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### Everyday multiscreening

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

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# Everyday Multiscreening

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

Claire Segijn

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Amsterdam, 2017

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

**ACADEMISCH PROEFSCHRIFT**

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# Chapter 1

General Introduction and  
Dissertation Outline



## EVERYDAY MULTISCREENING

Technology has quickly become ingrained into people's lives. Today, people have access to a variety of screens. For example, the majority of people in the Netherlands and the United States have access to a TV, laptop, smartphone, and/or tablet (see Table 1.1; Deloitte Development LLC, 2015; SKO, 2016). Especially the amount of people who own a smartphone and tablet has increased enormously over the years. In 2013, about 61% of the Dutch population owned a smartphone and about 48% owned a tablet. In 2015, the amount of smartphone owners increased to 76% and tablet owners to 61% of the Dutch population (Wennekers, de Haan, & Huysmans, 2016). Screen saturation and the convergence of these technologies have led to an increase in a combined use of different screens. For example, more than a quarter of the smartphone and tablet owners stated to use their screen simultaneously when watching TV on a daily basis (Nielsen, 2013). This phenomenon of combining multiple screens at the same time is known as multiscreening and is the central topic of this dissertation.

Multiscreening – a form of media multitasking – is characterized by the combination of screens. Multiscreening is, for example, watching television and browsing the web on a laptop, reading e-mails on a tablet, or sending text messages on a smartphone simultaneously. First, multiscreening involves tasks that are self-contained (Benbunan-Fich, Adler, & Mavlanova, 2011). This means that it is possible to carry out the tasks independent of each other. Second, multiscreening involves – similar to media multitasking – multiple tasks that are carried out on different media with some temporal overlap (Adler & Benbunan-Fich, 2012; Benbunan-Fich et al., 2011; Salvucci & Taatgen, 2011). The visual nature of the screen makes it impossible for people to engage in two tasks on multiple screens with complete temporal overlap (Salvucci & Taatgen, 2011). Because of this media characteristic, visual attention needs to be divided between the screens (Brasel & Gips, 2011; Jeong & Fishbein, 2007). People use an interleaved strategy in which one task is temporarily suspended in order to focus on another task. In other words, people have to switch their visual attention between the different tasks. Switching can vary on a continuum from rapid switching to longer time spans between switches (Salvucci & Taatgen, 2011).

**Table 1.1** Screen ownership in % of the Dutch and US population.

	NL <sup>a</sup>	US <sup>b</sup>
TV	96.8	82
Laptop	76.5	82
Smartphone	76.3	71
Tablet	62.1	54
Desktop	46.9	66
Game Device	31.7	56

<sup>a</sup> Source: SKO (2016)

<sup>b</sup> Source: Deloitte Development LLC (2015).

### Implications of Multiscreening for Information Processing

In communication science, media effects are typically examined in a mono-media consumption situation. Effects are assessed based on exposure to, for example, a video clip, an advertisement, or other media content, without distractions. However, combining multiple tasks simultaneously has implications for the way people process media content. Especially the combination of multiple screens at the same time has at least two major implications for how people process media content. First, the simultaneous usage of multiple screens may lead to – similar to other forms of media multitasking – capacity interference. This means that information processing is limited by the availability of people's cognitive resources (Kahneman, 1973). According to the limited capacity model of motivated mediated message processing (Lang, 2006), people are limited in the amount of cognitive resources they use to process information of media content. These cognitive resources are used to encode information, turn it into mental representations, store these representations into memory, and retrieve it at a later point in time (Lang, 2000; Lang, 2006). However, people are limited in the amount of cognitive resources that they can allocate to different tasks at the same point in time (Kahneman, 1973; Lang, 2000). This means that people have to divide their cognitive resources between the different tasks when multiscreening. This happens at the expense of the processing of both messages.

Second, the use of multiple screens simultaneously may also lead to structural interference. When processing media content, multiple resources are required to process information through different sensory channels (i.e., audio and visual). Structural interference occurs when people use different media with concurrent

modalities (Kahneman, 1973), such as the concurrent visual modalities of the screens involved in multiscreening. According to the dual-channel paradigm, structural interference is caused when information of the same modality needs to be processed through the same sensory channel (Baddeley, 1997; Paivio, 1986; Wickens, 2002). Because of the concurrent visual modality when multiscreening, people need to divide their visual attention between the screens (Brasel & Gips, 2011; Salvucci & Taatgen, 2011) and information processing of media content on both screens might be limited.

Thus, it is assumed that multiscreening could affect the way people process media content. However, it is still relatively unknown what the effects are of multiscreening on the way people process media content compared to single screen use. Only recently, scholars have started to examine the phenomenon of multiscreening. It is found, for example, that people remember less of news items (Van Cauwenberge, Schaap, & van Roy, 2014), television episodes (Oviedo, Tornquist, Cameron, & Chiappe, 2015), and advertisements (Chinchanachokchai, Duff, & Sar, 2015) when they multiscreen opposed to single screen. Furthermore, television episodes are less likely to be enjoyed (Oviedo et al., 2015), multiscreening could increase engagement with political debates (Vaccari, Chadwick, & O'Loughlin, 2015), and time is perceived as going faster (Chinchanachokchai et al., 2015). These studies showed different implications of multiscreening on the processing of media content. This dissertation will contribute to this knowledge by systematically examining how multiscreening affects information processing of media content. More specifically, this dissertation focuses on how multiscreening affects advertising outcomes, such as brand memory and brand attitudes.

### **Multiscreening and Advertising**

Television is the most often combined screen when multiscreening (eMarketer, 2016). The results of a survey employed among 2,076 US consumers showed that they engage in 2-3 additional activities when watching TV (Deloitte Development LLC, 2015). Also, the television is still the most important medium on which advertisers spent their money. In the Netherlands, it was announced that advertisers spent 483 million euros on television advertising. This is an increase of 5.6% compared to the year before (Screenforce, 2016). The prevalent occurrence of multiscreening in combination with the high amount of advertising spending shows that insights into how multiscreening affects advertising effectiveness is very important for advertisers. However, research into the effects of advertising mainly focus on effects when consumers are single tasking (Pilotta, Schultz, Drenik, & Rist, 2004). Therefore, it is still relatively unknown how multiscreening affects the processing of advertising and its consequences. To address this gap, the

current dissertation looks into how multiscreening affects advertising outcomes.

Based on media multitasking literature, it is expected that multiscreening has negative consequences for advertising outcomes in general. Especially for cognitive outcomes such as memory. The limited amount of cognitive resources people have to divide when multiscreening are assumed to be the cause of the detrimental effect of multiscreening on cognitive advertising effects. In addition, this memory deficit might be an underlying mechanism that explains why it is expected that people have less favorable advertising evaluations, such as brand attitudes, ad attitudes, or purchase intentions. On the other hand, multiscreening may also have a positive effect on affective advertising outcomes because people are less able to resist a persuasive message when multiscreening (Jeong & Hwang, 2012) or enjoy multiscreening more than single screening (Chinchanachokchai et al., 2015). This dissertation looks further into advertising effects when multiscreening and their underlying mechanisms and looks into the effect of multiscreening on cognitive and affective advertising outcomes.

### **Task Relevance**

Most multiscreening research has focused on the negative consequences. So far, research has shown that multiscreening has negative consequences mainly on cognitive outcomes, such as memory (e.g., Kazakova, Cauberghe, Hudders, & Labyt, 2016) or comprehension (e.g., Van Cauwenberge et al., 2014). However, these negative consequences do not prevent people to engage in this behavior. Thus, beside the fact that it is very important for advertisers to know how multiscreening affects advertising outcomes, it is considered even more important to examine how advertising effectiveness can be improved. In the current dissertation, a possible facilitator of advertising effects when multiscreening is examined, namely task relevance. By doing this, this dissertation takes a unique positive approach by focusing on the possibilities instead of the detrimental effects of multiscreening.

Task relevance is a form of relatedness and is defined as two tasks that are carried out simultaneously with an overarching or similar goal (Wang, Irwin, Cooper, & Srivastava, 2015). It is assumed that related tasks are less detrimental to advertising effects because combining related tasks is less cognitively demanding than combining unrelated tasks. This assumption was confirmed in a meta-analysis of 49 media multitasking studies. In this meta-analysis, the results showed indeed that the cognitive deficit was stronger when two unrelated tasks were carried out (Jeong & Hwang, 2016). However, most experiments that manipulated task relevance did not find an effect on memory and attitudes (study 1 of Kazakova et al., 2016; Van Cauwenberge et al., 2014). Because of this discrepancy between the meta-analysis and the experiments, researchers have

called for more investigation on this topic. Therefore, this dissertation looks further into the facilitating role of task relevance by examining the underlying mechanisms of related (vs. unrelated) multiscreening on advertising outcomes.

## DISSERTATION OUTLINE

The aim of this dissertation is to disentangle the phenomenon of multiscreening and how it affects information processing and advertising outcomes. This is examined by identifying three objectives:

1. Exploring the phenomenon of multiscreening in daily life
2. Examining how multiscreening affects advertising outcomes
3. Examining the facilitating role of task relevance

This dissertation consists of three parts in line with the three objectives. Each part consists of one or two chapters. Every chapter is published or publishable as an individual research paper. Hence, every chapter is self-contained and can be read individually. In total, this dissertation consists of one literature review and four empirical papers, all based on different datasets. A summary of these chapters is presented below. The three sections of this dissertation are: multiscreening in daily life (Chapter 2 & 3), multiscreening and advertising outcomes (Chapter 4 & 5), and multiscreening and task relevance (Chapter 6). This dissertation concludes with a general discussion on the findings (Chapter 7). See Figure 1.1 for the conceptual model of this dissertation and how the three parts and chapters relate to each other.

### Part 1. Multiscreening in Daily Life

This part of the dissertation addresses the first objective, that is, to explore multiscreening in daily life. In order to disentangle the phenomenon of multiscreening it is first important to get a better understanding of the different dimensions of multiscreening and to explore the current knowledge on the topic. Second, in order to get a better understanding of the scope of multiscreening in everyday life, it is important to examine how often it occurs, which screens are often combined, and who is likely to multiscreen. Therefore, the first part of this dissertation consists of two chapters examining the dimensions and the prevalence of multiscreening.

**Chapter 2** consists of a literature review describing a typology of multiscreening which is based on the multi-dimensions of media multitasking (Wang et al., 2015).

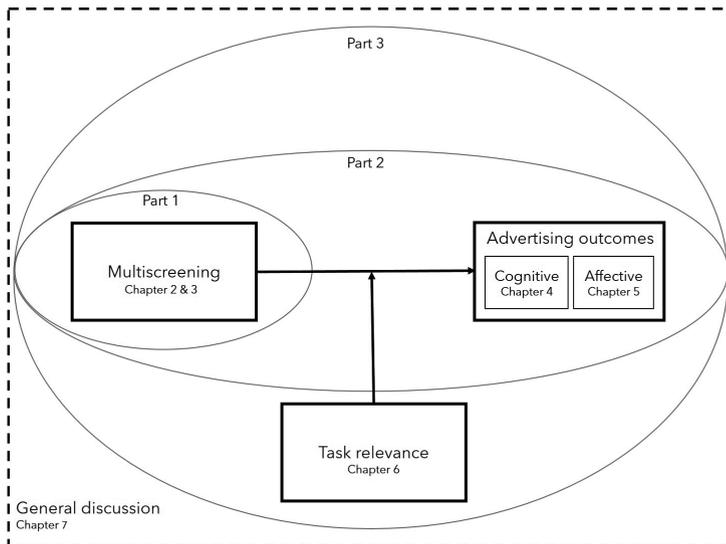


Figure 1.1 Conceptual model of the dissertation.

This framework is used in this chapter to describe and explain the phenomenon of multiscreening. The framework consists of four categories each with its own dimensions: 1) task relations (e.g., task hierarchy, task switch, shared modality), 2) task inputs (e.g., information flow), 3) task outputs (e.g., behavioral responses), and 4) user differences. The description of multiscreening per dimension is completed with a review of recent literature in the field of multiscreening, media multitasking, and persuasion. Hence, this chapter provides an overview and conceptualization of multiscreening in the field of advertising effectiveness.

**Chapter 3** reports on the prevalence of multiscreening, the composition of screens, and the multiscreeners. By means of a secondary analysis of an extensive diary study ( $N = 2,399$ ) among a representative sample of the Dutch population, this chapter provides insight into these three elements of multiscreening.

## Part 2. Multiscreening and Advertising Outcomes

The second part of the dissertation addresses the second objective, namely examining how multiscreening affects advertising outcomes. In two different chapters the effect of multiscreening on cognitive and affective advertising outcomes is examined.

**Chapter 4** reports on multiscreening viewing behavior, reporting, and the effects of multiscreening on cognitive advertising outcomes. Attention allocation

is an important component of multiscreening because visual attention is constantly shifting when multiscreening (Jeong & Fishbein, 2007). However, not much is known about people's viewing behavior when multiscreening, whether people are able to report this behavior, and how this affects people's memory. Therefore, this study explores 1) people's viewing behavior, 2) reporting of attention, and 3) how multiscreening affects people's memory of both advertising and editorial content. This is examined by means of an eye-tracking experiment ( $N = 177$ ).

**Chapter 5** reports on the effect of multiscreening on affective advertising outcomes, such as brand attitude, message attitude, and purchase intention. So far, most studies in media multitasking and multiscreening focused on cognitive outcomes. However, it is assumed that the simultaneous usage of multiple tasks could also influence affective outcomes (For an overview see Jeong & Hwang, 2016). Some scholars argue that multiscreening could have a negative effect on evaluative outcomes because multiscreeners have more difficulties remembering the brand. It is assumed that easy-to-recognize brands are more liked than difficult-to-recognize brands (Alter & Oppenheimer, 2009). Other scholars argue that multiscreening could increase evaluative outcomes because people are less able to resist the persuasive message (Jeong & Hwang, 2012) or because people simply enjoy multiscreening more than single screening (Chinchanachokchai et al., 2015). This chapter focuses on how multiscreening affects evaluative outcomes by examining three possible underlying mechanisms, namely recognition, counterarguing, and enjoyment. A lab experiment ( $N = 182$ ) was conducted to examine these underlying mechanisms.

### **Part 3. Multiscreening and Task Relevance**

In the third part of this dissertation the third objective is addressed by examining task relevance as a facilitating factor of multiscreening effects. In the previous part on multiscreening and advertising effects, the results showed that multiscreening is mainly detrimental to advertising outcomes. However, the multi-dimensions of multiscreening also showed that some factors could facilitate information processing and advertising effects when multiscreening (see also Chapter 2). In the third part we take a positive approach by examining one of these dimensions as a possible facilitator of advertising effects.

**Chapter 6** describes an experiment in which task relevance is examined as a possible facilitator of advertising outcomes. It is assumed that it is less cognitively demanding when combining tasks that are related opposed to combining tasks that are unrelated to each other (Wang et al., 2015). In addition, relatedness could stimulate goal directed attention allocation which implies that when tasks are related the messages would

gain more attention (Lang, 2000). Furthermore, attention could increase program involvement which stimulate memory and attitude of the brand (Krugman, 1983; Moorman, Neijens, & Smit, 2007; Tavassoli, Schultz, & Fitzsimons, 1995). In this chapter we examine, therefore, the effect of related/unrelated multiscreening and argue that the effects of this on brand memory and attitude are mediated by attention and, subsequently, program involvement. This assumption was examined in an online ( $N = 280$ ) and lab ( $N = 185$ ) experiment with different multiscreening settings and samples.



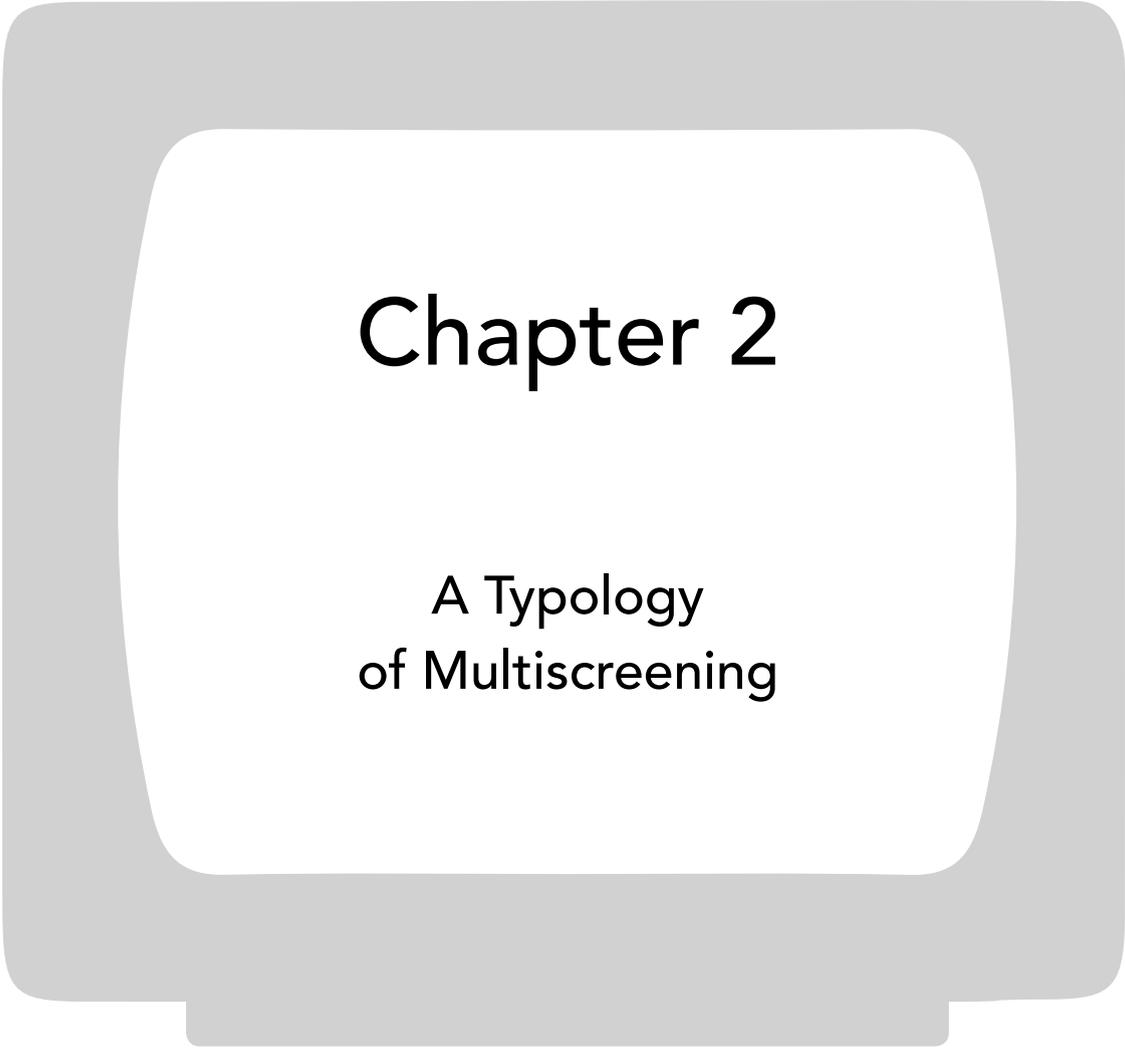


# PART 1

## Multiscreening in Daily Life

An adapted version of this chapter is published as:

Segijn, C. M. (2016). Second screen advertising: A typology of multiscreening. In P. De Pelsmacker (Ed.), *Advertising in new formats and media: Current research and implications for marketers* (pp 77-96). Bingley: Emerald Books.



# Chapter 2

A Typology  
of Multiscreening



## INTRODUCING THE TOPIC

The saturation of media and the rise of convergent media have made media multitasking into a pervasive phenomenon (e.g., Rideout, Foehr, & Roberts, 2010). Media multitasking is the use of multiple media at the same time (e.g., Voorveld, 2011). About 28% of consumers' media time consists of media multitasking (MediaTijd, 2014) and the expectation is that this will rapidly increase. Media multitasking is often described as a homogenous phenomenon, but the occurrence and effects may differ depending on the combination of media because of different medium characteristics (Voorveld, Segijn, Ketelaar, & Smit, 2014; Wang, Irwin, Cooper, & Srivastava, 2015). One form of media multitasking is 'multiscreening', multitasking with multiple screens, such as the combination of a TV and a second screen medium.

Second screen media (i.e., smartphone, tablet, or laptop) is a collective term for media with internet access that you can use simultaneously with the content on TV (SKO, 2012). A second screen is not just the second screen available in the room and it is not the screen that receives less attention than the first screen. It is called 'second screen' because it could be an addition to the TV content, which is traditionally assumed to be the first screen. There are different functions of a second screen. First, it could be used to make the TV content more interactive, for example by playing along with TV quizzes. Second, a second screen could have a social function by stimulating social interaction among viewers, for example by tweeting about TV content. Finally, a second screen could enhance the viewers' experience by providing more information about the TV content (Holmes, Josephson, & Carney, 2012), for example by providing statistics about the athletes during the Olympics or providing additional information about the product advertised.

Almost half of the tablet and smartphone owners use their device daily while watching TV (Nielsen, 2013). The task on the second screen device may differ between tasks related to the TV content (e.g., social media and second screen applications to interact with TV content) to tasks unrelated to the TV content (e.g., e-mailing, surfing, and banking; SKO, 2012). Almost half of tablet owners search for information related to the TV content when they are watching (Nielsen, 2013). This could, for example, be information about the product advertised on TV. As mentioned before, some TV shows develop specific second screen apps to engage the consumer with their program. An example of the use of second screen is TV show "The Voice". In this singing contest, people at home can play along by voting and guessing which candidate will continue to the next round. In this application both the TV show and the second screen application are sponsored by the same brand. Multiscreening could offer new ways of

advertising. However, not much is known about the phenomenon of multiscreening and the implications for advertising effectiveness. Therefore, the aim of this chapter is to describe multiscreening and its implications for advertising effectiveness.

### **Media Multitasking and Advertising Effectiveness**

Overall, it is assumed that media multitasking has a negative effect on persuasion (e.g., memory of brand/message). This view is mainly based on cognitive resource theories, such as the limited capacity model of mediated message processing (Lang, 2000). This theory argues that people have limited resources for encoding, storing, and retrieving information. When people engage in media multitasking, they have to divide these resources among multiple tasks. Therefore, attention to one task goes at the expense of attention to the other task. In addition, decrements in performance are the result of requiring more resources than resources available.

Despite some cognitive deficits, it is argued that media multitasking could also have positive effects. It is, for example, argued that people could have more positive (brand and message) attitudes (e.g., Chinchanchokchai, Duff, & Sar, 2015; Collins, 2008; Jeong & Hwang, 2012, 2014; Voorveld, 2011). An explanation for this positive effect could be that, because of these limited cognitive capacities, people are also less able to resist a persuasive message (Jeong & Hwang, 2012, 2014; Segijn, Voorveld, & Smit, 2016), and lower resistance leads to more positive attitudes (Moyer-Gusé & Nabi, 2010; Segijn et al., 2016).

Whether media multitasking will lead to an increase or decrease in persuasion depends on several factors. Recently, it is argued that different forms of media multitasking differ due to the combination of tasks and are, therefore, hard to compare. To get insight into these differences, multi-dimensions of media multitasking were distinguished based on cognitive resource theories (Wang et al., 2015). Because multiscreening is a relatively new form of media multitasking research in this area is scarce. The multi-dimensions of media-multitasking serve as a stepping stone to describe and explain this new phenomenon.

## **MULTI-DIMENSIONS OF MEDIA MULTITASKING**

In the article of Wang et al. (2015) multi-dimensions of media multitasking are described. In this framework the behavior of media multitasking is conceptualized. This framework allows to differentiate media multitasking behaviors based on different dimensions. They divide the dimensions into four categories with in each category

several dimensions of media multitasking. The categories and dimensions are labeled as 1) task relations (i.e., task hierarchy, task switch, task relevance, shared modality, and task contiguity), 2) task inputs (i.e., information modality, information flow, and emotional content), 3) task outputs (i.e., behavioral responses and time pressure), and 4) user differences.

Based on this framework and existing literature in the field of media multitasking, inferences can be made about the processing and the effects of advertising while multiscreening. The framework of Wang et al. (2015) is used in this chapter to describe a relatively new form of media multitasking, multiscreening. Multiscreening may be different than other forms of media multitasking, because each combination of media could lead to different effects caused by different characteristics of the media.

Furthermore, recent literature is discussed to provide an overview of what is known about multiscreening and advertising effectiveness, and to provide directions for future research. All dimensions are summarized in Table 2.1.

### Task Relations

Media multitasking occurs when people shift their attention between tasks that are independent, but concurrent tasks (Adler & Benbunan-Fich, 2012). Thus, media multitasking entails multiple tasks. The first category of the framework of Wang et al. (2015) is about the relations between the tasks involved in media multitasking. According to their framework this category consists of five dimensions: task hierarchy, task switch, task relevance, shared modality, and task contiguity. These dimensions are discussed for multiscreening below.

**Task hierarchy.** Task hierarchy focuses on the importance of the different tasks involved independent of whether the tasks are related or unrelated (Wang et al., 2015). When both tasks are of equal importance it is more difficult to process (i.e., encode or store) both messages. However, when one task has a higher priority, more cognitive resources will be allocated towards this task and the message on this task will be better processed (Dijksterhuis & Aarts, 2010). When people multitask with TV, this medium is often used as a background medium (e.g., Papper, Holmes, & Popovich, 2013; Pilotta, Schultz, Drenik, & Rist, 2004). This would imply that, during multiscreening, more cognitive resources are allocated towards the task/message on the second screen device. However, an eye-tracking study about multiscreening found that about two-third of people's viewing time is directed towards the TV. Attention towards the second screen device increased during the commercial break on the TV or during pushes (e.g., pop-ups, sounds) on the second screen device. Most attention was devoted towards the second screen device during the commercial break on the TV in combination with

pushes on the device (Holmes et al., 2012).

**Empirical Research.** Research on task hierarchy and media multitasking showed a difference in the processing of the message depending on task hierarchy. A study to reading performance found that when people had to read an educational message with TV as *background medium*, they performed better than when people had to read the same message while watching a video *simultaneously* (Lin, Robertson, & Lee, 2009). In addition, Jeong and Hwang (2012) manipulated a form of task hierarchy by asking the participants to focus mainly on the TV or a text. They found that the persuasive message in the text was better comprehended when people had the primary focus on the text, than when people had the secondary focus on the text (and the primary focus on the TV). In addition, they found that when people focused primarily on the text, people performed just as well as when they were only reading the text.

This has important implications for persuasive messages while multiscreening. Because the focus during a commercial break is more likely directed to the second screen device, it is likely that the message, such as an advertisement, on the second screen device will be better encoded and stored than the message on TV. It is even possible that the message on the second screen device will be equally well processed as when people would be single tasking. Thus, the assumed decrements in performance might not be present for the message with the primary focus of attention. Future research should empirically examine if this also holds for an advertisement while multiscreening and if this is the case for both media involved in multiscreening. Thus, is it also possible to process an advertisement on the TV, while multiscreening, in the same way as when you would be single tasking by manipulating the focus of attention or task hierarchy?

**Task switch.** Task switch is the control people have over switching (Wang et al., 2012). Switching can be seen as directing both visual and cognitive attention from one task/message to another. Thus, this dimension entails to what extent consumers have control over the allocation of their cognitive resources and the control of switching the allocation of resources between tasks/messages. In the media multitasking literature it is found that people switch a lot while using multiple media. A study into switching while media multitasking with TV and a computer found that people switch on average more than 4 times per minute (Brasel & Gips, 2011). Another study, which examined media multitasking within a personal computer, showed that people switched every 19 seconds (Yeykelis, Cummings, & Reeves, 2014). The effects and costs of switching may differ on the nature of the switches, such as the amount of control over the switches.

In general, a distinction can be made between internal and external switches (Adler & Benbunan-Fich, 2012; Benbunan-Fich et al., 2011). Internal switches are caused by

a consumer's own choice, and therefore, consumers have more control over these kind of switches. Internal switches can be caused by cognitive or affective processes. Internal switches related to cognitive processes may be caused when someone needs a mental break, gets a reminder about another task, (Jin & Dabbish, 2009 in Adler & Benbunan-Fich, 2013), a task is (temporarily) no longer rewarding or the (sub)task is completed (Payne, Duggan, & Neth, 2007). Internal switches may also be caused by affective processes, both positive and negative feelings can play a role. A negative feeling can be for example frustration, obstruction or exhaustion and a positive feeling can be exploration, stimulation, and reorganization (Adler & Benbunan-Fich, 2013). The findings of the study of Adler & Benbunan-Fich (2013) showed that positive triggers were correlated with good performance (e.g., solve a set of puzzles), and negative triggers with more self-interruptions and bad performance. Thus, for multiscreening it is important that internal switches are triggered by positive feelings to enhance advertising effectiveness. For example, a second screen application belonging to the TV content should not be too difficult (e.g., could lead to frustration) or too easy (e.g., could be boring). However, there is only limited research on the topic of task switching, control, multiscreening and advertising effects. Future research should examine what the effects of task control are in an advertising context.

External interruptions are caused by environmental cues, for example media content that provide stimuli that grab the attention of people, such as a ringtone or a beep when people receive a text message. Thus, technology itself produces stimuli to attract attention, with reminders, alerts, pop-ups, etc. (Carrier, Rosen, Cheever, & Lim, 2015). In addition, media also have features that incite multitasking behavior, such as loading times on computer (Foehr, 2006) and commercial breaks on TV (Rojas-Méndez, Davies, & Madran, 2009). However, it is not known what the effects are of these interruptions on advertising. Further research is needed to examine the effect of these external interruptions on advertising effects while multiscreening.

**Task relevance.** Task relevance is about the goals of the different tasks (Wang et al., 2015). For example, when you are watching TV and you are banking on your smartphone both tasks have a different goal. The first task has probably a more entertaining goal and the second task (banking) has a more informative/financial goal. Although multiscreening consists of two different tasks, these tasks may serve an overarching goal when a second screen application belongs to the TV content (e.g., TV show or commercials), for example the goal might be to entertain or persuade the consumer. An overarching goal is less cognitive demanding, than media multitasking with tasks containing separate goals.

The theory of threaded cognition (Salvucci & Taatgen, 2008, 2011) states that people

have different cognitive threads for different goals. When people have to perform different tasks with different goals (i.e., each with a different thread), these threads will compete for the same cognitive resources. However, in the case of multiscreening the tasks don't have to compete for the same thread. A lot of second screen devices are good examples of application which serve an overarching goal with the TV content. Second screen applications are often developed for a special program and are developed to accomplish an overarching goal. In terms of advertising an example is the STER application in the Netherlands. This application offers people the possibility to request premiums or to get additional information about the product/brand shown in the TV commercial break. The application operates simultaneously with the TV content. Thus, when a product is shown you can get additional information about this product. Both the commercial and the second screen application have the goal to persuade or inform the consumer.

In addition to a second screen application that is relevant to the TV content another possibility may be synced advertisement. Synced advertising is showing a message on a second screen device simultaneously with relevant TV content (or other medium) with the aim to persuade the consumer. For example, when a celebrity is interviewed in a talk show and he talks about a holiday in Spain, it is possible to show at that moment on the second screen device an ad for a trip to Spain. Thus, the advertiser can immediately react upon relevant content for his product/brand.

**Shared modality.** One of the differences of multiscreening with most other forms of media multitasking are the concurrent modalities of the media. The term 'multiscreening' already indicates that there are multiple screens involved, which in turn implies at least two media that are visual. For example, when you watch TV and use a second screen device, both media have information that is presented visually. Structural interference will occur when information is processed through the same sensory channel (Kahneman, 1973). Where other forms of media multitasking have to deal with capacity interference because of the limited cognitive capacities (Jeong & Hwang, 2015; Kahneman, 1973; Lang, 2000), multiscreening also 'suffers' of structural interference (Jeong & Hwang, 2015).

**Dual-channel paradigm.** According to the dual-channel paradigm, people have different channels to process visual and auditory information (Baddeley, 1997; Paivio, 1986; Wickens, 2002). The dual coding theory (Paivio, 1986) states that people process information through two unique systems which are interconnected. The first system is used to process verbal information, and the second system is used to process non-verbal information (i.e., imagery system). Both systems can be active on their own, but they can also be active at the same time. Another dual process

theory is the multiple resource theory (Wickens, 2002). This theory states that people have different 'pools' to process audio and visual information. Greater interference is caused when two tasks have concurrent modalities (e.g., both visual), than when two tasks have different modalities (e.g., audio and visual), because the tasks with concurrent modalities have to be processed through the same pool. This will result in decrements in performance when people are multiscreening. In addition, the cognitive theory of multimedia learning suggests that people learn better from information presented in multiple modalities (Mayer, 2005). Thus, consumers should remember advertisements better when they are presented in multiple modalities.

**Empirical research.** In the media multitasking literature, there is one study that specifically focusses on media multitasking with different modalities and the effects of a persuasive message (Jeong & Hwang, 2015). This study showed that people who had to read a persuasive text and combined it with visual advertising messages scored significantly lower on comprehension of the text, than people who combined the text with audio advertising messages and people who were single tasking (Jeong & Hwang, 2015). Thus, people in the concurrent modality condition scored the lowest on comprehension.

In addition, there is one study that examined the effects of different modalities of a message and the effects on advertising recall and recognition (Jensen, Walsh, Cobbs, & Turner, 2015). The results of this study showed that in a single tasking situation audiovisual information outperformed both audio only and visual only information on both recall and recognition. Thus, people who were exposed to audiovisual information scored higher on both recall and recognition than those who were exposed to only visual or only audio information. As a follow up, they tested single tasking compared to multiscreening (e.g., text messaging about the event). The results showed that brand recall was lower in all second screen conditions (i.e., audiovisual, audio only, visual only), than in all single tasking conditions. However, for recognition they found that people performed as good in the audiovisual multiscreening condition as in the single tasking condition.

**Task contiguity.** Task contiguity entails the physical closeness of the different tasks. For multiscreening it is required that the TV and the second screen device are present in the same room. However, the physical closeness differs each time and could even differ while they are used. It is unknown what the effects of task contiguity are on advertising while multiscreening. Future research could examine whether the physical closeness matters. Because of the shared modality (see Shared modality), it is possible that some distances require, for example, more head movements. This could have implications for research that sometimes examine multiscreening with a split screen on a computer (e.g., Van Cauwenberge et al., 2014) and sometimes use a more real-life situation with an actual TV and second screen device (e.g., Segijn et al., 2016).

### Task Inputs

A second category of the multi-dimensions of media multitasking of Wang et al. (2015) is task inputs. Task inputs is about the media content and format. The dimensions belonging to this category are: information modality, information flow and emotional content.

**Information modality.** Information modality is about the different modalities within one medium (Wang et al., 2015). For example, a newspaper is mainly visual, TV content is – in general - audiovisual, and gaming also includes the motor modality. These three modalities – visual, auditory, and motor – are most relevant in media multitasking research (Salvucci & Taatgen, 2011; Wickens, 2002). The more modalities a screen has, the more likely it is that there will be overlap in modality with another screen. In addition, overlap in modalities will lead to structural interference (See also Shared Modality; Salvucci & Taatgen, 2011; Wang et al., 2015).

**Information flow.** A second dimension of task inputs is the flow of the information. The information flow can either be internally or externally paced. When information is internally paced people have control over the information flow, how long they want to pay attention to the message, and the order of the messages. This is for example possible when consumers use their smartphone or tablet. In addition, with externally paced information consumers have no control over the information flow and they can only attend to the information at the moment of presentation (Wang et al., 2015). An example of an externally paced medium is a TV. Although this is not completely true nowadays with the recent developments with interactive TV possibilities where people could pause or forward TV content and TV on demand. However, the medium TV is more externally paced than for example a smartphone, because broadly speaking the order and pace is predetermined. As a result, consumers have less opportunity to process the information of an advertisement presented on TV. The comprehension of the message will be increased when consumers have more control over the pace of the message (MacInnis, Moorman, & Jaworski, 1991). Therefore, it is recommended to show more complex messages on media where consumers have more control over the message and easy to process messages on media with external pace.

In the case of multiscreening, the TV is a more externally paced medium. Therefore, consumers have less possibilities to process the advertisement presented on TV. In addition, the second screen device is a more internally paced medium. However, the pace of second screen devices depends on the task. When consumers are searching for information themselves, they have control. However, the control will be less when, for example, a branded app of a program/commercial break is shown. A branded app is "software downloadable to a mobile device which prominently displays a brand

identity, often via the name of the app and the appearance of a brand logo or icon, throughout the user experience” (Bellman, Potter, Treleaven-Hassard, Robinson, & Varan, 2011, p. 191). In this case, the pace may be predetermined by the app developer.

An example of a second screen app that consumers can use during a commercial break is the previously mentioned STER application (see Task relevance). In this case, the pace is decided by the medium, because it operates simultaneously with the TV content. However, this application has the opportunity to stay longer on a message in the application or to look back to previously shown products/brands. Then the consumer has more control over the pace.

In addition, consumers sometimes use a second screen device to look up relevant information to the TV content (SKO, 2012). This knowledge could be incorporated in traditional TV commercials. For example, by showing a link in the TV commercial may make it easier for consumers to look up relevant information. In this case, consumers have the opportunity to look up further information on their own pace, while initially the information was offered on a more externally paced medium (e.g., the TV).

**Emotional content.** Emotional content is about what content is shown on the media. Is the content positive or negative (i.e., valence) and is it arousing or calm (i.e., intensity. Wang et al., 2015). This is not a specific characteristic of multiscreening and can also differ for each time you watch TV and use a second screen device. However, it is still a dimension to take into account. Emotional arousing content, for example, can attract attention. Thus, when consumers are multiscreening and they focus on the second screen device, an advertisement which is arousing could direct the attention towards the TV. In general more arousing content also leads to more resources allocated towards this content (Lang, 2000; Wang, Lang, & Bussemeyer, 2011). Thus, the advertisement in the example will be processed with more cognitive resources. This could have implications for how the message is processed (see also Task hierarchy).

### Task Outputs

A third category of the multi-dimensions framework is task outputs. This category is about how the nature of multiscreening affects how messages are processed. Two dimensions belong to this category: behavioral responses and time pressure.

**Behavioral responses.** Behavioral responses are about the activity required by the user. Thus, does the task involve any behavioral responses of the user? As previously mentioned, the TV is often used as a background medium (e.g., Papper et al., 2013; Pilotta et al., 2004) and is also characterized as a ‘lean back’ or passive medium. This traditional medium does not require any explicit behavioral responses of the user. However, a second screen device requires more behavioral responses and is a so-

called 'lean forward' or active medium. More behavioral responses add more complex dynamics to media multitasking. Requiring behavioral responses generally also imply demining more resources. Future research could examine how behavioral responses during multiscreening affects advertising effectiveness.

**Time pressure.** Time pressure may have an influence on the performance of multiscreening, for example by influencing the decision making process and deterring the speed versus accuracy tradeoff (Wang et al., 2015). Most of the time multiscreeners will not experience a specific time pressure, for example when consumers look up information on the internet (un)related to the TV content or when they follow/post on Twitter during a TV show. However, there are some examples in which a time constraint is present. This may be caused by the information flow (see Information flow). For example some second screen applications allow users to play along with a TV quiz. Most of the time the user has a limited amount of time to answer questions. This feeling of time pressure could increase levels of stress, which in turn could lead to a decrease in performance (Wang et al., 2015).

It is argued that tasks with high time pressure are less often combined with other tasks (Wang et al., 2015). A reason could be that tasks with higher time pressures require more capacity allocation and, therefore, there are less capacities left for a second task (see also Task hierarchy). A study to media multitasking and advertising found a positive effect of media multitasking on ad evaluations mediated by perception of time (e.g., Chinchanchokchai et al., 2015). The more tasks involved, the faster the time seemed to pass for the participants. They argued that when people are media multitasking they have less cognitive capacities left to focus on time itself.

### User Differences

A final dimension indicated by Wang et al. (2015) is the individual differences between users. Effects of multiscreening may differ for individuals. These individual differences may serve as predictors or moderators of advertising effectiveness. However, there are only limited studies into demographical or psychological individual differences and the effects of multiscreening on advertising. Studies examining individual differences and media multitasking often focus on predictors of engaging in this behavior. This information could also be relevant for advertisers, because it may indicate what kind of people are combining what kind of media, and how often they use it. In other words, where can you find the target group of the campaign?

The literature on demographic predictors is consistent in finding age as a universal predictor of media multitasking behavior (Voorveld et al., 2014). Different studies indicated that, although all age groups multitask, younger people are more likely

to engage in media multitasking behavior (e.g., Carrier, Cheever, Rosen, Benitez, & Chang, 2009; Duff, Yoon, Wang, & Anghelcev, 2014; Voorveld et al., 2014; Voorveld & van der Goot, 2013). In addition, a popular assumption is that women engage more in media multitasking behavior than men. In studies in which multitasking with a media and non-media activity was examined, the results indeed showed that women were more likely to combine these kind of activities (Duff et al., 2014; Hwang, Kim, & Jeong, 2014; Jeong & Fishbein, 2007). Furthermore, there is some evidence that education (Hwang et al., 2014; Kazakova, 2014; Voorveld et al., 2014) and income (Hwang et al., 2014; Voorveld et al., 2014) might also predict of media multitasking behavior. However, education and income appeared to be only predictors in a limited number of cases in specific contexts and the results are mixed. To make further inferences about these demographic predictors more research is needed in this field.

In addition to demographic predictors, some studies also examined some psychological predictors. For example, it was found that people who score high on sensation seeking are more likely to engage in multitasking activities, than people who score low on sensation seeking (Duff et al., 2014; Jeong & Fishbein, 2007; Kononova, 2013; Sanbonmatsu, Strayer, Medeiros-Ward, & Watson, 2013). In addition, it was found that the people who score high on neuroticism (Wang & Tchernev, 2012), impulsivity (Sanbonmatsu et al., 2013), materialism (Kazakova, 2014) or people who perceive themselves as more creative (Duff et al., 2014) or are early adapters of new technologies (Kazakova, 2014) are more likely to engage in media multitasking behavior.

Some psychological predictors of media multitasking were examined in an advertising context, such as perceived ad utility and processing style. People who perceive ads as more useful are more likely to engage in media multitasking (Duff et al., 2014). This indicates the importance of taking media multitasking into account for advertisers. Finally, a study to the effects of processing style and ad recognition found that people with an analytic style (i.e., focus on specific items) showed decreased ad recognition when media multitasking compared to single tasking. In addition, people with a holistic style (i.e., orientation toward the relationship between objects and the field) did not show a decrease in ad recognition (Duff & Sar, 2015). Other factors that were but did not appear to predict of media multitasking behavior were parental education (Jeong & Fishbein, 2007; Kononova, 2013), extraversion (Wang & Tchernev, 2012), cognitive failure, and imagination (Duff et al., 2014).

## MULTISCREENING: CHALLENGE OR OPPORTUNITY FOR ADVERTISERS?

In the previous section the multi-dimensions of multiscreening were described. Based on this typology of multiscreening predictions can be made about what factors could hinder or facilitate processing and therefore advertising effectiveness. As mentioned in the beginning of this chapter media multitasking is often associated with decrease in persuasion, but is multiscreening only a challenge for advertisers or could it also be seen as an opportunity?

A challenge of multiscreening is that consumers have to divide their attention between multiple tasks. Therefore, the opportunity to process the advertisement will decrease. Especially with concurrent modalities and a more externally paced medium these opportunities to process the message are lower than in some other media multitasking situations or when consumers are single tasking. Therefore it is important for advertisers to take these dimensions into account.

Although multiscreening generates some challenges for advertisers, also some new opportunities arise. A second screen device offers the possibility to expose consumers also via this medium to an advertisement, for example through a branded app or synced advertising. In addition to 'simply' advertising twice, a second screen device can also be used to search for related information by consumers, for example when they want to know more about the advertised product or they can even immediately purchase it.

Although this chapter outlines some challenges and opportunities, it should be acknowledged that, with the current knowledge, it is difficult to estimate what the outcomes of multiscreening will be. There is still little knowledge about this phenomenon and also not much is known about the co-occurrence of the multiple dimensions. Future research is needed to provide a broader understanding of this phenomenon and the consequences for advertising effectiveness.

Multiscreening offers, besides its limitations, also new possibilities. In addition, it is expected that the prevalence of multiscreening will only increase in the years to come. Therefore, multiscreening is a phenomenon to take into account when thinking about advertising strategies. This chapter offers a steppingstone for both practitioners and scientist in the field of advertising. The typology of multiscreening can be used as an overview of the challenges and opportunities for advertisers and as a start for future research in the field of multiscreening and advertising effectiveness.

Table 2.1 Summary dimensions per category applied to multiscreening.

Categories	Dimensions	+ / 0 / - <sup>a</sup>	Dimensions applied to multiscreening	Empirical research per dimension
Task relations	Task Hierarchy	0	The message with the highest priority is better processed than the task with the lowest priority. TV is often used as a background medium. By attracting attention towards this medium the focus will shift and the message presented at that moment will be better processed.	Jeong & Hwang (2012), Lin et al. (2009)
	Task Switch	0	Internal interruptions: Switching doesn't have to be negative as long as they are triggered by positive feelings (e.g., exploration, stimulation) and not because of negative feelings (e.g., frustration, boredom). External interruptions: Commercial breaks on TV could induce multiscreening behavior. Stimuli that induce switching in second screen devices can be sounds (e.g., ringtone, beep) or pop-ups.	Adler & Benbunan-Fich (2013), Brasel & Gips (2011), Yeykells et al. (2014)
	Task relevance	+1	The tasks/messages involved in multiscreening may serve an overarching goal what is less cognitive demanding than having two different goals and the messages will therefore be better processed.	Angell et al. (2015), study 1 of Kazakova et al. (2016), Van Cauwenberge et al. (2015)
	Shared modality	-1	Both media (TV and second screen device) have concurrent modalities (both visual). This leads to structural interference.	Jensen et al. (2015); Jeong & Hwang (2014)
	Task contiguity	0	The physical closeness of the TV and the second screen device may differ each time people are multiscreening and may even differ within a time they are used.	-
Task inputs	Information modality	-1	The more modalities a screen has, the harder it may be to combine it with another screen.	-
	Information flow	0	A TV is a more externally paced medium and a second screen device a more internally paced medium. When consumers have more control over the pace the opportunity to process the advertisement is higher.	-
	Emotional content	0	Emotional content can attract attention to one or the other medium.	Wang et al. (2011)

Table continues on next page.

Table 2.1 (Continued).

Task outputs	Behavioral responses	+1	More behavioral responses require more cognitive resources. TV requires in general a low level of behavioral responses, but the second screen device requires more behavioral responses.	-
	Time pressure	0	When people are multiscreening time seem to pass faster and therefore they will have a more positive evaluation of the ad.	Chinchanachokchai et al. (2015)
User differences	User differences	-	<ul style="list-style-type: none"> <li>- Younger people are more likely to multitask</li> <li>- Other predictors are gender, education, and income</li> <li>- Sensation seekers, neuroticism, and creativity are found to be psychological predictors of multitasking behavior</li> <li>- Processing style has an influence on ad recognition</li> </ul>	e.g., Carrier et al. (2009), Duff & Sar (2015), Duff et al. (2014), Jeong & Fishbein (2007), Voorveld et al. (2014), Voorveld & van der Goot (2013)

Note. The categories and dimensions are based on the multi-dimensions of Wang et al. (2015).

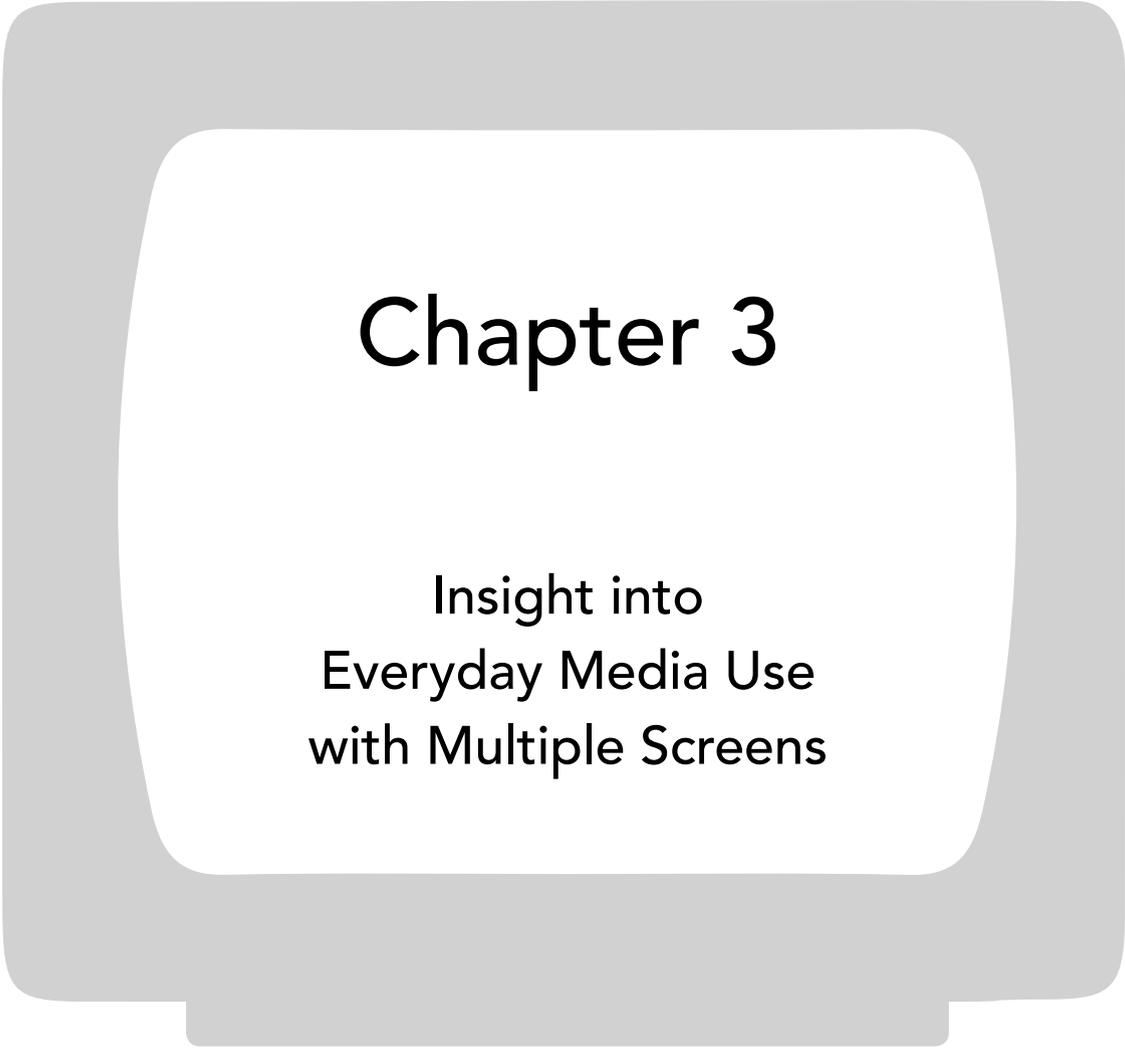
<sup>a</sup> Values are based on the coding scheme of Wang et al. (2015) (available on the journals website). In general, +1/-1 indicate relatively high/low levels of the dimension and 0 indicate ambiguous presence.

# 2

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# Chapter 3

Insight into  
Everyday Media Use  
with Multiple Screens

## ABSTRACT

Multiscreening has been shown to affect consumers' brand attitudes and their memory of advertisements. However, little is known about the prevalence of using multiple screens simultaneously and, thus, the severity of the impact that this multiscreening phenomenon has on advertising effects. The aim of this study is to provide insight into everyday multiscreening by examining its prevalence, the composition of screens, and who is likely to multiscreen. A diary study with a representative sample of the Dutch population was conducted. In total, 2,399 participants filled in a media diary for seven consecutive days. First, the results showed that almost 60% of the participants multiscreened at least once. They multiscreened on average three days a week, mostly on Sundays, and on average more than 80 minutes per day. Second, the most prevalent screen combinations were TV-smartphone, TV-laptop, and TV-tablet. Third, multiscreeners were on average 41 years old, predominantly female, have a higher than average education, and own on average more than four screens. Finally, it was found that, in general, younger participants multiscreened longer than older participants.

## INTRODUCTION

How often do consumers still watch television without doing something else, such as texting a friend on their smartphone or checking e-mail on their laptop? The simultaneous usage of multiple screens, such as a TV, smartphone, laptop, and tablet, is known as multiscreening (Chinchanachokchai, Duff, & Sar, 2015; Segijn, 2016). Recent research shows that multiscreening affects consumers' ad and brand attitudes (e.g., Kazakova, Cauberghe, Hudders, & Labyt, 2016; Segijn, Voorveld, & Smit, 2016) as well as consumers' memory of advertisements (e.g., Angell, Gorton, Sauer, Bottomley, & White, 2016; Duff & Sar, 2015). However, little is known about the *prevalence* of multiscreening, which is surprising considering the growth of research on the effects of this phenomenon and the implications of its findings for practitioners. To get a better understanding of the importance of the tested effects, it is necessary to examine the prevalence of this phenomenon. Relevant questions are 1) to what extent does multiscreening occur in real life outside the lab, 2) which screens are combined, and 3) who is likely to multiscreen? Therefore, the current study aims to get a better understanding of multiscreening by looking at 1) the prevalence of multiscreening, 2) the composition of screens, and 3) the multiscreeners.

The first aim is to gain insight into the prevalence of multiscreening (*to what extent does multiscreening occur?*). Multiscreening is a form of media multitasking (i.e., the simultaneous usages of multiple media; Jeong & Hwang, 2012; Voorveld, 2011) in which multiple screens are combined simultaneously. Previous studies show that about 25-50% of people's media consumption consists of *media multitasking* (Foehr, 2006; Pilotta, Schultz, Drenik, & Rist, 2004; Voorveld & van der Goot, 2013). However, different forms of media multitasking are likely to influence prevalence, media use, and media effects (e.g., Wang, Irwin, Cooper, & Srivastava, 2015; Xu, Wang, & David, 2016). To our knowledge, specific details about the prevalence of multiscreening are yet unknown.

The second aim of the current study is to examine the prevalence of various compositions of multiscreening (*which screens are most often combined?*). Consumers have access to a variety of screens, such as a TV, computer, laptop, smartphone, tablet and more. All these different screens can be used to multiscreen. So far it is unknown which screens are most often combined, however, this knowledge is relevant for both practitioners and scholars. It could benefit practitioners by justifying the use of specific screen media. For example, when advertisers want to advertise simultaneously on TV and a second screen, it is useful to know which screen is most often combined with TV. In addition, these results provide insights into prevalent screen compositions, and will therefore advance theory about media-related factors in a multiscreening context.

The final aim is to examine the multiscreeners themselves (*who* is likely to multiscreen?). The focus in the media multitasking literature is mostly on age, gender, education, and media ownership (Jeong & Fishbein, 2007), which is why the current study investigates these variables for multiscreening. Previous research indicates that there might be differences in user-related factors for different combinations of media. For example, previous research found that in some countries people prefer to multitask with different media than in other countries (Voorveld, Segijn, Ketelaar, & Smit, 2014). However, to our knowledge these user-related factors have not yet been examined for multiscreening. These insights are important for practitioners because they might help to develop profiles of consumers and segment target groups. Finally, the current study will build on previous work that examined user-related factors for other forms of media multitasking.

## THEORETICAL BACKGROUND

### Multiscreening

Multiscreening is defined as using a combination of multiple screens simultaneously without the co-occurrence of another non-media related activity (Segijn, 2016). Just like media multitasking, multiscreening includes multiple tasks that are carried out on different media with some temporal overlap (Adler & Benbunan-Fich, 2012; Benbunan-Fich, Adler, & Mavlanova, 2011; Salvucci & Taatgen, 2011). No complete temporal overlap exists between the tasks, because consumers' attention cannot simultaneously be divided among different tasks when both tasks require the same type of (visual) attention. Therefore, multiscreening entails a more interleaved strategy where one task is temporarily suspended to allocate visual attention to another task. Thus, multiscreening should be seen on a continuum that ranges from tasks that involve frequent attention switching to tasks that involve long time spans between switches (Salvucci & Taatgen, 2011).

Multiscreening is different than, for example, the combination of TV-radio, or newspaper-radio, on several dimensions (Segijn, 2016; Wang et al., 2015). First, one of the most distinctive characteristics of multiscreening is the concurrent visual modalities. As mentioned, this makes it difficult for consumers to process information concurrently because it requires the same type of attention opposed to a combination of purely audio and visual media (i.e., newspaper and radio). Second, the multiple – and often interactive – screens make it relatively easy to present related information on both screens. For example, this characteristic of multiscreening offers opportunities

for marketers to engage people (Vaccari, Chadwick, & O'Loughlin, 2015) or expose consumers to a brand on multiple platforms simultaneously (Segijn, 2016).

### **Multiscreening and Advertising Effects**

The body of literature on multiscreening and advertising effectiveness is expanding. So far, there is one literature overview that describes challenges and opportunities for marketers (Segijn, 2016) based on dimensions of media multitasking (Wang et al., 2015). In addition, several effect studies are conducted on various outcomes, such as brand memory (e.g., Angell et al., 2016; Duff & Sar, 2015; Kazakova et al., 2016), brand and ad attitudes (e.g., Chinchanchokchai et al., 2015; Segijn, Voorveld, & Smit, 2016), and perceived intrusiveness of commercials (Kazakova et al., 2016). Overall, the results of these effect studies showed a decrease in memory of advertisements when people are multiscreening compared to single screening (e.g., Angell et al., 2016; Segijn et al., 2016; Kazakova et al., 2016). Furthermore, studies found positive effects of multiscreening on affective advertising outcomes (Chinchanchokchai et al., 2015; Kazakova et al., 2016). However, a study also found that this effect depends on the underlying mechanism; Multiscreening could lead to more positive brand evaluations because people are less able to resist the persuasive message when multiscreening compared to single screening. On the other hand, multiscreening could lead to less positive brand evaluations because people would recognize the brand less compared to people who only use one screen (Segijn et al., 2016). Overall, these studies showed interesting effects of multiscreening. To get a better understanding of the importance of these effects, we need to know more about the prevalence of multiscreening.

### **Prevalence of Multiscreening**

The Nielsen Company survey of connected device owners states that about a quarter of the smartphone and tablet owners use their device daily while watching TV (Nielsen, 2013). All multiscreening studies rely on this survey to indicate the prevalence of this phenomenon. However, this Nielsen study has some shortcomings. First, Nielsen only examined smartphone and tablet use in combination with TV. In reality, consumers have access to more screens that they can use to multiscreen, such as laptop, PC or game device. Therefore, the current study includes all types of screens to get a complete picture of the whole phenomenon of multiscreening.

Second, Nielsen used a survey in which people had to answer questions about their media use in the past. This can be problematic because people have difficulty assessing their media exposure at a later point in time (de Vreese & Neijens, 2016; Slater, 2004), which makes it harder for people to accurately report their media use in

a survey (Brasel & Gips, 2011; Papper, Holmes, & Popovich, 2004; Voorveld & van der Goot, 2013). A more reliable method would be to make use of diaries, because data would be collected more closely to the moment of actual media usage (Papper et al., 2004; Voorveld & van der Goot, 2013). This will lead to less memory problems and more accurate results of media use. Therefore, the current study makes use of media diaries.

Finally, the Nielsen survey only examined smartphone and tablet owners. However, not every consumer might own the screens they use when multiscreening, such as adolescents living in a household where the parents own the screens. For a complete and correct account of the prevalence of multiscreening, these non-owners have to be taken into account as well. The current study, therefore, includes a random sample of the general population.

Thus, the Nielsen survey provides, to our knowledge, the only statistics currently available about the prevalence of multiscreening and it has several shortcomings. It is time for an update. Therefore, our first aim is to examine the prevalence of multiscreening. To this end, we formulated the following research question:

RQ1: To what extent are consumers engaging in multiscreening?

### **Composition**

The second aim of our study is to examine which screens are most often combined. It is argued that differences in media-related factors may influence how often a screen is combined with another screen because media-related factors could influence how cognitively demanding screen combinations are. In addition, the more cognitively demanding a medium is, the less it will be combined with another medium (Wang et al., 2015). Media-related factors that could influence this are information modality, information control, behavioral responses, and time pressure. We will discuss these four media-related factors below.

Information modality is related to the different modalities within a medium. For example, TV is audiovisual while a game console is audiovisual and strongly relies on the motor modality. It is argued that more modalities imply that more cognitive resources are required to process the information. Therefore, a screen with more modalities would be more cognitively demanding (Wang et al., 2015). For this reason, a TV would require less cognitive resources, and would be easier to combine with other screens than a game console.

Differences in screen compositions can also be explained based on who has control over the pace in which information is presented. The content can be internally or

externally paced. When the content is internally paced, the user has the control over the media content (e.g., Dijkstra, Buijtelts, & van Raaij, 2005; Voorveld, Neijens, & Smit, 2012). This is, for example, the case with an e-reader in which the user decides when to go to the next page and whether he needs to re-read certain information. However, TV is a mainly externally paced medium. It is decided beforehand how fast information is presented to the users and in which order (Dijkstra et al., 2005). The more people can control the pace, the less cognitively demanding the screen is (Wang et al., 2015), thus the more likely is that it is combined with other screens.

The number of behavioral responses that are required of the media user could also impact the prevalence of screen composition. Screens can be distinguished into lean back and lean forward media. Lean back media include media that do not require many behavioral responses of the media user, such as TV. To the contrary, many behavioral responses are required when using a game console, a lean forward medium. More behavioral response means more interaction and is therefore more cognitively demanding (Wang et al., 2015). Thus, it is less likely that a game console will be combined with other screens than a TV based on the number of behavioral responses.

A final media-related factor that could influence the composition of screens is time pressure. This is the (a)synchronicity of the medium (Wang et al., 2015). In other words, is it important that the media user responds immediately (i.e., synchronous) or is it possible to wait for the response (i.e., asynchronous). For example, a video game requires immediate response to certain cues, whereas checking email on a PC allows for a time lag-delay. It is argued that less time pressure is less cognitively demanding and a screen with this characteristic is therefore more easily combined with other screens.

These media-related factors described above indicate that some combination of screens might be easier to use and to combine with other screens than others. In addition to media related factors, screen ownership as a user-related factor could also be important in the prevalence of screen compositions. Some screens are more prevalent than others. Recent numbers showed, for example, that almost everyone (96.8%) has access to a TV, but almost half (46.9%) of the Dutch population has access to a desktop PC (SKO, 2016). Therefore, it could be expected that the TV is more often combined with another screen than a desktop PC. We formulated the following research question to examine which screens are most often combined when multiscreening:

RQ2: Which screens are most often combined when multiscreening?

### The Multiscreeners

The third aim of this study is to examine who is likely to multiscreen. Therefore, we have to examine certain user-related factors, namely age, gender, education, and screen ownership. These user-related factors are most often examined factors in media multitasking literature (Jeong & Fishbein, 2007), but not yet for multiscreening. To build on previous research, we test their relationship to multiscreening.

Age has proven to be a universal predictor of media multitasking across countries (Voorveld et al., 2014). Although it is often found that all age groups and generations engage in media multitasking, the studies are consistent in the finding that younger people are more likely to multitask than older people (e.g., Carrier et al., 2009; Duff et al., 2014; Hwang, Kim, & Jeong, 2014; Voorveld et al., 2014; Voorveld & van der Goot 2013; Voorveld & Viswanathan, 2014). An explanation for this finding could be that adoption rates of media vary among generations (Brasel & Gips, 2011; van der Goot, Rozendaal, Oprea, Ketelaar, & Smit, 2016). Results showed that it is more likely that age groups use the medium of their generation. For example, people between 54-81 years old are more likely to use a newspaper, whereas younger people (17-34) are more likely to use new media (van der Goot, et al., 2016). New media have characteristics (e.g., ease of switching, multiple screens/apps on one device, pop-ups) that stimulate media multitasking (Voorveld et al., 2014). Thus, it is argued that differences in adoption rates of different media could also explain the differences in media multitasking (Carrier et al., 2009; Voorveld & van der Goot, 2013). Another explanation could be that older people have more difficulties with media multitasking because with age, people become less cognitively flexible (Brasel & Gips, 2011). Older people have more difficulties with rapidly switching between tasks (Clapp, Rubens, Sabharwal, & Gazzaley, 2011) and, therefore, it is less likely that they engage in media multitasking.

Second, research on gender related to media multitasking has shown mixed results. Some studies have found that women are more likely to engage in media multitasking than men (Duff et al., 2014; Hwang et al., 2014; Jeong & Fishbein, 2007; Voorveld & Viswanathan, 2014), whereas other studies did not find significant gender differences across multitaskers (Christensen, Bickham, Ross, & Rich, 2015; Kononova, 2013; Voorveld et al., 2014). Although gender is sometimes assumed and found to be related to media multitasking, it is unclear why there would be gender differences. Some argue that women have greater neurological capacities for multitasking (Fisher, 1999, in Christensen et al., 2015). However, the *ability* to multitask does not necessarily relate to the *preference* to multitask or the actual *behavior* (König & Waller, 2010; Poposki & Oswald, 2010).

A third user-related factor is the level of education. Although some studies on media multitasking take education into account as predictor, no theoretical

explanation is provided why education might predict media multitasking. So far, there have been mixed results. In the study of Voorveld et al. (2014), education level was found to be a negative predictor of media multitasking, showing that people with lower education levels were less likely to engage in multitasking. However, educational level was found to be a positive predictor in the study of Hwang et al. (2014), whereas the study of Foehr (2006) showed no significant relation.

Finally, media ownership, in this case screen ownership, could be related to multiscreening. It is reasonable to assume that the more screens a consumer owns, the more access they have to the screens, the more likely it is that they will multiscreen. So far, it was found that the more media someone owns, the more likely they will engage in media multitasking (Jeong & Fishbein, 2007; Kononova, 2013; Voorveld & Viswanathan, 2014).

The results described above result from media multitasking research. However, how these user-related factors are related to multiscreening has not yet been examined. To this end, we formulated the following research question:

RQ3: Who is likely to multiscreen in terms of age, gender, education, and screen ownership?

## METHOD

A secondary analysis was performed on data collected collectively by the official audience measurement institutes for television, radio, print internet, and the government agency 'The Netherlands Institute for Social Research'. This study was intended to provide insight into the everyday media use of the Dutch population across all media platforms and devices. The study was conducted between the last three weeks of September and the first 2 weeks of October 2013. This period is considered to be relatively neutral given the absence of seasonal effects on media use from either summer or winter.

### Sample

Participants were recruited from the sample of the national print study, which used a randomly selected sample of addresses to recruit participants. The aim of the national print study is to determine the reach of print publication. Participants of the national print study are randomly selected twice a year from a database containing all private postal delivery points in the Netherlands (excluding companies, shops, etc.). Each selected household receives a letter announcing the study and, if necessary,

a reminder letter. In each household the person whose birthday is closest in time is asked to participate. In total 8,200 participants are recruited every year. The current study used a randomly selected sample of participants who participated in the national print study in the two years prior to this research and had indicated to be willing to participate in future research. A maximum of three attempts were made to contact a participant: first by telephone, then by e-mail, and finally by mail. 13,380 people were initially approached of which 54.3% ( $n = 7,268$ ) were reached. These people were asked to participate in a diary study and 63.8% ( $n = 4,638$ ) agreed to fill in the media diaries. Eventually, 2,399 people completed the media diaries for seven consecutive days. This is 17.9% of the 13,380 people who were initially approached and 51.7% of the 4,638 people who agreed to participate in the study. Participants received a gift card worth 30 euro for participating. The final sample ( $n = 2,399$ ) had a mean age of 42.22 ( $SD = 15.55$ ), owned on average 4.21 screens ( $SD = 1.46$ ), and consisted of 59.4% females. The sample is diverse and reflects a representative sample of the Dutch population (see Table 3.1 for an overview).

### Procedure

Participants were sent instructions for the online diary (Figure 3.1) which showed them how they could login and how they could navigate through the diary. Also, it explained what the respondents needed to record in the diary and how they should record it. Furthermore, they received a document explaining all the categories used for different activities, and a paper diary they could use to make notes of their time use during the day. Also, they received a link to the online diary in which they filled in their media use. They could report their media use at any given moment during the day up until two days after the final day. Before filling in the media diary for the first time, participants completed an online questionnaire in which their age, gender, education, and screen ownership was recorded.

Participants were randomly assigned a start day for recording their activities and were asked to keep a diary for seven consecutive days. In the diary, participants recorded their activities for every ten minutes. They were asked to report any activity that lasted five minutes or longer. They were instructed to make a distinction between main activities (e.g., working, sleeping, media use, etc.) and media activities (e.g., watching TV, listening to music, etc.). For each time slot, participants had to fill in one main activity, accompanied by the opportunity to fill in three simultaneous media activities (Figure 3.1). For media activities participants recorded both the type of activity as well as the device used. For example, participants could report eating as a main activity and watching TV and reading newspaper as two specific media activities. To reduce

missing data when submitting a day in the diary, the software checked whether every ten-minute interval included a main activity and if all media activities always included both an activity and a device. The participant could not continue submitting the diary of a certain day until all necessary fields were completed. To improve data quality we checked the diaries on unusual behavior. A day was flagged if the diary was sent in

**Table 3.1** Descriptive statistics in sample ( $n = 2,399$ ) and general population of the Netherlands.

Demographic variable		Sample	Population
		%	%
Gender			
	Female	59.4	50.7
	Male	40.6	49.3
Age groups			
	13-19	6.8	9.9
	20-34	27.8	21.7
	35-49	32.3	26.5
	50-64	23.3	24.2
	65+	9.7	17.7
Education			
	1 No/basic education	0.8	4.7
	2	7.3	17.1
	3	9.3	7.0
	4	23.3	34.7
	5	10.9	6.0
	6	33.6	21.1
	7 Graduate level or higher	14.2	9.5
Region			
	North	9.0	10.3
	East	19.8	20.9
	South	20.9	24
	West	50.2	44.8

either 12 hours before the end of the day or 48 hours after. Days were also flagged if the number of main activities recorded was three standard deviations either above or below the mean (i.e., less than one or more than sixteen main activities on one day). Participant who received flags for responding too early or too late on one or more days and who recorded too little main activities on more than one day were excluded from the data, this was the case for 39 participants.

### Measures

**Prevalence.** To calculate the amount of time people engaged in multiscreening, we first selected all responses in which the main activity was ‘media use’. In addition, we identified the amount of ten-minute time slots that participants indicated the use of two or three screens simultaneously. People could indicate from a list to have used the following screens: television, laptop, smartphone, desktop PC, tablet, e-reader, and game device (this includes both game consoles and portable game devices). The amount of time people combined two or three of these screens was calculated in minutes.

**Composition.** Composition was calculated by selecting every time a participant used two screens simultaneously when ‘media use’ was chosen by the participant as the main activity. For every participant, we checked for each possible composition if the participant had used (1) or not used (0) this combination of screens in the week of filling in the diary.

**User-related factors.** The predictors of interest were measured in a questionnaire, which participants filled in before using the online media diaries. Age was recorded



Figure 3.1 Online Media Diary (Source: GfK).

by asking the participants date of birth; gender could be indicated by checking 'male' or 'female'; level of education could be indicated by selecting one of seven categories ranging from 1 'no/basic education' to 7 'Graduate level or higher'. For screen ownership we asked participants to indicate which of the following devices they owned: television, laptop, smartphone, desktop PC, tablet, e-reader, and game device. A sum score was calculated for amount of screens owned per participant.

## RESULTS

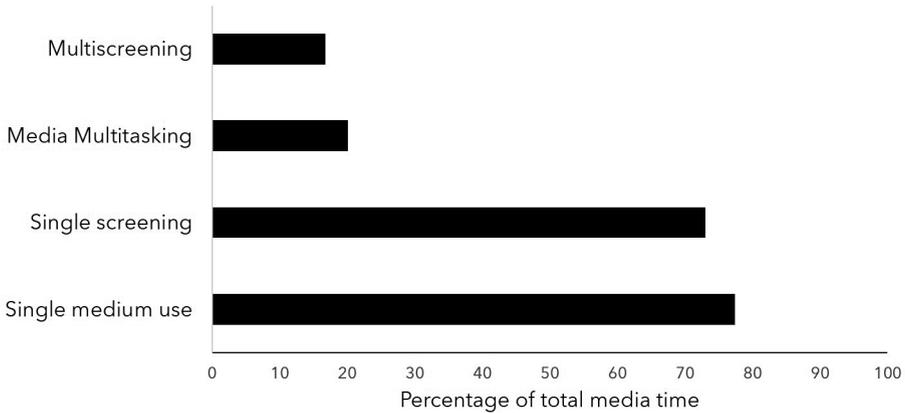
### RQ1: Prevalence of Multiscreening

In total, 59.3% of the participants ( $n = 1,423$ ) indicated to have used multiple screens simultaneously at least once in the diary measurement week. These 'multiscreeners' spent 239.76 minutes (almost four hours) multiscreening on average in the measured week ( $SD = 355.10$ ). This is about 30 minutes per day ( $M = 34.25$ ,  $SD = 50.73$ ). Furthermore, multiscreeners multiscreen on average 2.86 days a week ( $SD = 1.82$ , range 1-7). This is equally spread over the week. On each day, about 40% of the multiscreeners multiscreen at least once. When zooming in to this specific group of the multiscreeners, the results show that they multiscreen between 77 and 96 minutes per day (Table 3.2). To put this into perspective, the total multiscreening time is 16.8% of the total time multiscreeners spent using media<sup>1</sup>. In addition, 83.3% of all media multitasking consists of using of multiple screens simultaneously (Figure 3.2).

Furthermore, there was no significant difference in the amount of multiscreening between an average week day ( $M = 33.85$ ,  $SD = 52.07$ ) and a weekend day ( $M = 35.25$ ,  $SD = 66.41$ ),  $t(1422) = -0.954$ ,  $p = .340$ . However, when comparing the seven days, results showed a difference between Sundays and Fridays ( $p = .006$ ), and between Sundays and Saturdays ( $p = .004$ ),  $F(6, 1422) = 3.61$ ,  $p = .001$ ,  $\eta^2 = .003$ . On Sundays people multiscreened the most (Table 3.2).

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<sup>1</sup>This doesn't include media use in combination with a non-media activity (e.g., eating and watching TV).



**Figure 3.2** Percentage media use of total media time among multiscreeners.  
 Note. The figure indicates the percentage of the total media time. Total media time includes all media use indicated as the main activity. This does not include media use combined with a non-media activity (e.g., eating, working, etc.).

**Table 3.2** Percentage of multiscreeners and the amount of multiscreening per day.

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
% multiscreening	42.4%	42.0%	43.1%	40.7%	40.0%	36.4%	41.3%
Multiscreening in minutes							
All multiscreeners <sup>1</sup>	35.57 <sup>ab</sup> (73.15)	33.92 <sup>ab</sup> (74.02)	34.57 <sup>ab</sup> (71.01)	34.10 <sup>ab</sup> (78.50)	31.10 <sup>b</sup> (67.88)	30.72 <sup>b</sup> (67.99)	39.78 <sup>a</sup> (91.69)
Multiscreeners per day <sup>2</sup>	83.94 (92.59)	80.58 (96.25)	80.11 (89.68)	83.82 (104.81)	77.77 (88.88)	84.38 (90.44)	96.44 (122.18)

Note. The table presents 1) the percentage of multiscreeners who multiscreen on a certain day and 2) the average amount of multiscreening in minutes with the standard deviation in parentheses. Different superscripts indicate significant differences between days. Multiscreening in minutes is presented for all multiscreeners<sup>1</sup> ( $n = 1,423$ ) and for the percentage of multiscreeners that multiscreen on that specific day<sup>2</sup> ( $n$  varies per day, see % multiscreening).

**RQ2: Composition of Screens**

Second, we wanted to examine which screens are most often combined. The most prevalent combinations of screens are 1) TV–smartphone (39.6%), 2) TV–laptop (39%), and 3) TV–tablet (30.8%), see Table 3.3, column 3. Thus, 39.6% of the multiscreeners indicated to have used the combination of a TV and smartphone at least once in the measured week.

However, not every multiscreener also owns all screens (Table 3.4). The multiscreeners own on average 4.37 screens ( $SD = 1.38$ ). Almost every multiscreener owns a TV (96.3%), but only one-fifth owns an e-reader (18.3%). Therefore, we conducted the same analyses to examine the prevalence of combination of screens, but this time only for the multiscreeners who indicated that they own the specific combination of screens. In this case, the most prevalent combinations of screens are 1) TV-tablet (53.1%), 2) TV-smartphone (49.6%), and 3) TV-laptop (46.8%) (Table 3.3, column 5). Thus, 53.1% of the multiscreeners who own a TV and a tablet indicated to have used this combination of screens at least once in the measured week.

There is an interesting difference in the TV-tablet combination compared to all multiscreeners Table 3.3, column 3 with the multiscreeners who own these two screens Table 3.3, column 5. This indicates that the tablet is not a screen that every multiscreener owns. However, when they do own a tablet, more than half of them use this screen simultaneously while watching TV. Table 3.3 also shows that the TV is the most often combined screen, followed by the smartphone. An e-reader and a game device are the least often combined with another screen.

Table 3.3 Prevalence of screen composition among multiscreeners and screen owners.

Combination of screens	Multiscreeners (n = 1,423)		Multiscreeners who own the combination of screens	
	prevalence <sup>a</sup> %	n	screen ownership <sup>b</sup> n	prevalence <sup>c</sup> %
TV	39.6%	1,038		49.6%
TV	39.0%	1,116		46.8%
TV	30.8%	772		53.1%
Laptop	16.2%	905		23.3%
TV	16.0%	790		25.6%
PC	9.8%	607		14.2%
Tablet	6.4%	641		12.0%
Tablet	3.6%	652		7.1%
Laptop	2.5%	581		4.1%
Tablet	2.4%	495		6.1%

Table continues on next page.

Table 3.3 (Continued) Prevalence of screen composition among multiscreeners and screen owners.

Combination of screens	Multiscreeners (n = 1,423)		Multiscreeners who own the combination of screens	
	prevalence <sup>a</sup> %	screen ownership <sup>b</sup> n	prevalence <sup>c</sup> %	prevalence <sup>c</sup> %
Smartphone	1.5%	112	1.8%	1.8%
Laptop	1.0%	112	0.9%	0.9%
TV	0.9%	254	4.3%	4.3%
TV	0.9%	112	0.9%	0.9%
E-reader	0.6%	211	2.8%	2.8%
PC	0.5%	112	0.9%	0.9%
Tablet	0.4%	112	0.9%	0.9%
E-reader	0.2%	158	1.9%	1.9%
Tablet	0.1%	165	0%	0%
E-reader	0%	220	0%	0%
E-reader	0%	112	0%	0%

Note. The percentage indicates the percentage of multiscreeners that combined the two screens at least once in the diary measurement week. No distinction could be made between primary and secondary screen in terms of attention.

<sup>a</sup> The third column shows the percentage of multiscreeners who indicated to use a certain combination of screens. For example, 39.6% of the multiscreeners indicated to use a TV and smartphone simultaneously and only 2.4% of the multiscreeners indicated to use a tablet and PC simultaneously.

<sup>b</sup> The fourth column shows the number of multiscreeners who indicated to own the combination of screens. For example, 1,038 participants indicated to multiscreen, to own a TV, and to own a smartphone.

<sup>c</sup> In the fifth column the percentage of screen owners is presented who actual use the specific combination to multiscreen. For example, almost half of the participants (49.6%) who multiscreen, own a TV, and own a smartphone, also use this combination to multiscreen.

**Table 3.4** Screen ownership.

	% of multiscreeners
TV	96.3%
Laptop	81.5%
Smartphone	75.8%
PC	57.2%
Tablet	55.5%
Game console	39.4%
E-reader	18.3%
<i>n</i>	1,423

**Table 3.5** Descriptive statistics for each subsample.

	All participants	Multiscreeners	TV-Smartphone	TV-laptop	TV-tablet
Age	42.22 (15.55)	40.59 (14.70)	34.89 (13.02)	41.37 (13.88)	42.79 (12.86)
Gender (female)	59.4%	60.9%	66.3%	66.1%	59.6%
Education	4.95 (1.52)	4.99 (1.48)	5.07 (1.37)	4.86 (1.50)	5.09 (1.47)
Screen ownership	4.21 (1.46)	4.37 (1.38)	4.55 (1.27)	4.26 (1.34)	4.91 (1.22)

**RQ3: The Multiscreeners**

To examine the group of multiscreeners we first looked at the descriptive statistics of all participants, the multiscreeners, and the users of the top three combination of screens (i.e., TV-smartphone, TV-laptop, and TV-tablet). Multiscreeners are on average 40.59 years old ( $SD = 14.70$ ), predominantly female (60.9%), have a higher than average education ( $M = 4.99$ ,  $SD = 1.48$ ), and own on average 4.37 screens ( $SD = 1.38$ ). Generally, the same pattern was observed in the subsamples of the top three combination of screens with some small differences (Table 3.5).

Some variations can be observed for age. The boxplot presented in Figure 3.3 provides more detailed information about the age differences per subsample. The boxplot shows that multiscreening is for all ages (range 14-82 years old), but that small differences per subsample are present. For example, the TV-smartphone users are younger compared to the other subgroups. Fifty percent of the TV-smartphone users

is 33 years or younger, whereas in the other groups the median is around 41 years. Also the age range differs per subsample. Whereas the minimum age range is relatively constant over the subsamples (varying between 13-15 years old), the maximum age varies between 72-82 years old depending on the combination of screens used (Figure 3.3).

It should be noted that these descriptive statistics presented in Table 3.5 are about the multiscreeners who indicated that they multiscreened at least once, and it does not take duration of multiscreening into account. To further examine this, multiple regressions were conducted for each subsample including all the user-related factors as independent variables and the amount of multiscreening in minutes as dependent variable (Table 3.6). Overall, the regressions showed that the younger people are the more minutes they spent multiscreening. In addition, men appeared to multiscreen longer than women but only in the multiscreening and TV-smartphone subsample. Finally, screen ownership only affects amount of multiscreening when looking at all participants. Thus, the analyses showed that age is the most important user-related factor for multiscreening, followed by gender.

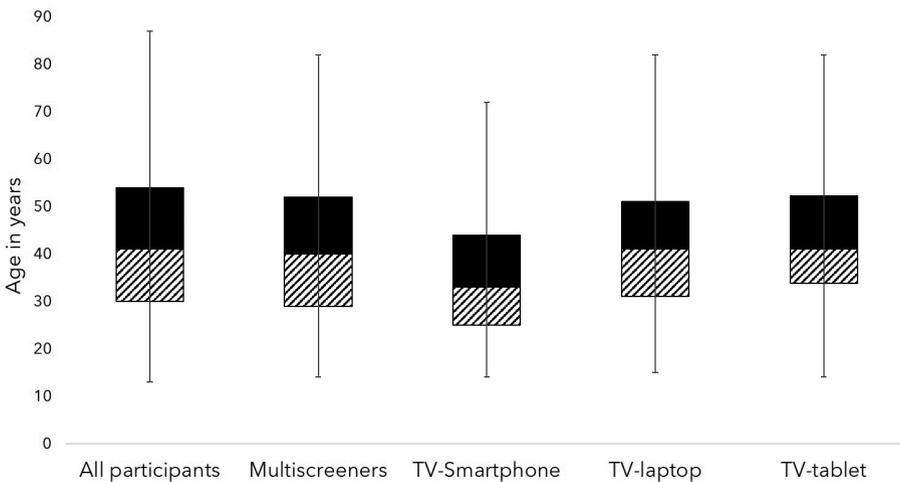


Figure 3.3 Boxplot on age per subsample.

**Table 3.6** Multiple regression of multiscreening and the user-related factors.

	All participants	Multiscreeners	TV-Smartphone	TV-laptop	TV-tablet
Age	-.140***	-.130***	-.154***	-.039	-.069
Gender (female)	-.030	-.055*	-.090*	-.070	-.023
Education	-.010	-.041	-.062	-.010	-.088
Screen ownership	.059**	-.031	.050	.017	.000
R <sup>2</sup>	.027	.021	.039	.006	.012
n	2,381 <sub>a</sub>	1,410 <sub>a</sub>	558	552	435

<sub>a</sub> Not every participant filled in their educational level ( $n = 18$ ). \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .

## CONCLUSION AND DISCUSSION

The aim of this study was to provide insight into the phenomenon of multiscreening by examining its prevalence, the composition of screens, and the multiscreeners. This study is innovative as it examines 1) the prevalence of this specific form of media multitasking by means of media diaries, 2) different screen compositions, and 3) who is likely to multiscreen for different combinations of screens. Furthermore, a strength of the study is that it makes use of a representative sample of the Dutch population. Therefore, the external validity of the results is high. However, future research is necessary to provide further validation of the study's results and generalizability to the Dutch population.

First, the results of the study showed that almost 60% of the participants multiscreened at least once in the diary measurement week. These multiscreeners multiscreen on average three days a week and when they do, it is between 77 and 96 minutes per day. It should be noted that multiscreening entails only the use of multiple screens *without* the co-occurrence of a non-media related tasks. Thus, more than half of the participants used on average more than 80 minutes a day multiple screens simultaneously besides the time that they were sleeping, eating, working, commuting, etc. This also does not include the times the participants are single screening or when they use screens in combination with other media, such as a radio or newspaper.

Second, the results of the study show that the screens that are most often combined are: TV-laptop, TV-smartphone, and TV-tablet. This is the case for all multiscreeners, both for screen owners and non-owners. In general, the TV is the screen that is most often used in combination with any other screen, and the e-reader and game device

are the least often combined. One explanation can be found in media-related factors. The lean backward nature of the medium TV makes it less cognitively demanding and therefore easier to combine with another screen (Wang et al., 2015). The e-reader and game device are least often combined with another screen. A game device is harder to combine with another screen because it demands a lot of cognitive capacities since it involves multiple modalities, requires a lot of behavioral responses, and time pressure is experienced (Wang et al., 2015). However, the e-reader is only visual, is internally paced, doesn't require a lot of behavioral responses, and no time pressure is experienced. Perhaps a more plausible explanation is screen ownership. The e-reader and game device are screens that are least owned. Conversely, almost every participant indicated to own a TV. Thus, it is important to also take screen ownership into account in future research.

Third, the results of the study provide insight into who is likely to multiscreen. The results show that multiscreeners are on average 40.59 years old, predominantly female, have a higher than average education, and own on average 4.37 screens. However, these results include everyone who indicated that they multiscreen at least once, and it does not take duration of multiscreening into account. Looking at the amount of multiscreening in minutes, the results show that in general the younger people are, the longer they will multiscreen.

Similar to media multitasking research, age is found to be a predictor of amount of multiscreening. The explanation that older people would not engage in multiscreening because they would be less cognitively flexible does not hold, because the results show that multiscreening is for all ages. The previous explanation of the media generations is more plausible as indicated by the lower age range for TV-smartphone users. However, this assumption does not apply to the TV-tablet users. An alternative explanation might be that certain media-related factors are more preferred by certain age groups because these factors accommodate some age-related limitations. For example, a tablet has a relatively large screen size, buttons are easy to select accurately, it involves intuitive usage, and it involves easy hand-eye coordination. These media-related factors make the tablet easy to use for all age groups (Caprani, O'Connor, & Gurrin, 2012).

### Implications

The results of the study have major theoretical and practical implications. First of all, these results will advance multiscreening research by providing a baseline number for the prevalence of this phenomenon. In addition, these results support the importance of this phenomenon and justify further research, for example, into how multiscreening

affects advertising effectiveness. Therefore, it may encourage researchers to continue examining the consequences of this behavior. It also shows that practitioners have to start recognizing that multiscreening should not be underestimated.

Second, the results show differences in screen compositions. The results show that the TV is most often combined with other screens, especially smartphones, laptops, and tablets. Therefore, it is important to not neglect these screens when designing a study into multiscreening. Furthermore, the results indicate that practitioners should focus on these screens to stimulate interactions and engagement with TV content, for example, by developing applications to play along with TV shows or get additional information of broadcasted brands/products on a second screen. However, the results provide information about the prevalence and not about the impact of the screen compositions. Further research is necessary to examine the impact of the different screen compositions on advertising effects.

Third, this study contributes to the literature by examining the multiscreeners. Therefore, this study contributes to the understanding of who is likely to multiscreen and with which screens. Examining the user-related factors in combination with the specific screen compositions is relevant information for advertisers. This will help them find their target audience and advise them as to which combination of screens are useful to invest in. For example, the target group will be younger when aiming at TV-smartphone users compared to TV-tablet or TV-laptop users.

### **Limitations**

Despite the important contributions, this study also has some limitations. First, we expect that the amount of multiscreening in minutes will be even higher in reality, since participants were asked to only report activities that had a duration of five minutes or longer. Thus, activities such as texting a friend on your smartphone with the TV in the background may be excluded when it involved a short act. Although diary data is a better method to capture people's media behavior than a survey, it still relies on self-reported measures (de Vreese & Neijens, 2016). It is possible that participants were sometimes not aware of the fact that they were multiscreening, since using multiple screens simultaneously may lead to more superficial attention to the different screens. For example, when the primary task was to work on a laptop, but the TV was on in the background, it is possible that participants would only report their primary task and forgot about the background screen. Therefore, the results of this study should be seen as a baseline of multiscreening and it is expected to be even higher in reality. Also, the exclusion of activities shorter than 5 minutes could have consequences for some other findings. For example, the results showed that men multiscreen longer

than women. Therefore, it is possible that some multiscreening activities of women are lost because the methodology did not capture events less than 5 minutes.

Second, the media diaries included information about screen use (e.g., TV, tablet, etc.) and media activities (e.g., watching TV, texting, etc.) but not on media content. The differentiation between screens and media activities is a strength of the study because media activities are no longer restricted to just one medium. For example, people can watch TV (i.e., media activity) on different devices. However, the missing information about the media content is seen as a limitation of the study. Because of this, it is not possible to make assumptions about the type of media content. For example, it is not possible to distinguish between screen use during editorial and advertising content. In addition, we were not able to conclude whether media activities across screens were related or unrelated to each other. This information might be very useful to advertisers because relatedness could influence how well advertisements are processed when multiscreening (Jeong & Hwang, 2016). Therefore, it is important that future research should also take relatedness of the tasks into account.

Finally, to further understand who is multiscreening it is necessary that future research also includes psychological user-related factors of multiscreening behavior, such as the need for cognition, sensation seeking, or neuroticism. These psychological factors have been examined for multitasking in general. However, it is not clear whether they are also related to multiscreening. For example, sensation seeking was found to be a predictor of media multitasking in general (Jeong & Fishbein, 2007), but not for media multitasking with smartphones (Lim & Shim, 2016). Future research could extend this work by examining psychological user-related factors in relation to multiscreening. Also, the results of the current study do not provide information about how the examined user-related factors could influence advertising effects. This is also something that future research should investigate. In any case, the results show that multiscreening is for all ages and that it is important to not neglect the TV.



# PART 2

## Multiscreening and Advertising Outcomes

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An earlier version of this chapter won the 2016 Best Student Conference Paper Award at the annual conference of the American Academy of Advertising

# Chapter 4

Effects of Multiscreening  
on Cognitive Advertising  
Outcomes

## ABSTRACT

Multiscreening, the simultaneous usage of multiple screens, is a relatively understudied phenomenon that may have a large impact on media effects. First, we explored people's viewing behavior while multiscreening by means of an eye-tracker. Second, we examined people's reporting of attention, by comparing eye-tracker and self-reported attention measures. Third, we assessed the effects of multiscreening on people's memory, by comparing people's memory for editorial and advertising content when multiscreening (TV/tablet) versus single screening. The results of the experiment ( $N = 177$ ) show that 1) people switched between screens 2.5 times per minute, 2) people were well capable of reporting their own attention, and 3) multiscreeners remembered content just as well as single screeners, when they devoted sufficient attention to the content.

People spend more than a quarter of their media time using multiple media simultaneously (MediaTijd, 2014); this is known as 'media multitasking' (e.g., Voorveld, Segijn, Ketelaar, & Smit, 2014; Wang, Irwin, Cooper, & Srivastava, 2015). A relatively new form of media multitasking is multiscreening, that is, the simultaneous use of multiple screens, such as a TV and a tablet or smartphone (Segijn, 2016). A recent Nielsen survey showed that a quarter of tablet or smartphone owners use their devices daily while watching TV (Nielsen, 2013), making multiscreening a part of the daily routine. However, there is still a limited understanding of this phenomenon. Three important aspects of multiscreening are largely unknown, namely 1) people's objective viewing behavior in terms of number of switches, gaze duration and total viewing time, 2) whether people are capable of reporting this behavior, and 3) the effects that multiscreening has on people's memory of editorial content and advertising in the different media. Thus, the current study examines three important aspects of multiscreening that are driven by descriptive (i.e., viewing behavior), methodological (i.e., reporting), and theoretical motivations (i.e., memory effects).

Viewing behavior refers to how people's attention is distributed across media, including the number of switches between screens, as well as gaze durations, and total viewing time per screen. Because of the multiple screens, people have to divide their attention (Jeong, Hwang, & Fishbein, 2010; Salvucci & Taatgen, 2011). There is limited knowledge of the viewing behavior of people who are multiscreening, and insights into such behavior will contribute to our understanding of media use and benefit both media scholars and practitioners. The first aim of the current study is to objectively examine the viewing behavior of people who are multiscreening.

Another important aspect of multiscreening research is the way viewing behavior is measured and reported. Media exposure is a challenging concept to measure (e.g., de Vreese & Neijens, 2016; Slater, 2004). Because it is mostly assessed by self-reported measures, researchers have to rely on people's memory and they have to trust that people are able to accurately and reliably assess their media exposure (Slater, 2004). An objective measure of attention is data collection through an eye-tracker (Bol, Boerman, Romano Bergstrom, & Kruikemeier, 2016). Testing the correlation between eye-tracking and self-reported data provides insights into the validity of the self-reported attention measures. The results provide insight into people's ability to report their attention distribution, which benefits future research into media exposure and how it is measured. Thus, the second aim of the study is to examine the correlation between eye-tracker and self-reported measures of attention.

Finally, the study examines the effects of multiscreening on people's memory for the media content. In the literature, the general assumption is that multiscreening

leads to a decrease in memory compared to single screening (e.g., Angell, Gorton, Sauer, Bottomley, & White, 2016; Kazakova, Cauberghe, Hudders, & Labyt, 2016; Oviedo Tornquist, Cameron, & Chiappe, 2015; Segijn, Voorveld, & Smit, 2016). Some scholars, however, argue that it is possible to remember media content just as well when multitasking as when single tasking, but only if the media user pays enough attention to the media content (Jeong, Hwang, & Fishbein, 2010; Jeong & Hwang, 2012). To our knowledge, this has not previously been examined for multiscreening. Thus, the third aim of the study is to examine the effects of multiscreening on people's memory.

### Uses of Multiscreening

Multiscreening is the use of multiple screens simultaneously (Segijn, 2016). Because people's attention cannot simultaneously be divided among different tasks when both tasks require visual attention (Salvucci & Taatgen, 2011), multiscreening entails an interleaved strategy of attention distribution where one task is temporarily suspended to allocate visual attention to another task. Two different processes determine how visual attention is allocated among screens, namely bottom-up and top-down processes. Bottom-up processes of attention are stimulated by features of the media content (e.g., Pieters & Wedel, 2004; Smit, Neijens, & Heath, 2013). For example, camera changes, arousing content, and new information introduced could result in orienting responses (Lang, Park, Sanders-Jackson, Wilson & Wang, 2007). Bottom-up processes are characterized as being automatic processes (Pieters & Wiedel, 2004). Thus, even when people are not intentionally searching for certain information, these features could attract people's attention. Top-down processes of attention, on the other hand, are guided by personal factors, such as goals (e.g., Eysenck & Keane, 2005). Thus, viewing behavior when multiscreening could be both directed by bottom-up processes (e.g., features in editorial content) and top-down processes (e.g., instructions on how to divide attention).

**Viewing behavior.** Switching is a first component of viewing behavior when multiscreening. A substantial amount of time during multiscreening is devoted to dividing attention between the multiple screens by switching between them. Like media multitasking, multiscreening should be seen on a continuum that ranges from tasks that involve frequent attention switching to tasks that involve long time spans between switches. A study into the attention allocation of people who were multiscreening with a TV and a computer, found that people switched their attention between media on average more than four times per minute (Brasel & Gips, 2011). On a computer screen, it was found that people switched approximately three times per minute (Yeykelis, Cummings, & Reeves, 2014). These studies indicate that people

often switch their attention to different media or different parts of the screen within a medium.

A second component of viewing behavior is gaze duration (defined here as the duration of a single gaze on specific medium content without switching to other content areas of interest). A study on single screening (TV only) showed that gazes mostly last around 1.5 seconds (Hawkins et al., 2005). Similar durations were found in the multiscreening study by Brasel and Gips (2011). In addition, they found that the gazes on the TV were shorter than the gazes on the computer. Both studies found that most gazes while using media are short in duration.

A third component of multiscreening viewing behavior is total viewing time, that is, the summed viewing duration of all fixations on a screen. There is limited knowledge of which screen receives the most attention. In their study, Brasel and Gips (2011) found that the computer dominated the TV in terms of viewing time. How viewing time is distributed may depend on several factors guided by bottom-up or top-down processes. For example, different types of content could lead to different attention allocation patterns. In addition, viewing behavior could be different when one or the other screen is the primary screen. It is therefore considered interesting to examine people's viewing behavior with other content and in a goal-directed versus a natural attention distribution setting. The first research question is:

RQ1: What does multiscreening viewing behavior look like in terms of a) number of switches, b) average gaze durations, and c) total viewing time?

**Reporting of viewing behavior.** In the media multitasking literature, scholars heavily rely on self-reported measures of media exposure (e.g., Duff & Sar, 2015; Jeong & Hwang, 2012; Voorveld, 2011), with some scarce exceptions (Wang et al., 2012). Therefore, researchers have to rely on people's memory and they have to trust that people are able to accurately and reliably assess their exposure to media. However, people have difficulty assessing their media exposure post-hoc, especially when their attention is limited (Slater, 2004). Despite this challenge, many inferences about the prevalence and effects of media use are based on these self-reported measures (de Vreese & Neijens, 2016).

Advances in technology, such as eye-tracking devices, make it possible to objectively record exposure and viewing behavior (Bol et al., 2016). This is an interesting addition to the commonly used self-reported measures in post-hoc questionnaires. In their multiscreening study, Brasel and Gips (2011) found, for example, that people seriously underestimate their switching behavior. This raises the question whether people are able to retrospectively report their own distribution of attention. Up until now it is not

known whether people are able to report their viewing behavior in terms of attention to both screens. To this end, the following research question is formulated:

RQ2: To what extent are people able to report attention to media content?

### Effects of Multiscreening

The third question of the study is about how multiscreening affects people's memory for editorial content and advertising on both screens. When people are multiscreening, their overall exposure to media content is increased. It is argued, however, that doing multiple tasks simultaneously diminishes the depth with which the information is being processed (Jeong & Fishbein, 2007; Wang et al., 2015). As a result, cognitive media effects such as memory are reduced when doing multiple things simultaneously compared to focusing on one task (e.g., Jeong & Hwang, 2016; Jeong et al., 2010; Segijn et al., 2016). However, the effect of multiscreening on cognitive outcomes may depend on different factors (Jeong & Hwang, 2016), such as the degree of structural and capacity interference (e.g. Jeong & Hwang, 2015; Pool, Koolstra, & van der Voort, 2003) and the amount of attention paid to the task (Jeong & Hwang, 2012).

**Structural versus capacity interference.** The dual-channel paradigm states that people have different sensory channels to process visual and auditory information (Baddeley, 1997; Paivio, 1986; Wickens, 2002). These channels are unique systems that function independently, but are interconnected (Paivio, 1986). Structural interference occurs when information from shared modalities is processed (Kahneman, 1973), which is the case with multiscreening (i.e., both screens are visual). It is harder (or even impossible) to process information from shared modalities (Salvucci & Taatgen, 2011), because it is processed through the same sensory channel rather than through different channels (Paivio, 1986; Wickens, 2002). As a consequence, people remember less of the messages when multitasking with different modalities (Jeong & Hwang, 2015; Wang et al., 2012). Thus, memory could be limited while multiscreening because people cannot allocate their visual attention to both screens simultaneously.

In addition, people who multiscreen also have to deal with capacity interference. According to the limited capacity model of mediated message processing (Lang, 2000), people are limited in the cognitive resources that they have for encoding, storing, or retrieving information. Thus, when people are multiscreening, they have to divide these cognitive resources among the tasks involved. Capacity interference occurs when people need more cognitive resources than are available. People are limited in the amount of resources they can divide among tasks. Thus, memory could be limited while multiscreening because people do not have enough cognitive resources to process both tasks.

**Amount of attention paid.** The multiscreening literature has mostly reported negative effects on memory (e.g., Angell et al., 2016; Kazakova et al., 2016; Oviedo et al., 2015; Segijn et al., 2016). However, there is an indication that multiscreening does not necessarily have to lead to a decline in memory compared to single tasking (Jeong & Hwang, 2012). It is argued that a sufficient amount of visual attention while media multitasking will help people overcome a potential memory deficit (Jeong et al., 2010; Jeong & Hwang, 2012). In this case, top-down processes of attention could help to improve processing the content of one of the two screens. The current study examines this argument and whether it applies to both screens involved in multiscreening. To do so, the following research question is formulated:

RQ3: To what extent does multiscreening affect people's memory in terms of editorial and advertising content?

## METHOD

### Sample

A total of 177 undergraduates participated in the experiment ( $M_{age} = 22.19$ ,  $SD_{age} = 3.34$ , 68.4% female). They were recruited through an online subject pool at the University of Amsterdam. Eye-tracker data were logged for all participants during their media use. Technical issues led to the eye-tracker data of ten participants being discarded, resulting in ten missing cases in the eye-tracking data. The total duration of participation was approximately 30–45 minutes per participant. The participants were given 5 euro or research credits for participating.

### Design and Procedure

A single factor between-subjects design with five media conditions was used. These media conditions were: 1) A multiscreening condition in which the participants were instructed to direct their primary attention to the TV (MS TV); 2) a multiscreening condition in which participants were instructed to direct their primary attention to the tablet (MS tablet); 3) a natural multiscreening condition (MS natural) in which the participants were free to choose how to divide their attention; 4) a single screening TV condition (SS TV); and 5) a single screening tablet condition (SS tablet). In all media conditions, participants' attention allocation was driven by bottom-up processes (i.e., media content that drives attention allocation). In addition, top-down processes played an important role in attention allocation in the MS TV

and MS tablet condition because of the instructions on how to divide attention.

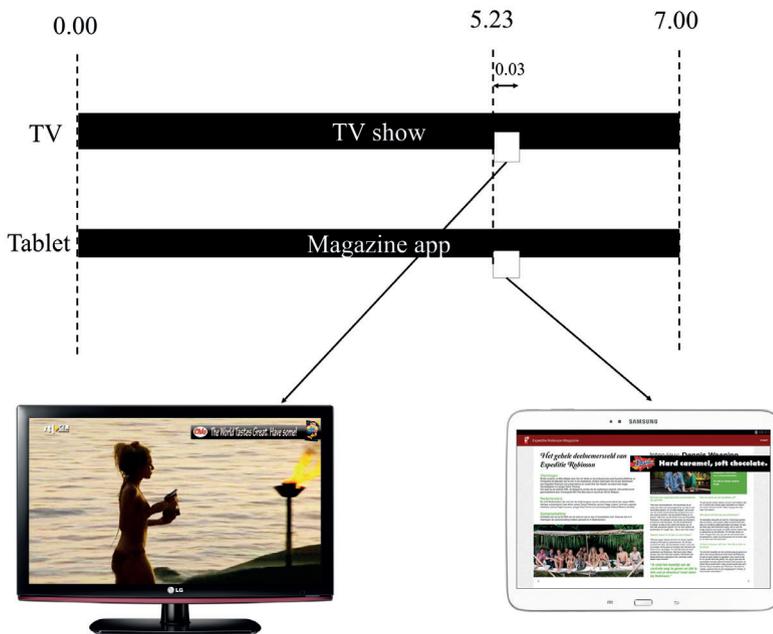
The experiment was conducted in a room that had been designed to simulate a living room, in order to create a multiscreening environment that was as natural as possible. Before the start of the experiment, the participants read and signed an informed consent form. They then put on the eye-tracker glasses and these were calibrated. After that, they received the instructions and the experiment started. The participants were told that the study was about how people experience, process, and evaluate TV programs. In the MS conditions and SS tablet condition, the participants were also told that some TV shows develop their own application (app). In the MS conditions the participants were told that they could use this app when the TV show was on. In the SS tablet condition the participants were asked to use the app for seven minutes and in the SS TV condition the participants were asked to watch a seven minute TV clip. All participants were also told that after media exposure they were asked to fill out a questionnaire about the media content (of TV, tablet or both), their experience, and their evaluation of the media content. Furthermore, in the MS TV and MS tablet condition they were asked to direct most of their attention to the TV or tablet, respectively. All instructions were provided on paper to guarantee consistency. The participants were seated on a couch in front of a TV. A tablet was also provided in the MS conditions and SS tablet condition. After media exposure, the participants removed the eye-tracker glasses and completed a questionnaire on a computer.

### Stimuli

**Television.** The TV show was played on a Samsung TV (3D-LED-TV, Full HD, 200 Hz, 40"). The editorial content consisted of a seven minute clip of an entertainment show (i.e., *Survivor*). It was a clip of episode 8 of season 13 of the Dutch version of *Survivor* which was originally broadcasted in 2012. This episode showed the merge, which is the point in the middle of the game in which the remaining contestants are merged into one group and start competing individually. The episode showed a barbecue to celebrate that the contestants made it to the next phase.

**Tablet.** The participants used a Samsung Galaxy Tab 3 10.1 P5210 Wi-Fi White tablet in the MS conditions and the ST tablet condition. The editorial content consisted of a magazine application (app) on the tablet that matched this TV show. The magazine consisted of a 15-page magazine with articles (e.g., interviews with contestants) that was specifically designed for the current study. Existing content of online media was used to create the content of the magazine. The magazine content was identical across all media conditions. The participants could only use the magazine in landscape orientation. The participants could scroll through the magazine back and forth as they

wished. The banner ad would always appear as a second layer on the right upper corner of the magazine simultaneously with the banner on the TV, no matter which page of the magazine was displayed. The timeline of the stimulus material for each condition is shown in Figure 4.1.



**Figure 4.1.** Timeline and stimulus material.

*Note:* The editorial content consists of a 7-minute clip of an entertainment show on television (TV) and a magazine application (app) on the tablet that matches this TV show. A banner ad appeared in the right upper corner on both the TV and the tablet after 5 minutes and 23 seconds, and disappeared 3 seconds later. The timeline is the same for all multiscreening conditions. In the single-screening conditions the participants are only exposed to the TV show or the magazine app.

**Banner.** An advertisement in the form of a banner was displayed simultaneously on the TV and tablet. The visibility of the TV banner ad was pretested in an online experiment ( $N = 62$ ,  $M_{\text{age}} = 31.19$ ,  $SD_{\text{age}} = 12.63$ , 67.7% female). This was necessary to make sure that the banner was at least sufficiently salient without distractions because it is assumed that the banner will be even less salient while multiscreening. In the pretest we compared three clips that all contained a banner. The banner included a brand logo and text, the banner was of three or six seconds of length (or both) and placed on 2.54 minutes or 5.23 minutes (or both) in the upper right corner. It was important that the banner wouldn't appear too early in the clip because of orienting responses (Lang, 2000). For the same reason a calm scene was selected in which the banner would appear. Participants were shown one of the three clips and after that different memory questions were proposed. The banner that led to the highest overall memory scores was chosen as stimulus material (Table 4.1). This banner was placed in a scene where one of the contestants was walking on the beach with calm background music.

A second pretest was conducted to find a brand for the ad on the tablet that was comparable to the brand on TV, to exclude the possibility that conclusions could be explained by differences in brands. In total, 58 participants (60.3% female,  $M_{\text{age}} = 30.98$ ,  $SD_{\text{age}} = 12.89$ ) were randomly exposed to the logos of three of six selected brands. One of these six brands was the target brand of the TV ad. Only one brand was not significantly different from the TV brand on brand familiarity (Laroche, Kim, & Zhou, 1996), brand attitude (Chang & Thorson, 2004), involvement (Traylor & Joseph, 1984), and purchase intention (Spears & Singh, 2004). This brand was chosen as the comparable target brand for the banner on the tablet (Table 4.2).

**Table 4.1** Memory scores of the three different clips.

	Banner conditions		
	Banner 6 sec - 2.54 min	Banner 3 sec – 5.23 min	Both banners
Product recall	29%	55%	52%
Brand recall	24%	35%	33%
Aided recall	24%	40%	43%
Brand cued recognition	33%	45%	48%
Banner recognition (6s)	14%	-	19%
Banner recognition (3s)	-	55%	43%

Table 4.2 Means (standard deviations) of different brands compared to TV brand.

	TV brand: Chio (n=30)	Daim (n=29)	Caramba's (n=33)	Hellema (n=27)	Punselie's (n=29)	Balisto (n=29)
Familiarity	3.90 (2.02)	3.39 (2.42)	1.47 (1.17)**	1.89 (1.43)**	1.41 (1.34)**	5.08 (1.86)**
Attitude	3.95 (1.39)	3.96 (1.30)	3.45 (1.11)	3.67 (1.26)	3.34 (1.25)*	3.84 (1.23)
Involvement	1.97 (0.94)	2.06 (1.12)	2.35 (1.26)*	1.89 (0.94)	2.02 (1.03)	2.02 (1.07)
Purchase intention	2.28 (1.31)	2.14 (1.58)	1.89 (1.34)	1.93 (1.10)	1.52 (0.97)**	2.16 (1.32)

Significance levels indicate differences with scores of TV brand. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .

## Variables

The questionnaire contained questions regarding memory, evaluation, and behavior. The variables were displayed in the following order to minimize cross-contamination between the various measures: memory about editorial content, implicit brand memory, unaided recall, aided recall, brand recognition, implicit brand attitude, explicit ad/brand attitude, purchase intention, variables about media use and possession, message recognition, self-reported attention, some demographics, and brand choice behavior. Only the cognitive variables are discussed in this paper.<sup>2</sup>

**Eye-tracker data.** To log eye-tracker data, eye-tracker glasses (SMI Eye Tracking Glasses 2 Wireless) were used because of the mobility and the possibility to log data related to both screens. The following variables of the eye-tracker data were coded: number of switches between media, average gaze duration in seconds for TV and tablet, prevalence of gaze duration per second, and total viewing time in seconds for TV and tablet. The eye-tracker videos were coded by two independent coders separately in Observer XT 11.5. The first coder coded 100% of the sample, and the second coder coded 25% of the sample. The Krippendorff's alpha of all measures was  $\geq .74$ , indicating a good intercoder reliability.

**Self-reported attention.** Self-reported attention was measured with two items: 'How much attention did you pay to the [TV/tablet]?' (Jeong & Hwang, 2012) on a scale of 0-100, where 0 means no attention and 100 means full attention ( $M_{tv} = 77.84$ ,  $SD_{tv} = 22.30$ ,  $M_{tablet} = 48.19$ ,  $SD_{tablet} = 31.59$ ).

**Memory of editorial content.** Memory of editorial content ( $memory_{ed}$ ) was measured by five multiple choice questions about both the TV and the tablet content (Oviedo, Tornquist, Cameron, & Chiappe, 2015). The questions were recoded into a dichotomous variable 1 = correct, 0 = incorrect. A sum score of the five questions was calculated, which resulted in two separate variables:  $memory_{ed}$  TV content (0-5;  $M = 3.25$ ,  $SD = 1.89$ ) and  $memory_{ed}$  tablet content (0-5;  $M = 2.03$ ,  $SD = 1.79$ ). This variable was not measured in the SS condition in which the participants were not exposed to the editorial content; for example,  $memory_{ed}$  TV was not asked in the SS tablet condition. The questions were based on information that was only presented in the editorial content of one screen or the other. No  $memory_{ed}$  TV questions were related to the part of the video in which the banner ad appeared. Three out of five of the  $memory_{ed}$  TV questions were based on visual information (e.g., How many beds

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<sup>2</sup>No significant effects were found between the conditions for the affective and the implicit outcomes. We did find that the tablet brand was more favorable and that people had a higher purchase intention for this brand than for the TV brand.

were on the island?), one was based on auditory information (What was the message from the envelope that was read by one of the contestants?), and one question was based on audiovisual information (Which contestant made the following statement [statement]?). All memory<sub>ed</sub> tablet questions were based on visual information that was derived from different pages throughout the entire magazine (e.g., What is going to change in the next season of the show?).

**Memory of ad.** Memory of both the TV ad and the banner ad was calculated by a sum score of correct answers on four different memory questions. First, we asked people to list all the brands they could remember. Second, we asked people if they could remember a chips/chocolate 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 TV clip. On every item the participants scored a 1 when they remembered it correctly and a 0 when they remembered it incorrectly (0-4;  $M_{tv} = 1.58$ ,  $SD_{tv} = 1.59$ ,  $M_{tablet} = 1.11$ ,  $SD_{tablet} = 1.61$ ).

4

**Table 4.3** Overview eye-tracker data per multiscreening condition.

	$F^a$	$p$	Multiscreening conditions		
			MS natural	MS TV	MS tablet
Average number of switches	9.397	< .001	17.87 (12.71) <sub>b</sub>	15.44 (10.28) <sub>b</sub>	27.61 (12.62) <sub>a</sub>
Number of switches per minute	9.379	< .001	2.50 (1.78) <sub>b</sub>	2.16 (1.44) <sub>b</sub>	3.86 (1.76) <sub>a</sub>
Average gaze time TV (sec)	9.039	< .001	45.95 (39.36) <sub>a</sub>	51.18 (36.33) <sub>a</sub>	18.50 (17.25) <sub>b</sub>
Average gaze time tablet (sec)	6.353	.003	12.29 (6.80) <sub>ab</sub>	9.20 (8.27) <sub>b</sub>	15.64 (6.67) <sub>a</sub>
Average % viewing time TV	25.954	< .001	73.9% (16.81) <sub>a</sub>	79.9% (18.93) <sub>a</sub>	48.8% (19.76) <sub>b</sub>
Average % viewing time tablet	25.549	< .001	25.3% (16.62) <sub>b</sub>	19.6% (19.04) <sub>b</sub>	50.1% (19.66) <sub>a</sub>

Note. A different subscript indicates a significant difference between conditions.

The table shows means with the standard deviations in parentheses.

<sup>a</sup> the degrees of freedom of all analyses are 2, 103.

### Control Variables

To check whether any control variables had to be included in the analyses, a chi-square test was conducted for gender and separate ANOVAs were conducted for the other variables. No control variables were included in the analyses, because no significant differences were found for gender ( $p = .094$ ), age ( $p = .240$ ), familiarity with the TV brand ( $p = .343$ ) and the tablet brand ( $p = .046$ ; Tukey's post-hoc test showed no significant differences between media conditions), tablet possession ( $p = .211$ ), average TV use ( $p = .141$ ), average tablet use ( $p = .946$ ), tablet skills ( $p = .704$ ) or whether participants had seen the video clip before ( $p = .732$ ).

## RESULTS

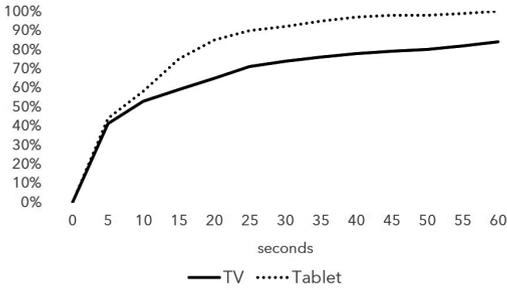
### Viewing Behavior (RQ1)

The eye-tracker data were analyzed to obtain information on people's viewing behavior while multiscreening. The number of switches, gaze duration, and total viewing time of the natural multiscreening condition are discussed here (see Table 4.3 for an overview of all conditions).

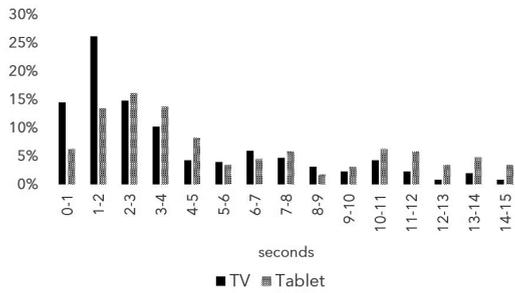
**Number of switches.** Participants in the natural multiscreening condition switched between media on average 17.87 times ( $SD = 12.71$ ) during media exposure. This is, on average, 2.50 switches per minute ( $SD = 1.78$ ). The number of switches differed between multiscreening conditions,  $F(2, 103) = 9.38, p < .001, \eta^2 = .16$ . Tukey's post-hoc test revealed that participants in the MS natural condition and MS TV condition switched less than those in the MS tablet condition. In addition, the MS natural and MS TV participants were not significantly different in terms of number of switches (Table 4.3).

**Gaze duration.** In the MS natural condition, the gazes on the TV were significantly longer ( $M = 41.54, SD = 28.53$ ) than those on the tablet ( $M = 12.29, SD = 6.80$ ),  $t(37) = 5.92, p < .001, d = 1.41$ . Two separate ANOVAs showed that the different multiscreening conditions resulted in different average gaze times on the TV ( $F(2, 103) = 9.04, p < .001, \eta^2 = .15$ ) and on the tablet ( $F(2, 102) = 6.35, p = .003, \eta^2 = .11$ ). Tukey's post-hoc test revealed that the average gaze time was similar in the MS natural and MS TV conditions for both screens. However, the average gaze time on TV in the MS tablet condition was significantly shorter than in the other two MS conditions. Thus, when instructed to focus mainly on the tablet, participants had on average a shorter gaze duration toward the TV. Whereas the average gaze time on the tablet was significantly longer in the MS tablet condition compared to the MS TV condition, it did not differ from average in the MS natural condition (Table 4.3).

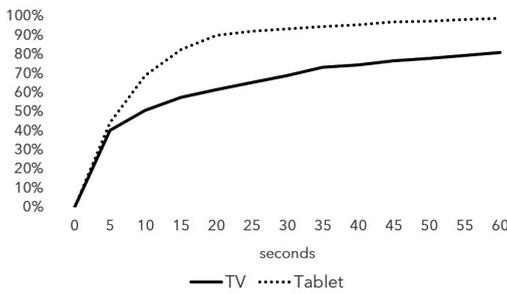
4.2.a



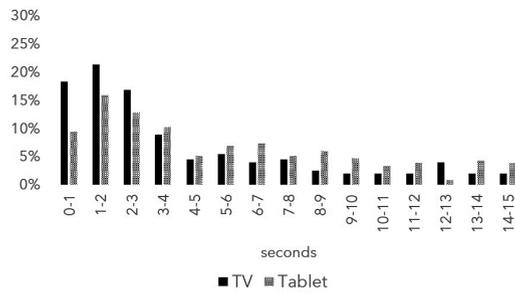
4.2.b



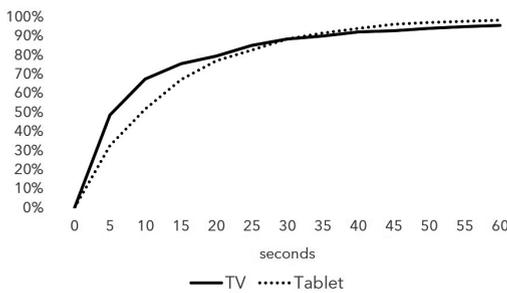
4.2.c



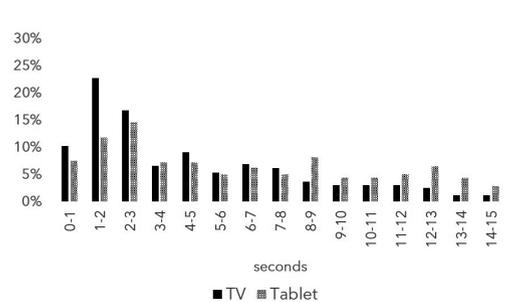
4.2.d



4.2.e



4.2.f



**Figure 4.2.** Gaze distributions presented as cumulative gaze distribution (left) and per duration (right) for the MS natural (a, b), the MS TV (c, d), and MS tablet (e, f) conditions.

Note: Gaze distributions presented as cumulative gaze distribution (left) and per duration (right) for the MS natural (a, b), the MS TV (c, d), and the MS tablet (e, f) conditions. Not all gazes are included in the figures. The cumulative figures (a, c, e) show all gazes up to 60 seconds and the gaze distribution figures (b, d, f) show all gazes up to 15 seconds.



However, drawing conclusions from the average gaze duration results should be done with caution, because longer gazes may result in skewed durations. It is therefore, important to also look at the gaze distribution. Figures 4.2a and 4.2b show the distribution of gaze durations in the MS natural condition. The results show that 50% of all gazes on both screens were shorter than 10 seconds (Figure 4.2a). Only a few gazes on the tablet in the MS natural condition lasted longer than 60 seconds, namely 0.5% ( $n_{\text{gazes}} = 2$ ) of the gazes on the tablet compared to 6.4% ( $n_{\text{gazes}} = 28$ ) of the gazes on the TV. Although the nature of the gazes on both media is characterized by mainly shorter gazes (Figure 4.2b), the gazes on the TV are more stretched (Figure 4.2a). The MS TV conditions follow roughly the same distribution as the MS natural condition in gaze duration (Figures 4.2c and 4.2d). The participants in the MS tablet condition had a more equal distribution of gazes on both media (Figures 4.2e and 4.2f).

**Total viewing time.** Participants in the MS natural condition spent, on average, 73.9% ( $SD = 16.81$ ) of their total viewing time on the TV and 25.3% ( $SD = 16.62$ ) on the tablet. When comparing the three multiscreening conditions, the results of two separate ANOVAs showed a significant difference between the groups in terms of viewing time toward the TV ( $F(2, 103) = 25.95, p < .001, \eta^2 = .34$ ) and tablet ( $F(2, 103) = 25.55, p < .001, \eta^2 = .34$ ). Tukey's post-hoc test showed that participants in the MS natural and MS TV conditions spent more time on the TV than participants in the MS tablet condition, and that participants in the MS tablet condition spent more time on the tablet than participants in the other two conditions (Table 4.3). Thus, participants in the instructed multiscreening conditions had their attention mostly directed toward the instructed medium, and the viewing behavior of the participants in the natural multiscreening condition was again similar to that of participants who were instructed to mainly focus on the TV.

### Reporting: Comparison between Eye-Tracker Data and Self-Reported Data (RQ2)

The second research question was about the extent to which people are able to report attention to media content. Therefore, self-reported data was compared to eye-tracking data of attention. The measurements showed that the self-reported attention and the visual attention measured with the eye-tracker (i.e., total viewing durations transformed into percentages) were highly correlated for both media ( $r_{\text{TV}} = .87, p < .001$ ;  $r_{\text{tablet}} = .91, p < .001$ ). Thus, the participants were capable of reporting the attention they paid to a medium.

### Multiscreening Effects on People's Memory (RQ3)

Separate ANOVAs were used to analyze the effects of multiscreening on people's memory of editorial and advertising content. All means, standard deviations, and correlations are presented in Table 4.4 and 4.5.

**Table 4.4** Overview of memory variables per condition.

	MS TV	MS tablet	MS natural	SS TV <sup>I</sup>	SS tablet <sup>II</sup>
Memory <sub>ed</sub>					
TV	4.05 <sub>ab</sub> (1.14)	3.65 <sub>b</sub> (1.23)	4.08 <sub>ab</sub> (0.97)	4.56 <sub>a</sub> (0.56)	-
Tablet	1.55 <sub>b</sub> (1.33)	3.29 <sub>a</sub> (1.53)	1.60 <sub>b</sub> (1.53)	-	3.72 <sub>a</sub> (0.97)
Memory <sub>ad</sub>					
TV	1.79 <sub>a</sub> (1.73)	1.32 <sub>ab</sub> (1.64)	1.85 <sub>a</sub> (1.56)	2.16 <sub>a</sub> (1.63)	0.78 <sub>b</sub> (1.05) <sup>III</sup>
Tablet	0.66 <sub>bc</sub> (1.36)	1.61 <sub>ab</sub> (1.82)	1.05 <sub>bc</sub> (1.58)	0.09 <sub>c</sub> (0.39) <sup>III</sup>	2.11 <sub>a</sub> (1.69)

Note. The means are presented in the table with the standard deviations in parentheses. Different subscripts indicate significant differences. <sup>I</sup>SS TV condition is for the ad on the TV the full focus condition and for the ad on the tablet the no exposure condition. <sup>II</sup>SS tablet condition is for the ad on the tablet the full focus condition and for the ad on the TV the no exposure condition. <sup>III</sup> In the no exposure condition some participants indicated to 'remember' the brand, but this was caused by the task that they had to perform before answering the memory<sub>ad</sub> items.

**Table 4.5** Correlation matrix of memory.

	1	2	3	4
1. Memory <sub>ed</sub> TV	x			
2. Memory <sub>ed</sub> tablet	-.57***	x		
3. Memory <sub>ad</sub> TV	.23**	-.19*	x	
4. Memory <sub>ad</sub> tablet	-.35***	.41***	-.20**	x

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$

**Memory<sub>ed</sub>.** To analyze the effects on memory of the editorial content, four media conditions were compared (i.e., the three MS conditions and one SS condition). The analysis for memory<sub>ed</sub> TV showed significant differences between the four (MS TV, MS Tablet, MS natural, SS TV) conditions,  $F(3, 140) = 4.36$ ,  $p = .006$ ,  $\eta^2 = .09$ . Tukey's post-hoc test revealed that the participants' memory of the editorial content on TV was equal in the SS TV, MS TV, and MS natural conditions, and that participants in the MS tablet condition remembered significantly less of the editorial content than participants in the SS TV condition (Table 4.4).

The analysis for the tablet also showed significant differences between the four media conditions (MS TV, MS Tablet, MS natural, SS tablet),  $F(3, 144) = 25.17$ ,  $p <$

.001,  $\eta^2 = .35$ . Tukey's post-hoc test revealed that the participants in the SS tablet and the MS tablet conditions remembered the editorial content of the tablet just as well and, even more importantly, they scored significantly higher on memory<sub>ed</sub> for the tablet than the participants in the MS TV and MS natural conditions (Table 4.4). This indicates that people remember the editorial content of the screen focused upon just as well when multiscreening as when single screening.

**Memory<sub>ad</sub>.** To analyze the effects on memory of the ad, all five media conditions were compared. The SS conditions functioned as a full or no exposure condition, depending on which medium the ad appeared (e.g., the participants in the SS TV condition were fully exposed to the ad on the TV, but had no exposure to the ad on the tablet). The analysis of the TV banner showed a significant difference of memory for the ad between the media conditions,  $F(4, 176) = 4.28, p = .003, \eta^2 = .09$ . Tukey's post-hoc test revealed that the participants in the SS TV, MS TV, and the MS natural condition remembered the TV ad just as well, and significantly better than the participants in the SS tablet (no exposure) condition. Participants in the MS tablet condition did not remember the TV ad better than the participants in the SS tablet (no exposure) condition (Table 4.4).

The analysis for the tablet also showed significant differences between the media conditions,  $F(4, 176) = 9.86, p < .001, \eta^2 = .19$ . Tukey's post-hoc test revealed that participants in the MS tablet and SS tablet conditions remembered the tablet ad just as well, and better than the participants in the SS TV (no exposure) condition. Conversely, participants in the MS TV and MS natural conditions had significantly less memory for the tablet ad compared to the participants in the SS tablet (full exposure) condition, and there was no difference between these groups and the participants in the SS TV (no exposure) condition (Table 4.4). Overall, these findings indicate that people remember the ads on the screen that they focus upon just as well when multiscreening as they do when single screening, but not when they multiscreen and have their primary focus on the other screen.

## DISCUSSION

In this study we examined 1) viewing behavior, in terms of number of switches, gaze duration, and total viewing time; 2) the correlation between eye-tracker and self-reported data on people's attention distribution across screens; and 3) the effect on people's memory of editorial content and advertising while multiscreening as compared to single screening. Overall, the results showed that people switched on average 2.5 times per minute and had greater average and total gaze durations on TV

than tablet. In addition, the study showed that, overall, people were well capable of reporting their own attention distribution to both screens. Finally, the results showed that multiscreeners were able to remember editorial content and advertising just as well as single screeners, as long as they devoted sufficient visual attention to the screen.

First, the study examined viewing behavior of multiscreening and found that participants in the natural multiscreening condition switched 2.5 times per minute, had longer gazes on the TV than toward the tablet, and devoted their attention to the TV almost 75% of the time. There appeared to be fewer switches than found in earlier research (Brasel & Gips, 2011). This shows that viewing behavior is context-dependent (bottom-up), and may vary based on the characteristics of the media, content, and user (Wang et al., 2015). However, top-down processes could also guide attention as shown in the differences in viewing behavior between the MS TV and MS tablet condition. The results also showed that half of all gazes on media are shorter than 10 seconds. Finally, the gaze distribution pattern was remarkably similar to gaze distribution patterns found in other attention research that examined multiscreening with TV and computer (Brasel & Gips, 2011) and in studies on TV attention (Hawkins et al., 2005).

Second, people are capable of reporting post-hoc how much attention they paid to the screens, as demonstrated by the highly correlated eye-tracker and self-reported data. A previous study found that people are not capable of reporting how often they switch between media (Brasel & Gips, 2011). Synergizing these findings, it seems that people are not capable of reporting details of their behavior (e.g., number of switches), but are capable of reporting their behavior in more general terms (e.g., the total distribution of their attention). However, whether people will always report their attention correctly is another matter. Although they were not told beforehand that they would have to report their attention afterwards, it is possible that they followed the instructions more carefully because of the eye-tracker glasses. Whether people always report the distribution of their attention accurately can only be examined by collecting both self-reported and objective measures of attention. Future research should examine the correlation between self-reported and objective measures in other contexts (e.g., different media combinations, different media content, longer durations) to get a better understanding of the extent to which people are capable of reporting, and are willing to report, their media exposure accurately.

Third, the effects on people's memory of editorial and advertising content between multiscreening and single screening were compared. The multiscreening literature has generally found a memory deficit when people use multiple media simultaneously, compared to when they use one medium. However, there is some indication that this

deficit might not be present when enough visual attention is devoted to the media content (Jeong et al., 2010; Jeong & Hwang, 2012). The current study confirmed this indication. Importantly, we found that memory was only impaired in multiscreening conditions when the focus of attention was on the medium that was not focused on in the single screening condition. The content of the medium focused upon in a multiscreening situation is remembered just as well as it is in a consecutive single screening condition.

The results of the study showed greater attention to and effects of TV compared to the tablet. There are at least three possible explanations for this difference. First, the found differences could be explained by a difference in screen size. Previous literature showed, for example, that bigger screens elicit more arousal than smaller screens and that more arousal could positively affect memory (e.g., Reeves, Lang, Kim, & Tatar, 1999). Second, TV is a more prevalent screen than the tablet (SKO, 2016). Thus, it is likely that people have more experiences with TV compared to tablet. Also, TV is more often used in combination with another screen when multiscreening. Therefore, people may have better skills to combine this screen with other screens. Third, in this study the content on TV was audiovisual, whereas the content of the tablet was only visual. Therefore, it is possible that people who were focusing on the tablet could still have paid attention to the information on the TV through their auditory senses, without directing visual attention to this medium. This is in line with previous research on multitasking and structural interference (e.g., Pool et al., 2003; Jeong & Hwang, 2015). However, it was not possible to direct visual attention towards the tablet when focusing on the TV. In addition, the results indicate that bottom-up processes are strong drivers of attention allocation towards the TV content. Even in the multiscreening condition where the participants were instructed to focus mainly on the tablet, they focused on the TV a large proportion of their time. Thus, bottom-up processes almost overruled the top-down process of the instruction to pay more attention towards the tablet in the MS tablet condition. Although these factors could be potential confounding factors, we believe our claims still hold, especially since the results showed both a decrease in participant's memory in the MS TV and MS tablet condition compared to the ST tablet and ST TV conditions respectively.

### **Limitations**

It could be argued that the self-reported and eye-tracker measurements of attention are not measuring the same concept. Attention is more than just viewing time (Hawkins et al., 2005). The eye-tracker data reflect visual attention, however, the self-reported measure also reflects whether someone is mentally present. One

can watch something without paying attention to it; for example, one can look at TV but not register what is happening. However, the difference in concepts is also seen as an advantage. Some studies only use eye-tracking data, which reflect only visual attention, and some studies measure attention with self-reports, which measures more than only visual attention. The current study shows that both measures are highly correlated, and this finding will benefit future research.

The focus of the study was to unravel people's visual viewing behaviors during multiscreening - and its consequences. Eye-tracker measurements of attention are ideal for this purpose. However, this focus on visual attention neglects the auditory component of television as an audiovisual medium. Future research could make use of other measures of attention that take into account all involved modalities, such as EEG, skin conductance, or heart rate, which are known to measure the orienting response or secondary reaction tasks (e.g., Lang et al., 2007).

Finally, as mentioned before bottom-up processes are important in guiding attention allocation of people (e.g., Pieters & Wedel, 2004). Therefore, using one kind of stimulus (e.g., one TV show and one type of advertising) could be seen as a limitation of the study. The current study is a first step in unraveling viewing behavior and its effect while multiscreening. Future research using different kinds of stimuli is necessary to further disentangle this phenomenon.

### Research Implications

The current study has some major research implications. First of all, it has made an important contribution by comparing eye-tracker data with self-reported data. By showing the high correlation between these two measures, we showed that people are capable of reporting their distribution of attention in multiscreening conditions, and that post-hoc self-reported attention immediately after exposure is a valid measure in multiscreening research. This finding will benefit future research on media exposure and attention. The high correlation between the self-reported and eye-tracker measures of attention indicate that both could be used. We suggest that the decision about which of the two measures researchers should use depends on what kind of attention the researchers are interested in.

A second contribution is the additional knowledge of the effect of multiscreening on memory. We found that the participants who were multiscreening had equal memory of the media content as the participants who were single screening, provided that they paid sufficient attention to the assessed media content. Thus, compared to TV as the single screen there was a decrease in memory only for the participants in the MS tablet condition, whereas compared to tablet as the single screen there

was a decrease in memory only for the participants in the multiscreening condition with most attention directed to the TV (i.e., MS TV and MS natural). Although less attention was paid to the content in the multiscreening conditions compared to the single screening conditions it was still sufficient to remember the content equally well. The memory deficit reported in earlier research seems to exist only when the main focus of attention is not on the assessed content. This means that not all types of multiscreening are the same. Effects might vary greatly by the type of multiscreening and how attention is divided. Therefore, future research should further look into differences between various multiscreening conditions.

Third, we have contributed to the knowledge on multiscreening by comparing natural (bottom-up) and instructed multiscreening (top-down). Thus, it was possible not only to make inferences about how people would normally behave while multiscreening, but also to actually examine rather natural multiscreening behavior and its effects on people's memory for media content. An important finding is the similarity in viewing behavior of the participants in the natural multiscreening condition and the multiscreening TV condition.

The current study also has important practical implications. First, the results with regard to viewing behavior provide important information for practitioners. The results showed, for example, that half of all gazes are shorter than 10 seconds. Thus, the attention paid to the screens is very short. This indicates that the main message of a media campaign must not take too long, because people will not pay enough attention to process longer messages. Second, by showing that a message can be processed just as well when people are multiscreening as when they are single screening, we showed that multiscreening does not have to be as bad for memory as believed. When the screen in focus is the same screen that is used when single screening, memory for the editorial and advertising content is unimpaired. This has implications for all kinds of parties who generate media content, such as advertisers, the government, program/app developers, etc. In a world where people are increasingly combining multiple media it is important to get the audience's attention. Attention is the key word when one wants to be remembered in a multiscreening environment.



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An earlier version of this chapter won the 2015 Best Student Conference Paper Award at the annual conference of the American Academy of Advertising

# Chapter 5

Effects of Multiscreening  
on Affective Advertising  
Outcomes

## ABSTRACT

Multiscreening, a relatively new form of media multitasking in which people use multiple screens simultaneously, has implications for the effects of persuasive messages due to limited cognitive capacities of people and concurrent modalities of the screens (i.e., both visual). The aim of the study is to examine underlying mechanisms (i.e., recognition, counterarguing, and enjoyment) of the effect of multiscreening on evaluative outcomes (i.e., brand attitude, message attitude, and purchase intention). The experiment ( $N = 182$ ) showed that both recognition and counterarguing are underlying mechanisms of the effect of multiscreening on evaluative outcomes. Multiscreening has a negative effect on evaluative outcomes by recognition and a positive effect on evaluative outcomes by counterarguing.

Media multitasking, the simultaneous use of multiple media (e.g., Jeong & Hwang, 2015; Voorveld, 2011) is a pervasive phenomenon (e.g., Rideout, Foehr, & Roberts, 2010; Voorveld, Segijn, Ketelaar, & Smit, 2014). A recent rapport about media use showed that 28% of the time that people spend on media consists of media multitasking (MediaTijd, 2014). The rise of this phenomenon has led to an increasing concern among advertisers, because relatively little is known about the advertising effectiveness under media multitasking circumstances. In the advertising literature assumptions are often based on mono-media consumption (Pilotta, Schultz, Drenrik, & Rist, 2004). However, with the arrival of convergent technologies and the same amount of time available to spend using these media, consumers are increasingly engaging in media multitasking (e.g., Jeong & Fishbein, 2007; Pilotta, et al., 2004; Rideout, Foehr, & Roberts, 2010). For example, nearly half of the tablet and smartphone owners indicate to use their device every day while watching TV (Nielsen, 2013). This type of media multitasking is also known as multiscreening (i.e., the simultaneous use of multiple screens; Segijn, 2016). Multiscreening is becoming a daily practice (Nielsen, 2013), but it is relatively unknown how this type of behavior affects the effectiveness of advertisements.

The current study examines advertising effectiveness in terms of evaluative outcomes (i.e., brand attitude, message attitude, and purchase intention) that are important for advertisers (e.g., Vakratsas & Ambler, 1999). Only recently scholars started to examine how media multitasking influences evaluation. So far, some evidence suggests media multitasking would lead to more positive evaluations (Chinchanachokchai, Duff, & Sar, 2015). However, another study showed that media multitasking could lead to both positive and negative evaluations depending on how well the advertisement is integrated in the storyline (Yoon, Choi, & Song, 2011). Scholars should be careful in drawing conclusions based on the limited available empirical evidence and contradicting results of the effect of media multitasking on evaluation. More research is needed to examine this effect. Furthermore, knowledge is limited about the underlying mechanisms of the effect of media multitasking on evaluation. The aim of the current study is, therefore, to gain an understanding of the underlying processes of the effect of multiscreening on evaluative outcomes by examining the three proposed underlying mechanisms, namely recognition, counterarguing, and enjoyment.

First, we examine recognition as a mechanism, because, to our knowledge, it has never been examined before as an underlying mechanism of media multitasking on evaluation, although, recognition has been related to both concepts separately. Second, we examine counterarguing as a mechanism, because counterarguing has been previously proposed as an underlying mechanism of the effect of media multitasking on evaluation (e.g., Jeong & Hwang, 2012, 2015), but has never been

tested in a full mediation model. Finally, we examine enjoyment as a mechanism, because only recently have scholars started to examine this mechanism related to media multitasking and advertising (Chinchanachokchai et al., 2015), but enjoyment has never been tested as underlying mechanism of media multitasking on evaluation. Thus, the current study provides a deeper understanding of the effect of multiscreening on evaluation by examining three underlying mechanisms of which one is predicted to have a negative effect of multiscreening on evaluation (i.e., recognition) and the other two are predicted to have a positive effect on evaluation (i.e., counterarguing and enjoyment).

## THEORY

A starting point for examining how multiscreening influences consumers' processing of advertising is to consider how consumers process messages. A basic assumption is that people have capacities for encoding, storing, and retrieving information (Lang, 2000). However, the limited capacity approach argues that people are limited in the amount of cognitive resources that they can allocate to different tasks (Kahneman, 1973; Lang, 2000). During multiscreening, multiple tasks compete for these cognitive resources. Because of the limited cognitive capacities, attention to one message should inherently come at the expense of attention to the other message (Lang, 2000). According to this model, multitasking is limited by the availability of people's resources. This is known as capacity interference (Kahneman, 1973).

In addition to capacity interference, multiscreening also involves structural interference (Jeong & Hwang, 2015). Structural interference occurs when media have concurrent modalities (Kahneman, 1973) for example, when both media are visual or when one medium is visual and the other medium is audiovisual (Jeong & Hwang, 2015). According to the dual-channel paradigm, people have different channels (or pools) through which to process visual and auditory information (Baddeley, 1997; Paivio, 1986; Wickens, 2002). Thus, when people need to process information for multiple tasks that contain the same modality, this information will be processed through the same sensory channel, which will lead to structural interference. Multiscreening is a form of media multitasking that involves concurrent modalities, which has implications for the processing of information in both tasks.

## Effects of Multiscreening on Evaluative Outcomes

Evaluative outcomes are important for persuasion (e.g., Petty & Wegener, 1998; Vakratsas & Ambler, 1999). Some researchers state that media multitasking may affect evaluative outcomes (Chinchanchokchai et al., 2015; Jeong & Hwang, 2012, 2015; Voorveld, 2011; Yoon et al., 2011). However, little is known about the effects of media multitasking or multiscreening on these evaluative outcomes (i.e., brand attitudes, message attitude, and purchase intentions). Three possible underlying mechanisms for the effect of multiscreening on evaluative outcomes are discussed.

### First Underlying Mechanism: Recognition

A first underlying mechanism that could explain how multiscreening may influence evaluative outcomes is recognition of the advertised brand. According to the limited cognitive capacity approach of mediated messages (Lang, 2000), information processing consist of three sub processes: encoding, storing and retrieving information. As mentioned, people need cognitive capacities to process information. Yet these cognitive capacities are limited. Multiscreening will affect consumers' information processing of an advertisement (Angell, Gorton, Sauer, Bottomley, & White, 2016). How well someone is able to recognize a certain message depends on how well someone was able to encode or store the message (Lang, 2000). Thus, the ease of recognition of an advertisement or brand depends on how well this advertisement or brand was encoded or stored. Multiscreening interferes with the encoding and/or storing process, because people have limited capacities for these processes due to the multiple tasks. Thus, encoding and/or storing is hindered and it will be more difficult to recognize the brand afterwards.

In addition, recognition could influence evaluative outcomes. A naïve theory of recognition is that easy to recognize stimuli are more liked than stimuli which are more difficult to recognize (Alter & Oppenheimer, 2009; Bornstein & D'Agostino, 1992; Zajonc, 1968). The mere exposure hypothesis is an example of this process (Zajonc, 1968). This hypothesis states that people prefer familiar stimuli over novel stimuli. Familiar stimuli are easier to recognize and, therefore, more liked than novel stimuli. Researchers argue that stimuli that are recognized more easily are more well liked because they misattribute the easiness of recognition for liking the stimulus (Bornstein & D'Agostino, 1992). Thus, the easier a brand is recognized, the more it is liked. In sum, recognition depends on how well a message is encoded and/or stored and multiscreening interferes with these processes. In addition, when something is more difficult to recognize, it is less likely that people will experience positive feelings for this stimulus.

H1: People who are multiscreening will have more difficulty recognizing the brand and will therefore have more negative evaluative outcomes than people who are using only one medium at a time.

### **Second Underlying Mechanism: Counterarguing**

The second underlying mechanism that could explain how multiscreening may influence evaluative outcomes is counterarguing. Counterarguing is a strategy for resisting a persuasive message. It entails thoughtfully elaborating on a message and thinking of arguments that will reject or that are inconsistent with the persuasive message (Moyer-Gusé & Nabi, 2010). Because of limited cognitive capacities, this thoughtful elaboration decreases during media multitasking (Jeong & Hwang, 2012, 2015). This tendency is consistent with the counterarguing inhibition hypothesis (Keating & Brock, 1974), which also suggests that counterarguing can be reduced by a form of distraction, such as multiscreening. In addition, reduced counterarguing leads to increased acceptance of messages (Moyer-Gusé & Nabi, 2010).

To the best of our knowledge, the relationship between media multitasking and counterarguing has been examined only by Jeong and Hwang (2012, 2015). They found that media multitasking reduced counterarguing, and they showed that people who were multitasking made significantly fewer counterarguments than people who were only performing one task at a time (Jeong & Hwang, 2012, 2015). In addition, they found that when people were multitasking with visual-visual media or with visual-audiovisual media, those people also made significantly fewer counterarguments than people who were multitasking with visual-audio media. They argued that a decrease in counterarguments would allow media multitasking to increase persuasion; however, they did not test this mediation effect of media multitasking on evaluative outcomes through counterarguing. They argued only that a decrease in counterarguments would increase persuasion. In addition, this mediation model has not been empirically examined for advertisements. In the current study, this mediation effect is tested, and the following hypothesis is formulated:

H2: People who are multiscreening will be less likely to counterargue and will, therefore, have more positive evaluative outcomes, than people who are using only one medium at a time.

### **Third Underlying Mechanism: Enjoyment**

A third underlying mechanism that could explain how multiscreening may influence evaluative outcomes is enjoyment (Lang & Chzran, 2015; Wang &

Tchernev, 2012). A popular assumption is that multiscreening would increase enjoyment (e.g., Bardhi, Rohm, & Sultan, 2010; Lang & Chzran 2015). Studies on the motives of media multitaskers have shown that enjoyment is a motive to engage in multitasking (Bardhi et al., 2010; Hwang, Kim, & Jeong, 2014) and that emotional needs are gratified when media multitasking (Wang & Tchernev, 2012).

Recently scholars started to examine this concept as a mechanism of media multitasking. A study by Chinchanchokchai et al., (2015) examined advertising and multi-window multitasking and they found that people who are multitasking with two tasks enjoyed completing the task more than people who had to perform only one task. In their study all participants had to watch commercials on a computer screen as one of the tasks. In the multitasking conditions the participants also had to monitor another window on the screen and respond to letters or a punctuation mark that appeared in these windows. Their explanation for the effect of multitasking on enjoyment is that time is perceived as going faster when people are multitasking instead of attending to only one task. In addition, the perception that time is going faster is associated with higher levels of task enjoyment. Indeed they found a positive effect of multitasking on enjoyment. However, they did not test the mediation of multitasking on enjoyment through perceptions of time progress. In addition to the effect on enjoyment they also found that participants who combined more tasks had more positive message (i.e., ad) attitudes. The combination of these findings touch upon the idea that media multitasking increases enjoyment and this in turn will increase message evaluations.

However, Chinchanchokchai et al., (2015) also did not test the full mediation model of the effect of media multitasking on message attitude mediated through enjoyment. Furthermore, they tested it only for message attitude and not for other evaluation outcomes, such as brand attitude and purchase intention. The current study examines enjoyment as underlying mechanism of media multitasking on evaluation and will test the full mediation on the three evaluation outcomes. Thus, doing multiple things at the same time is more enjoyed than just doing one thing (e.g., Bardhi et al., 2010; Lang & Chzran, 2015). In addition, enjoyment could increase evaluative outcomes through a carryover effect (Moorman, Neijens, & Smit, 2005). The following hypothesis is formulated:

H3: People who are multiscreening will experience more enjoyment and will therefore have more positive evaluative outcomes than people who are using only one medium at a time.

## METHOD

### Sample

The study was conducted at the University of Amsterdam. Participants were mainly undergraduates who were recruited through an online subject pool, and flyers and posters were posted throughout the university building. In total, 182 undergraduates joined the experiment ( $M_{age} = 22.75$ ,  $SD_{age} = 4.36$ , 60.6% female). The participants received an incentive of 5 euros or research credit for participation.

### Design

The experiment had a single factor (media) between-subjects design. The media factor consisted of four conditions: 1) a multiscreening (MS) condition in which the participants had to watch television and use a tablet simultaneously, 2) a sequential tasking (SQT)<sup>3</sup> condition in which the participants first watched television and then used the tablet, 3) a single tasking TV (ST TV) condition in which the participants only watched television, and 4) a single tasking tablet (ST Tablet) condition in which the participants only used a tablet. The participants were randomly assigned to one of the four conditions.

### Procedure

We designed the experiment to approximate a natural multiscreening environment by conducting the experiment in a room that looked like a living room. A maximum of five participants could participate at the same time, but they were told that it was an individual task (the researcher could monitor the participants through a one-way mirror). The participants first read and signed an informed consent form before participating in the study.

We asked the participants to imagine that they were watching TV on a regular weekday. The program that they were watching was almost finished, and they wanted to know what the following TV show was and whether there was any interesting program on another channel. In all conditions, the focus of the task was not on the advertisements and the participants had the same amount of time to use the media.

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<sup>3</sup>The SQT condition was initially inserted to control for cross-media effects. For half of the participants in the MS and SQT group a banner for the same product as advertised on the TV and for the other half an unrelated banner was shown on the tablet. However, these banners had no effect on the dependent variables. Only for counterarguing a difference was observed between the two banners in the multiscreening condition. However, when we controlled for the different banners the effects remained the same. Thus, these conditions were taken together as a general MS and a SQT condition.

In the SQT condition only the time was doubled because the participants in this condition used the two media sequentially. After media use the participants were asked to fill out a questionnaire where the variables were displayed in the following order: explicit recognition, perceptual identification task, evaluative outcomes, enjoyment, counterarguing, the control variables, and background variables (i.e., gender and age).

### Stimulus

**Content on TV.** The content on TV consisted of the end of a TV show, a commercial break, and the beginning of the next TV show. The commercial break consisted of one target and eight filler advertisements to compose a typical commercial break (3 minutes and 50 seconds). To prevent primacy and recency effects (e.g., Duncan & Murdock, 2000) the target ad was placed in the fourth position. To prevent bias resulting from strong preexisting attitudes and knowledge, all advertisements were relatively unknown existing advertisements broadcasted in Belgium, a different country with the same language. In the target ad the brand was mentioned in words and presented visually.

**Pretest of target brand.** To select the advertisements, two evenings of advertisements on three commercial TV channels of Belgium were recorded. This step yielded 544 advertisements for 164 different brands. Of these brands, 39 brands were not familiar in the Netherlands. To select a target brand, the following criteria were formulated: the brand should be 1) unfamiliar in the Netherlands, 2) presented visually and verbally in the advertisement because of the concurrent modalities, 3) gender neutral, and 4) a relevant product for students. Two brands (i.e., Cookeo and Sodastream) met the criteria and were included in a pretest. The filler ads were chosen from the same pool of recorded advertisements to establish an ecological valid commercial break. They were also unfamiliar brands in the Netherlands.

In the pretest ( $N = 31$ ,  $M_{age} = 25.45$ ,  $SD_{age} = 7.1$ , 81.0% female), we measured brand involvement (Zaichkowsky, 1985), brand attitude (Voorveld, Neijens, & Smit, 2011), brand likeability (Smit, Van Meurs, & Neijens, 2006), and brand familiarity (Kent & Allen, 1994) on a 7-point Likert scale. No significant difference between brands appeared for involvement, attitude, and likeability. However, Cookeo was significantly more familiar ( $M = 3.00$ ,  $SD = 1.92$ ) than Sodastream ( $M = 1.72$ ,  $SD = 1.35$ ). Therefore, we choose the brand Sodastream as the target brand (For an overview of the statistics see Table 5.1).

**Content on the tablet.** The content on the tablet consisted of a professionally designed application of a TV guide and could be adjusted for the purpose of the study. We used a TV guide application because it is the most common activity related to TV content for which people use their device (SKO, 2012). A banner was placed in

the TV guide and it was visible on the screen the entire time. Thus, in all conditions the participants were exposed to the target brand Sodastream.

### Dependent Variables

**Evaluative outcomes.** The evaluative outcomes consisted of brand attitudes, message attitudes (for both the TV ad and banner), and purchase intentions. We measured *brand attitude* with a 7-point semantic differential scale (Chang & Thorson, 2004; Voorveld, Neijens, & Smit, 2011). The endpoints of the scale consisted of *bad/good*, *unappealing/appealing*, *not attractive/attractive*, and *not interesting/interesting* (Cronbach's alpha = .90;  $M = 4.17$ ,  $SD = 1.55$ ). We used the same 7-point semantic scale to measure *message attitude*. Both the scale for TV ad attitude (Cronbach's alpha = .92;  $M = 4.95$ ,  $SD = 1.42$ ) and attitude toward the banner (Cronbach's alpha = .89;  $M = 3.61$ ,  $SD = 1.46$ ) were reliable. Message attitude was asked only in the conditions in which the participants were exposed to the message. We measured *purchase intention* with four items (Tariq, Nawaz, Nawaz, & Butt, 2013) on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). An example of an item is 'I would like to buy Sodastream' (Cronbach's alpha = .90;  $M = 2.87$ ,  $SD = 1.46$ ).

### Mediators

**Recognition.** In advertising literature, recognition is often measured with an explicit recognition task. While advertising effects are traditionally assessed through explicit measures, these tools may be inadequate to measure effects caused by superficial or automatic information processing (e.g., Vandenberg, Murre, Voorveld, & Smit, 2015). An implicit measure of recognition is necessary to provide a more complete understanding of the mechanisms that underlie multiscreening processing and effects. Therefore, we choose to measure implicit recognition with the Perceptual Identification Task (Fang, Singh, & Ahluwalia, 2007). Because this is a

**Table 5.1** Overview statistics of pretest variables.

	Cronbach's alpha	F-value	p-value	95% CI
Brand involvement	.93	0.89	.598	[-0.60, 1.02]
Brand attitude	.91	0.15	.794	[-0.79, 1.03]
Brand likeability	.76	0.79	.398	[-0.35, 0.86]
Brand familiarity	.92	6.94	.040	[0.07, 2.48]

relatively new way to measure recognition implicitly, we also measured recognition in the traditional, explicit way as a proxy. Both measures are described here.

In the Perceptual Identification Task the participants were exposed to a brand logo masked with noise. The noise decreased every second, and in 15 frames the brand became completely visible. The participants were asked to press a key as soon as they recognized the brand. The response time of the participants was recorded. Their response time was used in the analyses for implicit recognition. Thus, the faster their response (in seconds), the easier it is to recognize the brand. When they pressed the key, the picture immediately disappeared and it was replaced by a screen where the participants had to indicate the brand depicted. In addition, they had to fill out the brand name to check for accuracy. Nine participants were excluded from the analyses of implicit recognition because of technical issues ( $n = 3$ ) or inaccuracy ( $n = 3$ ) or because they were identified as outliers ( $n = 3$ ) according to the outlier labeling rule (Hoaglin & Iglewicz, 1987). The task included the target brand and filler brands. The filler brands consisted of four filler brands from the TV content and four new brands. The participants first completed a practice trial before they began the actual task.

Explicit recognition was measured by providing a list of brand names that included the target brand, 7 filler brands from the same product category, and an 'I have not seen one of these brands' option in a random order. The filler brands consisted of a combination of existing brands sold in the Netherlands and Belgium, and made up soda brands that sounded similar to the target brand or described what was displayed in the advertisement. The participants answered if they had seen one of the listed brands during media usage (Voorveld, 2011). We assigned a score of 1 when a participant remembered the brand correctly, and a score of 0 when he/she choose one of the other answer options (45.6% correct).

**Counterarguing.** Counterarguing was measured similar to the studies of Jeong and Hwang (2012, 2015) with an open-ended question. The respondents were asked to list arguments why they should not buy/use the target brand. Two independent coders counted the number of counterarguments ( $M = 1.55$ ,  $SD = 1.08$ , range 0-6). The coders only counted the arguments to not buy/use the product (e.g., "I think that it is unhealthy", "It looks expensive", and "I don't need a machine to make soda") and assigned arguments to buy/use the target brand ("I want to buy it, because it looks useful") with a 0. Two coders counted all the responses separately, and the intercoder reliability was very reliable (Krippendorff's  $\alpha = .90$ ).

**Enjoyment of media use.** We measured enjoyment of media use with five items on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*) of the interest-enjoyment subscale of the Intrinsic Motivation Scale (Ryan, 1982). The interest-enjoyment subscale

has recently been validated as measuring enjoyment (e.g., Tamborini et al., 2011). Examples of items were 'I enjoyed using the media in the living room very much' and 'I would describe the use of media in the living room as very interesting'. The scale appeared reliable in the current study (Cronbach's alpha = .89;  $M = 3.81$ ,  $SD = 1.22$ ).

### Control Variables

The control variables were gender, age, brand familiarity (Kent & Allen, 1994; Cronbach's alpha = .92), tablet possession, tablet use, tablet skills, and the number of participants in the living room during exposure. Gender (Wald  $\chi^2(3) = 2.04$ ,  $p = .564$ ), age ( $F(3, 176) = 2.123$ ,  $p = .099$ ), brand familiarity ( $F(3, 176) = 2.655$ ,  $p = .050$ ), tablet possession (Wald  $\chi^2(3) = 0.187$ ,  $p = .980$ ), tablet use ( $F(3, 176) = 1.119$ ,  $p = .343$ ), and tablet skills ( $F(3, 176) = 1.015$ ,  $p = .388$ ) were equally divided among the conditions. However, the number of participants in the living room during exposure differed,  $F(3, 181) = 8.763$ ,  $p < .001$ . A post-hoc Bonferroni showed that the multiscreening condition differed significantly from all other media conditions. Therefore, we included only the variable 'number of participants in the living room' as covariate in all analyses.

### Analysis

To test the hypotheses of the three proposed underlying mechanisms separate PROCESS models were tested to examine if one or more of these mechanisms played a role in the effect of multiscreening on evaluative outcomes. PROCESS (Hayes, 2013) uses an ordinary least squares or logistic regression based path analytical framework to estimate the direct and indirect effects in mediator models, including bootstrapping methods for inferences regarding indirect effects in mediation models. Other than the previously used method of Baron and Kenny (1986), it is possible to test an indirect effect without the assumption of a total effect. The current study used PROCESS with 1,000 bootstrap samples to estimate the bias-corrected bootstrap confidence intervals (BCBCIs). Because recognition was measured as a dichotomous variable, it is not possible to use this variable as a mediator in a PROCESS model (Hayes, 2013). However, it is sufficient to test both paths separately, because this variable is used as a proxy for implicit recognition. We used a logistic regression to test the effect of multiscreening on recognition and ANCOVAs to test the effect of recognition on the evaluative outcomes.

The dependent variable in all analyses was the evaluative outcome and the independent variable was multiscreening (1) versus single medium use (0). Single medium use consisted of SQT, ST TV, and ST tablet condition. These conditions did not significantly differ from each other on the Multitasking Perception Scale (Adler & Benbunan-Fich, 2012). This scale consisted of four items measured on a 7-point Likert

scale (1 = strongly disagree, 7 = strongly agree). The items were: when I used media in the living room 1) I switched between two media, 2) I tried to use both media at the same time, 3) I used one medium at a time (reversed), 4) I was carrying out several media tasks at the same time (Cronbach's alpha = .87;  $M = 2.48$ ,  $SD = 1.69$ ). However, they all significantly differed from the multiscreening condition, Wald  $\chi^2(3) = 215.67$ ,  $p < .001^4$ . An overview of all means of the evaluative outcomes and mediators are presented in Table 5.2.

## RESULTS

### Recognition as an Underlying Mechanism

The first hypothesis stated that recognition would be a mediator in the relationship between multiscreening and evaluative outcomes. The mediation model for brand attitude as the dependent variable showed the full mediation of multiscreening through implicit recognition (indirect effect =  $-.23$ ,  $SE = 0.10$ , 95% BCBCI  $[-0.48, -0.08]$ ; direct effect =  $.04$ ,  $SE = 0.27$ ,  $p = .875$ , 95% BCBCI  $[-0.49, 0.57]$ ). As expected, the participants who were multiscreening had more difficulty with recognizing the brand ( $b = -1.89$ ,  $p < .001$ ), and difficulty to recognize the brand decreased brand attitude ( $b = .12$ ,  $p = .004$ ).

In addition, the results showed a full mediation effect for attitude toward the banner (indirect effect =  $-.23$ ,  $SE = 0.10$ , 95% BCBCI  $[-0.49, -0.07]$ ; direct effect =  $.28$ ,  $SE = 0.27$ ,  $p = .310$ , 95% BCBCI  $[-0.26, 0.81]$ ). A similar model was found as observed for brand attitude. The participants who were multiscreening had more difficulty to recognize the brand ( $b = -1.87$ ,  $p < .001$ ), and difficulty to recognize the brand decreased banner attitude ( $b = .12$ ,  $p = .005$ ).

No significant effects were found for attitude toward the TV ad (direct effect =  $-.04$ ,  $SE = 0.28$ ,  $p = .879$ , 95% BCBCI  $[-0.58, 0.50]$ ; indirect effect =  $.04$ ,  $SE = 0.11$ , 95% BCBCI  $[-0.15, 0.27]$ ) and purchase intention (direct effect =  $-.20$ ,  $SE = .27$ ,  $p = .455$ , 95% BCBCI

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<sup>4</sup> The three single medium use conditions did also not significantly differ from each other on all evaluative outcomes and mediators.

Table 5.2 Scores on evaluative outcomes and mediators by media condition.

	Multiscreening		Single medium use		
	MS	SQT	ST TV	ST Tablet	
<b>Dependent variables</b>					
Brand attitude	3.92 (1.47) <sup>a</sup>	4.42 (1.68) <sup>a</sup>	4.70 (1.49) <sup>a</sup>	3.66 (1.29) <sup>a</sup>	
Attitude towards TV ad	4.84 (1.42) <sup>a</sup>	5.01 (1.38) <sup>a</sup>	5.07 (1.55) <sup>a</sup>	x <sub>a</sub>	
Attitude towards banner	3.65 (1.38) <sup>a</sup>	3.69 (1.47) <sup>a</sup>	x <sub>a</sub>	3.42 (1.63) <sup>a</sup>	
Purchase intention	2.63 (1.43) <sup>a</sup>	3.15 (1.59) <sup>a</sup>	2.90 (1.30) <sup>a</sup>	2.83 (1.41) <sup>a</sup>	
<b>Mediators</b>					
Recognition					
Implicit <sub>b</sub>	13.05 (2.77) <sup>a</sup>	10.77 (2.72) <sup>b</sup>	10.87 (2.23) <sup>b</sup>	11.39 (3.00) <sup>ab</sup>	
Explicit <sub>c</sub>	24% <sup>a</sup>	58% <sup>bc</sup>	73% <sup>b</sup>	40% <sup>ac</sup>	
Counterarguing	1.22 (0.81) <sup>a</sup>	1.91 (1.35) <sup>b</sup>	1.67 (1.03) <sup>ab</sup>	1.40 (0.81) <sup>ab</sup>	
Enjoyment	3.81 (1.08) <sup>a</sup>	3.78 (1.42) <sup>a</sup>	3.76 (1.30) <sup>a</sup>	3.92 (1.03) <sup>a</sup>	
n	63	58	30	30	

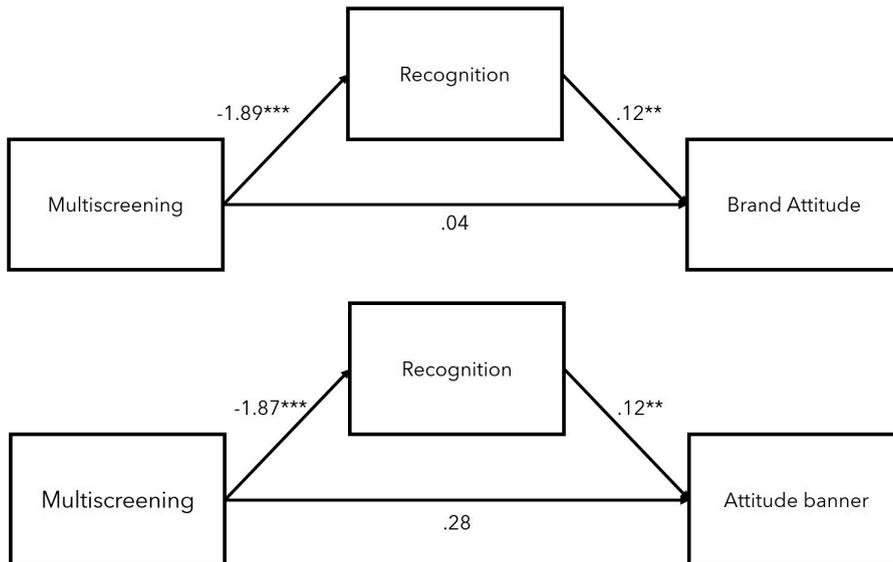
Note. Cell entries are means with standard deviations in parentheses. Different superscripts indicate significant differences between means.

<sup>a</sup> Attitude towards TV ad was not asked in the ST Tablet condition and Attitude towards banner was not asked in the ST TV condition.

<sup>b</sup> Some participants were excluded for the Perceptual Identification Task to measure implicit recognition (see criteria methods section).

Finally, there were 58 participants in the MS condition and 115 in the single medium use condition.

<sup>c</sup> Brand recognition was measured as a dichotomous variable. The percentages are the results of a logistic regression and indicate the chance that a participant in that condition would recognize the brand.



**Figure 5.1** Full mediation effect of multiscreening on brand attitude and attitude toward the banner through implicit recognition. \*\*\*  $p < .001$ , \*\*  $p < .01$ .

[-0.72, 0.32]; indirect = -.08,  $SE = .09$ , 95% BCBCI [-0.28, 0.07]). Thus, the first hypothesis can be accepted for brand attitude and attitude toward the banner (Figure 5.1).

In addition to implicit recognition, we also conducted the analysis for explicit recognition. First we tested the direct effect of multiscreening on explicit recognition. The logistic regression showed, as expected, a significant differences between multiscreening and single medium use for explicit recognition, Wald  $\chi^2(1) = 17.28$ ,  $p < .001$ . The probability of recognizing the brand was significantly lower in the multiscreening condition (24%), than in the single medium use conditions (57%). Second, we tested the effect of recognition on the different evaluative outcomes. Similarly to the findings of implicit recognition, the ANCOVA showed that participants who recognized the brand had a more positive brand attitude ( $F(1, 180) = 18.54$ ,  $p < .001$ ; recognized  $M = 4.74$ ,  $SD = 1.50$ ; not recognized  $M = 3.68$ ,  $SD = 1.42$ ) and banner ad attitude ( $F(1, 180) = 5.02$ ,  $p = .028$ ; recognized  $M = 3.99$ ,  $SD = 1.53$ ; not recognized  $M = 3.28$ ,  $SD = 1.37$ ). In addition, the ANCOVA showed also that participants who recognized the brand had a more positive purchase intention ( $F(1, 180) = 8.29$ ,  $p =$

.004; recognized  $M = 3.25$ ,  $SD = 1.56$ ; not recognized  $M = 2.56$ ,  $SD = 1.30$ ). Similarly to the findings of implicit recognition, there was no significant effect of recognition on TV ad attitude ( $F(1, 180) = 0.27$ ,  $p = .714$ ). The results of explicit recognition confirm the findings of implicit recognition. Based on these analyses it can be concluded that multiscreening leads to a decrease in recognition and that recognition leads to more positive evaluations.

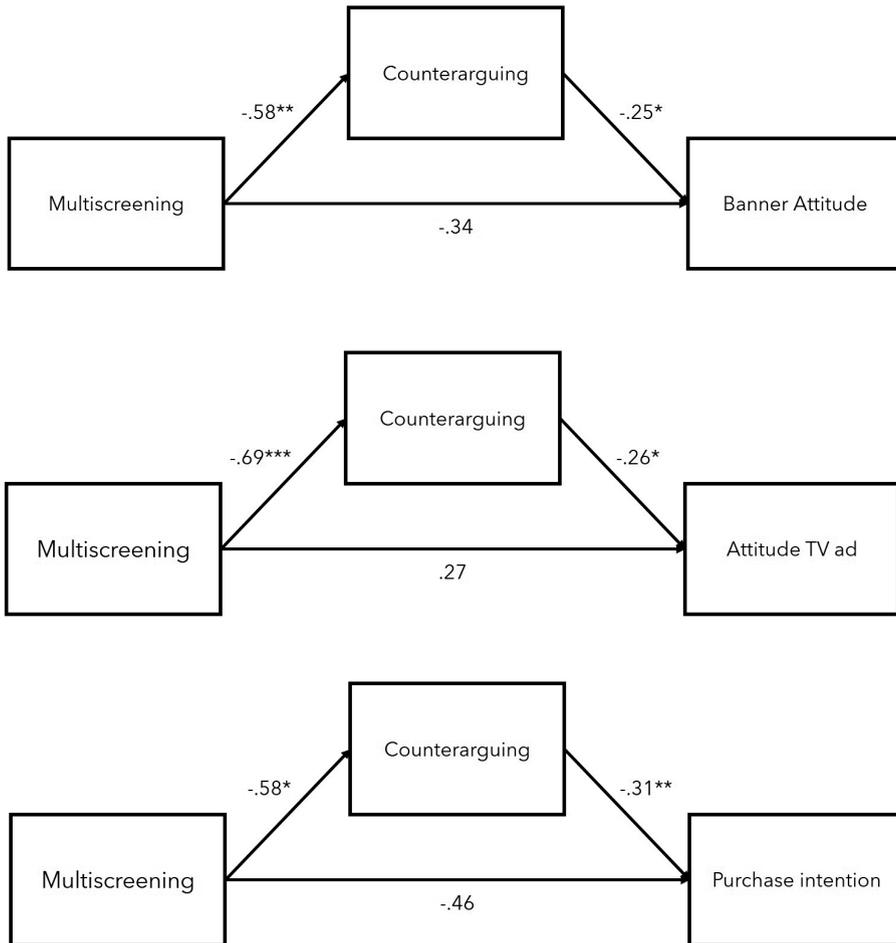
### Counterarguing as an Underlying Mechanism

The second hypothesis stated that counterarguing serves as a mediator between multiscreening and evaluative outcomes. The mediation model with brand attitude as the dependent variable was examined ( $n = 181$ ). As expected, counterarguing functioned as a full mediator between multiscreening and brand attitude (indirect effect = .14,  $SE = 0.07$ , 95% BCBCI [0.03, 0.35]; direct effect = -.34,  $SE = 0.26$ ,  $p = .187$ , 95% BCBCI [-0.85, 0.17]). Multiscreening decreased counterarguing ( $b = -.58$ ,  $p = .001$ ), and a decrease in the number of counterarguments resulted in a more positive brand attitude ( $b = -.25$ ,  $p = .022$ ).

The results showed a similar model for both attitude toward the TV ad and purchase intention (Figure 5.2). For both attitude toward the TV ad (indirect effect = .18,  $SE = 0.08$ , 95% BCBCI [0.06, 0.36]; direct effect = -.27,  $SE = 0.25$ ,  $p = .293$ , 95% BCBCI [-0.77, 0.23]) and purchase intention (indirect effect = .18,  $SE = 0.07$ , 95% BCBCI [0.06, 0.34]; direct effect = -.46,  $SE = .24$ ,  $p = .06$ , 95% BCBCI [-0.94, 0.02]), full mediation was observed. The mediation model for attitude toward the TV ad showed that multiscreening decreased the number of counterarguments ( $b = -.69$ ,  $p < .001$ ) and that a decrease in counterarguments resulted in a more positive attitude toward the TV ad ( $b = -.26$ ,  $p = .014$ ). Also for the dependent variable purchase intention led multiscreening to a decrease in counterarguments ( $b = -.58$ ,  $p = .001$ ) and this resulted in an increase in purchase intention ( $b = -.31$ ,  $p = .002$ ). The mediation model showed no significant effect for attitude toward the banner (indirect effect = .09,  $SE = 0.07$ , 95% BCBCI [-0.02, 0.27]; direct effect = -.02,  $SE = 0.26$ ,  $p = .94$ , 95% BCBCI [-0.54, 0.50]). In sum, the second hypothesis is supported for brand attitude, attitude toward the TV ad, and purchase intention.

### Enjoyment as an Underlying Mechanism

The third hypothesis stated that the enjoyment of media use is another possible mediator in the relationship between multiscreening and evaluative outcomes. However, for all evaluative outcomes the models showed no significant effects: brand attitude (direct effect = -.21,  $SE = 0.25$ ,  $p = .392$ , 95% BCBCI [-0.70, 0.28]; indirect effect



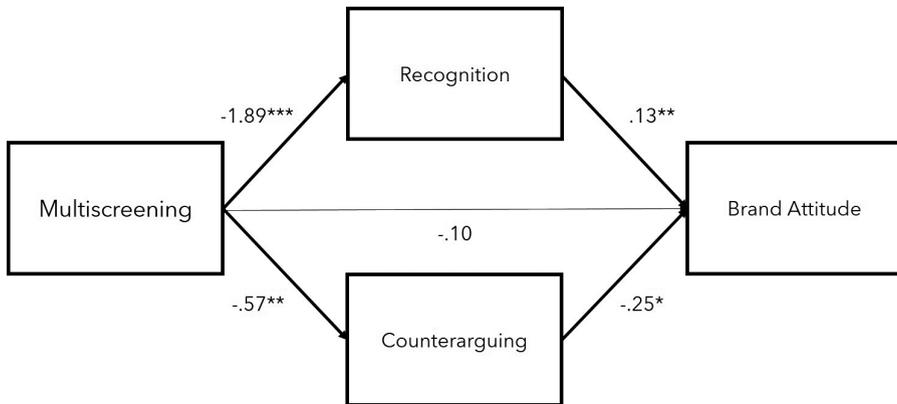
**Figure 5.2** Mediation of counterarguing on brand attitude, attitude toward the TV ad, and purchase intention. The model shows the unstandardized coefficients. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .

= .02,  $SE = 0.05$ , 95% BCBCI [-0.07, 0.15]), TV ad attitude (direct effect =  $-.12$ ,  $SE = 0.23$ ,  $p = .606$ , 95% BCBCI [-0.58, 0.34]; indirect effect =  $.03$ ,  $SE = 0.08$ , 95% BCBCI [-0.12, 0.20]), banner attitude (direct effect =  $.05$ ,  $SE = 0.24$ ,  $p = .831$ , 95% BCBCI [-0.43, 0.53]; indirect effect =  $.02$ ,  $SE = 0.08$ , 95% BCBCI [-0.12, 0.18]), and purchase intention (direct effect =  $-.30$ ,  $SE = 0.24$ ,  $p = .208$ , 95% BCBCI [-0.76, 0.17]; indirect effect =  $.02$ ,  $SE = 0.06$ , 95% BCBCI [-0.07, 0.16]). Thus, the third hypothesis was rejected. Although there

was no mediation, the relationships between enjoyment and brand attitude ( $b = .25, p = .008$ ), attitude toward the TV ad ( $b = .40, p < .001$ ), attitude toward the banner ( $b = .37, p < .001$ ), and purchase intention ( $b = .27, p = .003$ ) were significant.

**Counterarguing and Recognition as Underlying Mechanisms**

The analyses showed that both counterarguing and recognition could be a mediator for brand attitude. Pearson’s correlation coefficient shows that counterarguing and recognition are two distinct mechanisms ( $r = -.08, p = .285$ ). However, the two mechanisms have opposite effects on brand attitude. Therefore, we tested both mechanisms in one model to examine which of these processes (i.e., counterarguing and implicit recognition) has the largest effect on brand attitude. The model showed a full mediation effect of both mediators (Figure 5.3). The direct effect of multiscreening on attitude was not significant (direct effect =  $-.10, SE = 0.27, p = .723, 95\% BCBCI [-0.64, 0.44]$ ). However, the mediation through counterarguing (indirect effect =  $.14, SE = .07, 95\% BCBCI [0.02, 0.33]$ ) and the mediation through implicit recognition (indirect



**Figure 5.3** Full mediation effect of multiscreening on brand attitude through implicit recognition and counterarguing. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .

effect =  $-.24$ ,  $SE = .11$ , 95% BCBCI  $[-0.48, -0.07]$ ) were both significant, but in opposite directions. Recognition appeared to have the largest effect on brand attitude. The model explains 11.15% of the variance in brand attitude.

## DISCUSSION

The current study approximated a natural multiscreening environment by examining multiscreening with an actual TV and tablet. The results provide insights into advertising effects of a relatively new form of media multitasking: multiscreening. The aim of the study was to examine the underlying mechanisms of the effect of multiscreening on evaluative outcomes, such as brand attitude, message attitude, and purchase intention. The results provided an explanation for the effect of multiscreening on evaluative outcomes. First, recognition appeared to be an underlying mechanism of the effects of multiscreening on evaluative outcomes. When people were multiscreening it was more difficult to recognize the brand afterwards, and difficult to recognize brands resulted in more negative brand attitudes and attitudes toward the banner. Second, counterarguing also appeared to be an underlying mechanism of multiscreening on evaluative outcomes. As expected, multiscreening decreased the number of counterarguments; in turn, fewer counterarguments and thus less resistance resulted in more positive brand attitudes, attitudes toward the TV ad, and purchase intentions. When comparing the relative strength of both recognition and counterarguing, the former had the largest effect on brand attitude.

This study is the first to demonstrate that (implicit) recognition and counterarguing are underlying mechanisms of multiscreening on evaluative outcomes. However, the mechanisms might not always be present depending on capacity and structural interference. We argue that the occurrence of either capacity or structural interference might explain which mechanism plays the most important role in a typical situation. On the one hand, counterarguing entails thoughtful elaboration of a message and it is, therefore, impaired by the limited cognitive capacities that people have to divide while multiscreening. Capacity interference is present in all forms of media multitasking. Therefore, we argue that counterarguing would be a mechanism underlying the effects of all forms of media multitasking, not only multiscreening. On the other hand, recognition might be more closely related to structural interference. Difficulty in recognizing the ad depends on how well this ad is encoded and stored. This process can be enhanced by attention to the ad. However when multiscreening, attention is hindered because of the concurrent visual modalities of both screens.

Therefore, we argue that difficulty of recognition occurs when there is structural interference, especially structural interference caused by concurrent visual modalities. Thus, difficulty of recognition might not have a negative effect on brand attitude while engaging in other forms of media multitasking in which no concurrent visual modalities are involved, such as reading a newspaper while the radio is on. In addition, this mechanism might not have a negative influence on the effect of multiscreening on brand attitude when more attention is directed towards the ad while multiscreening, for example, in case of advertising on both screens or when the attention of the viewer is directed to the screen with the ad. Future research is needed to get more insights in these underlying mechanisms, when they might occur, and how to counter them.

In addition to the underlying mechanisms of multiscreening observed, a third mechanism was proposed. It was expected that enjoyment would also be an underlying mechanism of multiscreening on evaluative outcomes. Although it was found that more positive evaluations occurred when people enjoyed using media more, there was no direct link between multiscreening and enjoyment. Thus, the idea of a carry-over effect was supported, but no support was found for the popular assumption that enjoyment would increase as a result of multiscreening. This is not in line with previous findings in advertising research to media multitasking on enjoyment where they found that multitasking would increase enjoyment (Chinchanachokchai et al., 2015). However, in another study they found a negative relation between multiscreening (combining TV episodes with Facebook) and enjoyment (Oviedo, Tornquist, Cameron, & Chiappe, 2015). Differences can be found in the type of multitasking, content, but also the way enjoyment was measured. Future research should take a closer look at the effect of multiscreening on enjoyment.

### **Limitations**

One explanation for the findings in the current experiment might be the specific task. Normally, people might use their device to engage in the content on TV (Nielsen, 2013; SKO, 2012). Engagement can occur in different ways, such as providing information or creating an intrinsically enjoyable experience (Calder, Malthouse, & Schaedel, 2009). The task in the current experiment (i.e., TV guide) was designed to provide information. In addition, recently it was found that motives of multitasking differ depending on the type and goal of the task (Hwang et al., 2014). Because the task on the tablet consisted of information searching, it was less likely that people would engage in this type of media multitasking for the purpose of enjoyment. That the experiment did not include a very 'enjoyable' task could be regarded as a limitation of the current study.

Another limitation of the study is the answer to the following question: To what extent

does the multiscreening behavior in the experimental study resemble multiscreening behavior in real-life situations? To increase ecological validity the room was designed like a living room and participants watched an actual TV and using a tablet, instead of multiscreening on a split-screen on a computer like in earlier multiscreening studies (e.g., Chinchanchokchai et al., 2015; Van Cauwenberge, Schaap, & van Roy, 2014; Wang et al., 2012). However, whether their behavior (e.g., switching, viewing time, etc.) resembles real-life behavior is unknown. Empirical research is needed to assess how consumers behave while multiscreening, for example by means of an observational study in consumers' living room.

### Implications

The findings of the current study, especially regarding the two underlying mechanisms, have important implications for research on media effects. First, this is the first study that examined the three proposed mechanisms in a full mediation model. We thereby extend beyond work on direct effects of media multitasking and tap into the underlying processes explaining these effects. This is important for our understanding of media multitasking in general and of multiscreening in specific. The current study adds two new underlying mechanisms to the model, namely counterarguing and recognition. This is a major contribution, since this is one of the first studies that directly tested simultaneously both a cognitive (i.e., recognition) and attitudinal (i.e., counterarguing) mediator of multiscreening on advertising effects (also see Jeong & Hwang, 2016).

A second important contribution is that the two underlying mechanisms had an opposite effect on evaluative outcomes; counterarguing had a positive effect and recognition a negative effect on brand attitude. This finding has an important theoretical implication because it could initially seem that multiscreening has no effect on evaluative outcomes. However, the current study showed that two opposite mechanisms are present. Finally, a differential effect of the mechanisms on the evaluative outcomes was found. For attitudes toward the message and purchase intentions only one mechanism appeared to play a role, and for brand attitude both mechanisms played a role. Thus, it is important in future research to consider different mechanisms when examining different evaluative outcomes.

In addition to the theoretical contributions the study also has an important methodological contribution. This study is one of the first media multitasking studies that measured recognition in an explicit and implicit manner. The use of implicit measures is important because in real-life situations consumer decisions are mostly not explicitly linked to brand advertisements. The results of the current study were similar for both measurements. This indicates that both measures can be useful to

measure recognition in future advertising research. Purchase intention was the only evaluative outcome where a difference was found between explicit and implicit recognition. We found no effect of implicit recognition, but we did find an effect of explicit recognition. This is an indication that the effect of recognition on purchase intention may involve a more conscious process (Vandeberg et al., 2015). However, it may also be an effect of the measurement itself. Further research that includes both implicit and explicit measures is necessary to get a better understanding of measuring recognition in a media multitasking and advertising context.

Second, the design of the current study has an important methodological contribution. In previous multitasking research the multitasking condition is often compared to only one single tasking condition (i.e., one of the two tasks involved in the multitasking condition) and successful multitasking is often defined as no decrease in performance in the multitasking condition compared to this single tasking condition (Jeong & Hwang, 2016; Lang & Chzran, 2015). Therefore, choosing the right single tasking condition is considered to be an important decision in the research design. The current study, however, made use of different control conditions (i.e., single tasking TV, single tasking tablet, and sequential tasking) and found no differences among these control conditions. This finding suggests that the effects of multitasking may not always differ significantly by the type of control group. Future research could further examine the different types of single tasking (control) groups.

Finally, the results of the study provide also important practical implications. Especially with the increasing population that engages in multiscreening, this phenomenon is of great concern to advertisers. The current study found that multiscreening led to both negative and positive effects on evaluation.

The negative effect on evaluation was mediated by a decrease in recognition. This indicates that multiscreening hinders the encoding and/or storing process which leads to a decrease in ease of recognition and, therefore, a decrease in evaluation. This is undesirable for advertisers who spent a lot of their advertising budget on advertisements that are not recognized afterwards. To negate this effect and to make advertising more effective, advertisers could enhance the encoding/storing process. A way to establish this is when an advertisement is novel, unexpected, or a change in the environment (Lang, 2000). These characteristics of a message will elicit an orienting response and consumers will pay attention to the advertisement. Eliciting orienting responses is also important when people are not engaging in multiscreening but is even more important in the current environment in which people are increasingly using multiple screens at the same time. Also when consumers are media multitasking, it can be an advantage when the primary focus of attention is

directed towards the message (Jeong & Hwang, 2012). Thus, an advertisement which is novel, unexpected or a change in environment might elicit an orienting response, which enhances the encoding processes and could eventually lead to a positive effect on the evaluation of the brand and the message through recognition.

In addition, the positive effect on evaluation was caused by a decrease in resistance. Because consumers have to allocate their cognitive capacities to multiple tasks, they also have less cognitive capacities left to resist the persuasive message. Thus, encouraging multiscreening behavior by, for example, developing an application related to the TV content can be an advantage for advertisers when the aim is to increase a positive brand evaluation of a brand shown on the TV. In addition, applications which are related to the TV content might elicit enjoyment which will also benefit the evaluation of the brand and message.

Because this is one of the first studies into multiscreening and advertising, future research is needed to explore this phenomenon further. Research in the field of media multitasking is often focused on the decrements in performance. It would be interesting for advertisers to examine if there are any mediators or moderators that could facilitate memory or evaluative outcomes, since this is often the goal of a campaign. The current study found two opposite underlying mechanisms for the effect of multiscreening on brand attitude. This indicates that there are factors that hinder, but also factors that could facilitate evaluative outcomes.



# PART 3

## Multiscreening and Task Relevance

This chapter is currently under review as:

Segijn, C. M., Voorveld, H. A. M., & Smit, E. G. (2017). The effect of (un)related multiscreening on advertising outcomes. *Revise and Resubmit*.

An earlier version of this chapter won the 2017 Promising Student Paper Award at the annual conference of the International Communication Association, information systems division

# 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

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	-	-	-

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.

### 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.

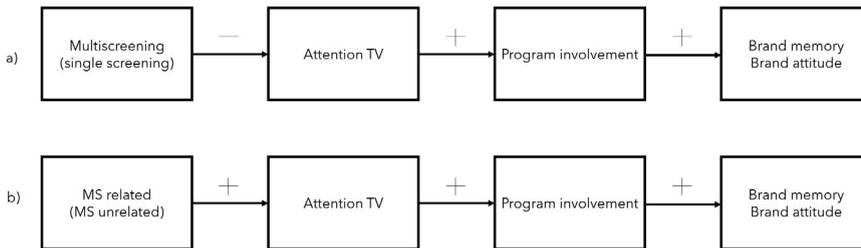
Attention to the television show might not directly influence advertising effects but could stimulate program involvement. Additionally, program involvement has previously been associated with advertising effects (Krugman, 1983; Moorman et al., 2007; Tavassoli et al., 1995). Program involvement is defined 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 ( $M_{\text{age}} = 29.13$ ,  $SD_{\text{age}} = 6.68$ , 52.9% female)<sup>5</sup>. 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.

### 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 ( $N = 32$ ,  $M_{\text{age}} = 20.28$ ,  $SD_{\text{age}} = 1.51$ , % 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 ( $N = 33$ ,  $M_{\text{age}} = 30.85$ ,  $SD_{\text{age}} = 14.13$ , 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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<sup>5</sup> 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).

**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) <sup>a</sup>	4.84 (0.90) <sup>a</sup>	3.58 (0.97) <sup>b</sup>	4.03 (1.11) <sup>b</sup>
Brand familiarity	4.00 (1.93) <sup>b</sup>	5.19 (1.53) <sup>a</sup>	2.90 (1.74) <sup>c</sup>	4.05 (1.67) <sup>b</sup>
Brand commitment	3.03 (1.58) <sup>a</sup>	2.98 (1.77) <sup>a</sup>	1.73 (0.99) <sup>b</sup>	2.70 (1.56) <sup>a</sup>

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-variables 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,  $F(3, 276) = 32.39$ ,  $p < .001$ ,  $\eta^2 = .26$ . 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,  $F(3, 279) = 98.61$ ,  $p < .001$ ,  $\eta^2 = .52$ . 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 ( $p = .077$ )<sup>6</sup>. Finally, the results showed a significant difference in program involvement,  $F(3, 279) = 18.65$ ,  $p < .001$ ,  $\eta^2 = .17$ . The participants in both single

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

Note. Cell entries are means with standard deviations in parentheses.

Different superscripts indicate significant differences between means.

<sub>1</sub> 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.

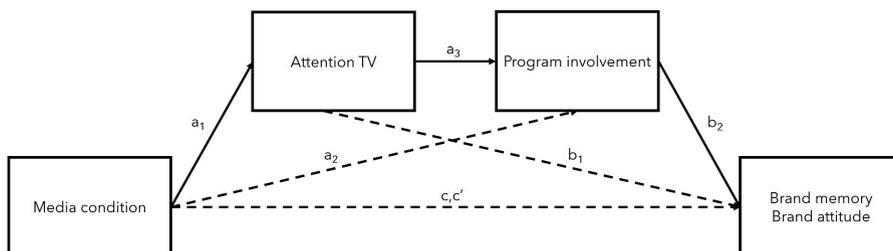
However, attention to the clip and involvement with the clip was measured about other content.

<sup>6</sup>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)
		BCBCI	SE							
Brand memory										
MS related (SS)	MS related (SS)	-0.31 (0.14)	0.29	-37.41 (3.77)***	0.04	0.01	0.21	-0.48 (0.19)*	-0.09 (0.30)	
		[-0.60, -0.04]	(0.24)	(0.00)***	(0.01)	(0.09)*				
		-0.38 (0.16)	0.49	-46.29 (3.87)***	0.04	0.01	0.21	-0.57 (0.23)*	-0.22 (0.33)	
MS unrelated (SS)	MS unrelated (SS)	[-0.74, -0.09]	(0.26)	(0.00)***	(0.01)	(0.09)*				
MS related (MS unrelated)	MS related (MS unrelated)	0.07 (0.05)	-0.20	8.88 (4.01)*	0.04	0.01	0.21	0.09 (0.08)	0.13 (0.26)	
		[0.02, 0.21]	(0.21)	(0.00)***	(0.01)	(0.09)*				
Brand attitude										
MS related (SS)	MS related (SS)	-0.55 (0.14)	0.29	-37.41 (3.77)***	0.04	-0.00	0.38	-0.29 (0.21)	-0.01 (0.30)	
		[-0.87, -0.29]	(0.24)	(0.00)***	(01)	(0.09)***				
		-0.68 (0.16)	0.49	-46.29 (3.87)***	0.04	-0.00	0.38	-0.31 (0.24)	0.04 (0.33)	
MS unrelated (SS)	MS unrelated (SS)	[-1.02, -0.38]	(0.26)	(0.00)***	(01)	(0.09)***				
MS related (MS unrelated)	MS related (MS unrelated)	0.13 (0.07)	-0.20	8.88 (4.01)*	0.04	-0.00	0.38	0.02 (0.10)	-0.05 (0.26)	
		[0.01, 0.33]	(0.21)	(0.00)***	(01)	(0.09)***				

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.

## STUDY 2

### METHOD

#### Sample and Design

The sample of the laboratory experiment consisted of 185 undergraduates ( $M_{\text{age}} = 22.22$ ,  $SD_{\text{age}} = 3.93$ , 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 ( $n = 9$ ,  $M_{\text{age}} = 25.56$ ,  $SD_{\text{age}} = 2.60$ , 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*;  $M = 3.60$ ,  $SD = 2.35$ ).

### 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 ( $M_{\text{words}} = 49.42, SD_{\text{words}} = 23.30$ ) than in the MS unrelated condition ( $M_{\text{words}} = 26.30, SD_{\text{words}} = 19.18$ ),  $F(1, 121) = 36.00, p < .001$ . 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,  $F(1, 121) = 4.33, p = .040, \eta^2$

**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) <sup>a</sup>	1.49 (1.39) <sup>b</sup>	1.90 (1.28) <sup>ab</sup>
Brand attitude	3.57 (1.33) <sup>a</sup>	3.18 (1.09) <sup>a</sup>	3.46 (1.02) <sup>a</sup>
Memory of editorial content	8.93 (1.17) <sup>a</sup>	7.66 (1.62) <sup>b</sup>	7.24 (1.91) <sup>b</sup>
Mediators			
Attention television	89.79 (10.11) <sup>a</sup>	62.74 (16.11) <sup>b</sup>	61.16 (16.65) <sup>b</sup>
Program involvement	5.42 (1.31) <sup>a</sup>	4.76 (1.19) <sup>b</sup>	4.43 (1.35) <sup>b</sup>

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<sup>7</sup>.

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 conditions showed higher brand memory than the participants in the MS unrelated condition (indirect effect =  $.06$ , boot SE =  $.04$ , 95% BCBCI [ $.01, .17$ ]).

<sup>7</sup> 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)
<b>Brand memory</b>									
MS related (SS)		-16 (07)	-16.31	0.54	0.05	0.00	0.21	-07	-0.54
		[-.33, -.04]	(3.77)***	(0.31)	(0.01)***	(0.01)	(0.09)*	(0.16)	(0.37)
MS unrelated (SS)		-22 (.10)	-22.72	0.31	0.05	0.00	0.21	-.18	-0.15
		[-.44, -.06]	(2.95)***	(0.27)	(0.01)***	(0.01)	(0.09)*	(0.18)	(0.31)
MS related (MS unrelated)		.06 (.04)	6.41	0.22	0.05	0.00	0.21	.12	-0.40
		[.01, .17]	(2.82)*	(0.22)	(0.01)***	(0.01)	(0.09)*	(.09)	(0.26)
<b>Brand attitude</b>									
MS related (SS)		-.13 (0.08)	-16.31	0.54	0.05	-0.01	0.17	.15	-0.28
		[-.23, -.02]	(3.77)***	(0.31)	(0.01)***	(0.01)	(0.08)*	(0.14)	(0.32)
MS unrelated (SS)		-.18 (0.11)	-22.72	0.31	0.05	-0.01	0.17	.13	-0.09
		[-.44, -.00]	(2.95)***	(0.27)	(0.01)***	(0.01)	(0.08)*	(0.17)	(0.28)
MS related (MS unrelated)		.05 (.04)	6.41	0.22	0.05	-0.01	0.17	.02	-0.19
		[.00, .17]	(2.82)*	(0.22)	(0.01)***	(0.01)	(0.08)*	(.07)	(0.23)
<b>Memory of editorial content</b>									
MS related (SS)		-.19 (0.10)	-16.31	0.54	0.05	.03	0.25	-.46	-0.13
		[-.45, -.05]	(3.77)***	(0.31)	(0.01)***	(0.01)**	(0.10)*	(0.22)*	(0.42)
MS unrelated (SS)		-.27 (0.12)	-22.72	0.31	0.05	.03	0.25	-0.75	-0.57
		[-.56, -.06]	(2.95)***	(0.27)	(0.01)***	(0.01)**	(0.10)*	(0.24)*	(0.36)
MS related (MS unrelated)		.07 (0.05)	6.41	0.22	0.05	.03	0.25	.29	.44
		[.01, .21]	(2.82)*	(0.22)	(0.01)***	(0.01)**	(0.10)*	(.13)*	(.30)

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



## 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., Chinchanchokchai 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

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.





# Chapter 7

General Discussion



## GENERAL DISCUSSION

The aim of this dissertation was to disentangle the phenomenon of multiscreening and how it affects information processing and advertising outcomes. To examine this, the dissertation had three objectives: 1) to explore multiscreening in daily life, 2) to examine how multiscreening affects advertising outcomes, and 3) to examine the facilitating role of task relevance. Based on these three objectives this dissertation led to six conclusions about multiscreening and how it affects information processing and advertising effectiveness. The conclusions are categorized per objective.

### Conclusions about Multiscreening in Daily Life

*First, multiscreening consists of different dimensions that could either facilitate or hinder information processing and advertising effectiveness.* Different dimensions of multiscreening were described and completed with recent literature in the field of multiscreening, media multitasking, and persuasion. Based on this typology, an overview was provided of factors that could hinder or facilitate processing of advertising when multiscreening. The overview showed that the biggest challenge of multiscreening is its concurrent modality: both screens are visual. Because of this characteristic, people have to divide their visual attention between screens which hinders the information processing of advertising. Beside challenges also new opportunities for advertisers arise. An additional screen could for example offer the possibility to engage in related content on both screens, which could eventually increase advertising outcomes.

*Second, multiscreeners in the Netherlands multiscreen more than 80 minutes a day, they combine the television most often with another screen, and multiscreening is for all ages.* It was found that multiscreeners multiscreen on average three days a week, mostly on Sundays, and on average for more than 80 minutes per day. The television is the most often combined screen and is mostly combined with a smartphone, laptop, or tablet. The multiscreener has an average age of 41 years old, is predominantly female, has a higher than average education, and owns on average more than four screens. Multiscreening is for all ages, however, the younger people are the longer they will multiscreen.

*Third, people tend to focus for only short periods of time on a screen when multiscreening and switch often between screens.* The results of this dissertation showed that people switched 2.5 times per minute, had longer gazes on the television screen than to the tablet, and devoted most of their attention - 75% of their time – to the television. However, it should be noted that this could also vary, depending on content and tasks. Furthermore, half of all gazes was shorter than 10 seconds. This indicates that the main message of a media campaign must not take too long because

people are less likely to hold their gaze to the screen to process longer messages.

### **Conclusions about Multiscreening and Advertising Effects**

*Fourth, multiscreening has a negative effect on cognitive advertising outcomes, such as brand memory.* Thus, multiscreeners remember less of media content (e.g., TV shows, advertising, etc.) compared to single screeners. These results connect to the findings in the media multitasking literature that consistently show this negative effect of multitasking on people's memory. However, the results of this dissertation also showed that multiscreening is not always detrimental to memory. It was found that multiscreeners' memory of a message was unimpaired when most attention was allocated to the screen that displayed the message.

*Fifth, multiscreening could have a negative and a positive effect on affective advertising outcomes, such as brand attitudes.* In this dissertation, underlying mechanisms of multiscreening on affective advertising outcomes were examined. It was found that multiscreening could have a negative effect on affective advertising outcomes through ease of recognition and a positive effect on affective advertising outcomes through counterarguing. First of all, when people are multiscreening it is more difficult to recognize the brand afterwards, and difficult-to-recognize brands result in more negative brand attitudes and attitudes to the tablet ad. Second, multiscreening could have a positive effect on affective advertising outcomes through counterarguing, a resistance strategy. Multiscreening decreases the number of counterarguments and less counterarguments result in more positive brand attitudes, attitudes toward the television ad, and purchase intentions.

### **Conclusion about Multiscreening and Task Relevance**

*Finally, multiscreening with related tasks results in better memory and more positive attitudes compared to multiscreening with unrelated tasks through attention to the television and subsequent program involvement.* In other words, task relevance is shown to be a facilitator of advertising effects when multiscreening. Task relevance is a form of relatedness in which the tasks of the different media in media multitasking serve an overarching or similar goal on the same topic (Wang, Irwin, Cooper, & Srivastava, 2015). Although single screeners still had the best brand memory and the most positive brand attitudes, it was found that related multiscreening led to better brand memory and more positive brand attitudes compared to unrelated multiscreening. This effect was mediated by attention to the television show and subsequent program involvement. The results showed that when people were engaged in related multiscreening they had more attention to the television show, were subsequently more involved with the

television show and, therefore, had better brand memory and more positive brand attitudes compared to people who engaged in unrelated multiscreening.

### Theoretical Implications

This dissertation contributes to the development of theory regarding multiscreening and advertising effectiveness in four ways. First, this dissertation contributes to the conceptualization of the phenomenon of multiscreening. A few years ago, multiscreening was a phenomenon that was only mentioned by the industry. In 2014, this concept was still barely present in the scientific literature. Around that time, research on media multitasking as a general phenomenon was growing, but not yet on this specific form of media multitasking. The research in this dissertation contributes to the systematic development of the theoretical conceptualization of multiscreening, by describing the multi-dimensions of this phenomenon, by mapping its prevalence and composition in real-life, and by showing in an eye-tracking study what the viewing behavior of this specific form of media multitasking looks like. Conceptualizing multiscreening is important because the phenomenon of media multitasking encompasses all kinds of media compositions that are used simultaneously (e.g., Jeong & Hwang, 2015; Voorveld, Segijn, Ketelaar, & Smit, 2014). As a consequence, general conclusions were drawn about the effects of media multitasking based on diverse contexts and characteristics of media. Moreover, the breadth of the media multitasking definition makes comparing findings across studies challenging (Wang et al., 2015; Xu, Wang, & David, 2016). This dissertation, therefore, focused on a specific combination of media, namely screens. This makes it possible to draw conclusions about this specific form of media multitasking and to compare results between multiscreening studies. Finally, the conceptualization of multiscreening will advance future research on this topic. Especially the different dimensions of multiscreening could be used as a steppingstone to continue to examine multiscreening systematically and to further broaden the understanding of multiscreening and the consequences for information processing and advertising effectiveness.

Second, this dissertation contributes to the development of theories on multiscreening and advertising effectiveness. It was already assumed that multiscreening could affect information processing and advertising effectiveness because of capacity and structural interference. It was found that media multitasking hinders these processes, which results in less memory of the media content compared to single tasking. However, empirical evidence that tested whether multiscreening affects information processing of advertising outcomes has been scarce until now. This dissertation confirms the memory deficit when multiscreening. Additionally, this dissertation showed effects on

affective outcomes are less straightforward. Multiscreening could have both a negative and positive effect on affective advertising outcomes depending on the underlying mechanism (i.e., implicit recognition or counterarguing).

Third, this dissertation makes a theoretical contribution to the understanding of why multiscreening is detrimental to advertising compared to single screening. It goes beyond measuring direct effects of multiscreening on advertising outcomes and taps into underlying mechanisms of this effect. Overall, the results of this dissertation call for the incorporation of attention as a theoretical concept in multiscreening literature. Exposure may be sufficient to affect brand memory and brand attitudes in single screening situations. However, attention becomes a key factor when multiscreening, because of the concurrent visual modalities. The important role of attention was, for example, demonstrated in the eye-tracking study in which attention to both screens was manipulated. The results of this study showed how attention allocation affected people's memory. Furthermore, attention appeared to be a key factor when comparing related to unrelated multiscreening. Other underlying mechanisms found in this dissertation were implicit recognition and counterarguing for affective advertising outcomes, and program involvement for both cognitive and affective advertising outcomes.

Finally, this dissertation makes a theoretical contribution to the understanding of facilitators of multiscreening on advertising effectiveness. By focusing on opportunities instead of negative consequences, this dissertation introduces a positive approach that focuses on how information processing and advertising effectiveness could be improved in a multiscreening situation. The results of this dissertation showed that multiscreening is not always bad for advertising effectiveness. For example, related multiscreening resulted in better brand memory and more positive brand attitudes through attention and subsequently program involvement, compared to unrelated multiscreening.

### **Methodological Implications**

The studies conducted in this dissertation have three important methodological implications. First, the studies contribute to the knowledge about research designs when examining multiscreening or other forms of media multitasking. In order to assess multiscreening performance, a reference group is required. In most multitasking research, performance of multitaskers is assessed in comparison with single taskers (Lang & Chzran, 2015). Typically, a single tasking group (e.g., exposure to a video) is compared to a multitasking group (e.g., exposure to the same video + distractor task) on, for example, how well the participants of both groups can remember certain

elements from the video. A single screening condition is required to connect findings of multiscreening studies to the current knowledge in the field, which is mainly based on mono-media consumption. Studies in this dissertation also included other reference groups beside a single screen condition, which broadens the understanding of what is seen as (un)successful multiscreening (Lang & Chzran, 2015). For example, in chapter 5 a design was used that also included a sequential condition (e.g., first watch video, then complete additional task). In this study, no significant differences were found between this reference group and the two single screening conditions (i.e., television only and tablet only). Other reference groups were used in chapter 4 and 6 in which multiple multiscreening groups were compared to each other in addition to the comparison to a single screen group. These two chapters showed that not all multiscreening conditions are equally detrimental to advertising outcomes. There could be factors (e.g., attention allocation and task relevance) that could vary between multiscreening conditions and that affect information processing and advertising effectiveness. Based on this dissertation, it is recommended to always include at least one single screening condition as a reference group. However, future research should also further look into differences between different multiscreening conditions.

Second, this dissertation contributes to the knowledge of two methodological approaches used by two schools of multiscreening research. One school of research in which multiscreening is examined by split screen computer tasks, and one school of research in which multiscreening is examined with tasks on different screens. Both approaches exist in the literature, as well as in real-life. However, until now it was uncertain whether the approaches of both schools were complementary or could lead to different results. In chapter 6 of this dissertation, the same conceptual model was tested by the approaches of both schools in two separate studies. The results were similar. This is good news for multiscreening scholars because it indicates that the approaches will not lead to different outcomes. However, the studies had more differences than just the methodological approach. Therefore, more research is needed in order to provide further validation for this claim.

Third, the results of this dissertation, particularly the results of chapter 4, contribute to our knowledge of measuring attention allocation when multiscreening. In this chapter, visual attention was measured in two ways: by means of an eye-tracker and by means of self-reported measures. The results showed that these two measures were highly correlated. This implies that people are capable of self-reporting their attention allocation to both screens and that post-hoc self-reported attention – immediately after exposure – could be used as a reasonably accurate attention measure. This finding will benefit future research on media exposure and attention. The high correlation

between the self-reported and eye-tracker measures of attention indicate that both could be used. The difference is that eye-tracking primarily measures visual attention (i.e., eyes on the screen) where self-reported measures of attention could also include psychological attention (i.e., being mentally present or not). Future research should use the measure based on what kind of attention the researchers are interested in.

### **Practical Implications**

The results of this dissertation have important practical implications. Despite that this dissertation focuses on advertising outcomes, the implications may not only apply to advertisers. This dissertation is about information processing of a persuasive message when multiscreening. Although not tested in this dissertation, it can be argued that multiscreening could also influence the way other persuasive messages are processed, such as political campaigns or health messages. Especially when the aim is to affect cognitive outcomes, the results of this dissertation might be useful. Thus, the implications could be relevant for everyone involved in designing a persuasive message that is distributed through screen media.

Overall, it is very important to realize that a persuasive message never stands alone. Effects of a message can be altered by the use of an additional screen. Moreover, it can be influenced by the content shown on this additional screen and whether this content is related or unrelated to the designed message. In general, this dissertation shows that multiscreening has a detrimental effect on cognitive (e.g., memory) and affective (e.g., attitudes) outcomes. Therefore, it is reasonable to assume that the sender of a persuasive message would prefer single screening over multiscreening. However, this is beyond their control. The sender cannot control whether people are going to multiscreen while being exposed to their persuasive message or decide to pay full attention to it. However, this does not mean that there is nothing that they can do. The results of this dissertation showed at least two important factors that could facilitate cognitive and affective effects when multiscreening and which can be taken into account when designing a persuasive message.

The first factor that could facilitate the effectiveness of a persuasive message when multiscreening is attention. The results of this dissertation showed that it is possible that a message is processed just as well when people are multiscreening, as when they are single screening. People's memory of the media message is not impaired when most attention is allocated to the screen of the message of interest. Thus, it is important to attract attention when multiscreening. In the literature some message characteristics are presented that could elicit orienting responses, such as noises, camera changes, and arousing content (e.g., Lang, 2000). Attracting

attention to the message is also important when people are not multiscreening but becomes even more important in environments where distractions in the form of other screens are ever present. As a result of attracting attention, the encoding process of the advertised message might be enhanced. Furthermore, it is important to take into account that people have only short gazes – approximately 10 seconds – to the message. Thus, it would be recommended to keep the most important message short and elicit an orienting response right before this message.

The second factor that could facilitate advertising effectiveness when multiscreening is task relevance. The results of this dissertation showed that related multiscreening – opposed to unrelated multiscreening – led to better brand memory and more positive attitudes through attention and subsequent program involvement. Although the results showed that single screeners had even better brand memory and more positive attitudes via the same mechanism, related multiscreening might be the next best option. As argued in chapter 6, the question arises whether single screeners really exist in real-life or that they are an artifact of experiments in which people are forced to pay full attention to media content. Even more importantly, whether people are going to single screen is beyond the control of the sender. However, related multiscreening can be encouraged, for example, by offering interaction possibilities to engage with the television content on a second screen device. The challenge for the sender lies in thinking of creative ways to involve people.

### Limitations and Suggestions for Future Research

Although this dissertation makes a substantial contribution to the multiscreening and advertising literature, it is not without limitations. Two limitations will be discussed: the conceptualization of multiscreening and the ecological validity of the research.

**Conceptualization of multiscreening.** A first limitation concerns the conceptualization of multiscreening. One of the most important implications of this dissertation is that it contributes to the conceptualization of multiscreening. As stated in the introduction of this dissertation, multiscreening consists of task independence (i.e., tasks are self-contained) and performance concurrency (i.e., tasks have some sort of temporal overlap) (Benbunan-Fich, Adler, & Mavlanova, 2011). The visual nature of the screens makes it impossible for people to use multiple screens with complete temporal overlap. Therefore, multiscreeners use an interleaved strategy by switching their visual attention between screens. These switches can vary from rapid switching to longer time spans between switches (Salvucci & Taatgen, 2011). The conceptual question arises, however, where multiscreening stops and single screening begins. How many switches and how much temporal overlap is necessary to define it as multiscreening? At both ends of the

continuum the distinction between multiscreening and single screening can be made. However, this leaves a grey area in the middle where this distinction becomes less clear.

This conceptual ambiguity has three implications for multiscreening research. First, the ambiguity of the definition could lead to different views about the measurement of multiscreening among researchers with implications for the generalizability of the results. Discrepancies between definitions of multiscreening can lead to difficulties in comparing results of different multiscreening studies. It would become an even bigger problem when certain situations are defined as multiscreening by some researchers and as single screening by others. Second, the ambiguity of the definition could lead to a different view about the concept between the researcher and the participant. The implication varies per method chosen. In an experiment, for example, the tasks are predefined by the researcher. In this case, the researcher is in charge of what is meant by multiscreening. A survey or diary study, however, relies on self-report of the participant. Therefore, the precise perception of multiscreening is more out of the researcher's control. This could lead to different interpretations of the results. For example, when people are asked to report the amount of multiscreening it is possible that they over- or underestimate their behavior based on the difference between their definition and that of the researcher. This implication also applies to the research done in this dissertation, because it contains both a study that was based on self-reported measures of multiscreening (Chapter 3) and studies in which multiscreening was predefined in the method (Chapter 4-6). Finally, the conceptual ambiguity of the definition could lead to different views about multiscreening within the population. This has implications for the validity of measuring multiscreening, especially when the definition of multiscreening differs between certain groups in the population. For example, it was found that younger people multiscreen longer than older people. However, it could be possible that younger people have a broader definition of multiscreening than older people, which could (partly) explain this difference. Because of these three implications, it is very important that future research continues to develop the conceptualization of multiscreening. This dissertation is a first step in unraveling the phenomenon of multiscreening and could serve as a steppingstone for future research in this respect.

**Ecological validity of the research.** A second limitation concerns the ecological validity of the research. Every method has its limitations. The majority of the studies presented in this dissertation consists of experiments. This is an appropriate method to examine causal effects in a controlled environment. However, this has also implications for the ecological validity of the findings. It is very hard to capture naturalistic multiscreening behavior, in the sense that people choose the composition of screens,

the content on the screens, the tasks, and even if they want to multiscreen or not. In an experiment, these decisions are made by the researcher and depend on the condition the participant is assigned to. Thus, an experiment might not resemble people's naturalistic multiscreening behavior. This does not need to be a problem when the aim of the study is to examine effects of multiscreening. However, it is a less ideal situation when multiscreening viewing behavior itself is under examination, as is done in chapter 4. Especially when it is assumed that viewing behavior could depend on composition, content, and tasks. Ideally, viewing behavior would be examined in a real-life situation. However, this is not feasible for many reasons. Although the approach chosen in this dissertation might not be ideal, some measures were taken to increase ecological validity. For example, the study approached a naturalistic multiscreen environment; the experiment took place in a living room setting with an actual television and tablet. Also, the use of eye-tracking glasses – opposed to the fixed eye-tracker – had the advantage of flexibility, while still recording detailed viewing information that did not obstruct multiscreening viewing behavior. However, the main issue is that it remains forced exposure. In this light, the results should be seen as a first step in exploring multiscreening viewing behavior.

### Research Agenda

This dissertation is a first step in examining how multiscreening affects information processing and advertising effectiveness. However, future research is necessary to further disentangle multiscreening and its effects.

The first recommendation for future research is focused on the phenomenon of multiscreening. Future research should continue the conceptualization of multiscreening. As mentioned in the limitation section of this chapter, the conceptual ambiguity of the phenomenon could have implications for multiscreening research. Therefore, it is important that future research continues the process on conceptualizing the phenomenon of multiscreening which was started in this dissertation.

The second recommendation for future research is focused on advertising effects. Similar to media multitasking research, the results of this dissertation showed a memory deficit when combining multiple media. Effects of multiscreening and media multitasking on cognitive outcomes are examined thoroughly and the findings of different studies are consistent (For an overview see Jeong & Hwang, 2016). However, the effect of multiscreening on affective outcomes has less often been examined and this relation appears to be more complex. Some researchers found a positive relation between multiscreening and affective advertising outcomes, others found a negative effect, and some found no direct effects. In addition, researchers found both positive

and negative indirect effects of multiscreening on affective advertising outcomes. Therefore, it is recommended that future research focusses on unraveling the effect of multiscreening on affective advertising outcomes. To further explore this relation, future research could extend the work of this dissertation by examining possible additional underlying mechanisms of this effect, such as perceived ad intrusiveness. Also, to further validate the findings of this dissertation, it should be tested whether the mechanisms found in this dissertation also work in different contexts, for example with different tasks, media content, or brands.

The third recommendation for future research is focused on additional advertising variables, such as (purchase) behavior. The ultimate goal of advertisers is that the product is purchased by consumers. Most screens that are combined when watching television are connected to the Internet and make it possible for consumers to immediately purchase advertised products. Knowledge about people's purchase behavior or intentions is scarce. However, it would be highly relevant for practitioners and it will contribute to theory about emerging media and consumer behavior. Future research could also focus more on implicit effects of multiscreening. Advertising effects are traditionally assessed through explicit measures. However, these tools may not provide a complete picture of the effects of multiscreening. In general, implicit measures are more sensitive to information that is processed in a shallow opposed to deep fashion. They are better capable of tapping into unconscious processes (Vandeberg, Murre, Voorveld, & Smit, 2015). Implicit measures may, therefore, be able to detect potential influences of a hardly attended medium. Thus, implicit memory and attitude are necessary to provide a more complete understanding of the mechanisms that underlie multiscreening processing and effects. This dissertation is one of the first multiscreening studies that incorporated implicit measures. However, future research is necessary to further assess the effect of multiscreening on implicit outcomes in order to get a better understanding of multiscreening and advertising effectiveness.

The final recommendation for future research is focused on the facilitators of multiscreening effects. This dissertation introduced a positive approach by focusing on facilitators of information processing and advertising effectiveness instead of focusing on how multiscreening hinders these processes. This is necessary because research continuously shows the high prevalence of multiscreening in society. At the same time, research shows that people have difficulties to process information when using multiple screens simultaneously. The results of the dissertation showed two possible facilitators of multiscreening effects, namely attention and task relevance. Future research could further look into facilitating factors of multiscreening on information processing and advertising outcomes. The dimensions of multiscreening (Chapter 2) could serve as a

starting point in examining these facilitators.



English Summary

Dutch Summary  
(Nederlandse Samenvatting)

References

Author Contributions

Acknowledgements  
(Dankwoord)

About the Author



## ENGLISH SUMMARY

**Everyday multiscreening. How the simultaneous usage of multiple screens affects information processing and advertising effectiveness.**

Today, people have access to a variety of screens, such as a television, laptop, smartphone, and tablet. Screen saturation and the convergence of these technologies have led to an increase in combining different screens simultaneously, also known as multiscreening. With so many new devices and screens competing for people's attention, they continue to be distracted. Multiscreening is assumed to affect the way people process media messages, such as advertising, for two reasons. First, they have a limited amount of cognitive capacities to process media content. During multiscreening these cognitive capacities need to be divided between the different screens which goes at the expense of the processing of both messages. Second, the visual nature of the screens force people to divide their visual attention between the screens. This limits the opportunity to process the information of the screen that is not focused on. Even though distractions in the form of different screens are ever present, it is still relatively unknown how multiscreening affects information processing and advertising effectiveness compared to single screening. Therefore, the aim of this dissertation was to disentangle the phenomenon of multiscreening and how it affects information processing and advertising effectiveness by; 1) exploring the phenomenon of multiscreening in daily life, 2) examining how multiscreening affects advertising outcomes, and 3) examining the facilitating role of task relevance.

## CONCLUSIONS

Based on the results of this dissertation three conclusions can be drawn about multiscreening in daily life, two about multiscreening and advertising effectiveness, and one about multiscreening and task relevance.

### 1. MULTISCREENING IN DAILY LIFE

**1.1. Multiscreening consists of different dimensions that could either hinder or facilitate information processing and advertising effectiveness.**

A literature review described a typology of multiscreening based on dimensions of media multitasking. These eleven dimensions are divided into four categories: 1)

task relations: task hierarchy, task switch, task relevance, shared modality, and task contiguity, 2) task inputs: information modality, information flow, and emotional content, 3) task outputs: behavioral responses and time pressure, and 4) user differences. This overview showed that these dimensions could either hinder or facilitate information processing. For example, the visual modality of all screens (i.e., shared modality) could hinder information processing of advertising because people have to divide their visual attention. On the other hand, an additional screen also offers the possibility to engage in related content (i.e., task relevance).

**1.2. In the Netherlands, people multiscreen more than 80 minutes a day, they combine a television most often with other screens, and multiscreening is for all ages.**

The diary study showed that people in the Netherlands multiscreen on average more than 80 minutes a day, about three days a week, and mostly on Sundays. The television is most often combined and mostly with a smartphone, laptop, or tablet. Furthermore, the multiscreener has an average age of 41 years old, is predominantly female, has a higher than average education, and owns on average more than four screens. The younger people are the longer they will multiscreen but multiscreening happens across the life span.

**1.3. People tend to focus only for short periods of time on a screen and switch often between screens.**

The eye-tracking experiment showed that multiscreeners switched 2.5 times per minute, fifty percent of all gazes was shorter than 10 seconds, and most of multiscreeners' attention was allocated to the television. However, multiscreeners' viewing behavior may vary depending on the media content and tasks.

## **2. MULTISCREENING AND ADVERTISING OUTCOMES**

**2.1. Multiscreening has a negative effect on cognitive advertising outcomes (e.g., brand memory).**

It was found that multiscreeners remember less of the media content (i.e., editorial and advertising content) compared to single screeners. However, people's memory of a message is unimpaired when most attention is devoted to the screen that displays the message.

## 2.2. Multiscreening could have a negative and positive effect on *affective* advertising outcomes (e.g., brand attitudes).

The effect of multiscreening on affective advertising outcomes and its underlying mechanisms was examined. First, it was found that multiscreeners – opposed to single screeners – have more difficulty in recognizing the brand afterwards and difficult to recognize brands result in more negative affective advertising outcomes. Second, it was found that multiscreeners – opposed to single screeners – have more difficulty to resist a persuasive message and less resistance result in more positive affective advertising outcomes.

## 3. MULTISCREENING AND TASK RELEVANCE

3.1 Engaging in multiscreening with related tasks (e.g., watching TV and chatting about TV content) results in better memory and more positive attitudes compared to multiscreening with unrelated tasks (e.g., watching TV and chatting about other content).

Thus, multiscreening is not always detrimental to advertising effectiveness. When people engage in related tasks (versus unrelated tasks) it results in better brand memory and more positive brand attitudes than when people engage in unrelated tasks, because related multiscreening increases attention to the television show, and subsequently program involvement. However, single screeners have the best brand memory and most positive attitudes.

## IMPLICATIONS

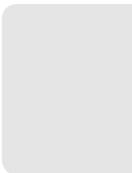
First, this dissertation contributes to the development of **theory** regarding multiscreening and advertising effectiveness by 1) contributing to the conceptualization of the phenomenon of multiscreening, 2) systematically examining the effects of multiscreening on both cognitive and affective advertising outcomes, 3) examining *why* multiscreening affects information processing and advertising effectiveness by going beyond measuring direct effects and tapping into underlying mechanisms of the effect, and 4) introducing a positive approach that focuses on how information processing and advertising effectiveness can be enhanced when multiscreening instead of focusing on detrimental effects.

Second, this dissertation has three valuable **methodological implications**. The

studies conducted in this dissertation contribute to the knowledge of 1) research designs when examining multiscreening – or other forms of media multitasking – by using different reference groups instead of only focusing on comparing multiscreening with single screening, 2) two methodological approaches used by two schools of multiscreening research by testing the same conceptual model with the approach of both schools, and 3) measuring attention allocation when multiscreening by comparing eye-tracking data with self-reported measures of attention.

Finally, this dissertation also has important **practical implications** that not only apply to advertisers but to everyone involved in designing persuasive messages that are distributed through screen media. The results of this dissertation showed that a message does not stand alone. The simultaneous usage of multiple screens could influence the way a message is processed. Even the content on the additional screen could have an impact. But more importantly, this dissertation showed that media content developers could anticipate this. The results of this dissertation showed at least two factors that could facilitate information processing and advertising effectiveness when multiscreening, namely attention and task relevance.

In sum, this dissertation shows that multiscreening is ingrained into people's daily lives and it impacts the way people process media content. Moreover, it shows that media messages never stand alone. The way a message is processed can be influenced by the use of additional screens and even media content that is shown on these additional screens. Finally, this dissertation shows that multiscreening is not only detrimental to information processing and advertising effectiveness, but there are some things media content developers can do to facilitate this process.





## DUTCH SUMMARY (NEDERLANDSE SAMENVATTING)

**Alledaags multiscreening. Hoe informatieverwerking en reclame effectiviteit wordt beïnvloed door het gebruik van meerdere schermen tegelijkertijd.**

Het medialandschap is de laatste jaren snel veranderd. Mensen hebben tegenwoordig toegang tot verschillende schermen, zoals een televisie, laptop, smartphone of tablet. De hoeveelheid aan schermen en het gemak om deze schermen te combineren heeft ervoor gezorgd dat mensen dit vaker zijn gaan doen. Het tegelijkertijd gebruiken van verschillende schermen staat bekend als multiscreening. Multiscreening zou op twee manieren invloed kunnen hebben op de manier waarop mensen mediaboodschappen, zoals reclame, verwerken. Ten eerste hebben mensen een beperkt aantal cognitieve capaciteiten om informatie te kunnen verwerken. Deze capaciteiten worden bijvoorbeeld gebruikt om een mediaboodschap tot zich te nemen, op te slaan in het geheugen en op een later moment weer terug te halen uit het geheugen. Bij multiscreening moeten deze cognitieve capaciteiten worden verdeeld over de verschillende schermen en dit gaat ten koste van de verwerking van de informatie op deze schermen. Ten tweede moeten mensen hun visuele aandacht verdelen, omdat zij hun ogen niet op beide schermen tegelijkertijd kunnen richten. Visuele informatie kan alleen worden verwerkt als de ogen erop gericht zijn en dit gaat ten koste van de verwerking van de visuele informatie waar de ogen niet op zijn gericht. Hoewel meerdere schermen continue aanwezig zijn in onze samenleving, was er nog weinig bekend over de invloed van multiscreening op het verwerken van mediaboodschappen in het algemeen en reclame in het bijzonder. Dit proefschrift had als doel om meer grip te krijgen op het fenomeen multiscreening en de invloed hiervan op de verwerking van reclameboodschappen te bestuderen. Het proefschrift is opgedeeld in drie delen:

1. *Multiscreening in het dagelijks leven.* Dit deel gaat over wat multiscreening is, hoe vaak en in welke vorm het voorkomt en wie de multiscreeners zijn.
2. *Multiscreening en reclameverwerking.* In dit deel staat het effect van multiscreening op zowel cognitieve (bijv. merkherkenning) als affectieve (bijv. merkattitude) reclamereacties centraal.
3. *Multiscreening en het uitvoeren van gerelateerde taken.* Dit deel behandelt het verschil in effect van multiscreening op reclamereacties wanneer mensen twee gerelateerde taken combineren in vergelijking met wanneer mensen twee taken combineren die niet gerelateerd zijn.

## CONCLUSIES

Gebaseerd op de resultaten uit dit proefschrift kunnen er verschillende conclusies worden getrokken die hieronder per deel zijn beschreven.

### 1. MULTISCREENING IN HET DAGELIJKS LEVEN

#### 1.1 Multiscreening bestaat uit verschillende dimensies die de verwerking van mediaboodschappen zowel kunnen hinderen als faciliteren.

In een literatuurreview is een typologie van multiscreening beschreven gebaseerd op elf verschillende dimensies van media multitasking. Deze dimensies zijn gebaseerd op 1) de relatie tussen de taken (bijv. hiërarchie of aantal switches), 2) input van taken (bijv. informatie flow of emoties), 3) output van taken (bijv. het aantal vereiste handelingen of tijdsdruk) en 4) individuele verschillen. Dit overzicht bracht in beeld welke dimensies informatieverwerking hinderen en welke informatieverwerking faciliteren. Doordat de schermen die gecombineerd worden allemaal visueel zijn (dimensie: gedeelde modaliteit), zou de informatieverwerking kunnen hinderen. Aan de andere kant biedt een extra scherm ook de mogelijkheid om gerelateerde informatie aan te bieden wat weer faciliterend zou kunnen werken.

#### 1.2. Nederlanders multiscreenen meer dan 80 minuten per dag, combineren de televisie het meest met andere schermen en multiscreening is voor alle leeftijden.

Het onderzoek met mediadagboeken liet zien dat Nederlanders gemiddeld meer dan 80 minuten per dag multiscreenen, gemiddeld drie dagen per week en het meeste op zondag. De televisie wordt het vaakst gecombineerd met een ander scherm. Het scherm dat het meest wordt gebruikt in combinatie met een televisie is de smartphone, laptop of tablet. De multiscreener is gemiddeld 41 jaar oud, de meerderheid is vrouw, heeft een iets hoger dan gemiddeld opleidingsniveau en bezit gemiddeld meer dan vier schermen. Tot slot bleek dat multiscreening voorkomt onder alle leeftijden, maar hoe jonger iemand is des te meer hij/zij zal multiscreenen.

#### 1.3 Mensen hebben maar kort aandacht voor een scherm en switchen vaak tussen schermen.

Het eye-tracking onderzoek liet zien dat mensen ongeveer 2,5 keer per minuut switchen tussen schermen, dat 50% van alle fixaties 10 seconden of korter duurt en dat de meeste aandacht uitgaat naar het televisiescherm (versus de tablet). Hierbij

moet wel de kanttekening worden gemaakt dat deze aantallen kunnen verschillen bij andere mediaboodschappen (bijv. film versus reclameblok) of andere taken (bijv. lezen versus gamen).

## 2. MULTISCREENING EN RECLAMEVERWERKING

### 2.1 Multiscreening heeft een negatief effect op *cognitieve* reclamereacties.

De resultaten van dit proefschrift laten zien dat multiscreeners in het algemeen minder van de mediaboodschappen kunnen herinneren dan single screeners. Voldoende aandacht voor een scherm kan ervoor zorgen dat multiscreeners evenveel kunnen herinneren als single screeners, maar alleen van de boodschap op het scherm waar hun aandacht het meest op is gericht.

### 2.2 Multiscreening kan zowel een negatief als een positief effect hebben op *affectieve* reclamereacties.

In dit proefschrift is gekeken naar het effect van multiscreening op affectieve reclamereacties en de onderliggende mechanismen hiervan. Ten eerste blijkt dat multiscreeners (versus single screeners) meer moeite hebben om een merk achteraf te herkennen en daarom evalueren zij het merk negatiever. Ten tweede blijkt dat multiscreeners (versus single screeners) meer moeite hebben om weerstand te bieden aan een reclameboodschap en daarom evalueren zij het merk positiever.

## 3. MULTISCREENING EN HET UITVOEREN VAN GERELATEERDE TAKEN

### 3.1 Wanneer mensen twee gerelateerde taken tegelijkertijd uitvoeren resulteert dit in positievere reclamereacties dan wanneer mensen twee taken tegelijkertijd uitvoeren die niet gerelateerd zijn.

Multiscreening is niet altijd negatief voor reclameverwerking. Als multiscreeners twee gerelateerde taken tegelijkertijd uitvoeren (bijvoorbeeld televisiekijken + chatten over het programma), hebben zij een betere merkherinnering en beoordelen zij een merk positiever dan wanneer zij taken uitvoeren die niet gerelateerd zijn (bijvoorbeeld televisiekijken + chatten over een ander onderwerp). Dit komt doordat gerelateerde taken ervoor zorgen dat men meer aandacht heeft voor het televisieprogramma en men hierdoor meer betrokken raakt bij het programma. De merkherinnering is echter

nog het hoogst en merken worden het meest positief geëvalueerd wanneer mensen single screenen.

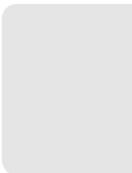
## IMPLICATIES

Ten eerste draagt dit proefschrift bij aan de ontwikkeling van **theorie** over multiscreening en reclameverwerking door 1) het fenomeen multiscreening te conceptualiseren, 2) het systematisch onderzoeken van de invloed van multiscreening op zowel cognitieve als affectieve reclamereacties, 3) te onderzoeken *waarom* multiscreening reclameverwerking beïnvloedt en 4) een positieve benadering te introduceren en te onderzoeken hoe reclameverwerking gefaciliteerd zou kunnen worden.

Ten tweede heeft dit proefschrift drie belangrijke **methodologische implicaties**. Het onderzoek draagt bij aan de kennis over 1) onderzoekdesigns in multiscreening onderzoek door verschillende referentiegroepen te gebruiken en niet alleen multiscreening te vergelijken met single screening, 2) twee methodologische benaderingen in multiscreening onderzoek door deze twee benaderingen te gebruiken om hetzelfde model te testen en 3) het meten van aandacht door eye-tracking resultaten te vergelijken met zelfrapportage van aandacht.

Tot slot heeft dit proefschrift **praktische implicaties** die niet alleen voor adverteerders gelden, maar voor iedereen die betrokken is bij het ontwerpen van een persuasieve boodschap die wordt verzonden via schermen. De resultaten van dit proefschrift laten zien dat een mediaboodschap nooit op zichzelf staat. Het gebruik van meerdere schermen tegelijkertijd kan een invloed hebben op hoe de boodschap wordt verwerkt. Zelfs de inhoud van het andere scherm kan hier invloed op hebben. Tot slot laat dit proefschrift zien hoe men hiermee om zou kunnen gaan. Er zijn op z'n minst twee factoren die reclameverwerking kunnen beïnvloeden, namelijk aandacht en het uitvoeren van gerelateerde taken.

Samenvattend laat dit proefschrift zien dat multiscreening een onderdeel is van ons dagelijks leven en dat het invloed heeft op hoe mensen mediaboodschappen verwerken. Het laat ook zien dat een mediaboodschap nooit op zichzelf staat. De manier waarop een boodschap wordt verwerkt kan worden beïnvloed door het gebruik van een extra scherm of zelfs de mediaboodschap op dit extra scherm. Tot slot laat dit proefschrift zien dat multiscreening niet altijd negatief is voor reclameverwerking, maar dat er ook factoren zijn die dit proces kunnen faciliteren.



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### PART 1: MULTISCREENING IN DAILY LIFE

#### Chapter 2: A typology of multiscreening

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Conceptualization: CS. Methodology: CS. Writing (original draft preparation): CS.

Writing (reviews & editing): CS, HV, & ES. Visualization: CS.

#### Chapter 3: Insight into everyday media use with multiple screens

*Claire Segijn, Hilde Voorveld, Lisa Vandeberg, Sjoerd Pennekamp, & Edith Smit*

Conceptualization: CS, HV, LV, ES. Methodology: SP. Data collection: SP<sup>a</sup>. Analysis:

CS. Writing (original draft preparation): CS. Writing (reviews & editing): all authors.

Visualization: CS & SP.

### PART 2: MULTISCREENING AND ADVERTISING OUTCOMES

#### Chapter 4: Effects of multiscreening on cognitive advertising outcomes

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Conceptualization: all authors. Methodology: all authors. Data collection: CS.

Analysis: CS. Writing (original draft preparation): CS. Writing (reviews & editing): all

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#### Chapter 5: Effects of multiscreening on affective advertising outcomes

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Conceptualization: all authors. Methodology: all authors. Data collection: CS.

Analysis: CS. Writing (original draft preparation): CS. Writing (reviews & editing): all

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## PART 3: MULTISCREENING AND TASK RELEVANCE

### Chapter 6: The facilitating role of task relevance

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Conceptualization: all authors. Methodology: all authors. Data collection: CS.

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Claire Monique Segijn (December 24, 1988) completed her bachelor program in Communication Science at the University of Amsterdam (2007-2010) including the extracurricular and interdisciplinary honours programme. In 2010, she started with the Research Master Communication Science at the University of Amsterdam. After obtaining her research master's degree in Communication Science *Cum Laude* (with distinction) in 2012, she worked as a junior research manager at the Amsterdam School of Communication Research, research assistant, and lecturer.

In March 2014, she started with her 3-year PhD project on information processing and advertising effectiveness when multiscreening. Her work has been published in top-tier journals in the field of communication and advertising (e.g., *Human Communication Research*, *Journal of Advertising*). Furthermore, her work has been honored with the best student paper award of the American Academy of Advertising (2015, 2016), International Communication Association (2017), and has been nominated for best student paper of the annual conference of the European Advertising Association (EAA). During her PhD project she visited dr. Zheng Joyce Wang and her lab group at the School of Communication at the Ohio State University, and dr. Anastasia Kononova at the department of Advertising + Public Relations at the College of Communication Arts & Sciences, Michigan State University. She also participated in a summer school about knowledge exchange at the University of Oxford organized by the League of European Research Universities.

Besides conducting research, Claire also contributed to the review process of the annual conference of the EAA from 2014-2016, helped organizing a symposium, a summer school, and coordinated the organization of debates between academics and practitioners. Furthermore, she taught several courses both to undergraduate and graduate students, ranging from individual supervision to teaching in front of large groups of students. She obtained her University Teaching Qualification certificate in November 2015. After her PhD project, she started working as an assistant professor at the Amsterdam School of Communication Research, University of Amsterdam. In the fall semester, she will join the School of Journalism and Mass Communication, University of Minnesota, as an assistant professor.

## PUBLICATIONS

**Segijn, C. M.**, Voorveld, H. A. M., Vandeberg, L., Pennekamp, S. F., & Smit, E. G. (accept). Insight into everyday media use with multiple screens. *International Journal of Advertising*.

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