

JACK OF ALL TRADES IN THE ERA OF MEDIA: MULTITASKING AND  
ATTENTIONAL INFLUENCES ON ADVERTISING EFFECTIVENESS

BY

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THESIS

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## **Abstract**

A large number of research found that multitasking behavior can impair people's explicit memory performance. Television advertisements thus are increasingly being regarded as a waste of money in the era of media when people are used to multitasking to avoid TV advertisements. However, recent studies indicated that the dissociation in attentional resources does not always lead to impairment in implicit memory. The study reported here shows that even though explicit memory can be impaired by the attentional resource dissociation in several attentional modes, implicit memory can remain uninfluenced. Affective evaluations of the exposed advertisements in different attentional modes are also tested.

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## **Chapter 1**

### **Introduction**

Media-multitasking has become a prevalent phenomenon nowadays. Advances in mobile-device technology enable people to do separate tasks simultaneously on different screens. According to Ericsson Consumer Report (2013), 75% of television viewers multitask by using a mobile device. Nielsen Wire (2009) also estimated that 57% of television viewers are simultaneously using the internet at least once a month. Thus, multitasking has become a trend that should not be ignored by media measurement companies as well as advertising and marketing communications.

The prevalence of media multitasking has resulted in anxiety by advertisers about the accuracy of reach and effectiveness metrics. According to Google's Think Insights, 81% of Internet users multitask to avoid advertisements (Simmons, 2013). With this potential to lower exposure and/or perception of ads, it is not surprising that advertisers are concerned.

However, some research has found that multitasking does not necessarily lead to negative impact on advertising effectiveness. For example, Duff and Sar (2015) found information-processing style can moderate the influence of multitasking behavior. In their research, while analytic processors showed significantly decreased ad recognition because of multitasking, holistic processors' ad recognition remained unimpaired from multitasking behavior. The result is likely due to the fact that holistic processors' tendency to split their attention and focus less on one focal object, which is similar to the attentional pattern of

multitasking. Psychological research also found that multitasking could help with concentration by reducing mind-wandering because a second task could occupy an individual's working memory which is necessary for the occurrence of mind-wandering (Levinson, Smallwood and Davidson, 2012). Thus, more academic research is required to investigate the relationship between multitasking and advertising effectiveness.

## **Chapter 2**

### **Literature Review**

#### **2.1 Definition of Media-Multitasking and Advertising Effectiveness**

Multitasking is a term that originated from computer engineering. Human multitasking was firstly studied by cognitive psychologists as dual-task performance (Pashler, 1994).

Media-multitasking, as a by-product of the advance in mobile-device technology, is defined as “individual consumers being exposed to more than one media system or approach at a single point in time” (Pilotta et al., 2004). For example, the behavior of cooking while watching television is multitasking, but not media-multitasking, because cooking is not a “media system”. However, an individual can be seen as being media-multitasking if he/she is checking SNS on a smartphone while watching television, because both smartphone and television can be regarded as “media system”.

Measurement of advertising effectiveness varies according to the objective of an advertising campaign (e.g. Shapiro and Krishnan, 2001; Norris and Colman, 1992). In this research, advertising effectiveness is measured as explicit memory of advertisement, implicit memory of advertisement and attitude toward advertisement, which are common measurements of advertising effectiveness in both advertising industry and academia.

#### **2.2 Summary of Research in Multitasking**

Several academic studies have looked into the predictors, mechanism and boundary of the occurrence of multitasking. Memory performance is usually used as a measure to indicate the



outcome of media-multitasking for ads (Armstrong and Greenberg, 1990; Voorveld, 2011). In a study in how background music influences work efficiency, a group of students were asked to perform a test while exposed to pop music, while another group of students merely finished the test without the background music. Lowered recall memory about the content of the test was found in the group exposed to the background music (Furnham and Bradley, 1997).

Even if most research in multitasking makes claims that task performance and efficiency are impaired by multitasking behaviors (Adler and Benbunan-Fich, 2012), some studies found that multitasking can sometimes benefit people's performance by alleviating boredom. For example, mind wandering is form of multitasking, which can negatively influence an individual's work efficiency and memory of an object. However, Andrade (2009) found that performing two tasks simultaneously could improve people's memory by reducing mind wandering, because multitasking could relieve the boredom brought out by the primary task. While not specifically looking at mind wandering, one study also showed that the combination of online and radio advertising could result in more positive affective and behavioral response toward the advertisements (Voorveld, 2011). Levinson and Davison (2012) tried to prove that mind wandering was determined by task difficulty rather than working memory capacity. However, the results of the research disproved their hypothesis, thereby suggesting a positive relationship between working memory and mind wandering. This is important because it suggests that there may be conditions in which multitasking could provide positive outcomes.

In summary, previous research in multitasking shows impairment in task performance on

at least one task due to the competition for processing resources between tasks. However, almost all of the studies were built on the assumption that individuals pay equal amounts of attention to the two tasks. In real-life situations, however, people usually have a goal in mind when they are multitasking, thereby paying different amounts of attention to different tasks. Thus, it is important to investigate how different levels of attention paid to different media content influence individuals' task performance and advertising effectiveness.

### **2.3 Attention and Media-Multitasking**

The attention literature in attention is filled with debates on the nature of attention. For example, Moray (1970) proposed six meanings of attention, while Pashler (1998) suggested that “no one knows what attention is”. However, despite the fierce debates, it is broadly agreed that attention involves selectively concentrating on some information for further processing while ignoring some perceivable information (Smith and Kosslyn, 2006). Attention is a limited resource that advertisers are competing for, because attention is vital for the formation of memory and attitude. When people are multitasking, attentional competition is bound to occur between tasks if the required amount of attentional resource outweighs an individual's resource capacity (Lang, 2000). An individual's explicit memory is posited to be harmed by the lack of attentional resource during encoding process (Anderson, 2000). Lack of attention has also been found to cause distractor devaluation to the advertisements in a goal-oriented environment (Duff and Faber, 2011). In summary, attention is closely related to advertising effectiveness. On the other hand, multitasking, as mentioned before, is likely to result in the

division of attention. Consequently, attention serves as a bridge that should be investigated further in order to understand the relationship between multitasking and advertising effectiveness.

## **2.4 Attentional Process during Multitasking**

Attention can be categorized into four modes: sustained attention (merely monitoring an input for a period of time), divided attention (dealing with more than one input simultaneously), selective attention (focusing on one input while filtering out others), and attention switching (switching between more than one input, monitoring one at a time) (McDowd and Birren, 1990). When people are multitasking, despite the lack of empirical proof, it is conceivable that the modes of attentional process most likely to occur are divided attention and selective attention.

Divided attention occurs when people are trying to perform two tasks simultaneously, and attention is required for both of the tasks. Examples range from watching videos while chatting with someone to having breakfast while reading newspaper. The occurrence of divided attention usually leads to a decrease in the performance on at least one task because less attention is likely to be allocated to each task due to people's limited resource capacity (Lang, 2000). Once a task receives less attention, task performance will be impaired. Castel and Craik (2003) found that subjects performed worse in recalling word pairs when they were also engaged in a secondary task during the encoding phase. In the study of interference in the dual-task condition, participants were slower in recognizing the alternative organization of

ambiguous stimuli when they were required to do mental arithmetic at the same time (Reisberg, 1983). A study in a learning environment also found that students who were allowed to keep their laptop open during a lecture showed worse performance on the memory test than those who were forced to close their laptops (Hembrooke and Gay, 2003).

Selective attention is the act of focusing on a task while simultaneously filtering out irrelevant distractors. Selective attention happens in a goal-oriented environment in which an individual feels the urge to ignore irrelevant information that is also occurring in order to finish their task as soon as possible. Research in psychology has shown that selective attention can have affective consequences and impact the formation of memory (Fenske, Raymond and Kunar, 2004; Fenske and Raymond, 2006).

## **2.5 Attention and Explicit Memory**

Explicit memory is posited as a basic form of memory retrieval when an individual intentionally attempts to access the information that was presented (Shapiro and Krishnan, 2001). The formation of explicit memory covers three important stages: encoding, storage and retrieval. The encoding of explicit memory depends on an individual's ability to recognize the stimulus to store it. The later retrieval of the encoded information is influenced by the encoding of the information (Kolb & Wishaw, 2003).

Encoding cannot occur without attention. "To attend" means mind resource being allocated to a task (Chun & Browne, 2007). Thus, the division in attention will influence the formation of explicit memory.

### **2.5.1 Divided Attention and Explicit Memory**

The division in attention means that some attention that should be initially devoted to the main task will be allocated to another task. Since resource capability is limited, a trade-off among processes will occur: when a good amount of available capacity is allocated to one control processes all others will be impoverished. However, the trade-off will become manifest only when the combined demands for capacity exceed the amount available (Wright, 1981). Attention is necessary for the formation of explicit memory, thus it is conceivable that divided attention will lead to the impairment of explicit memory.

In a PET (positron emission tomography) study of the effects of divided attention on encoding- and retrieval-related brain activity, participants were asked to encode a list of word pairs, and then at retrieval were given the first word as a cue to recall the second word. Results of scanning showed that divided attention reduced memory performance, and reduced brain activity in left-prefrontal and medial-temporal lobe regions, showing that divided attention during encoding interferes with encoding processes that lead to the formation of explicit memory (Anderson et al., 2003).

In research in the dissociation of explicit memory and implicit memory, it was found that the effectiveness of the divided attention manipulation can influence the memory task performance. For recall cued with category names, manipulating the amount of attention available at encoding could affect both implicit and explicit memory. Therefore, divided attention at encoding was posited to reduce the amount of semantic elaboration that can occur

during information processing (Schmitter-Edgecomer, 1999).

### **2.5.2 Selective Attention and Explicit Memory**

When selective attention occurs, the availability of attentional resources might not be sufficient for the formation of explicit memory (Chun & Turk-Browne, 2007). Explicit memory will only be created when the attention is paid to the object. For example, when faces and scenes are combined into fully overlapping composite stimuli, subjects can only remember what they selectively attend to (Yi & Chun, 2005). For the reason that an individual will pay as little attention to the distractor as possible in order to improve the efficiency on the main task, the attentional resources for encoding the distractor would be minimal. Therefore, the explicit memory formed in the selective attention process should be little.

In the research in distractor devaluation in advertising, the participants who completed a reading task in a goal-oriented environment were not able to recall the advertisements that appeared as distractors in the task (Duff and Faber, 2011). In psychological research, it has been acknowledged that distractor devaluation will only work on the unconscious level (Raymond et al, 2003; Fenske et. al, 2004). In conclusion, the least explicit memory of a task will be formed if the task is the least attended to in any attention mode.

**Hypothesis 1:** The more attention paid to an advertisement, the more explicit memory about the advertisement will be formed.

### **2.6 Attention and Implicit Memory**

The nature of implicit memory remains unknown. However, according to previous

research, implicit memory can be revealed by a change in task performance caused by a prior exposure to a stimulus (Schacter, 1987). Unlike explicit memory, many studies have shown that implicit memory tasks are generally unaffected by elaborative-semantic encoding operations that facilitate performance on an explicit memory task (Isingrini, 1995). Amnesic patients who were severely impaired on standard explicit memory tasks showed normal priming on implicit tests (Isingrini, 1995). Therefore, it is reasonable to assume that the division in attention would not necessarily exert any influence on the formation of implicit memory.

The dissociation between explicit and implicit memory tests can be explained by the fact that these two types of task require different modes of processing during encoding and retrieval (Isingrini, 1995). In a study of the influence of divided attention on memory, decreasing attention at learning was found to have no effect in conceptual priming. The result was explained by the fact that performance on perceptual and conceptual indirect tests may largely reflect automatic encoding processes, whereas performance on direct memory measures is crucially dependent on attentional resources at learning (Schmitter-Edgecomer, 1999).

Shapiro and Krishnan (2001) asked participants to pay attention either both to audio message and visual advertisements (divided attention) or only to the audio message. After having completed the task, the participants did a memory test. Explicit memory was found to be reduced, which was measured by the number of correct identification of brands among

multiple brands. Implicit memory, on the other hand, was measured by asking participants to choose the brands as if they were to make a purchase decision in a grocery store. However, no difference based on divided attention was found for implicit memory.

However, studies of implicit memory have produced mixed results, some finding no effects of the division in attention on implicit memory (e.g. Isingrini et al., 1995), some reporting substantial impairment (e.g. Mulligan, 1997; Mulligan and Hartman, 1996). Schmitter-Edgecomer (1999) explained the incongruity by indicating the difference between conceptual implicit memory test and perceptual implicit memory test. In his meta-analysis of implicit memory test, he concluded that some research that investigated the performance on perceptual indirect tests indicated that, if the division of attention during encoding process does not disrupt identification of the study stimuli, then subsequent perceptual priming will not be affected. On the other hand, several studies found that performance on conceptual indirect tests declined following division of attention at encoding.

Memory tests are regarded as perceptual if participants' performance is enhanced by attending to physical aspects of the stimuli (e.g. color, shape, etc). In the opposite, if participants' performance is facilitated by attending to the meaning or information traits of the stimuli (e.g. meaning association), the memory test would be categorized as "conceptual" (Schmitter-Edgecomer, 1999). In the advertising field, the bulk of experience with advertisements that people usually have in daily life should be perceptual. Consequently, in the current research, perceptual implicit memory, rather than conceptual implicit memory, would



be tested. Even if the impact of the attentional division on conceptual implicit memory is still remaining debated, it has been agreed that perceptual implicit memory would be invariant with the division in attention because it reflects “automatic encoding processes”

(Schmitter-Edgecomer, 1999). Therefore, we have hypothesis 2 as:

**Hypothesis 2:** Participants’ implicit memory will remain the same despite different levels of attention paid to the advertisements.

## **2.7 Attention and Distractor Devaluation**

It has been found that a non-attended object (distractor) can lead to negative attitude in a goal-oriented environment. In research in distractor devaluation, participants were asked to do a visual task and then evaluate the attended (target) stimuli, ignored stimuli (distractor) and novel stimuli in the task. The ignored stimuli were rated lower than attended stimuli and novel stimuli. In other words, in a goal-oriented environment, the previously ignored stimuli can lead to a negative attitude. That is to say, the top-down information processing involves emotional processing (Raymond et al, 2003).

Some research tried to refine the boundary of distractor devaluation. Goolsby, Shapiro and Raymond (2009) found high visual working memory load could eliminate distractor devaluation. Attentional inhibition suggests an association between visual working memory and to-be-ignored feature of the distractor. Therefore, when one is involved in high visual working memory load, there are no working memory resources left for inhibition process. Consequently, in the extreme situation when all the working memory resources are occupied,

distractor devaluation would be eliminated.

Duff and Faber (2011) examined the influence of target-distractor similarity, task difficulty and target-distractor distance on devaluation. They found visual similarity between target and distractor could lead to increased distractor devaluation for the reason that distractors similar to the target are more difficult to avoid in a search task. They also found that task difficulty could increase distractor devaluation because when one is engaged in a difficult task, little attentional capacity can be allocated to the distractors. This finding seemingly contradicts to Goolsby et. al's findings that high working memory load could eliminate distractor devaluation. However, Goolsby's research was conducted in the extreme situation when visual working memory is completely occupied by the task. In the normal situation when the difficulty of the task does not reach that level, on the contrary, his findings have no ground.

### **2.7.1 Selective Attention and Distractor Devaluation**

The distractor devaluation effect might be explained by an inhibition mechanism. Inhibition happens when one is engaged in a task while trying to avoid irrelevant distractors (Lavie and Fox, 2000). Due to the limited-capacity resource, in a top-down search process, attention to distractors should be reduced to the minimum in order for finishing the task efficiently. Therefore, once a stimulus is labeled as irrelevant to the task in the memory, it would be inhibited the next time encountered. Because selective attention happens in the goal-oriented environment, which is the prerequisite of the occurrence of distractor

devaluation, it is reasonable to predict that distractor devaluation would happen in the selective attention condition of multitasking.

### **2.7.2 Divided Attention and Distractor Devaluation**

The rationale behind the occurrence of distractor devaluation is: an individual will have a negative attitude toward the distractors because they require some level of attention - the capacity of which is limited - to be inhibited. The reduction in the available attentional resources for the main task will cause the individual to “dislike” the distractors that impair his/her task performance.

With this deduction, it is also reasonable to predict that devaluation to the less important task can occur in the divided-attention condition, because the less important one “steals” attentional resource from the more important one, despite the fact that both of them are goals to the individual. The more important the main task is, the more negative an individual’s attitude would be.

**Hypothesis 3:** In the multitasking condition, the less attention paid to a secondary task, the more devalued the stimuli in the task will be.

## **Chapter 3**

### **Methodology**

An experiment was designed to manipulate the amount of attention that each group of participants pays to each of two screens. Two pretests were done to ensure the effectiveness of the attention manipulation, both of unfamiliarity with the stimuli and neutral initial attitude toward the stimulus.

#### **3.1 Participants**

Forty eight participants from an advertising research subject pool of a mid-western university participated in the two pretests. One hundred and sixty participants from the same pool participated in the main experiment. Students who participated in the two pretests were excluded from the main test. Extra credit was given to the participants following the requirement of the Institutional Review Board.

#### **3.2 Stimuli**

The basic idea of the experiment design was to use instructions to manipulate participants in each group to pay different level of attention to the content on each of the screens (an article on the tablet screen and a TV show). Afterwards, participants would be asked to answer questions about their memory and attitude toward the advertisements. Stimulus on the computer screen was designed as a four-minute segment of the Ellen Show with two sets of five commercials inserted. Two brands (Kingsmill, Allinson), two seasoning brands (OXO, Baking Mad), three soft drinks brands (Volvic, Del Monte, Barr), two cookie brands (Revyta, Fox's) and a meat brand (Quorn) comprised the commercials. To guarantee that participants

would be generally unfamiliar to the stimuli, all advertisements were picked from British advertisements. Both the brand names and advertisements were pretested as unfamiliar to participants. To simulate a commercial pod, advertisements were edited to create two three-minute segments. These commercial pods were inserted into a 4-minute clip from the Ellen Show. Each of the advertisements lasted 15 to 30 seconds.

The stimulus on the tablet screen was an article about children and advertising retrieved from TOEFL test. Since the TOEFL is an English-as-second-language test required for all international students in the university, it was assumed that all participants, regardless of nationality, should be able to read the article fluently. The difficulty of the article was pretested as appropriate for participants to read while watching the video at the same time.

### **3.3 Pretest**

Two pretests were conducted. Pretest 1 tested the effectiveness of the attention manipulation and task difficulty. Pretest 2 was conducted to ensure a lack of familiarity of stimulus to participants and a neutral attitude toward the advertisements.

#### **3.3.1 Pretest 1**

In pretest 1, participants' attention was manipulated into three modes by differentiating the importance of the tasks on each screen in each group: group 1 had divided attention with equal amount of attention to each screen; group 2 had divided attention with more attention to tablet screen; group 3 had selective attention. Participants in group 1 were instructed that "In this study, you will read an article on a tablet while watching a television program with a series of

advertisements at the same time. Please stop reading the article when the TV program ends.

Please also count the number of bread advertisements in the ad series. **Your performance will**

**be evaluated based on both of the two tasks.**” By creating tasks to be performed on both

screens, it was assumed that participants would pay equal amount of attention to each screen.

Participants in group 2 received the same instruction as group 1 except the last sentence:

**“Your performance will be evaluated based on the comprehension test. However, extra**

**points can be granted if you could tell the correct number of bread advertisements in the**

**ad series.”** Participants were supposed to pay more attention to advertisements on the tablet

screen than they did to the computer screen. However, they should not completely ignore the

advertisements because they had chances to earn extra points by watching them. Participants

in group 3 were instructed as **“Please try to ignore the television program and focus on the**

**article. Your performance will be evaluated solely based on the following comprehension**

**test.”** The purpose of the instruction was to make participants try to focus on the article on the

tablet screen and ignore the advertisements. Afterwards, participants were asked to finish a

questionnaire about the difficulty of the tasks and to self-report the amount of attention they

paid to each screen.

### **3.3.2 Pretest 1 Results**

The means of the portion of participants’ attention to each screen were compared by a

one-way ANOVA. Tests of homogeneity of variance showed feasibility of ANOVA. There

were significant differences among the three groups in the amount of self-assessed attention

paid to the computer screen:  $F(2, 17) = 12.20, p < .05$ . Post Hoc Tests on LSD indicates that participants in group 1 ( $M=78.57\%$ ,  $SD=19.3\%$ ) reported that they paid significantly more attention to the computer screen than those in group 2 ( $M=53.33\%$ ,  $SD=13.66\%$ ), who, in turn, paid significantly more attention to the computer screen than participants in group 3 ( $M=32.86\%$ ,  $SD=17.99\%$ ). The results above indicate that the attention manipulation was successful (see table 1 for all means).

As for task difficulty, regardless of which group they were in, 47 out of 48 participants reported that they managed to complete reading the article on the tablet. Additionally, 46 out of 48 participants correctly answered an objective question about the article. All the participants clearly summarized the main point of the article. That is to say, the total amount of mind resources required to complete the tasks did not surpass the amount of mind resource that a normal participant have.

### **3.3.3 Pretest 2**

In pretest 2, participants watched all of the advertisements which were going to appear in the experiment. Afterwards, they filled out a questionnaire about their familiarity and liking about the advertisements and brands. Familiarity of the brand names used for implicit memory measures was also tested. Participants were asked to rate their familiarity of the brand names and advertisements on a five-point scale.

### **3.3.4 Pretest 2 Results**

One-sample t-tests were conducted to examine participants' familiarity and liking of the

brand names and advertisements. The means of liking scores were compared with three, the midpoint of the five-point scale, which is regarded as a neutral-attitude point in many studies (e.g. Raaijmakers et al., 2000). None of the pretested brands and advertisements was found significantly differed from three, indicating that participants held a neutral attitude toward all the brands and advertisements. The means of the familiarity scores for each brand and advertisement were also compared with three, the midpoint of a five-point scale which was labeled as “moderately familiar”. Ten out of twelve advertisements were selected as stimuli for the main experiment.

### **3.4 Main Experiment**

For the main study, 160 participants were randomly assigned to one of four groups. Participants in group one ( $group_{divided\_equal}$ ) were instructed to read an article on a tablet while trying to count how many bread advertisements appeared among the series of commercials on the computer screen. Meanwhile, they were told that the two tasks were equally important (divided attention with equal amount of attention to each screen). Participants in group two ( $group_{divided\_tablet}$ ) were also instructed to do the same tasks as those in group one. However, they were told that it would be alright if they could not give the right answer, and that they needed to pay more attention to the article (divided attention with more attention to the tablet screen). For the third group ( $group_{selective}$ ), the participants were instructed to try to concentrate on reading the article with ignoring the computer screen and its content (selective attention). Group four ( $group_{full}$ ) was set as a control group. Participants in group four were instructed to



watch the TV show and advertisements without reading the article. After finishing the tasks, participants in the first three groups were asked to do a comprehension test about the article as a cover story. A questionnaire was finished by all participants to measure their explicit memory, explicit memory and liking of the brands advertised.

### **3.4.1 Measures**

*Explicit memory* was measured using a free-recall test. Participants were instructed to “please type into the box as many brand names that appeared in the video as possible”. The free recall of brand names was scored on a five-point scale used by Norris and Colman (1992): four points for a “perfectly and virtually correct” response (e.g. Kingswill instead of Kingsmill), three points for a response that was “substantially correct with a significant error” (e.g. Kingswhite), two points for a response with recognizable elements while “not almost correct” (e.g. Kingmall), one point for a response that was only correct with the initial letter, and zero for a completely wrong answer. Means of the scores were compared to examine if there were any significant differences in explicit memory among the four conditions.

*Implicit memory* was measured by asking participants to make a choice between the six exposed brands and six paired novel brands in the same category (e.g. Shapiro and Krishnan, 2001). Similar to the exposed brands, the novel brands were also British brands pretested to be unfamiliar and neutral to participants. The participants were told that for each category, they should imagine that they were shopping in a grocery and that they should try to make a choice between the two paired brands listed. No active search of memory for the previously exposed

brand names was required, which made it an implicit memory task (Shapiro and Krishnan, 2001). Implicit memory was measured by the proportion of the exposed brand names chosen by the participants.

A shopping list was also used to measure implicit memory. Participants were asked to write down three brand names for each of three categories (seasoning, soft drink and biscuit).

*Liking* was measured via a one-item scale that had been used in previous advertising studies (Duff and Faber, 2011). Participants were asked to rate their liking of the brand names that appeared in the commercial from 1 (extremely dislike) to 7 (extremely like). Every participant's average liking scores on all exposed brand names was calculated and compared by an ANOVA.

### **3.4.2. Results**

Because of the vagueness of the instruction, most participants did not complete the shopping list task as required (e.g. some just wrote down three sub-categories of the each named category). Therefore, the shopping list data was abandoned. Implicit memory was measured only by the “grocery decision-making” test.

#### **3.4.2.1 Hypothesis 1 Results**

A third person coded the results of the free recall test based on the five-point scale used by Norris and Colman (1992) to make sure the coding process was not biased. A two-tailed Pearson correlation test shows a significant relationship between the two sets of results (correlation: .96, sig. < .00). Therefore the coding results are not biased and could be used for

the analysis on the free-recall test.

H1 predicts that explicit memory about the exposed brands will decrease as attention to the advertisement decreases. An ANOVA on the free recall performance shows significant differences among the four groups on explicit memory on the exposed advertisements,  $F(3, 156)=4.76$ ,  $p=.003$ . However, post hoc tests on LSD indicate that only the mean score of group<sub>full</sub> ( $M=7.10$ ,  $SD=7.24$ ) is significantly higher than the means of the selective attention group ( $M=2.75$ ,  $SD=4.23$ ) and the two divided attention groups ( $M_{\text{divided\_equal}}=3.97$ ,  $SD_{\text{divided\_equal}}=3.81$ ;  $M_{\text{divided\_tablet}}=4.28$ ,  $SD_{\text{divided\_tablet}}=5.26$ ), and that the divided and selective groups are not significantly different from each other in terms of explicit memory. The results above demonstrate the fact that participants in the non-multitasking condition (full attention) performed better on explicit memory than those in multitasking condition, while differences among the two multitasking conditions did not yield significant differences in explicit memory. Therefore, H1 is not supported.

### **3.4.2.2 Hypothesis 2 Results**

An ANOVA on the brand-choice task was conducted to test H2, which predicts that implicit memory would remain consistent despite the reduction in attention. Similar to the previous test, significant overall differences between the groups in implicit memory were found,  $F(3, 15) = 2.84$ ,  $p=.04$ , while the post hoc tests on LSD only show significant difference between the selective attention group ( $M=.25$ ,  $SD=.09$ ) and the full attention group ( $M=.31$ ,  $SD=.09$ ). There was not a significant difference between the selective attention group

and the two divided attention groups ( $M_{\text{divided\_equal}}=.28$ ,  $SD2=.11$ ;  $M_{\text{divided\_tablet}}=.28$ ,  $SD3=.09$ ).

According to the results above, the reduction in attentional resources do not cause the impairment in implicit memory in the multitasking condition. Therefore, H2 is supported.

### **3.4.2.3 Hypothesis 3 Results**

H3 predicts that advertisements that are part of a secondary task will be devalued as the importance of the primary task increases. However, no significant results are found on an ANOVA with the liking measures,  $F(3, 157) = 1.42$ ,  $p = .24$ . Therefore, H3 is not supported.

### **3.4.2.4 Divided-Attention Groups Combined Analysis Results**

Since the means of the two divided attention groups were similar on all the dependent variables, the two groups were combined to make a single divided attention group to compare with selective attention and full attention. Results of an ANOVA with the explicit memory measures showed a significant difference among the three groups,  $F(2, 157) = 7.14$ ,  $p = .001$ . Post hoc tests on LSD show significant differences between the selective attention group ( $M = 2.76$ ,  $SD = 4.23$ ) and the full attention group ( $M = 7.10$ ,  $SD = 7.24$ ), and between the divided attention group ( $M = 4.13$ ,  $SD = 4.61$ ) and the full attention group. There were no significant differences between the selective attention group and the divided attention group. The results above indicate that the dissociation in attention can cause the impairment in explicit memory, while the strength of the dissociation may not influence the degree of the impairment in explicit memory.

An ANOVA on the implicit memory measure also showed significant differences among

the three groups,  $F(2, 157) = 4.29$ ,  $p = .02$ . However, post hoc tests only showed significant difference in implicit memory between the selective attention group ( $M = .25$ ,  $SD = .09$ ) and the full attention group ( $M = .31$ ,  $SD = .09$ ). No significant differences were found between the selective attention group and divided attention group ( $M = .28$ ,  $SD = .10$ ) or between the full attention group and the divided attention group.

Additionally, no significant differences among the three groups were shown in the ANOVA with the liking measures,  $F(2, 157) = 1.85$ ,  $p = .16$ . Post hoc tests on LSD did not show any significant difference in pairwise comparisons.

## **Chapter 4**

### **Discussion**

This study investigated how different types of attention modes that can possibly occur during multitasking behaviors exert influence on advertising effectiveness. Specifically, we measured people's performance on explicit memory, implicit memory and liking of advertisements in each attention mode.

#### **4.1 Findings**

Results reported here don't indicate any significant difference in explicit memory among all the multitasking attention modes. However, compared to full-attention condition, explicit memory was shown to be impaired by multitasking behavior. Additionally, means plots of the free recall test showed an upward-going trend with the increase in attentional resource, despite the insignificant differences in explicit memory performance among the multitasking groups. That is to say, in line with previous research in explicit memory (e.g. Shapiro and Krishnan, 2001; Anderson et al., 2003), performance on explicit memory is positively correlated with the amount of attentional resource, while a reduction in attentional resource does not necessarily lead to impairment in explicit memory.

An explanation to the insignificant difference among the three multitasking groups in explicit memory is the measure used for explicit memory. Most previous research used free-recall tests along with cued-recall tests and recognition tests to measure explicit memory (e.g. Norris and Colman, 1992; Shapiro and Krishnan, 2001). However, in this research, only free-recall tests were involved. Compared to the other two tests, free-recall test is regarded as

“the least sensitive measure of memory” because it involves the retrieval process of information (Lang, 2000). Retrieval is the final stage of the formation of memory after the encoding stage and storage stage, which can be measured by recognition test and cued-recall test (Lang, 2000). Therefore, it is possible that a slight change in the amount of attentional resources can directly influence the formation of short-term memory, while not enough to exert impact on the long-term memory. Another explanation is that it could have been too hard to complete the multi-screen tasks at the same time. It is true that the task difficulty was pretested to be desire. However, when answering the comprehension questions, participants could easily go back to the article on the tablet, which could make the pretest invalid. Since the amount of mind resources required completing the tasks outweigh the total amount of mind resources a normal college student have, the attention that participants paid to the stimuli may not have been enough to form explicit memory about the advertisements even if the attention manipulation proved to be effective.

In support with hypothesis 2, no significant difference was found in implicit memory among multitasking groups. However, since explicit memory was not proved to be impaired in hypothesis 1, it is highly possible that the intactness of implicit memory was merely due to the fact that the decrease in mind resource was not enough to bring any change. However, when broadly comparing full-attention condition and split-attention condition, implicit memory was found to stay consistent while explicit memory was impaired. Therefore, in a broad way, the hypothesis is supported that the decrease in attentional resource can lead to the impairment in

explicit memory with intact implicit memory. An implication of the finding is that money spent on television advertisements nowadays are not wasted in the era when TV viewers tend to switch their attention to another screen during advertisement period for the reason that implicit memory is not necessarily impaired by the division in attention. Implicit memory, as discussed in the literature section, can be more important for advertisers than explicit memory because consumers' purchase behavior is usually driven by implicit memory rather than explicit memory (Shapiro and Krishnan, 2001).

Finally, in terms of attitude, no devaluation was found in the results. A possible reason is the affective effect of the television show in the stimuli. Since the content of the Ellen Show is light-hearted and hilarious (several participants laughed out loud during the experiment), it is possible that participants watched the advertisements in a positive mood which can have led them to having a more favorable attitude toward the advertisements. Previous research has shown that positive mood can mediate brand attitude because it creates less elaboration, thus leading to a reduction in the elaboration of advertising messages (Batra and Stayman, 1990). Distractor devaluation may thus have been offset on the liking scale. However, studies also showed that positive mood can diffuse to irrelevant stimuli, thus resulting in overall positive ratings on all stimuli (Monahan, Murphy and Zajonc, 2000). If the finding holds in the current case, then devaluation should also be shown despite the overall higher affective ratings. Additionally, the use of a seven-point scale can be a reason for non-significant difference in liking. Because an eight-point scale can force participants to choose whether they hold a



positive or negative attitude toward the stimuli instead of roughly clicking the midpoint, there should be larger differences in terms of liking.

Task performance was evaluated as a manipulation check. 67% of participants in the selective attention group correctly answered the objective question about the article, while 49% of participants in the divided-attention-equal group gave the correct answer. 71% of participants in the divided-attention-tablet group correctly answered the question. As for the bread-ad-counting task, 62% of participants in the divided-attention-equal group gave the correct answer while 45% of participants in the divided-attention-tablet group answered correctly. As indicated in the results above, participants in the divided-attention-tablet group (71%) outperformed participants in the selective attention group (67%) in the comprehension test, which was not supposed to happen if the manipulation effectively worked. Therefore, it is possible that participants in the main test did not complete the tasks exactly according to the instructions as participants did in the pretest. The results of the experiment thus were not in line with what hypothesis predicted.

#### **4.2 Limitation and Future Research**

One of the limitations of the study is the failure to pretest the difficulties of the tasks on the two screens. As discussed before, it could have been too hard for participants to simultaneously deal with the two tasks, thereby showing no significant difference in explicit memory among all the multitasking attention modes. Further study should carefully pretest participants' capability in completing the multitasking tasks in case that the tasks exhaust a

participant's mind resource.

Another limitation of the study lies in the explicit memory measures. Compared to free recall, recognition and cued recall can be more important to advertisers in that consumers are usually able to recognize an exposed brand with some cues in a grocery instead of searching in their mind a brand name that they just saw on TV. Therefore, future study could employ recognition test and cued-recall test along with free-recall test to measure explicit memory.

The third limitation of the study is the fact that no pretest about the TV show – the Ellen Show – was conducted to preclude the show's possible affective influence on participants' ratings on the following advertisements. As discussed above, it is possible that the distractor devaluation of the advertisements was offset by the favorable attitude brought about by the Ellen Show. Future research should pretest all elements in a stimuli. However, in a real-life situation, a TV show that can cause neutral affective response of viewer barely exists. It would also be interesting to look at how the mood state caused by a previously stimuli can lead to a change in memory and attitude toward the following advertisements in a multitasking condition.

Fourthly, the implicit memory measure used in this study could not completely tease out the influence of explicit memory. Shapiro and Krishnan (2001) used PDP (process dissociation procedure), which involved an inclusion task and an exclusion task, to parse out the effects caused by conscious memory retrieval. The rationale behind PDP is to quantify participants' performance on a stem-completion task, so that the amount of unconscious influence and that

of conscious influence could be algebraically calculated by solving two equations created in each of the two tasks (Shapiro and Krishnan, 2001). However, in the current study, nothing similar was done to exclude possible influence of explicit memory. Therefore, the results in implicit memory reported here are somewhat ambiguous. Additionally, in Shapiro and Krishnan's study, participants were asked to choose brands merely based on the brand names in the implicit memory test. However, similar instructions were not given in the current study. It is thereby possible that participants made their brand choice by searching the brand names in their memory, thus contaminating the results of the implicit memory test with explicit memory.

Another point that should be noted is the features of the advertisements. Among all the ad stimuli, some advertisements were verbally repeated while some were visually accentuated. For example, in the advertisement for "*Allinson*", the brand name was verbally repeated for more than three times, which could have created memory for the name even for participants who were visually engaged in reading the article on the tablet. In the advertisement for "*Barr*", on the other hand, even though visually appearing throughout the entire advertisement, the brand name was merely verbally mentioned once, which could have made it relatively hard for participants to explicitly remember the brand names. As a result, the differences in the peripheral features of the advertisements could be a factor that influenced participants' performance on the free-recall test. Further research should pretest the brands to make sure that they are equally "perceptible" to participants.

Finally, priori planned comparisons should have been a more appropriate way of

analyzing data than a post hoc test in this study, because the comparisons among the groups were initially planned to be conducted to test the hypotheses. To fix the problem, a contrast analysis was conducted to further investigate the difference among the selective attention groups, the divided attention (combined) group and the full attention group. Significant differences in explicit memory were found between the divided attention group ( $M = 4.13$ ,  $SD = 4.61$ ) and the full attention group ( $M = 7.10$ ,  $SD = 7.24$ ),  $t(53.47) = 2.34$ ,  $\rho = .02$ , and between the selective attention group ( $M = 2.76$ ,  $SD = 4.23$ ) and the full attention group ( $M = 7.10$ ,  $SD = 7.24$ ),  $t(60.60) = 3.26$ ,  $\rho = .002$ . However, there was not a significant difference between the divided attention group and the selective attention group,  $t(87.14) = 1.65$ ,  $\rho = .10$ . The results are in line with what the divided-attention groups combined analysis shows.

In terms of implicit memory, significant differences were found between the selective attention group ( $M = .25$ ,  $SD = .09$ ) and the divided attention group ( $M = .29$ ,  $SD = .10$ ),  $t(87.72) = 2.01$ ,  $\rho < .05$ , and between the selective attention group ( $M = .25$ ,  $SD = .09$ ) and the full attention group ( $M = .31$ ,  $SD = .93$ ),  $t(77.56) = 3.03$ ,  $\rho < .05$ . No significant difference was found between the divided attention group and the full attention group,  $t(80.23) = 1.41$ ,  $\rho = .16$ .

As for liking, similar to the results of the divided attention groups combined analysis, significant difference was found between the divided attention group ( $M = 3.71$ ,  $SD = .48$ ) and the full attention group ( $M = 3.87$ ,  $SD = .35$ ),  $t(99.76) = 2.03$ ,  $\rho < .05$ , while no significant differences were found between the divided attention group and the selective attention group

( $M = 3.75$ ,  $SD = .34$ ),  $t(106.02) = -.56$ ,  $\rho = .58$ , or between the selective attention group and the full attention group,  $t(77.72) = 1.48$ ,  $\rho = .14$ .

As shown in the results above, the big difference between the two tests lies in results for implicit memory. In the priori planned comparison test, there is a significant difference between the selective attention group and the divided attention group, while the two groups are not significantly different in the post hoc test. That is to say, similar to explicit memory, implicit memory could also be impaired by the dissociation in attention. Future research should be more careful with choosing the method of data analysis.

### **4.3 Conclusion**

Overall the study shows that attention plays an important role on advertising effectiveness in a multitasking condition, even though some hypotheses of the study were not supported, probably due to the imperfection of the experiment design. However, in a broad way, it was indeed found that implicit memory can remain intact with explicit memory being impaired by attention division. Further research should be done to investigate the attentional mechanism and its impact on advertising industry in media-multitasking.

## References

- Adler, R. F., & Benbunan-Fich, R. (2012). Juggling on a high wire: Multitasking effects on performance. *International Journal of Human-Computer Studies*, 70(2), 156-168.
- An Ericsson Consumer Insight Summary Report (August, 2013). Retrieved from <http://www.ericsson.com/res/docs/2013/consumerlab/tv-and-media-consumerlab2013.pdf>
- Anderson, N. D., Iidaka, T., Cabeza, R., Kapur, S., McIntosh, A. R., & Craik, F. I. (2000). The effects of divided attention on encoding-and retrieval-related brain activity: A PET study of younger and older adults. *Journal of Cognitive Neuroscience*, 12(5), 775-792.
- Andrade, J. (2010) "What does doodling do?," *Applied Cognitive Psychology*, Published online by Wiley InterScience.
- Armstrong, G. B., & Greenberg, B. S. (1990). Background television as an inhibitor of cognitive processing. *Human Communication Research*, 16(3), 355-386.
- Castel, A. D., & Craik, F. I. (2003). The effects of aging and divided attention on memory for item and associative information. *Psychology and aging*, 18(4), 873.
- Chun, M. M., & Turk-Browne, N. B. (2007). Interactions between attention and memory. *Current opinion in neurobiology*, 17(2), 177-184.
- Duff, B. R., & Faber, R. J. (2011). Missing the mark. *Journal of Advertising*, 40(2), 51-62.
- Fenske, M. J., Raymond, J. E., & Kunar, M. A. (2004). The affective consequences of visual attention in preview search. *Psychonomic Bulletin & Review*, 11(6), 1055-1061.

- Fenske, M. J., & Raymond, J. E. (2006). Affective influences of selective attention. *Current Directions in Psychological Science*, 15(6), 312-316.
- Furnham, A., & Bradley, A. (1997). Music while you work: The differential distraction of background music on the cognitive test performance of introverts and extraverts. *Applied Cognitive Psychology*, 11(5), 445-455.
- Goolsby, B. A., Shapiro, K. L., & Raymond, J. E. (2009). Distractor devaluation requires visual working memory. *Psychonomic bulletin & review*, 16(1), 133-138.
- Hembrooke, H., & Gay, G. (2003). The laptop and the lecture: The effects of multitasking in learning environments. *Journal of Computing in Higher Education*, 15(1), 46-64.
- Isingrini, M., Vazou, F., & Leroy, P. (1995). Dissociation of implicit and explicit memory tests: Effect of age and divided attention on category exemplar generation and cued recall. *Memory & Cognition*, 23(4), 462-467.
- Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of communication*, 50(1), 46-70.
- Lavie, N., & Fox, E. (2000). The role of perceptual load in negative priming. *Journal of Experimental Psychology: Human Perception and Performance*, 26(3), 1038.
- Levinson, D. B., Smallwood, J., & Davidson, R. J. (2012). The Persistence of Thought Evidence for a Role of Working Memory in the Maintenance of Task-Unrelated Thinking. *Psychological science*, 23(4), 375-380.

- McDowd, J. M. & Birren, J. E. (1990) "Aging and Attentional Processes," In: Birren, J.E. and Schaie, K. W. (Eds) *Handbook of the Psychology of Aging* (3rd ed.), San diego, CA: Academic Press, 222-233.
- Mulligan, N. W. (2002). Attention and perceptual implicit memory: effects of selective versus divided attention and number of visual objects. *Psychological research*, 66(3), 157-165.
- Mulligan, N. W., & Hartman, M. (1996). Divided attention and indirect memory tests. *Memory & Cognition*, 24(4), 453-465.
- Nielsen Wire (2009) Three Screen Report: Media Consumption and Multi-tasking Continue to Increase across TV, Internet and Mobile. Retrieved from <http://www.nielsen.com/us/en/newswire/2009/three-screen-report-media-consumption-and-multi-tasking-continue-to-increase.html>
- Norris, C. E., & Colman, A. M. (1992). Context effects on recall and recognition of magazine advertisements. *Journal of Advertising*, 21(3), 37-46.
- Pashler, H. (1994). Dual-task interference in simple tasks: data and theory. *Psychological bulletin*, 116(2), 220.
- Pilotta, J.J., Schultz, D.E., Drenik, G. & Rist, Philip (2004) "Simultaneous media usage: A critical consumer orientation to media planning," *Journal of Consumer Behavior*, 3(3), 285-292.



- Raaijmakers, Q. A. W., Van Hoof, A., 't Hart, H., Verbogt, T. F. M. A. & Vollebergh, W. A. M. (2000). Adolescents' midpoint responses on Liker-type scale items: Neutral or missing values? *International Journal of Public Opinion Research* 12(2).
- Raymond, J. E., Fenske, M. J., & Tavassoli, N. T. (2003). Selective attention determines emotional responses to novel visual stimuli. *Psychological Science*, 14(6), 537-542.
- Schacter, D. L. (1987). The evolution of multiple memory systems. *Psychological review*, 94(4), 439.
- Reisberg, D. (1983) "General mental resources and perceptual judgments," *Journal of Experimental Psychology: Human Perception and Performance*, 9(6), 966-979.
- Schmitter-Edgecombe, M. (1999). Effects of divided attention on perceptual and conceptual memory tests: An analysis using a process-dissociation approach. *Memory & Cognition*, 27(3), 512-525.
- Shapiro, S., & Krishnan, H. S. (2001). Memory-based measures for assessing advertising effects: a comparison of explicit and implicit memory effects. *Journal of advertising*, 30(3), 1-13.
- Simmons, J. (2013, October 11). Actively avoiding ads: Why millennials don't watch ads. Retrieved from <http://yayaconnection.com/2013/actively-avoiding-ads-why-millennials-dont-watch-ads/>
- Voorveld, H. A. (2011). Media multitasking and the effectiveness of combining online and radio advertising. *Computers in Human Behavior*, 27(6), 2200-2206.

Yi, D. J., & Chun, M. M. (2005). Attentional modulation of learning-related repetition attenuation effects in human parahippocampal cortex. *The Journal of neuroscience*, 25(14), 3593-3600.

## Appendix

**Table 1**  
**Means (SD) in Pretest 1**

	<b>Attention to TV</b>	<b>Attention to tablet</b>
<b>Selective attention</b>	32.9% (18.0%)	67.1% (18.0%)
<b>Divided attention (equal)</b>	53.3% (13.7%)	46.7% (13.7%)
<b>Divided attention (tablet)</b>	78.6% (19.3%)	31.4% (19.3%)

**Table 2**  
**Means of Each Advertisement and Brand in Pretest 2**

Ad ID	Familiarity		Liking	
	Brand Familiarity	Ad Familiarity	Brand Liking	Ad Liking
<b>1</b>	1.4	1.2	3.5	3.4
<b>2</b>	1.3	1.3	3.3	3.3
<b>3</b>	1.5	1.3	2.8	3.2
<b>4</b>	2.7	1.6	3.7	3.2
<b>5</b>	1.4	1.5	3.3	3.4
<b>6</b>	1.3	1.3	2.9	3.7
<b>7</b>	1.4	1.2	3.0	3.3
<b>8</b>	1.4	1.3	3.1	3.7
<b>9</b>	1.1	1.1	2.9	3.0
<b>10</b>	1.3	1.1	2.6	2.7
11	1.7	1.1	1.4	1.3
<b>12</b>	1.0	1.2	2.4	2.3
<b>13</b>	1.0			
14	1.55			
<b>15</b>	1.2			
<b>16</b>	1.4			
17	2.3			
<b>18</b>	1.18			
<b>19</b>	1.3			

Note: Liking ratings are based on a five-point Likert scale. Familiarity ratings are based on a five-point Likert scale. Ads 1-11 were pretested for exposed brands while ads 12-18 were pretested for unexposed brands. The bold ones are those that were finally adopted in the main test.

**Table 3**  
**Means (SD) in the Main Experiment**

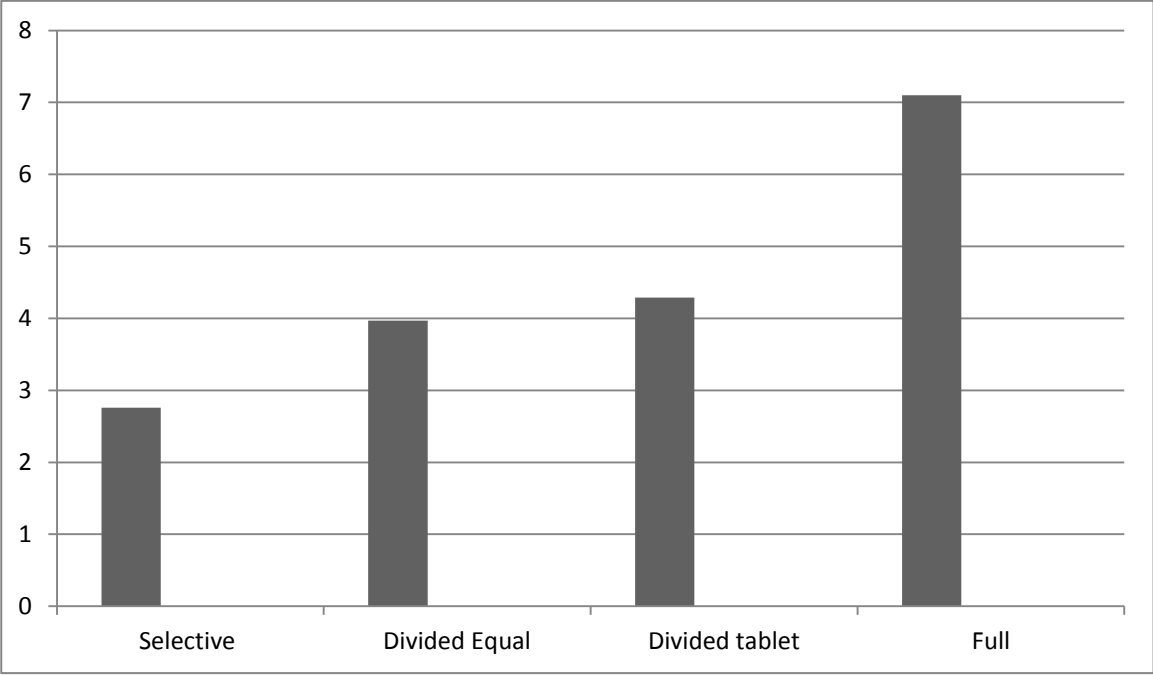
	<b>Free recall</b>	<b>Grocery shopping choice</b>	<b>Liking</b>
<b>Selective attention</b>	2.76 (4.23)	.25 (.09)	3.75 (.35)
<b>Divided attention 1</b>	3.97 (3.82)	.29 (.11)	3.67 (.57)
<b>Divided attention 2</b>	4.29 (5.27)	.29 (.09)	3.74 (.39)
<b>Full attention</b>	7.10 (7.24)	.31 (.09)	3.87 (.35)

Note: Free recall performance is based on the number and correctness of the brand names that participants wrote down. Grocery shopping task is measured by the portion that participants chose the exposed brands over unexposed brands. Liking is measured on a seven-point Likert Scale.

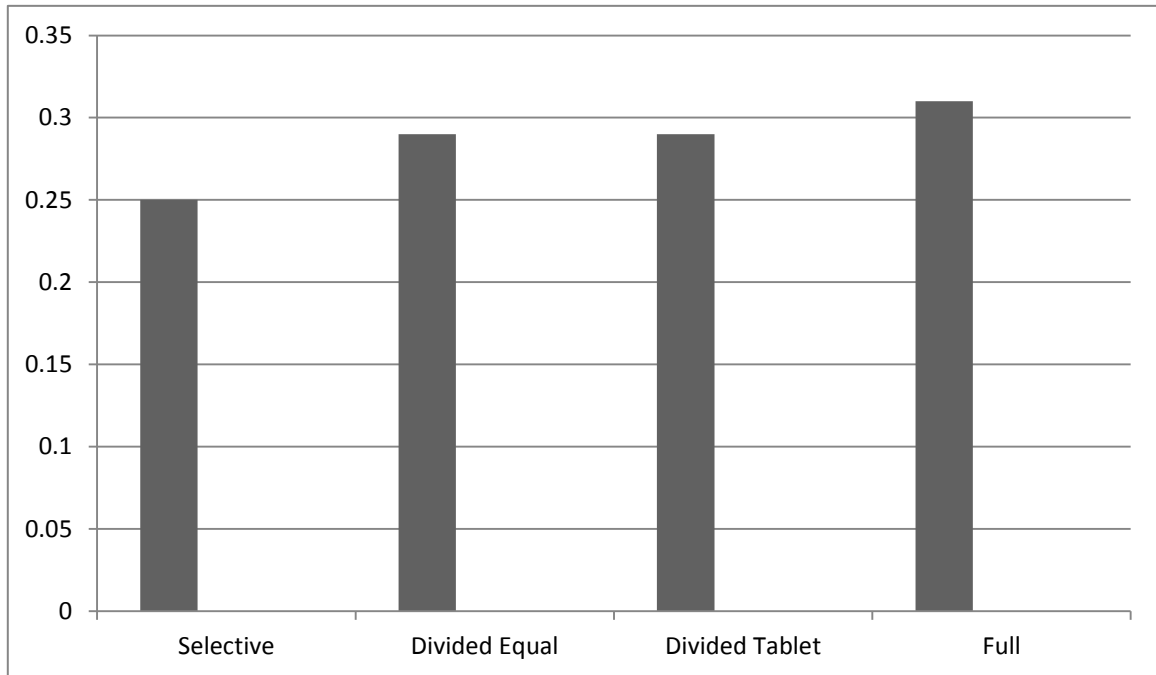
**Table 4**  
**Means (SD) in the Main Experiment (Combined Divided-Attention Group)**

	<b>Free recall</b>	<b>Grocery shopping choice</b>	<b>Liking</b>
<b>Selective attention</b>	2.76 (4.23)	.25 (.09)	3.75 (.35)
<b>Divided attention</b>	4.14 (4.61)	.29 (.10)	3.71 (.48)
<b>Full attention</b>	7.10 (7.24)	.31 (.09)	3.87 (.35)

**Figure 1**  
**Charts of Free Recall Results**

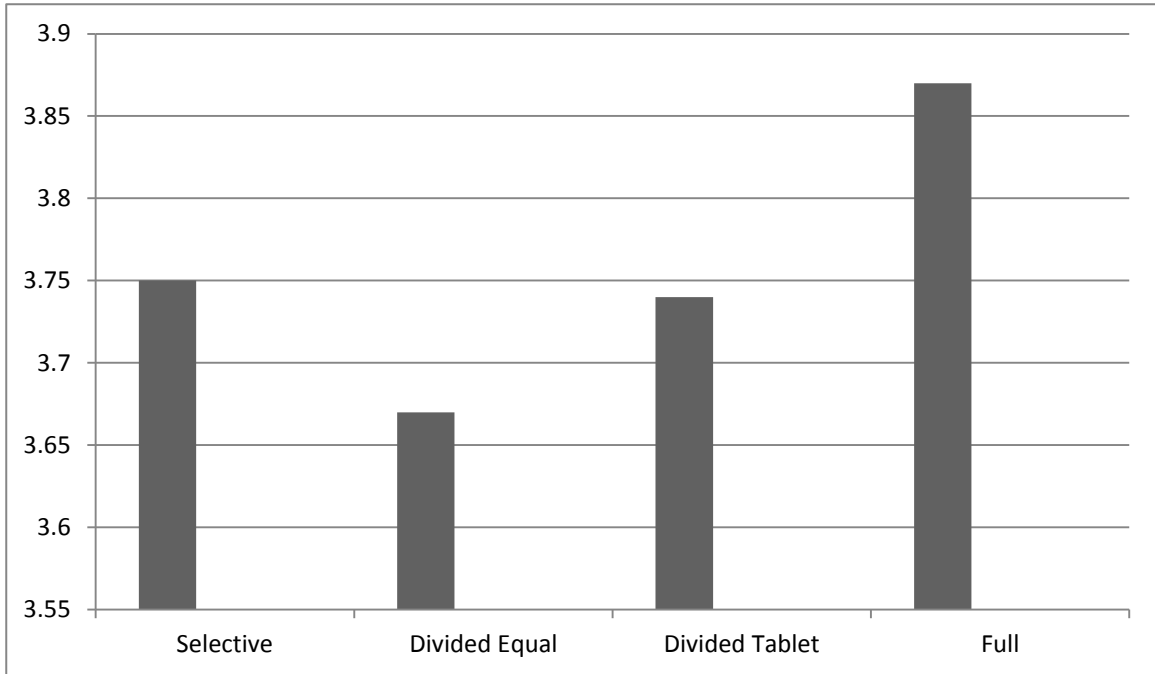


**Figure 2**  
**Charts of Implicit Memory Results**

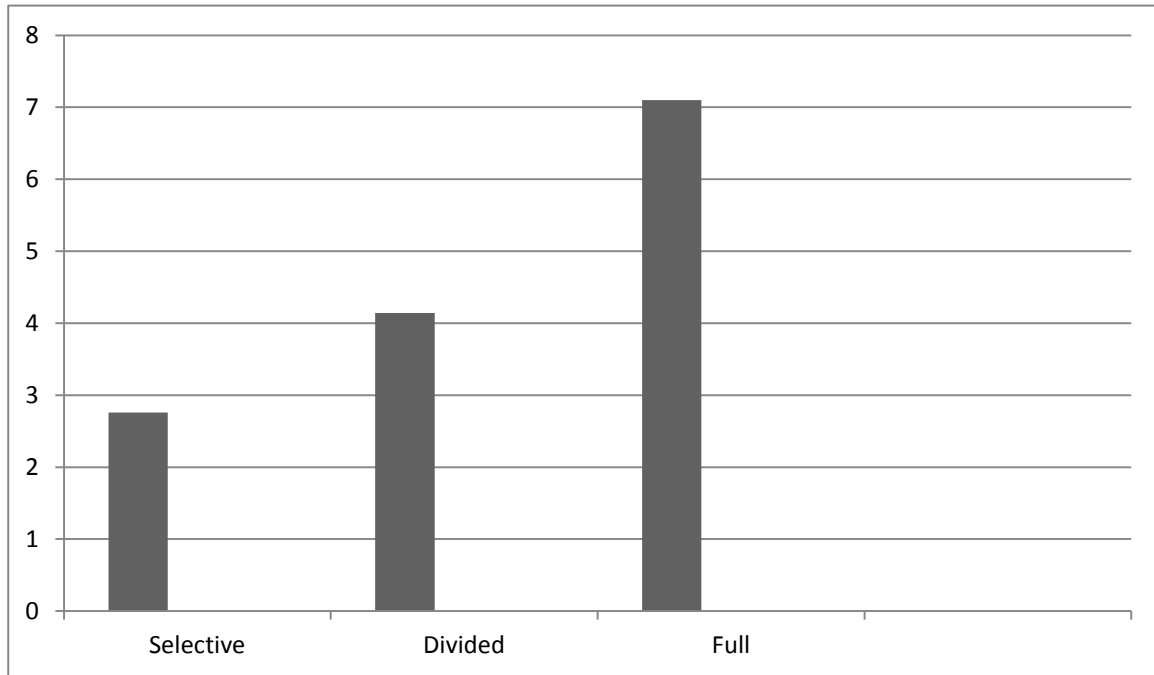




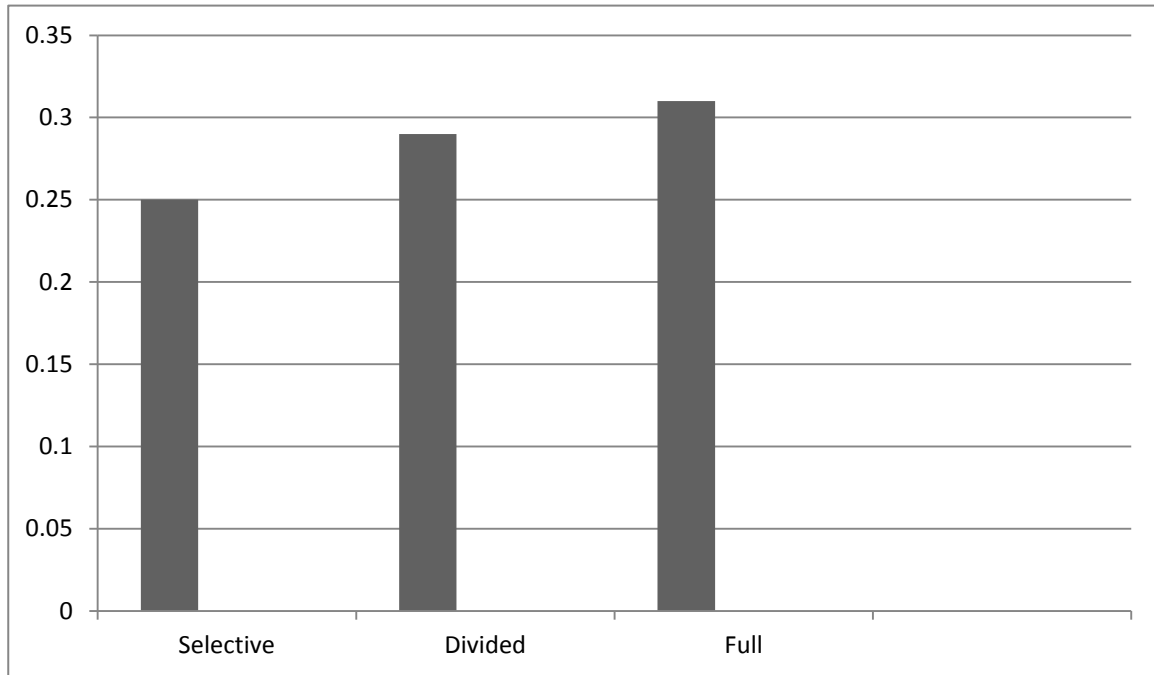
**Figure 3**  
**Charts of Liking Results**



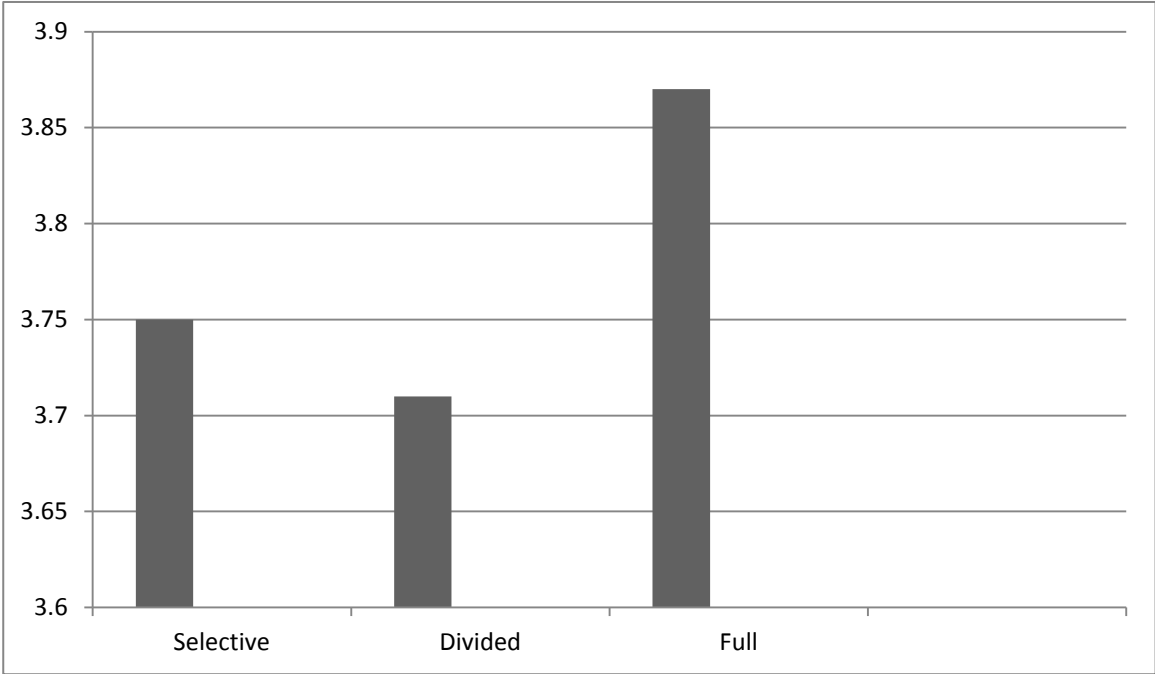
**Figure 4**  
**Charts of Free Recall Results (Combined Divided-Attention Groups)**



**Figure 5**  
**Charts of Implicit Memory Results (Combined Divided-Attention Groups)**



**Figure 6**  
**Charts of Liking Results (Combined Divided-Attention Groups)**



**Figure 7**  
**Stimuli (The Ellen Show)**




**Figure 8**  
**Stimuli (Advertisement Sets)**



Note: The two sets of advertisements were inserted into an episode of Ellen Show. So the sequence that the participants watched the stimuli was: the Ellen Show (1m32s) → Ads (2min10s) → the Ellen Show (2min30s) → Ads (2min15s). The Stimuli can be watched on <https://www.youtube.com/watch?v=LyVIH4JE5ek>.


**Figure 9**  
**Questions for Explicit Memory Measure**



Please type into the box as many brand names that appeared in the video as possible.

>>


**Figure 10**  
**Questions for Implicit Memory Measures**



Please imagine that you are in a grocery store, trying to choose an item from two similar brands. Which one would you choose?

Season	OXO <input type="checkbox"/>	Schwartz <input type="checkbox"/>
Season	Baking Mad <input type="checkbox"/>	Spice Island <input type="checkbox"/>
Drinks	Ame <input type="checkbox"/>	Barr <input type="checkbox"/>
Biscuit	Happy Faces <input type="checkbox"/>	Fox's <input type="checkbox"/>
Biscuit	Ryvita <input type="checkbox"/>	Aero <input type="checkbox"/>
Drinks	Del Monte <input type="checkbox"/>	Lift <input type="checkbox"/>

>>



Please make a shopping list that includes 3 brands for each category.

Seasoning	<input type="text"/>
Drinks	<input type="text"/>
Biscuit	<input type="text"/>

>>



**Figure 11**  
**Questions for Liking Measures**




Please rate the following brands from 1 (extremely dislike) to 7 (extremely like).

	Extremely dislike			Neutral		Extremely like	
	1	2	3	4	5	6	7
Allinson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Baking Mad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Barr	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Burgen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Del Monte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fox's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kingsmill	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ryvita	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OXO	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quorn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[>>](#)

**Figure 12**  
**Questions for Pretest 1**



Please rate your familiarity with the brand "Baking Mad" in the advertisement


- Not at all Familiar
- Slightly Familiar
- Moderately Familiar
- Very Familiar
- Extremely Familiar

---


Please rate your familiarity with the advertisement

- Not at all Familiar
- Slightly Familiar
- Moderately Familiar
- Very Familiar
- Extremely Familiar


How much do you like the brand in the advertisement?



How much do you like the advertisement?



**Figure 13**  
**Questions for Pretest 2**



Did you finish reading the article before the end of the TV program?

Yes

No

>>




What portion of your attention was allocated to the TV program?

What portion of your attention was allocated to the article?

>>

**Figure 14**  
**Comprehension Questions**



Please summarize the article in 1 or 2 sentence(s).

The article indicates that there is uncertainty about which of the following issues involving children and fantasy in advertising?

- Whether children can tell if what they are seeing in an advertisement is real or fantasy
- Whether children can differentiate fantasy techniques from other techniques used in advertising
- Whether children realize how commonly fantasy techniques are used in advertising aimed at them
- Whether children are attracted to advertisements that lack fantasy

>>

## **Article on the Tablet**

### **Children and Advertising**

Young children are trusting of commercial advertisements in the media, and advertisers have sometimes been accused of taking advantage of this trusting outlook. The Independent Television Commission, regulator of television advertising in the United Kingdom, has criticized advertisers for "misleadingness"—creating a wrong impression either intentionally or unintentionally—in an effort to control advertisers' use of techniques that make it difficult for children to judge the true size, action, performance, or construction of a toy.

General concern about misleading tactics that advertisers employ is centered on the use of exaggeration. Consumer protection groups and parents believe that children are largely ill-equipped to recognize such techniques and that often exaggeration is used at the expense of product information. Claims such as “the best” or “better than” can be subjective and misleading; even adults may be unsure as to their meaning. They represent the advertiser's opinions about the qualities of their products or brand and, as a consequence, are difficult to verify. Advertisers sometimes offset or counterbalance an exaggerated claim with a disclaimer—a qualification or condition on the claim. For example, the claim that breakfast cereal has a health benefit may be accompanied by the disclaimer “when part of a nutritionally balanced breakfast”. However, research has shown that children often have difficulty understanding disclaimers: children may interpret the phrase “when part of a nutritionally balanced breakfast” to mean that the cereal is required as a necessary part of a balanced breakfast. The author George Comstock suggested that less than a quarter of children between the ages of six and eight years old understood standard disclaimers used in many toy advertisements and that disclaimers are more readily comprehended when presented in both audio and visual formats. Nevertheless, disclaimers are mainly presented in audio format only.

Fantasy is one of the more common techniques in advertising that could possibly mislead a young audience. Child-oriented advertisements are more likely to include magic and fantasy than advertisements aimed at adults. In a content analysis of Canadian television, the author Stephen Kline observed that nearly all commercials for character toys featured fantasy play. Children have strong imaginations and the use of fantasy brings their ideas to life, but children may not be adept enough to realize that what they are viewing is unreal. Fantasy situations and settings are frequently used to attract children's attention, particularly in food advertising. Advertisements for breakfast cereals have, for many years, been found to be especially fond of fantasy techniques, with almost nine out of ten including such content. Generally, there is uncertainty as to whether very young children can distinguish between fantasy and reality in advertising. Certainly, rational appeals in advertising aimed at children are limited, as most advertisements use emotional and indirect appeals to psychological states or associations.

The use of celebrities such as singers and movie stars is common in advertising. The

intention is for the positively perceived attributes of the celebrity to be transferred to the advertised product and for the two to become automatically linked in the audience's mind. In children's advertising, the celebrities are often animated figures from popular cartoons. In the recent past, the role of celebrities in advertising to children has often been conflated with the concept of host selling. Host selling involves blending advertisements with regular programming in a way that makes it difficult to distinguish one from the other. Host selling occurs, for example, when a children's show about a cartoon lion contains an ad in which the same lion promotes a breakfast cereal. The psychologist Dale Kunkel showed that the practice of host selling reduced children's ability to distinguish between advertising and program material. It was also found that older children responded more positively to products in host selling advertisements.

Regarding the appearance of celebrities in advertisements that do not involve host selling, the evidence is mixed. Researcher Charles Atkin found that children believe that the characters used to advertise breakfast cereals are knowledgeable about cereals, and children accept such characters as credible sources of nutritional information. This finding was even more marked for heavy viewers of television. In addition, children feel validated in their choice of a product when a celebrity endorses that product. A study of children in Hong Kong, however, found that the presence of celebrities in advertisements could negatively affect the children's perceptions of a product if the children did not like the celebrity in question.