip.

However, in the MS related condition, the participants sent significantly longer chat messages ($M_{words} = 49.42$, $SD_{words} = 23.30$) than in the MS unrelated condition ($M_{words} = 26.30$, $SD_{words} = 19.18$), $F(1, 121) = 36.00$, $p < .001$. Additionally, the number of words sent had a negative effect on attention to the television clip, $F(1, 121) = 7.67$, $p = .007$, $b^* = -.25$. Therefore, we also compared attention to the television clip between the two multiscreening conditions controlling for the number of words sent in the chat messages. The ANCOVA showed that the participants in the MS related condition paid significantly more attention to the television than the participants in the MS unrelated condition when controlling for the number of words sent, $F(1, 121) = 4.33$, $p = .040$, η^2

Table 6.6 Overview of dependent variables and mediators per condition (study 2).

	Single screening	Multiscreening related	Multiscreening unrelated
Dependent variables			
Brand memory	2.39 (1.27)[a]	1.49 (1.39)[b]	1.90 (1.28)[ab]
Brand attitude	3.57 (1.33)[a]	3.18 (1.09)[a]	3.46 (1.02)[a]
Memory of editorial content	8.93 (1.17)[a]	7.66 (1.62)[b]	7.24 (1.91)[b]
Mediators			
Attention television	89.79 (10.11)[a]	62.74 (16.11)[b]	61.16 (16.65)[b]
Program involvement	5.42 (1.31)[a]	4.76 (1.19)[b]	4.43 (1.35)[b]

Note. Cell entries are means with standard deviations in parentheses.
Different superscripts indicate significant differences between means.
No control variables were added to these analyses.

= .04. Additionally, there was no significant difference between the two multiscreening conditions in the amount of attention to the chat messages, $F(1, 121) = 3.07$, $p = .082$.

Mediation Effects via Attention and Program Involvement

Similar to study 1, we tested whether related multiscreening results in more attention to the television clip, which results in more involvement with the television clip and results in higher brand memory and more positive brand attitudes compared to unrelated multiscreening. The same PROCESS model as in study 1 was conducted (Figure 6.2). In all the models, we controlled for number of words sent in the chat messages[7].

Again, the results of the models showed significant indirect effects of related multiscreening on brand memory and brand attitude (Table 6.7). Compared to SS, the results showed lower brand memory in the related multiscreening condition (indirect effect = -.16, boot SE = .07, 95% BCBCI [-.33, -.04]) and unrelated multiscreening condition (indirect effect = -.22, boot SE = .10, 95% BCBCI [-.44, .06]). Even more noteworthy, the participants in the MS related condition showed higher brand memory than the participants in the MS unrelated condition (indirect effect = .06, boot SE = .04, 95% BCBCI [.01, .17]).

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[7] We inserted the value 0 for the number of words sent in the single screening condition to be able to control for it in all three media conditions.

Additionally, for brand attitude the results showed lower brand attitudes for participants in the MS related (indirect effect = -.13, boot SE = .08, 95% BCBCI [-.23, -.02]) and MS unrelated conditions (indirect effect = -.18, boot SE = .11, 95% BCBCI [-.44, -.00]) compared to the SS condition. Again, more positive brand attitudes were observed for participants in the MS related condition compared to the MS unrelated condition (indirect effect = .05, boot SE = .04, 95% BCBCI [.00, .17]).

As expected, related multiscreening resulted in more attention to the television clip (b = 6.41, p = .024), and more attention to the television clip led to more involvement (b = .05, p < .001). Finally, more involvement led to better brand memory (b = .21, p = .019) and more positive brand attitude (b = .17, p = .025). Additionally, we tested the same model for memory of the editorial content. A similar pattern was observed for this dependent variable (Table 6.7); more involvement resulted in an increase in participant memory of the editorial content (b = .25, p = .012). Thus, the hypotheses were again confirmed.

DISCUSSION OF STUDY 2

In the second study, we replicated the findings of the first study in a different multiscreening setting. Additionally, we addressed the limitations of study 1 by presenting two tasks on separate screens and by using an automatic script to ensure that the participants were multiscreening during brand exposure. Moreover, the results of the second study were in line with the hypotheses. The results showed that participants in the multiscreening conditions had worse brand memory, worse memory of the editorial content, and less positive brand attitudes via attention and subsequently program involvement compared to participants in the single screening conditions. Furthermore, we found that participants in the related multiscreening conditions had better brand memory, better memory of the editorial content, and more positive brand attitudes compared to participants in the unrelated multiscreening condition via attention and subsequent program involvement.

Table 6.7 Indirect effect of multiscreening on brand memory, brand attitude, and memory of editorial content (study 2)

Dependent variable	Media condition (reference group)	Indirect effect (SE) [95% BCBCI]	a1	a2	a3	b1	b2	c (total)	c' (direct)
Brand memory									
	MS related (SS)	-.16 (.07) [-.33, -.04]	-16.31 (3.77)***	0.54 (0.31)	0.05 (0.01)***	0.00 (0.01)	0.21 (0.09)*	-.07 (0.16)	-0.54 (0.37)
	MS unrelated (SS)	-.22 (.10) [-.44, -.06]	-22.72 (2.95)***	0.31 (0.27)	0.05 (0.01)***	0.00 (0.01)	0.21 (0.09)*	-.18 (0.18)	-0.15 (0.31)
	MS related (MS unrelated)	.06 (.04) [.01, .17]	6.41 (2.82)*	0.22 (0.22)	0.05 (0.01)***	0.00 (0.01)	0.21 (0.09)*	.12 (.09)	-0.40 (0.26)
Brand attitude									
	MS related (SS)	-.13 (0.08) [-.23, -.02]	-16.31 (3.77)***	0.54 (0.31)	0.05 (0.01)***	-0.01 (0.01)	0.17 (0.08)*	.15 (0.14)	-0.28 (0.32)
	MS unrelated (SS)	-.18 (0.11) [-.44, -.00]	-22.72 (2.95)***	0.31 (0.27)	0.05 (0.01)***	-0.01 (0.01)	0.17 (0.08)*	.13 (0.17)	-0.09 (0.28)
	MS related (MS unrelated)	.05 (.04) [.00, .17]	6.41 (2.82)*	0.22 (0.22)	0.05 (0.01)***	-0.01 (0.01)	0.17 (0.08)*	.02 (.07)	-0.19 (0.23)
Memory of editorial content									
	MS related (SS)	-.19 (0.10) [-.45, -.05]	-16.31 (3.77)***	0.54 (0.31)	0.05 (0.01)***	.03 (0.01)**	0.25 (0.10)*	-.46 (0.22)*	-0.13 (0.42)
	MS unrelated (SS)	-.27 (0.12) [-.56, -.06]	-22.72 (2.95)***	0.31 (0.27)	0.05 (0.01)***	.03 (0.01)**	0.25 (0.10)*	-0.75 (0.24)*	-0.57 (0.36)
	MS related (MS unrelated)	.07 (0.05) [.01, .21]	6.41 (2.82)*	0.22 (0.22)	0.05 (0.01)***	.03 (0.01)**	0.25 (0.10)*	.29 (.13)*	.44 (.30)

Note. The table represents the unstandardized coefficients (with boot SE between parentheses). BCBCI = bias corrected 1,000 bootstrap confidence interval. *** $p < .001$, ** $p < .01$, * $p < .05$

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GENERAL DISCUSSION

The aim of this study was to test whether relatedness of the tasks on both screens could be a facilitator of advertising effects via attention and subsequently program involvement. The study confirmed that advertising was more effective when people were single screening than when people were multiscreening. However, this study also showed that multiscreening need not always be detrimental to advertising effectiveness. It was found that advertising was more effective when people were multiscreening with related tasks than when people were multiscreening with unrelated tasks. The underlying processes of these effects were attention to the television show and subsequent program involvement. The results confirmed the hypotheses. Moreover, these results appeared to be robust over two studies with different multiscreening settings and different samples.

The findings of the study provide four valuable contributions to the advertising and multitasking literature. First, this study provides insight into how multiscreening affects advertising outcomes. Previous studies have often examined direct effects of multiscreening on advertising outcomes (e.g., Angell et al., 2016; Kazakova et al., 2016) with some rare exceptions (Chinchanachokchai et al., 2015; Segijn et al., 2016). The current study contributes to this knowledge by examining attention and subsequently program involvement as underlying mechanisms. This knowledge helps provide a better understanding of how multiscreening affects advertising outcomes.

Second, this study contributes, to the best of our knowledge, to relatedness between tasks when multiscreening by examining task relevance – the most general level of relatedness – as a facilitator of advertising effects. A meta-analysis of media multitasking found that task relevance was a moderator of multitasking effects (Jeong & Hwang, 2016). However, most studies that manipulated this factor found no differences between related and unrelated multiscreening (Kazakova et al., 2016; Van Cauwenberge et al., 2014). An explanation could be that these studies did not look into underlying mechanisms. The results of this study showed the important role of attention when multiscreening. Exposure may be sufficient to affect brand memory and brand attitudes. However, when combining multiple tasks, attention becomes a key factor. Furthermore, involvement is necessary to remember specific elements within the media content, such as an advertisement or product placement. The results of this study showed that a difference between related versus unrelated multiscreening can be found in the amount of attention that people devote to both tasks.

Third, the results of the study showed a difference not only between multiscreening and single screening conditions but also between different multiscreening conditions.

Multitasking performance is often assessed based on single tasking performance. Successful multitasking is often defined as no decrease in multitasker performance compared to single tasker performance (Lang & Chzran, 2015). The current study goes beyond the comparison of multiscreening versus single screening and shows that effects can also differ between different multiscreening conditions. Future research should further examine differences between multiscreening conditions and how these differences affect information processing and advertising effects.

Fourth, this study contributes to the methodological knowledge of multiscreening research because it uses two different approaches by two schools of research. The first school examines multiscreening on a split screen with computer tasks (e.g., Chinchanachokchai et al., 2015; Van Cauwenberge et al., 2014; Wang et al., 2012), and the second school examines multiscreening with different tasks on separate screens (Kazakova et al., 2016; Segijn et al., 2016). To the best of our knowledge, this is the first multiscreening study that tested a conceptual model by both methodological approaches. Both approaches yielded the same results, which is good news because it indicates that the results of the research schools are complementary. Although the results of the current study showed that both approaches can be used to examine multiscreening effects, future researchers should carefully consider the opportunities and limitations of each approach when conducting their studies. A split-screen computer task is suitable for online studies, which offer the opportunity to examine the phenomenon among a more representative sample in a shorter period of time but with a less controlled environment. In contrast, an experiment with different tasks on different screens is more suitable for a laboratory experiment and could be more controlled. However, the sample is often bound to students, and a laboratory experiment is more time consuming than an online experiment. By combining the two methodological approaches in the current study, we benefitted from both approaches.

This study also has important implications for practitioners. The results showed that multiscreening is not necessarily bad for advertisers, as is sometimes assumed. The results showed that multiscreeners have worse brand memory and less positive attitudes toward brands compared to single screeners. However, it is uncertain whether single screeners exist in real life or are an artifact of the research method. In experiments, participants are often asked to pay full attention to a certain clip. However, in real life, consumers might face all sorts of distractions that the advertiser cannot control, such as people in their surroundings. The results of the current study showed that related multiscreening results in more positive advertising outcomes than unrelated multiscreening. Advertisers could influence this related multiscreening to a certain extent by seeking to engage consumers by offering ways to interact with

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the television content on smartphones or tablets. Thus, it might be an advantage for advertisers to involve consumers in related multiscreening. The challenge for advertisers lies in thinking of creative ways to involve consumers with the television content.

The current study is a first step in unraveling how relatedness could influence effects when multiscreening. However, much more research on this topic is necessary to understand how relatedness influences advertising effects when multiscreening. At the beginning of this article, we presented the multi-layered levels of relatedness that can be used as a starting point in examining the different levels of relatedness when multiscreening. This typology was necessary to ultimately bring order to the chaos of the relatedness concepts. In the current study, we manipulated the most general level of relatedness – task relevance – while keeping the other two levels of relatedness constant (i.e., the brand was always congruent, and there was no repetition of messages). Future research is necessary to manipulate the other levels of relatedness – or combinations of relatedness levels – and examine how these levels affect advertising outcomes when multiscreening.