More plastic than fish in the sea by 2050. Will advertising be the solution?

The effects of ambient advertising on attitudes and recycling behavior

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Abstract

The amount of waste is an ever-growing problem. Advertising can be used to make people aware of this problem. Creative advertisements that are incongruent with people's expectations can help advertisers in drawing consumers' attention and further enhancing their attitudes towards the advertisement. Ambient advertising, with its surprising nature, would therefore be a useful tool. However, academic research on the impact of ambient advertising is still rare. This study focused on the role of ambient advertising on attitudes towards the advertisement, attitudes towards recycling, and eventually recycling behavior. The level of involvement towards environmental issues, processing fluency and the amount of attention given to the advertisement were expected to play an important role. To study the impact of incongruity in advertising, this research had a 2 (regular vs ambient advertising) x 2 (low vs high involvement) between-subjects design (n=80). An experiment was conducted to measure the behavioral consequences of the (in)congruent advertisements. The attitudes of the participants were measured using a questionnaire for various combinations of (in)congruency and involvement. This study adds value to academic research on ambient advertising as it gave evidence that the advertisement was perceived as more incongruent compared to regular advertisements. Surprisingly, the ambient advertisement appeared to be easier to process, and evoked more environmentally-related thoughts. In addition, participants in the ambient condition perceived recycling as being more hygienic. Furthermore, people's attitude towards waste recycling was positively influenced. However, no effects have been found on recycling behavior, which validates the existence of an attitude-behavior gap. These insights can be useful for marketers who want to get a better understanding of how to design effective advertisements, and, for example, want to set up a campaign regarding the environment and plastic waste.

Keywords: ambient advertising, environmental issues, incongruity, involvement, plastic waste, attitude towards recycling, recycling behavior.

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1. Introduction

In our everyday life, we are consuming more and more plastic without being aware of it. Much of this waste ends up in nature and will stay there forever since plastic is not biodegradable. Until recently our plastic waste was processed and recycled in China, but from January 1, 2018, China has banned importing various types of waste, including plastic (NOS, 2018). So, it is about time to think more carefully about what to do with our plastic waste.

Luckily there are many developments that encourage people to deal more consciously with waste, especially for plastic. For example, as from January 1, 2016, the Dutch government banned the free plastic bags which normally were distributed by retailers (Rijksoverheid, 2015). Furthermore, packaging-free stores are increasingly on the rise, and more and more municipalities oblige their residents to separate their household waste. Even the world's first plastic-free pop-up supermarket has opened their doors recently in Amsterdam (Seleky, 2018).

However, despite these good initiatives, it is still not enough to make a relevant change. Frequently the news delivers items about the 'plastic soup' in the ocean, the consequences of plastic on animals in the ocean, and the health consequences of plastic in our drink water. Many people still do not realize how big the impact is of plastic waste, and too often waste ends up on the ground instead of in the bin. Therefore, everyday recycling behaviors (e.g. on the street, at work, and at the university) should become normal.

One of the main ways in which waste can be prevented is engaging consumers in rethinking their behavior (Cox, Giorgi, Sharp, Strange, Wilson, & Blakey, 2010). The first step to change recycling behavior is to change the attitude towards waste recycling. With a positive attitude, people are more likely to involve in plastic recycling behavior (Oskamp et al., 1991; Wan, Shen, & Choi, 2017). However, people often say that they care about the environment and would throw away their waste as they are supposed to do, but it turns out that their behavior is not in line with this. A positive attitude towards recycling does not always translate into environmentally friendly behavior (Berger & Mitchell, 1989). This is also known as the attitude-

behavior gap (Sheeran & Webb, 2016). Therefore, this study also looks at the behavior of participants, to see if people are actually more aware of their plastic waste, and their behavior is in accordance with their attitudes.

To make people more aware of how much plastic waste there is in the world and to make them realize their stake in this problem, advertisements can be used. An advertisement can help individuals to remind them of their attitudes, or positively change these attitudes (Berger & Mitchell, 1989). It is a useful tool to educate consumers about the positive environmental outcomes that are possible with the consumers' involvement and efforts (Lee, Haley, & Yang, 2017). The use of creative advertising is found to generate a great shift in consumers' attitudes towards the advertisement (Baack, Wilson, van Dessel, & Patti, 2016; Hutter & Hoffmann, 2014; Smith, MacKenzie, Yang, Buchholz, & Darley, 2007). By generating positive attitudes, creative advertisements will reduce people's resistance to persuasion (Lee & Hong, 2016; Maniu & Zaharie, 2014; Sameti & Khalili, 2017).

In this study, ambient advertising is used to see if this kind of advertising has an effect on the attitudes and behavior of people. Ambient advertising is a form of communication that uses elements of spaces to convey a message, which gets people involved. It works through surprise, creativity and discovery (Baack et al., 2016; Gambetti, 2010; Hutter & Hoffmann, 2014; Luxton & Drummond, 2000). While traditional advertisements can evoke surprise particularly within the ad content (by using image- or text-elements that are unexpected or incongruent), an ambient advertisement is able to raise attention by using an incongruent element that contrasts with the surroundings and people's expectations (Hutter & Hoffmann, 2014; Turk, Ewing, & Newton, 2006). It confronts people with incongruent stimuli appearing in their familiar environment, which evokes surprises and attracts people passing by (Hutter & Hoffmann, 2014). If an ambient advertisement is successful, it engages a person in a unique way (Lee, 2015). It is designed to increase consumer involvement (Graffigna, Gambetti, & Bosio, 2011; Maniu & Zaharie, 2014). Because of the incongruent and surprising character of ambient advertising, more attention is

directed towards the advertisement (Hutter & Hoffmann, 2014). Information that is incongruent with the schema of people generates surprise and triggers extensive cognitive processing in order to help the person resolve this incongruity and make sense of the unusual situation (Jurca & Plăiaș, 2013). Experts agree that using ambient advertising is potentially capable of increasing both an individual's attention to the advertisement and the chances that information becomes part of their behaviors (Graffigna et al., 2011; Lee & Hong, 2016). It helps to attract attention to the problem and creates a strong positive attitude among consumers, which will enhance recycling behaviors and therefore is an important step in solving the plastic problem (Hutter & Hoffmann, 2014; Törn & Dahlén, 2008). Examples of ambient advertisements are the ones of Coca-Cola and Bounty: Coca-Cola made a sticky poster placed at a bus shelter in Paris, to promote their new better grip bottle (Figure 1). And Bounty, a paper towel brand in America, placed a (knocked down) coffee cup, spilling onto the sidewalk. This cup was accompanied by a sign, with the message: 'Bounty, makes small work of big spills' (Figure 2).

Figure 1. Ambient advertisement Coca Cola (Lum, 2010).

Figure 2. Ambient advertisement Bounty Papers Towels (Lum, 2010).

For ambient advertisements to work, they should be unexpected but relevant to the consumer (Hutter & Hoffmann, 2014; Jurca & Plăiaș, 2013). In this way, the advertisement has the most lasting effect on attitudes, because the unexpected factors increase elaborative reasoning (Heckler & Childers, 1992). Previous research found that unexpected information

attracts attention, and stimulates processing (Lee & Schumann, 2004; Törn & Dahlén, 2008). Ambient advertising can be found on every available physical surface, to convey messages that potentially elicit consumer engagement on the subject (Gambetti, 2010). It is one of the most innovative and creative ways to break through the clutter of advertising (Biraghi, Gambetti, & Graffigna, 2015; Shankar & Horton, 1999).

Most of the studies on ambient advertising look at why ambient advertising is a useful tool for retailers (e.g. Halkias & Kokkinaki, 2013; Hutter & Hoffmann, 2014; Rosengren, Modig, & Dahlén, 2015). The food and beverage sector show the highest use of ambient advertising and most research has also been done in this industry (Jurca & Madlberger, 2015). Other studies take a theoretical approach to ambient advertising, to define the topic in a conceptual framework, and figure out the underlying processes of ambient advertising (e.g. Biraghi et al., 2015; Gambetti, 2010; Jurca & Madlberger, 2015). However, little research has been done to assess the conditions under which these methods can effectively communicate the desirable environmental-friendly attitudes and behaviors. So, this relationship needs further investigation. While we know from previous research that ambient advertising may directly relate to positive attitudes (Dahlén, Rosengren, Törn, & Öhman, 2008; Hutter & Hoffmann, 2014: Smith et al., 2007), less is known about the processes that can explain this relationship. Lee et al. (2017) state that research should devote more attention to advertising related to environmental attitudes and their underlying processes because research on this subject is sparse and inconclusive.

Based on this gap, the purpose of the current study is to investigate the level of incongruity of the advertisement, the level of attention, processing fluency, and involvement as underlying processes in the relationship between ambient advertising and environmental-related attitudes and behaviors. Therefore, the following research question is formulated:

'*To what extent does incongruity in advertisements and consumer involvement towards environmental issues, affect the attention and processing fluency given to an advertisement, and does this, in turn, influences attitudes and behavior?*'

2. Theoretical framework

2.1 Ambient advertising, attitudes and behavior

According to Barnes (1999), ambient advertising is incongruent with its surroundings. It surprises the consumers by confronting them with visuals that they did not expect. Luxton and Drummond (2000) define ambient advertising as: "The placement of advertising in unusual and unexpected places, often with unconventional methods and being the first or only ad execution to do so" (p. 735). However, as the new and unconventional ways eventually end up being conventional, the definition is determined by the advertising norms of the day. It therefore can be seen as a moveable term, which can change over time (Luxton & Drummond, 2000).

An ambient advertisement challenges people's expectations stored in existing schema, which generates surprise (Jurca & Plăiaș, 2013). Lee and Schumann (2004) state that incongruity in advertisements is a mismatch between a stimulus element and the existing schema that one holds. This schema serves as a reference frame in forming judgments (Mandler, 1982). When an advertisement does not match the schema, it induces individuals to process the advertisement thoroughly in order to understand it (Mandler, 1982). Therefore, incongruity stimulates cognitive efforts to resolve the perceived mismatch between the experience and the schema (Jurca & Madlberger, 2015; Lee & Hong, 2016).

According to Heckler and Childers (1992), (in)congruency is built up from two dimensions: expectancy and relevancy. Expectancy refers to the extent to which an ad conforms to the expectations of consumers. Furthermore, relevancy refers to the degree to which the incongruent elements of an advertisement provide meaningful information about the product or brand (Jurca & Plăiaș, 2013), and that the advertisement is relevant in a specific context. A continuum of 3 types of (in)congruency is created when the two dimensions are combined. Something is congruent if it is expected and relevant, mildly incongruent when it is unexpected and relevant, and extreme incongruent if it is both unexpected and irrelevant (Baack et al., 2016; Yoon, 2013). In an experiment of Heckler and Childers (1992) the unexpected but relevant

condition had the highest attention. Also, this condition is the most relevant for ambient advertisements, because these advertisements can be found in an unexpected location. For an unexpected advertisement to be meaningful, it should be relevant (Ang & Low, 2000). This results in moderately incongruent advertisements, that depict novel ideas that challenge the existing schema but are still able to be integrated into the schema (Heckler & Childers, 1992; Jurca & Plăiaș, 2013; Mandler, 1982).

An incongruent and surprising advertisement is able to improve consumer attitudes (Hutter & Hoffmann, 2014). The effect of incongruency on attitudes is an inverted U-curve (Mandler, 1982). Extremely congruent or extremely incongruent messages are negatively interpreted (Schoormans & Robben, 1997). But if incongruity is moderate, where it is unexpected in a certain location, but relevant enough to provide meaningful information, it can be stimulating since the individual is triggered to interpret the new information, and therefore is able to resolve the perceived mismatch by thinking about it (Baack et al., 2016; Fleck & Maille, 2010; Heckler & Childers, 1992). Only when the mismatch can be solved, it will have a positive effect on the consumer (Lee & Schumann, 2004). If this is not possible, consumers will get frustrated (Yoon, 2013).

Therefore, because of the incongruent and surprising character of ambient advertising, more attention is attracted to the advertisement (Dahlén et al., 2008; Keldermans & Smits, 2017). It is a useful tool in creating positive attitudes (Hutter & Hoffmann, 2014; Till & Baack, 2005; Yang & Smith, 2009). By using mildly incongruent information, interest, memorability, and persuasiveness in consumers are increased (Yoon, 2013). Prior studies found empirical evidence that ambient advertising increases people's attitudes towards the advertisement (Baack, Wilson, & Till, 2008; Dahlén & Edenius, 2007; Shankar & Horton, 1999). When a nontraditional medium is used, attitudes towards the advertisement are stronger and more positive (Dahlén, 2005). In turn, attitude is the most important predictor of behavior (Kotchen & Reiling, 2000). A person's attitude has a strong connection with the behavior that is performed (Azjen & Fishbein,

1977). Therefore, it is expected that ambient advertising will have a more positive impact on attitudes than advertisements that are congruent and expected by people. The following hypothesis is tested:

> **H1:** Ambient advertising, compared to regular advertising, more positively impacts people's (a) attitude towards the advertisement, (b) attitude towards waste recycling and (c) recycling behavior.

2.2 Ambient advertising and the level of attention

Attention in this research is defined as the substantive attention given to the advertisement, which will influence the way information will be processed. The number of cognitive responses resulting from looking at the advertisement will indicate the level of information processing. Various studies suggest that novel and unexpected information attracts attention, and stimulates processing (e.g., Laczniak & Muehling, 1993; Lynch & Srull, 1982; Törn & Dahlén, 2008).

Compared to regular advertisements, creative advertisements owe attention-getting qualities which are influential in promoting deeper levels of message processing (Baack et al., 2016; Lee & Hong, 2016; Sameti & Khalili, 2017). Ambient advertisements use unexpected visuals, which trigger a surprise in people looking at the advertisement (Hutter, 2015). This is more likely to result in attention for an ambient advertisement than a conventional advertisement (Van der Stigchel et al., 2009). The creative advertisements have the power to draw the attention and hold it (Turk et al., 2006), while traditional advertisements can evoke surprise only if people have already directed their attention towards the advertisement (Hutter & Hoffmann, 2014). Halkias and Kokkinaki (2013) state that consumers are expected to pay more attention to the ambient advertising, trying to gather relevant information to adjust incongruities in their mind. Advertisements that are moderately incongruent are expected to stimulate processing that leads to more attention and a more favorable evaluation relative to advertisements that are congruent and expected (Dahlén, 2005; Dahlén & Edenius, 2007; Dahlén, Granlund, & Grenros, 2009;

Keldermans & Smits, 2017; Meyers-Levi & Tybout, 1989; Smith, Chen, & Yang, 2008). Therefore, it can be stated that the level of attention influences the level of information processing.

Lee and Schumann (2004) found that incongruent, unexpected advertisements receive more attention than congruent, expected advertisements. Moreover, Fiske, Kinder, and Larter (1983) suggest that people pay more attention to unpredicted, unexpected advertisements, and as a consequence tend to be more motivated to learn about them. Originality and novelty in advertisements increase attention to the various elements (Pieters, Warlop, & Michel, 2002; Van der Stigchel et al., 2009). Haberland and Dacin (1992) found that incongruent information presents a distinction from the norm, and therefore attracts the viewer's attention more than congruent information. It generates positive reactions because it is a pleasurable feeling for consumers to decode a message (Sameti & Khalili, 2017; Smith et al., 2008), and it eventually increases the consumers' processing motivation, which will be transferred to their long-term memory (Lee & Hong, 2016; Smith et al., 2008; Wilson, Baack, & Till, 2015). Therefore, we propose the following hypothesis:

> **H2:** Ambient advertising, compared to regular advertising, more positively impacts the level of attention.

2.3 Two processes of information processing and the effect on attitudes

Creative advertisements are found to be effective in promoting deeper levels of message processing (Baack et al., 2016; Smith et al., 2007; Yang & Smith, 2009). For this study, the ambient advertisement would be effective if positive attitudes follow from looking at the advertisement, and people eventually change their behavior.

It is suggested by the Elaboration Likelihood Model (ELM) that attitudes formed under high elaboration (high attention, thoughtful processing) are stronger than those formed under low elaboration (low attention, less thoughtful processing) (Petty et al., 1983). Therefore, the greater

the amount of attention that is focused on the advertisement, the greater is the processing and elaboration of the message and the more effect there is on attitudes (Chattopadhyay & Nedungadi, 1992). Several studies found the same results (Baack et al., 2016; Butterfield, Deal, & Kubursi, 1998; Lee & Hong, 2016; Smith et al., 2008). Moreover, Pieters et al. (2002) found that original and surprisingly designed advertisements correlated strongly with increased attention to the ad and encourages deeper message processing, which in turn results in stronger attitudes. Attention therefore plays a mediating role in the relationship between ambient advertisements and attitudes.

For advertisements that are congruent with people's expectations, the processing of an advertisement goes much more fluently (Storme, Myszkowski, Davila, & Bournois, 2015). If an experience is highly congruent, it creates a feeling of familiarity, which does not evoke any cognitive effort for processing (Mandler, 1982). This is often the case with regular advertisements. People might like those advertisements more because high processing fluency is associated with positive favorable evaluations (Baack et al., 2016; Winkielman, Schwarz, Fazendeiro, & Reber, 2003). The traditional advertisements, that are labeled as congruent, fit the expectations that people have of the advertisement (Claypool, Mackie, & Garcia-Marques, 2015). Congruent elements of advertisements that fit a schema are easier to process, and therefore they are often perceived as more attractive (Reber, Schwarz, & Winkielman, 2004). However, congruent messages do not attract much attention, and people do not engage in active processing (Keldermans & Smits, 2017). The comfortable feeling of familiarity generates limited cognitive processing (Jurca & Plăiaș, 2013). Therefore, it has only a small impact on people's attitudes (Petty, Cacioppo, & Schumann, 1983).

Overall, it is stated that the effect of ambient advertising on positive recycling attitudes is mediated by the level of attention, and the effect of regular advertising on positive recycling attitudes is mediated by processing fluency. Therefore, the following hypotheses are tested:

H3: Ambient advertising, compared to regular advertising, more positively impacts the level of attention, and in turn people's (a) attitude towards advertisement and (b) attitude towards waste recycling.

H4: Regular advertising, compared to ambient advertising, (a) more positively impacts the level of processing which in turn influence (b) the attitude towards the advertisement and (c) the attitude towards waste recycling.

Attitudes in turn influence the reaction of consumers with respect to the environment (Rashid, 2009). It is proved to be a significant predictor to affect pro-environmental behaviors (Cho et al., 2013; Axelrod & Lehman, 1993; Grob, 1995). Therefore, it is the most important predictor of behavior (Kotchen & Reiling, 2000). If attitudes are positive, behavioral intentions also tend to be more positive (Chen & Tung, 2014). Furthermore, Mostafa (2007) found a significant positive relationship between attitude and behavioral intentions. Hence, according to literature, attitude is a good predictor of behavior. However, it often happens that people say one thing, but do the other. Even though it is expected that people live according to their values, environmentally-related attitudes have been found to have a varying, but regularly small impact on recycling behaviors (Kollmuss & Agyeman, 2002). People's self-reported attitudes are not in line with the actual behavior, which is also known as the attitude-behavior gap (Sheeran & Webb, 2016). This is more likely to happen in the case of regular advertisements, where processing fluency can result in mildly strong attitudes towards waste recycling, but the relationship between these attitudes and the behavior that is performed is not that strong compared to those formed by ambient advertisements. Terlau and Hirsch (2015) state that this is because traditional advertisements are not as engaging and personal relevant as ambient advertisements. When attitudes are formed through attention, which is the case for ambient advertisements, the relationship between attitudes and behavior is much stronger, and the attitudes are more

predictive of the actually performed behavior. This is because the attitudes are stronger compared to attitudes formed with regular advertising.

Therefore, it can be stated that for ambient advertisements, the attitudes are more predictive for behavior compared to regular advertisements. Based on these findings it can be argued that the impact of ambient advertising on recycling behavior is mediated by attitudes to waste recycling, and the effects differ whether the attitudes are formed through attention (by ambient advertising) or processing fluency (by regular advertising). Therefore, it is hypothesized that:

> **H5:** The effect of ambient advertising through attention results in (a) strong and more sustainable attitudes than the effect of regular advertising through processing fluency, which in turn are (b) more predictive of the actual behavior.

2.4 The moderating role of involvement

Involvement towards environmental issues appears to have a great effect on recycling behaviors (Stanley, Lasonde, & Weiss, 1996). Celsi and Olson (1988) explained that the level of involvement depends on the degree of personal relevance that an issue holds in the mind of the consumer. An issue that is highly relevant for an individual leads to the formation of beliefs, and in turn, lead to strong attitudes. These attitudes are more likely to translate in behavior compared to low issue involvement (Stanley et al., 1996). According to the level of involvement, individuals process information and behave in a different manner (Petty et al., 1983). High involvement, for example, is characterized by an increased willingness to spend effort in processing the incoming information (Lee & Schumann, 2004). High involved people tend to process a message more thoroughly (Mantel & Kardes, 1999).

An ambient advertisement can reach consumers and creates an experience for those who are not involved with the environmental issues yet (Lee Yuen, 2017). Incongruent and unexpected advertisements generally result in higher involvement for those people, because of

their attention-getting qualities (Baack et al., 2016; Lee & Hong, 2016; Sameti & Khalili, 2017; Singh & Hu, 2012). Halkias and Kokkinaki (2013) suggest that highly involved people already have attention to the advertisement, so incongruity has less influence on their attitudes, compared to people who are low involved. Segev, Wang and Fernandes (2015) also found that people who are less involved with the issue, compared to people who are highly involved, respond more favorably to an advertisement when it is placed in an incongruent context. In highly involved situations, the differences between congruent and incongruent advertisements might be smaller because consumers are already motivated to process the advertisement (Campbell & Goodstein, 2001). Highly involved people are more efficient in dealing with the discrepancies, and the arousal induced to resolve incongruity is low. This is not enough to trigger the psychological mechanism that enhances evaluations and positively influences attitudes (Halkias & Kokkinaki, 2013). So, the attention of low-involved people may be higher than those who are highly involved. Therefore, the relationships described in the previous hypotheses will be less pronounced under high-involvement decisions.

Involvement has a great impact on how attitudes are formed or changed (Greenwald & Leavitt, 1984; Halkias & Kokkinaki, 2013; Laczniak, Muehling, & Grossbart, 1989). Thus, when attention is higher for low involved people, a positive attitude towards waste recycling is also more likely to be higher. As a result, the positive attitude is more likely to result in recycling behavior (Mitchell, 1979). The following hypotheses are tested:

H6: Involvement towards environmental issues will moderate responses to ambient advertising, such that under high-involvement conditions, the positive effect of ambient advertising on attention will be less pronounced than under low involvement conditions.

H7: Ambient advertising, as opposed to regular advertising, has a more positive effect on attitudes. Under low involved conditions, the attitude towards waste recycling will be higher than in high involved conditions.

H8: Ambient advertising, as opposed to regular advertising, has a positive effect on behavior. Under low involved conditions, the recycling behavior will be higher than in high involved conditions.

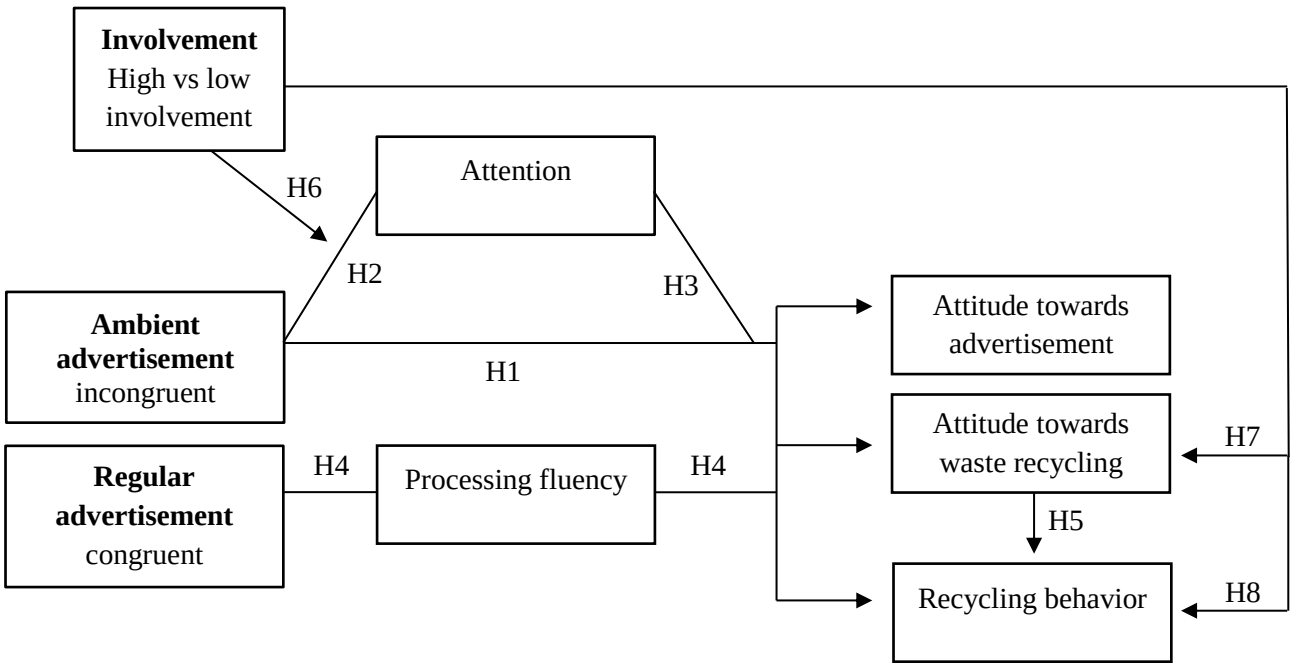

Figure 3. Research model with independent variables, dependent variables, mediators and a moderator.

3. Methodology

3.1 Research design

The above hypotheses were investigated in an experimental study using a 2x2 full-factorial between-subjects design. Recycling advertisements were created to make people aware of the problem. The hypotheses were tested by manipulating two factors: incongruity and involvement. Advertisement incongruity was analyzed on two levels (regular vs ambient advertising), which was manipulated by developing stimuli either congruent or incongruent with people's expectations. The incongruent advertisement was created to reveal a surprise in a specific environment. A pretest was done to see which advertisements were seen as incongruent and congruent. Involvement towards environmental issues was also analyzed on two levels (low vs high involved), which was manipulated by asking either environmental- and recycling-related questions in the taste test, or only questions about the packaging of the lemonade, where the first option would create personal relevance for the participants (Lee, 2000).

To ensure the validity of the experiment, the best natural circumstances during the exposure were ensured. The experiment was conducted at the university itself, where advertising is common. Additionally, the pretest that was conducted enhanced the validity of this study even more.

3.2 Stimulus materials

To minimize plastic waste and to promote recycling, stimulus materials were created. With these materials, people should become more aware of their attitudes and behaviors regarding recycling. Two types of materials were created, namely congruent, regular advertising and incongruent, ambient advertising. The congruent advertisement was most likely to fit the expectations of people. However, the incongruent advertisement was designed to create a surprise, the advertisement was not expected in a specific environment.

A pretest was conducted to see which advertisements were seen as either congruent or incongruent. Sixteen participants joined in a small study, in which they had to evaluate seven types of advertisements. For example, they were shown three different posters, that each raised the issue of recycling in their own way (e.g. an informational text, a cartoon and seeing plastic sushi). Furthermore, they saw four types of 'advertisements' that presented the effects of plastic in a different way (e.g. a plastic water dispenser, plastic monster, plastic soup, and ecological footprint). The materials used for the pretest can be found in Appendix A. They had to evaluate each advertisement in terms of originality, distinctiveness, unexpectedness, and innovativeness. Furthermore, they were asked to indicate their favorite advertisement and had to explain why. The results showed that the water dispenser was the best advertisement of all four dimensions. Some quotes from the participants: *"You often see a water dispenser standing somewhere, but when seeing lots of plastic floating in it, it suddenly stands out". "This ad emphasizes the effects of your own behavior". "It is confronting because it shows that it can have an effect on your own health".*

Based on these results, two advertisements have been designed (See Appendix B). For both advertisements, a water tap was used. For the regular advertisement, a poster was placed on the water dispenser. This poster contained the message: 'Our water is getting dirty. There will be more plastic than fish in the sea by 2050'. The background of the poster was an image full of plastic (see figure 4). In the ambient condition, the water dispenser was filled with plastic (see figure 5). To provide a little context, a message was placed on the water dispenser with the text: 'Our sea in 2050'.

Figure 4. Regular (congruent) advertisement in experiment setting.

Figure 5. Ambient (incongruent) advertisement in experiment setting.

3.3 Manipulations

The involvement levels were manipulated through the questions asked in the taste test, by varying participants' importance and personal relevance (Chaiken & Maheswaran, 1994). In both conditions, participants were told that a new lemonade would be introduced in the summer of 2019. In the low involvement condition, people had to answer questions about the taste and packaging design of the lemonade. For example, they had to evaluate the design of the packaging in terms of colors and design. However, in the high involvement condition, participants were told that students have difficulty with recycling of plastic waste, and that is why, in addition to taste and product design, the brand was also interested in what they thought of the packaging when it comes to recycling. For example, they were asked if they thought the package was biodegradable and environmentally friendly. In this way, they were primed by the questions, triggering environmental and recycling related thoughts. By priming these concepts, they came more available in the mind, which made the behavior of the participants more likely to occur. Research has previously demonstrated that various complex social and physical behaviors can be activated by being primed by relevant stimuli, without the person being aware of the influence or the persons intent to behave in that way (Dijksterhuis, Chartrand, & Aarts, 2007). See Appendix C and D for the taste test, that was used as a prime.

3.4 Participants

The participants were recruited through several means (SONA, flyers, e-mail, social media and direct social contacts) at the University of Twente. From the initial 84 responses, 4 were not useful, and, therefore, removed from the data analysis. These four participants were removed from the data set because they had not understood the instructions correctly. Of the remaining 80 participants, 38 of the participants were male (47.5%), and 42 were female (52.5%). The respondents ranged in age from 19 to 33 years old, with a mean age of 23 (SD = 2.90). The vast majority of the respondents were highly educated (HBO 2,5%, WO bachelor 66,3% and WO

master 31,3%). This means that all the participants were students and therefore, the sample might not be fully representative of the general population because participants share a similar educational level and age.

As can be seen in Table 1, gender, age and the average level of education were divided over the four conditions equally. Only the condition of the regular advertisement with the low involvement manipulation contained more females than males, however, this was not a significant difference.

Table 1

Gender, age, and level of education level per condition.

		Gender		Average age (rounded)	Average level of education
		Males	Females		
Ambient advertisement	High involvement	10	10	23	WO bachelor
	Low involvement	11	9	23	WO bachelor
Regular advertisement	High involvement	10	10	22	WO bachelor
	Low involvement	7	13	23	WO bachelor

3.5 Procedure

This research was carried out at the BMS lab of the University of Twente. The participants were invited to a room to participate in a taste test. They were told a brief cover story about the purposes of the study and were given additional guidelines on how to proceed. They have been randomly assigned to one of the four conditions: either ambient or regular advertising and either low or high involved. The experiment took place in two different rooms. In the first room, the participants had to do a taste test. They were told that for a brand that is going to launch a new lemonade soon, they had to answer some questions about the taste and packaging design of the lemonade. In the high involvement condition, they also answered some questions about the environmental friendliness of the packaging. They received a plastic cup filled with lemonade,

which they had to evaluate. However, this taste-test was bogus, because, in the same room where the taste test was conducted, the water dispenser with the advertisement was placed in the right corner of the desk.

When finished in the first room, the participants were given the opportunity to throw away the plastic cup they had used for the taste test. Two sorts of garbage cans were placed a couple of meters outside the first room, to test if they threw away the plastic cup. They had the opportunity to choose for a 'normal' garbage can, which was the most accessible, and the 'recycling' garbage can, which was placed slightly out of direction, and therefore took a little bit more effort. See Appendix E for pictures of the setting.

After this, they were directed to the second room, where they could do the second part of the experiment. They were asked about their attitudes towards the environment, their behavioral intentions regarding recycling, their attitude towards the advertisement on the water dispenser, the degree of processing fluency, the level of attention they had for the advertisement and an involvement and incongruity manipulation check.

3.6 Measures

The independent variable and the moderator involvement were defined as the different experimental conditions. The dependent variables were measured using a questionnaire. This section discusses the measurement scales of these variables. The questionnaire was divided into subjects regarding the constructs of attitude towards waste recycling, behavioral intentions, attitude towards the advertisement, attention, processing fluency, and the two manipulation checks of involvement towards environmental issues and incongruity. All questions were asked after the participants have been exposed to the stimulus materials and subjected to the manipulation. An overview of the questionnaire can be found in Appendix F.

Attitude towards waste recycling

The dependent variable of attitude towards waste recycling was measured using a six-item semantic differential scale based on the study of Tonglet, Philips and Read (2004). Examples of items are: 'Recycling is: 'bad/good', 'rewarding/not rewarding' and 'not doable/doable''. The items together did not form a reliable scale, however, by deleting one item the reliability increased sufficiently. The new scale that was made without the item 'hygienic' formed a more reliable scale ($\alpha = 0.58$). This is still not ideal, but it is more reliable than with that one item, so the analysis was continued.

Attitude towards hygiene

Nonetheless, since the deleted item was found very interesting, it was included as a separate scale. We were curious what the item would do because it might be related to the stimulus material exposed during the taste test. The 'plastic soup' displayed in the first room can make people feel that recycling might not be hygienic. Therefore, the item was included separately in the analyses. The item was measured testing the statement: 'Recycling is not hygienic - hygienic', using a 7-point semantic differential scale. This means that the higher the score on this scale, the more hygienic people think recycling is.

Behavioral intentions

The second dependent variable, behavioral intentions, was measured using a five-item, 7-point Likert scale, with 1 standing for 'strongly disagree' and 7 for 'strongly agree'. Two of those items were based on the research of Wan, Shen, and Yu (2014). Those items were: "I intend to recycle my waste in the next four weeks" and "I will recycle my waste every time I have it for disposal". However, to provide a more reliable scale, three items of Echegaray and Hansstein (2017) were added: "I am willing to speak to my friends about recycling", "I am willing to spend some time recycling and "I am willing to get more information about appropriate ways of recycling". These five items together formed a reliable scale ($\alpha = 0.73$).

Attitude towards advertisement

The third dependent variable, attitude towards the advertisement, was measured using a nine-item, 7-point semantic differential scale (Laczniak & Muehling, 1993). Those items were: not attractive – attractive, bad – good, unpleasant – pleasant, unappealing – appealing, dull – dynamic, depressing – refreshing, not enjoyable – enjoyable, uninteresting – interesting and not likable – likable. The items together formed a reliable scale ($\alpha = 0.90$).

Attention

Attention towards the advertisement was measured using a seven-item, 7-point Likert-type scale adapted from the study of Lee (2000), such as: "I was paying attention to attention to this advertisement", "I was concentrating on the advertisement" and "I carefully read the advertisement". Also, one item of Chaffee and Schleuder (1986) was added to provide a more reliable scale. This item was "I looked longer than normal at the advertisement". The items formed a reliable scale ($\alpha = 0.95$).

Furthermore, participants had to list their thoughts that occurred to them while looking at the advertisement. These cognitive responses were obtained to assess the number of relevant thoughts, since higher attention is more likely to lead to more relevant thoughts, and in turn in a greater attitude change (Laczniak, Muehling, & Grossbart 1989). Three types of thoughts were distinguished: advertisement-relevant thoughts, environment-relevant thoughts, and irrelevant thoughts. For example, advertisement-relevant thoughts were: "*This is a cool way to bring attention to the issue*" and "*The ad was surprising in this context*". Some environment-relevant thoughts were: "*Saving the environment is important*", "*It is sad that the oceans are destroyed like this*", "*I was annoyed at people who don't take recycling seriously*" and "*I was inspired to tell more people to recycle*". Moreover, the thoughts labeled as irrelevant had nothing to do with either the advertisement or the environmental issue, like "*I am thirsty*" and "*Why is there a water dispenser*?".

Processing fluency

To measure processing fluency the scale of Bone and Ellen (1991) was used. The scale consisted of 3 subscales: ease of processing, clarity, and pleasure in processing the advertisement. A four-item, 7-point Likert scale was used to ease the processing of the ads. The items were: "I find it difficult to get a clear picture of the problem that is being raised", "I can make a good impression of the problem", "I quickly got a clear idea of the problem" and "Based on the advertisement, I can get a good picture of who it is meant for" (1 = strongly disagree, 7 = strongly agree). These items formed a reliable subscale ($\alpha = 0.78$).

To determine the level of clarity in the processing of the advertisements was used a ten-item, 7-point Likert scale (items: clear, chaotic, warry, detailed, weak, intense, blurred, lifelike, lively, sharply, where 1 = strongly disagree; 7 = strongly agree). This subscale was not reliable ($\alpha = 0.40$). For this reason, the scale was excluded from the analysis.

The pleasure of processing the advertisements was measured by means of a three-item scale (negative/positive, unpleasant/pleasant, annoying/nice), where subjects were able to answer a 7-point semantic differential scale. This subscale proved to be reliable ($\alpha = 0.83$).

It was decided to continue with the first and third subscale of processing fluency separately in our analysis since these two subscales were proven to be reliable.

Involvement towards environmental issues

To check whether the involvement manipulation succeeded, a manipulation check was included in the questionnaire. Involvement towards environmental issues was measured using a five-item, 7-point scale, measuring how interesting, involving and personally relevant the material was. Three of those items were based on the study of Maheswaran and Meyers-Levy (1990). The items were: "Recycling is important to me", "I care about the environment" and "To me, environmental related issues are relevant and significant". To provide a more reliable scale, two

items were added, namely: “I am worried about the problem that plastic waste creates” and “I feel responsible for the environment”. These items formed a reliable scale ($\alpha = 0.88$).

Incongruity

Another manipulation check was included to check whether the advertisement was seen as incongruent by the participants. Incongruity was measured using a three-item, 7-point semantic differential scale adapted from the study of Ang and Low (2000) and Lee and Mason (1999). For instance, a seven-point scale anchored by ‘expected/unexpected’ and ‘ordinary/unique’ was used. The higher the score for these items, the more incongruent the advertisement is perceived. These together items formed a reliable scale ($\alpha = 0.88$).

Behavior and further measures

To determine how participants would act after being exposed to the stimulus, their behavior has been tracked during the experiment to see in which bin the participants threw the plastic cup, or if the participants left the cup in the room of the first experiment. They were giving the opportunity to throw away the cup in a normal bin, a recycle bin or to leave the cup on the desk.

Furthermore, the gender, age, and their educational level were asked as control variables. All scales can be found in Appendix G.

4. Results

4.1 Manipulation checks

Incongruity

As expected, a manipulation check on the perceived incongruity showed that the regular advertisement (e.g. congruent) and the ambient advertisement (e.g. incongruent) differed from each other. A univariate variance analysis (ANOVA) on the perceived incongruity showed a significant effect for the advertisements ($F(1, 76) = 5.00$, $p = 0.028$). The perceived incongruence of the ambient advertisement ($M = 4.99$, $SD = 1.24$) was significantly higher than that of the regular advertisement ($M = 4.42$, $SD = .99$). However, it is striking that both conditions are perceived as highly incongruent, and the difference between the two conditions is small. This finding will therefore be reflected in the discussion.

Involvement

The manipulation check on involvement was not significant ($F(1, 76) = 1.24$, $p = 0.27$), and therefore it can be concluded that the involvement manipulation did not succeed. The self-reported involvement towards environmental issues was only slightly higher in the high involvement condition ($M = 5.99$, $SD = .74$) than in the low involved condition ($M = 5.79$, $SD = .89$). But it is striking that both cases are already very high. Accordingly, this means that the low involved group is already highly involved in the subject of environmental problems. This is problematic for the validity of the results, but it has been decided to continue with the analysis as planned. In the discussion, all the results will be discussed in light of the failed manipulation.

4.2 The main effects of advertising and involvement

The main effects of the ambient and regular advertising and involvement were investigated using a multivariate analysis of variance (MANOVA). Attitude towards waste recycling, behavioral intentions and attitude towards the advertisement were included as dependent variables, and the type of advertisement and level of involvement as independent variables.

Findings of the multivariate test showed that there was a significant effect for the advertising condition ($F(11, 66) = 2.07$, $p = .035$, partial $\eta^2 = .26$). No significant effects were further found for involvement. An overview of these results can be found in Table 2.

Table 2

Multivariate test (Wilk's Lambda)

Effect	F	*p*	η^2
Condition advertisement	2.07	**.035***	.26
Involvement	.91	.53	.13
Condition advertisement x involvement	.24	.99	.04

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

Furthermore, a factorial between-subjects analysis of variance (ANOVA) was conducted to study the effects of type of advertisement and level of involvement on attention, ease of processing, pleasure of processing, involvement, incongruity, several cognitive responses, attitude towards advertisement, attitude towards waste recycling, attitude towards hygiene, and behavioral intentions. The results of the analysis can be found in Table 4. Moreover, Table 3 gives an overview of the mean scores and the standard deviations for all four experimental conditions.

Shapiro-Wilk and Levene's tests were used to evaluate the assumptions of normality and homogeneity of the variance respectively. Analysis showed a significant effect on the Levene's tests for attention and number of irrelevant thoughts. However, since ANOVA is quite robust against violations of the equal variances assumption when the sample is moderate or large and when the samples are equally sized, this will not form a problem for the analysis (Allen & Bennett, 2014). In this research, all four samples consist of 20 participants, and therefore, the violation of homogeneity is not considered to be a problem.

As can be seen in Table 4, the univariate (between-subjects effects) analysis showed that the type of advertisement has a significant main effect on the attitude towards hygiene ($p < .05$).

Table 3 shows that participants in the ambient, incongruent condition indicated having a more positive attitude towards hygiene (M = 5.60, SD = 1.10) compared to participants in the regular, congruent condition (M = 5.00, SD = 1.26). This means that people in the ambient condition perceived recycling as being more hygienic.

Moreover, a significant main effect on the ease of processing ($p < .05$) (see Table 4). The test indicated that participants in the participants in the ambient, incongruent condition (M = 4.87, SD = 1.12) experience an easier way of processing of the advertisement as compared to participants in the regular, congruent condition (M = 4.33, SD = 1.22) (see Table 3).

Furthermore, as can be found in Table 4 the advertising condition influences the pleasure of processing ($p < .01$), with participants in the regular, congruent condition indicating a higher pleasure of processing (M = 4.64, SD = 1.37) than participants in the ambient, incongruent condition (M = 3.71, SD = 1.15) (see Table 3).

Finally, the analysis showed a significant effect of the advertisement on the number of irrelevant cognitive responses ($p < .01$). It can be seen from the data in Table 3 that participants in the regular condition had more irrelevant thoughts (M = 1.15, SD = 1.33) compared to participants in the ambient condition (M = .53, SD = .64). For example, thoughts that were listed as irrelevant were: "*O hey, there is a water dispenser*", "*Why is it here*?", "*This is not relevant for the task that I am doing right now*" and "*I would like to have some water*".

There were no significant effects of involvement and the two conditions (type of advertisement + involvement) together, which confirms the previously executed MANOVA.

Table 3

Means and standard deviations per condition (n=80)

	Condition					
	Ambient advertising			Regular advertising		
	High involvement *M (SD)*	Low involvement *M (SD)*	Total	High involvement *M (SD)*	Low involvement *M (SD)*	Total
Attitude towards waste recycling	6.18 (.59)	6.07 (.64)	6.13 (.61)	6.06 (.67)	5.99 (.73)	6.02 (.70)
Behavioral intentions	5.41 (.82)	5.13 (.88)	5.27 (.85)	5.37 (1)	5.13 (.99)	5.25 (.99)
Attitude towards advertisement	4.65 (1.32)	4.55 (.85)	4.65 (1.09)	4.64 (1.07)	4.80 (.99)	4.72 (1.03)
Attention	3.21 (2.06)	2.84 (1.29)	3.03 (1.71)	2.46 (1.53)	2.85 (1.48)	2.66 (1.50)
Ease of processing	5.07 (1.24)	4.66 (.97)	4.87 (1.12)	4.33 (1.22)	4.34 (1.25)	4.33 (1.22)
Pleasure of processing	3.55 (1.27)	3.88 (1.02)	3.72 (1.15)	4.30 (1.42)	4.98 (1.27)	4.64 (1.38)
Involvement	5.96 (.74)	5.68 (1.02)	5.82 (.89)	6.03 (.75)	5.90 (.75)	5.96 (.74)
Incongruity	5.09 (1.18)	4.88 (1.31)	4.99 (1.24)	4.26 (.89)	4.57 (1.09)	4.42 (.99)
Attitude towards hygiene	5.85 (.98)	5.35 (1.18)	5.60 (1.10)	5.05 (1.32)	4.95 (1.23)	5.00 (1.26)
Number of cognitive responses	2.75 (1.52)	2.05 (1.82)	2.40 (1.69)	2.95 (1.87)	2.55 (1.57)	2.75 (1.72)
Advertisement relevant responses	.70 (.92)	.65 (1.35)	.67 (1.14)	.60 (1.18)	.90 (1.37)	.75 (1.27)
Environmental relevant cognitive responses	1.45 (1.73)	.95 (1.27)	1.20 (1.52)	1.00 (1.77)	.70 (1.30)	.85 (1.54)
Irrelevant cognitive responses	.60 (.68)	.45 (.60)	.53 (.64)	1.35 (1.53)	.95 (1.09)	1.15 (1.33)

Table 4

Overview of univariate results

Independent variables		F (1. 76)	*p*	η^2
Condition advertisement	Attitude waste recycling	.45	.50	.00
	Attitude towards hygiene	5.11	**.027***	.06
	Behavioral intentions	.01	.92	.00
	Attitude advertisement	.24	.63	.00
	Attention	1.00	.31	.01
	Ease of processing	4.00	**.045***	.05
	Pleasure of processing	10.00	**.001****	.13
	Involvement towards environmental issues	.62	.43	.00
	Incongruity	5.00	**.028***	.06
	Number of cognitive responses	.84	.36	.01
	Ad-relevant cognitive responses	.08	.78	.00
	Environmental-relevant cognitive responses	1.00	.31	.01
	Irrelevant cognitive responses	7.00	**.009****	.09
Involvement	Attitude waste recycling	.36	.54	.00
	Attitude towards hygiene	1.28	.26	.02
	Behavioral intentions	1.57	.21	.02
	Attitude advertisement	.02	.89	.00
	Attention	.00	.97	.00
	Ease of processing	.58	.45	.01
	Pleasure of processing	3.28	.07	.04
	Involvement towards environmental issues	1.23	.27	.02
	Incongruity	.04	.84	.00
	Number of cognitive responses	2.00	.15	.03
	Ad-relevant cognitive responses	.21	.65	.00
	Environmental-relevant cognitive responses	1.35	.25	.02
	Irrelevant cognitive responses	1.38	.24	.02
Condition advertisement x involvement	Attitude waste recycling	.02	.89	.00
	Attitude towards hygiene	.57	.45	.01
	Behavioral intentions	.01	.92	.00
	Attitude advertisement	.30	.58	.00
	Attention	1.11	.29	.01
	Ease of processing	.65	.42	.01
	Pleasure of processing	.39	.53	.00
	Involvement towards environmental issues	.16	.68	.00

	Incongruity	1.00	.31	.01
	Number of cognitive responses	.15	.69	.00
	Ad-relevant cognitive responses	.41	.52	.00
	Environmental-relevant cognitive responses	.08	.77	.00
	Irrelevant cognitive responses	.28	.59	.00

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

4.3 Interaction effect

The results of the analysis do not indicate a significant effect on the outcome variables for a two-way interaction. Overall, the data do not show significant interaction effects between the advertising condition and the level of involvement ($p = .99$). Therefore, it can be stated that there is no moderating effect of the level of involvement on the relationship between advertising condition and attention. However, this was expected since the involvement manipulation has failed.

4.4 Effects on behavior

4.4.1 Chi-square test

A Chi-square test was performed to determine whether behavior differed between ambient advertising and regular advertising. Behavior was found not to be significantly different between the type of advertising (X^2 (2) = 1.26, $p = .53$).

Another test was performed to study also the effects of the induced involvement on behavior. However, this test again showed no significant effects (X^2 (2) = .86, $p = .65$). Therefore, it can be stated that behavior does not vary regarding the type of advertisement or the level of involvement of participants. This is not very surprising since the manipulation of involvement has failed in our study.

Even though the results are not significant and the differences between the conditions are very minimal, it is interesting to take a short look at the actual behavior participants performed. Table 5 shows these results. It is noteworthy that in the regular condition participants most often

leave their cup in the first experiment room. Meanwhile, people in the ambient condition generally throw their cup in one of the two garbage cans. Furthermore, when we look at involvement, it is striking that high-involved people oftentimes leave their cup on the desk.

Table 5

Crosstabs chi-square analysis

	Type of advertisement			Induced level of involvement		
Behavior	Ambient advertisement	Regular advertisement	Total	High involvement	Low involvement	Total
Leaves cup on desk	13	17	30	17	13	30
Normal garbage can	13	9	22	10	12	22
Recycle garbage can	14	14	28	13	15	28

4.4.2 Correlation analysis

To find out whether a relationship between different variables exists, a correlation analysis was carried out. The correlation coefficient provided insights into the strength and direction of these relationships. First the relationship between behavior and other variables are discussed, and later on, we will take a look at the other mutual relations that exist. All results can be found in Table 6 and 7.

4.4.2.1 Behavior

We were especially interested in the relationship between several variables and behavior. As can be seen in Table 6, there is only one significant correlation found. This is the relation between behavior and the number of irrelevant thoughts (r (79) = -.28, p = .012). This result indicates a moderate negative correlation, which means that the more irrelevant thoughts people have, the less people engage in recycling behavior.

The other relationships that were found regarding behavior were very small and not significant, indicating that there is no connection between among other things attitudes towards environmental problems and behavior (r (79) = .04, p = .76) (see Table 6). This finding suggests

the likelihood of an attitude-behavior gap. Also, no significant correlations were found in the relationship between involvement and behavior. Even though participants indicated being highly involved in recycling, it did not make any difference in their recycling behavior.

Table 6

Spearman correlations of behavior

	Behavior
Attitude towards advertisement	.01
Attitude towards hygiene	-.05
Attitude towards waste recycling	.04
Behavioral intentions	-.08
Attention	.02
Involvement	-.04
Incongruity	-.02
Ease of processing	-.02
Pleasure of processing	-.10
Number of cognitive responses	.02
Ad-relevant cognitive responses	.13
Environmental-relevant cognitive responses	.16
Irrelevant cognitive responses	**-.28***

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

4.4.2.2 Further analysis of correlations

Looking at the other correlation analysis with the other variables, some interesting effects arise. As can be seen in Table 7, there are several significant correlations with behavioral intentions. Among other things, there is a relationship with attitude towards waste recycling (r (79) = .54, p = .00) and involvement (r (79) = .74, p = .00). Also, the relation between involvement and attitude towards waste recycling is high (r (79) = .56, p = .00). These results therefore show the logical relationship between these variables.

Another positive significant relationship has been found between the attitude towards hygiene and the number of environmental-relevant thoughts (r (79) = .23, p = .037). This result

indicates that the higher the self-reported attitude towards hygiene, the more environmental relevant thoughts the participants had. Furthermore, the ease of processing also correlates significantly positive with environmental relevant thoughts (r (79) = .45, p = .00). It seems that the easier it is to process an environmental-related advertisement, the more environmental-relevant thoughts people have.

In addition, Table 7 shows that there is a significant negative relationship between the number of irrelevant thoughts and the ease of processing (r (79) = -.34, p = .002). This indicates that the more irrelevant thoughts a participant had, the less easily the advertisement was processed.

Further significant correlations can be found in Table 7.

Table 7

Pearson correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Attitude towards advertisement	1												
2. Attitude towards hygiene	.12	1											
3. Attitude towards waste recycling	**.22***	.17	1										
4. Behavioral intentions	**.24***	.17	**.54****	1									
5. Attention	**.47****	.16	.08	.14	1								
6. Involvement	.08	.10	**.56****	**.74****	.02	1							
7. Incongruity	**.53****	.19	**.26***	.18	**.41****	.08	1						
8. Ease of processing	**.27***	.06	**.29****	.18	**.45****	.07	**.38****	1					
9. Pleasure of processing	**.54****	.12	.09	.06	.05	.09	.07	-.13	1				
10. Number of cognitive responses	.16	.08	**.23***	.10	**.28***	.07	.12	.21	.14	1			

	1	2	3	4	5	6	7	8	9	10	11	12	13
11. Ad-relevant cognitive responses	.13	-.17	.11	.05	.04	.03	.13	.03	.20	**.38****	1		
12. Environmental-relevant cognitive responses	.08	**.23***	**.26***	.09	**.34****	.09	.13	**.45****	-.09	**.57****	**-.28***	1	
13. Irrelevant cognitive responses	-.01	-.01	-.13	-.03	-.08	-.03	-.15	**-.34****	.13	**.35****	-.12	-.22	1

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

4.5 Mediation analysis

Besides the direct main effects and the interaction effect, another aim of this study was to determine the mediation effect on the relationship of advertising condition and the dependent variables.

According to Baron and Kenny's (1986) procedures for mediation, four conditions must be met in order to indicate a mediating effect. First, the independent variable must influence the dependent variable. Furthermore, the independent variable must have an effect on the mediator, and the mediator in return has to affect the dependent variable. And lastly, the relationship between the independent and dependent variable has to disappear when the mediator is included. However, as can be seen in the analyses, there is no direct effect of the advertising condition on either attitude towards advertisement, attitude towards waste recycling or behavioral intentions. Therefore, step 1 of Baron and Kenny's (1986) procedure can already not be met. Nonetheless, many analysists nowadays believe that not all steps have to be met before we can speak of a mediation (Rucker, Preacher, Tormala, & Petty, 2011). The most essential steps are step 2 and 3 (Kenny, 2018). As a result, the mediation analysis will be continued.

Since the aforementioned analysis (Table 2 and 4) showed only effects on the ease of processing ($p = .045$), the pleasure of processing ($p = .001$) and the number of irrelevant thoughts ($p = .009$), the mediation analysis will be performed only on these mediators. However, the mediation analysis showed no significant effects of the mediator 'irrelevant thoughts' on the

four dependent variables (i.e. attitude towards advertisement, attitude towards waste recycling, attitude towards hygiene and behavioral intentions), and because it does not meet the essential conditions for mediation (step 3), further analysis on this mediator makes no sense.

Furthermore, the dependent variables of behavioral intentions and attitude towards hygiene are excluded, since all three possible mediators do not show a significant effect on these two variables. Hence, only attitude towards waste recycling and attitude towards the advertisement were the dependent variables used in this analysis.

4.5.1 Mediation effect of ease of processing

The results show that there is no direct significant effect between the advertisement condition and attitude towards waste recycling (Figure 6). Comparison of the direct β-values showed only minor effects and is reduced slightly when including the mediator. However, there is a full mediation of ease of processing on the relationship between an ambient advertisement and attitude towards waste recycling (p = .013).

The same applies for the effect of the mediator on attitude towards the advertisement, in which the mediator ease of processing also proved to fully mediate the relationship between ambient advertisements and attitude towards the advertisement (p = .009) (Figure 7).

Nevertheless, some the results have to be interpreted with some nuance since the Sobel test (Sobel, 1982) was not significant for both the attitude towards waste recycling (Sobel Z = -.20, p = .84) and the attitude towards the advertisement (Sobel Z = -1.63, p = .10). This means that the indirect effect via the mediator did not differ significantly from zero. However, due to the low (n), it is possible that the Sobel test was not entirely reliable (Kenny, 2018).

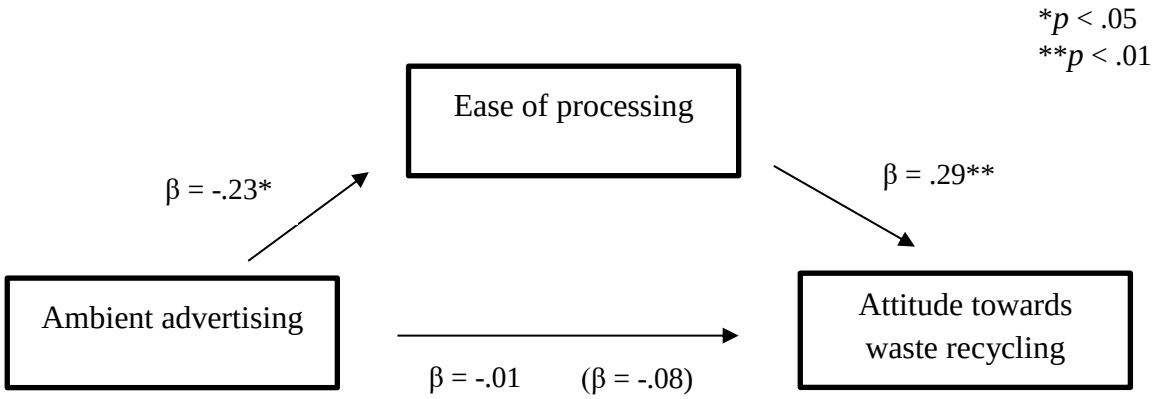

Figure 6. Full mediation effect of ease of processing on attitude towards waste recycling.

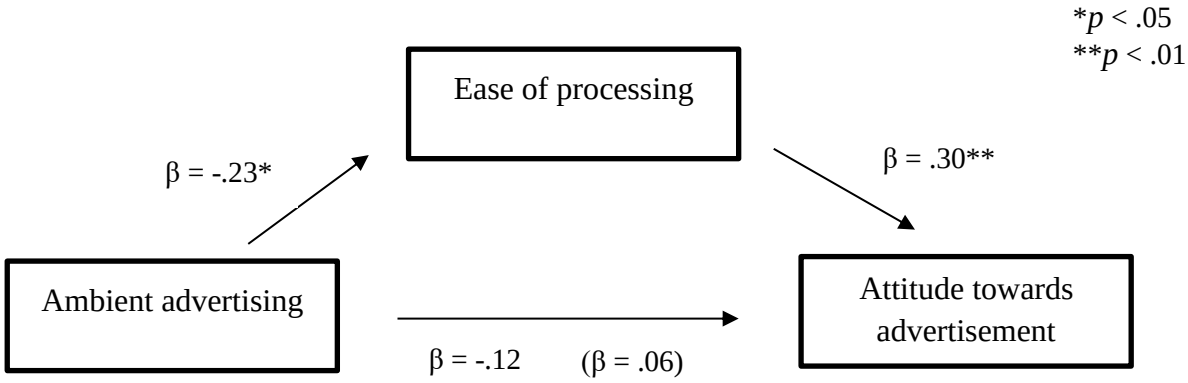

Figure 7. Full mediation effect of ease of processing on attitude towards advertisement.

4.5.2 Mediation effect of pleasure of processing

With regard to the effect of the mediator pleasure of processing on the relationship between the advertisement condition and the attitude towards the advertisement, the coefficient in the second equation decreased slightly when the mediator was included (Figure 8). However, the direct relation turns out not to be significant. This implicates that the pleasure of processing fully mediates the relationship. This was supported by the results of the Sobel test, which revealed that the indirect effect of the independent variable on the dependent variable via the mediator was significantly different from zero (Sobel $Z = 2.85$, $p = .004$).

For the mediator 'pleasure of processing' no significant effect was found on attitude towards waste recycling, so no further analysis is performed on this relationship.

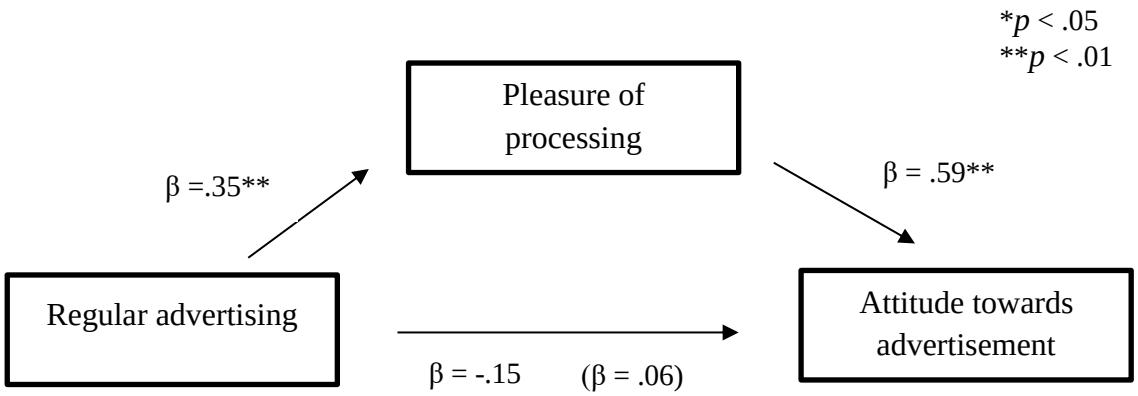

Figure 8. Full mediation effect of pleasure of processing on attitude towards advertisement.

4.6 Overview of results

Table 8

Overview of supported and rejected hypotheses

Hypotheses		**Result**	
H1	Ambient advertising, compared to regular advertising, more positively impacts people's		
	(a) attitude towards the advertisement,	Rejected	
	(b) attitude towards waste recycling and	Rejected	
	(c) recycling behavior.	Rejected	
H2	Ambient advertising, compared to regular advertising, more positively impacts the level of attention.	Rejected	
H3	Ambient advertising, compared to regular advertising, more positively impacts the level of attention, and in turn people's		
	(a) attitude towards advertisement and	Rejected	
	(b) attitude towards waste recycling.	Rejected	
H4	Regular advertising, compared to ambient advertising,		
	(a) more positively impacts the level of processing,	Rejected	
	which in turn influences		
	(b) the attitude towards the advertisement and	Partly supported	Only in the ambient condition the ease of processing influences these two types of attitudes.
	(c) the attitude towards waste recycling	Partly supported	
H5	The effect of ambient advertising through attention results in		
	(a) strong and more sustainable attitudes than the effect of regular advertising through processing fluency,	Rejected	
	which in turn are		
	(b) more predictive of the actual behavior.	Rejected	
H6	Involvement towards environmental issues will moderate responses to ambient advertising, such that under high-involvement conditions, the positive effect of ambient advertising on attention will be less pronounced than under low involvement conditions.	Rejected	

H7	Ambient advertising, as opposed to regular advertising, has a more positive effect on attitudes. Under low involved conditions, the attitude to waste recycling will be higher than in high involved conditions.	Rejected
H8	Ambient advertising, as opposed to regular advertising, has a more positive effect behavior. Under low involved conditions, the recycling behavior will be higher than in high involved conditions.	Rejected

5. Discussion and conclusion

5.1 Discussion of the results

Driven by the recent developments and growing attention that has been given to the plastic soup in the ocean, and the lack of empirical evidence concerning the use of ambient advertisements to effectively communicate waste recycling messages, this study sought to examine to what extent ambient, incongruent advertisements have an impact on attitudes towards the advertisement, attitudes towards waste recycling and recycling behavior itself.

The following paragraphs will discuss the main findings of the study. Furthermore, the limitations of the research will be pointed out, and both theoretical and practical implications will be presented, including recommendations for future research. Afterwards, an overall conclusion of the whole research will be given.

Ambient advertisements

Results of the current study have met our expectations of the surprising and incongruent nature of ambient advertising. The ambient advertisement was perceived as more incongruent compared to regular advertisements. However, it is noteworthy that both types of advertisements were rated very high on the level of incongruity. This implicates that even the regular condition was interpreted as incongruent. A possible explanation for this result is that both types of advertisements stood out in the experimental setting. The participants had to perform a taste test, and probably because the water dispenser had no function in this first part of the experiment, it was seen as something surprising and incongruent.

Even though the ambient advertisement was perceived as significantly more incongruent and surprising, our results did not support the expectation that an ambient advertisement would result in more attention. The cognitive responses of the participants support these findings. People reported seeing the water dispenser shortly, and wondering what it did there, but did not spend much time to analyze it in detail. This could be due to the fact that the participants had a

very specific task (the taste test), and therefore had less attention for the water dispenser. These results are in line with those obtained by Baack et al. (2008) and Cronin (2006), who examined the effect of advertisements on people who were distracted or who were in a rush, and found that attention in these cases was much less compared to people who were not distracted.

Another important finding was that there were some surprising effects on the ease of processing. Even though it was expected that a regular advertisement would be easier to process, since these advertisements are not as disrupting, the effect was found with ambient advertisements. Apparently, an ambient advertisement ensures that the problem of plastic waste becomes clearer for the participant, which makes processing easier. It was interesting to find a positive significant effect in the correlation analysis between the ease of processing and the number of environmentally-related thoughts. It seems that the easier an advertisement is to process, the more environmentally-related thoughts people have. This discrepancy could be attributed to the fact that the advertisement is straight to the point and shows the direct consequences of plastic waste. A traditional advertisement, in this case, uses a longer text, which more often distracts from the message and makes the processing of the message more difficult.

Additionally, the ease of processing turned out to play a mediating role in the relationship between ambient advertising and people's attitude towards waste recycling. The relationship was fully mediated by this variable, which indicates that the ease of processing clarifies the nature of the relationship between ambient advertising and attitude towards waste recycling. Without this mediating variable, there would be no connection between an ambient advertisement and people's attitude towards waste recycling.

Moreover, it is certainly interesting to note that this study found significant results for the relationship between ambient advertising and attitude towards hygiene. The emergence of this variable came as a surprise in this study, since it was first a part of the scale 'attitude towards waste recycling', but did not seem to fit in this scale. Nevertheless, it appears to be that an ambient advertisement results in a higher attitude towards hygiene. An explanation for this might

be that people were faced with the facts, seeing the plastic floating in the water dispenser. This could make participants realize that if they recycle their plastic waste, the world would become a bit cleaner. The correlation analysis confirms this result by showing a positive correlation between attitude towards hygiene and the number of environmental-relevant thoughts. This means that people expressed their concerns about the environment more when their attitude towards hygiene was higher.

Regular advertisements

Looking at the effects of the regular, congruent advertisements, they resulted among other things in more pleasure of processing. Processing fluency was initially measured using two separate scales, namely ease of processing and pleasure of processing. It was expected that both variables would somehow show the same effects, however, both variables had totally different outcomes. This result may be explained by the fact that the regular type of advertisement, compared to an ambient advertisement, does not really disrupt people. A regular advertisement is therefore more pleasurable to process. It could also be related to the way this variable was measured, since the question was about the 'nature of the image' that the ad conveys. The ambient advertisement was of course much more violent in nature, which seems less pleasant and positive compared to the regular advertisement. This can be the reason why this question deviates from the outcomes with the ease of processing.

Another important finding was that people in the regular advertisement condition had more irrelevant thoughts. This result can also be found in the correlation analysis, which shows that the regular advertisement apparently has caused some confusion among participants. A possible explanation for this result is that people in this condition were distracted from the advertisement's main message, because the purpose of the advertisement was less clear. Thoughts like: *"Why is there a water dispenser? And what does it have to do with the taste test?"* indicate that people did see the water dispenser but did not understand the purpose of it.

People were confused and distracted, which resulted in more irrelevant thoughts. In addition, the correlation analysis also shows that the more irrelevant thoughts people have, the fewer people are inclined to recycle. A regular advertisement apparently does not address the problem straight away and does not convey a clear message. In that respect, an ambient advertisement is straightforward, since it shows the direct effect of plastic in the ocean.

Main effects of advertisements

If we look at the effect of both types of advertisements on the eventual behavior, no significant effects were found. And even though the manipulation of involvement has failed, it is an interesting variable in this study, and to link to the actually performed behavior. It was striking that even in the low-involved condition, participants indicated being very involved in environmental problems. This means that low-involved people were already highly involved beforehand. It seems possible that these results are due to the fact that the plastic issue has been in the news a lot lately, and as a result, people are unconsciously primed. The plastic soup is a hot topic, and every week we can find something in the newspaper, on TV, or on social media. This ensures that a so-called ceiling effect has been reached, because people are already very involved in the problem.

Despite the participants indicating being highly involved, stating they have a positive attitude towards waste recycling and expressing positive behavioral intentions regarding recycling, the results of this study did not show an increase in recycling behavior. People often choose the easiest option, which is leaving the plastic cup on the desk of the first experiment room, or throw it away in the first bin they see (in this case, the normal bin). These results further support the hypothesis of the existence of an attitude-behavior gap. The finding is consistent with that of Hume (2010) who also found that sometimes there is a great contradiction between what people think and know about recycling, and how they act. And even though it is striking that some studies did found effects on behavior, there might be a reason for why no

results were found in this study. Sameti and Khalili (2017) namely found that short-term consequences of advertisement behavior were less obvious compared to long-term results. There is no direct effect on an advertisement on behavior straight after seeing the advertisement, but some time is needed for the individual to result in a behavior change. Therefore, it might be possible that the recycling behavior of our participants will change over time.

And although advertisements are important for influencing beliefs and behaviors, consistent messages from several sources are necessary to result in an actual behavior change (Turk et al., 2006). These sources (among which advertisements), both regular and ambient, only work in a specific context. According to the Fogg Behavior Model (FBM), behavior is a product of three factors, namely motivation, ability, and triggers (Fogg, 2009). Motivation is about the willingness to act according to the desired behavior, and ability covers the resources and opportunities available to people (Pieters, Bijmolt, van Raaij, & de Kruijk, 1998). These factors both can affect people's recycling behavior (Azjen, 1996). At least one of these factors, either motivation or ability, must be high enough for behavior to be carried out. However, a trigger is needed to result in the desired behavior. A trigger, for example an advertisement, will remind people to perform their behavior and must take place at the moment they are motivated and able enough. This means that if the recycling behavior is not made easy enough, people are not motivated to recycle their plastic waste, or they do not get reminded to perform the behavior, changes in recycling behavior are not likely.

5.2 Limitations and future research

There are several limitations to this study which should be considered when interpreting the results. First, the manipulation of involvement has not succeeded. Because the manipulation has not exactly done what we had expected, it is possible that our findings have been influenced. The manipulation check indicated that participants in both conditions (either high or low involved) were very involved, which means that it is hard to manipulate this kind of variable. Further

research should be undertaken to explore how results would be if the two kinds of groups of involvement were divided naturally.

Furthermore, participants had a very specific task in the first part of the experiment. This resulted in the fact that some people did not even see the water dispenser, because their attention was directed somewhere else. Therefore, further research might explore the effect of an ambient advertisement in a more realistic and natural environment for people, for example in a canteen, where they do not have to perform a specific task. Maybe if participants were not as distracted in this study, there might be an effect on behavior. Moreover, this research has been conducted among a group of students, with a relatively small sample size. Future research has to identify whether the found effects in this study will remain intact when the experiment is conducted in the field.

Another limitation of this study was the fact that the short-term recycle behavior of the participant was measured. Even though it might be difficult to research, it can be interesting to look at the long-term consequences of ambient advertisements. For example, Baack et al. (2016) stated that the benefits of a creative advertisement are found to persist over time. The longer the delay between advertising exposure and measurement of the outcomes, the higher the cognitive advantages and behavior (Till & Baack, 2006).

Future research could also look at the correct use of an ambient advertisement. In what case and for what type of products or issues does it works best? It might be interesting to look at the effect of regular and ambient advertisements together, for example in a campaign. Perhaps an ambient advertisement is a good tool to create awareness for the issue at the beginning of a campaign, and afterwards, a regular advertisement can be used to remind people.

5.3 Theoretical implications

A lot of research has focused on several kinds of advertising, however, barely any of these articles were focused on the use of advertisements in promoting recycling behavior. Therefore,

this study gave some insights into the theoretical field of ambient advertising regarding plastic waste and provided some surprising results for the effect of regular advertisements.

From this study, it appears that an ambient advertisement is more outstanding, which corresponds to earlier research. Hutter and Hoffmann (2014) for example also found that an ambient advertisement was able to raise more attention by using incongruent elements. The ambient advertisement in this study was focused on plastic waste, that led people to think more about the environment. Also, people were more concerned with the hygiene that comes with the problem of plastic waste.

This research has added relevant information to the literature of advertising since it has been found that different types of advertisements can evoke different (unexpected) thoughts. In our case, people had much more irrelevant thoughts when looking at a regular advertisement. Severn, Belch, and Belch (1990) found that the use of a distracting picture can interfere with advertisement-relevant and/or environmental relevant thoughts. In this study, it is not a distracting picture, but probably the long text on the advertisement.

Another surprising fact that contributes to the literature about ambient advertisement is the fact that an ambient advertisement is easier to process. Earlier research did not find this effect before, because almost all of them found the disrupting effect of an ambient advertisement. They state that because it is incongruent, people's expectations are not met, and processing is less easy compared to a regular advertisement. But apparently, the purpose of the ambient advertisement is clearer compared to a regular advertisement.

5.4 Practical implications

This study also has several practical implications. First, the results of the study could be used to design an effective advertisement. Marketers could benefit from the insights found in this study, by for example consider the fact that an advertisement can cause several cognitive responses. Before an advertisement is applied in real life, one must first look at what kind of thoughts it

evokes in people. Because an advertisement can trigger some unforeseen reactions, it is important to know what kind of reactions this is, so marketers can anticipate on this.

Furthermore, the government and organizations that are committed to reducing plastic waste can use several things from this study. For example, it is important for them to realize that the attitude-behavior gap in case of recycling still exists, and that they should remember this when searching for solutions. Keeping the Fogg Behavior Model (Fogg, 2009) in mind, the relation between attitudes and behavior can be successfully influenced by trying to make people motivated and able to perform the behavior, and trigger this behavior at the right moment. That is why it is advisable to make recycling as easy as possible. We now know that people quickly choose the most convenient option, which is most visible to them. Showing the right advertisement at the right moment may result in more recycling. It reminds people so that they know how, where and when to carry out their recycling behavior.

In addition, we have seen that an ambient advertisement does not in itself lead to a behavioral change. That is why it is advisable to organizations and marketers to use several types of media if they really want to make a change in behavior.

5.5 Conclusion

This study has tried to answer the main question: '*To what extent does incongruity in advertisements and consumer involvement towards environmental issues, affect the attention and processing fluency given to an advertisement, and does this attention in turn influence attitude and behavior?*'

Findings indicate that ambient advertising is indeed incongruent and therefore is experienced as surprising, and that people thanks to this kind of advertising will start thinking about the environment better. But unfortunately, the results also confirm the existence of the attitude-behavior gap, so that in the actual recycling behavior of the participants nothing has changed.

The study could not find any effects of the level of involvement, due to the failed manipulation and the already high involvement rates. Also, no evidence has been found for the effects of attention in an ambient condition and of processing fluency in a regular condition. However, the ease of processing was playing a role in ambient advertisements, which was an unusual finding.

So, will advertising be the solution against the plastic soup in the ocean? Unfortunately, we are not able to answer this question with full conviction, because no effect on recycling behavior has been found in this study. However, ambient advertisements remain a useful tool to make people at least think about the problem of plastic waste. Due to the incongruous nature and the clear purpose of these types of advertisements, people start to think more about the environment and translate this into their attitude towards waste recycling. In the long term, it is to be hoped that people also adjust their behavior accordingly.

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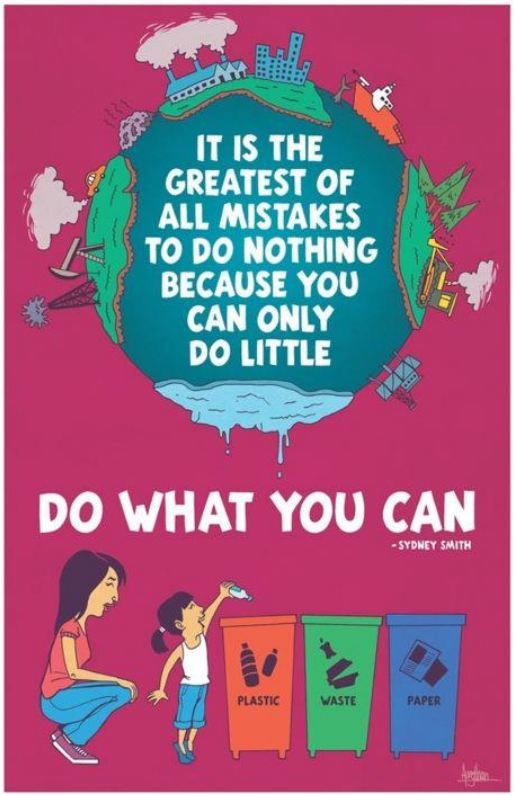
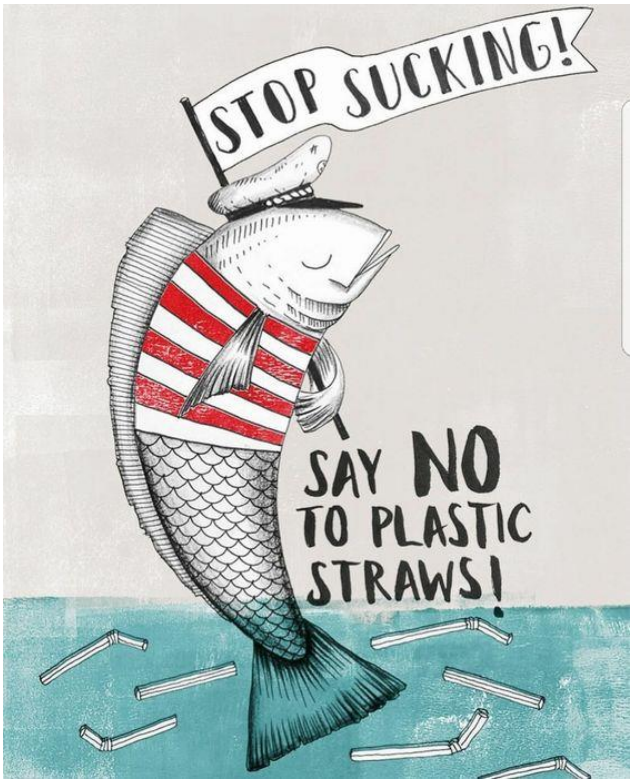
7. Appendices

Appendix A – Pretest materials

3 types of posters:





4 types of ‘different’ (more outstanding) advertisements:

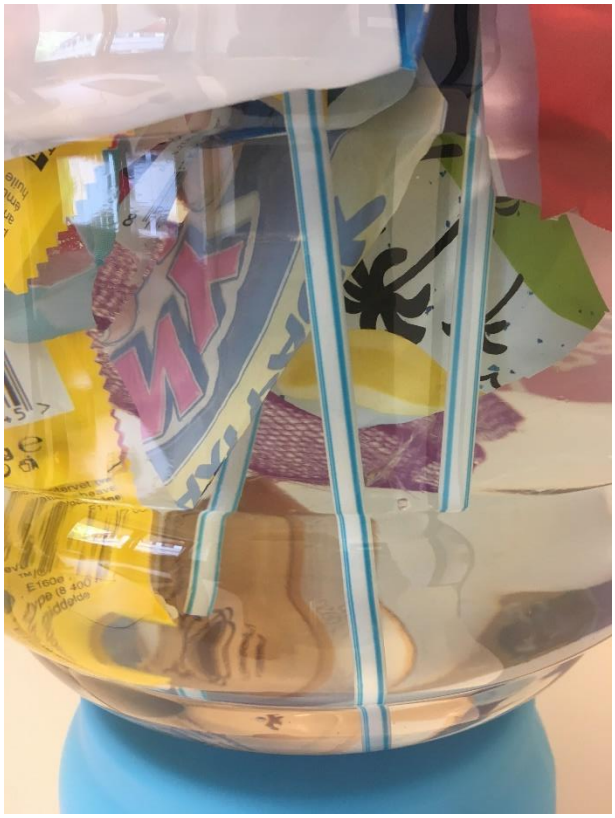
Your plastic footprint

Your actual footprint

These footsteps would be encountered on the ground in the hall of a school / work on a large scale (the big footstep is made entirely of plastic).

Appendix B – Stimulus materials

Regular (congruent) advertisement in experiment setting.



Ambient (incongruent) advertisement in experiment setting.

Appendix C – Taste test high involved

Informed consent:

Welcome to the research study!

Dear participant,
For this research you will assess a lemonade on taste and packaging. A new syrup for students will be introduced in the summer of 2019. Therefore, the client is curious about what students think of the taste and packaging. Please be assured that your responses will be kept completely confidential.
The study should take you around 5 minutes to complete, and you can receive study points for your participation. Your participation in this research is voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice. If you would like to contact the Principal Investigator in the study to discuss this research, please e-mail taste.productdesign@gmail.com.

By clicking the button below, you acknowledge that your participation in the study is voluntary, you are 18 years of age, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason.

- ○ I consent, begin the study (1)
- ○ I do not consent, I do not wish to participate (2)

Demographics:

Q2. What is your gender?

- ○ Male (1)
- ○ Female (2)

Q3. What is your age?

_____

Taste test:

Q4. The lemonade tastes:

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Not sweet	○	○	○	○	○	○	○	Sweet
Awful	○	○	○	○	○	○	○	Tasty
Not fruity	○	○	○	○	○	○	○	Fruity
Unnatural	○	○	○	○	○	○	○	Natural

Q5. Research has shown that students have difficulty with the recycling of packaging. That is why, in addition to taste and product design, we are also interested in what you think about the packaging when it comes to recycling.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I like the colors used on this packaging (1)	○	○	○	○	○	○	○
I think the packaging is biodegradable (2)	○	○	○	○	○	○	○
The packaging is attractive (3)	○	○	○	○	○	○	○
I think the packaging is unsustainable (4)	○	○	○	○	○	○	○
The packaging displays quality (5)	○	○	○	○	○	○	○
I think the packaging is environmental friendly (6)	○	○	○	○	○	○	○

Appendix D – Taste test low involved

Informed consent:

Welcome to the research study!

Dear participant,
For this research you will assess a lemonade on taste and packaging. A new syrup for students will be introduced in the summer of 2019. Therefore, the client is curious about what students think of the taste and packaging. Please be assured that your responses will be kept completely confidential.
The study should take you around 5 minutes to complete, and you can receive study points for your participation. Your participation in this research is voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice. If you would like to contact the Principal Investigator in the study to discuss this research, please e-mail taste.productdesign@gmail.com.

By clicking the button below, you acknowledge that your participation in the study is voluntary, you are 18 years of age, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason.

- ○ I consent, begin the study (1)
- ○ I do not consent, I do not wish to participate (2)

Demographics:

Q2. What is your gender?

- ○ Male (1)
- ○ Female (2)

Q3. What is your age?

_____

Taste test:

Q4. The lemonade tastes:

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Not sweet	○	○	○	○	○	○	○	Sweet
Awful	○	○	○	○	○	○	○	Tasty
Not fruity	○	○	○	○	○	○	○	Fruity
Unnatural	○	○	○	○	○	○	○	Natural

Q5. Research has shown that students are very price-conscious. That is why we are also interested in what you think of this packaging in terms of price and quality

	Strongly Disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
The design of the packaging is adjusted to students (1)	○	○	○	○	○	○	○
I think the packaging displays quality (2)	○	○	○	○	○	○	○
The colors appeal to me as a student (3)	○	○	○	○	○	○	○
I like the shape of the packaging (4)	○	○	○	○	○	○	○
I think the packaging looks cheap (5)	○	○	○	○	○	○	○
I would buy this product based on its appearance (6)	○	○	○	○	○	○	○

Appendix E – Experimental setting

Figure 9. Regular advertisement setting.

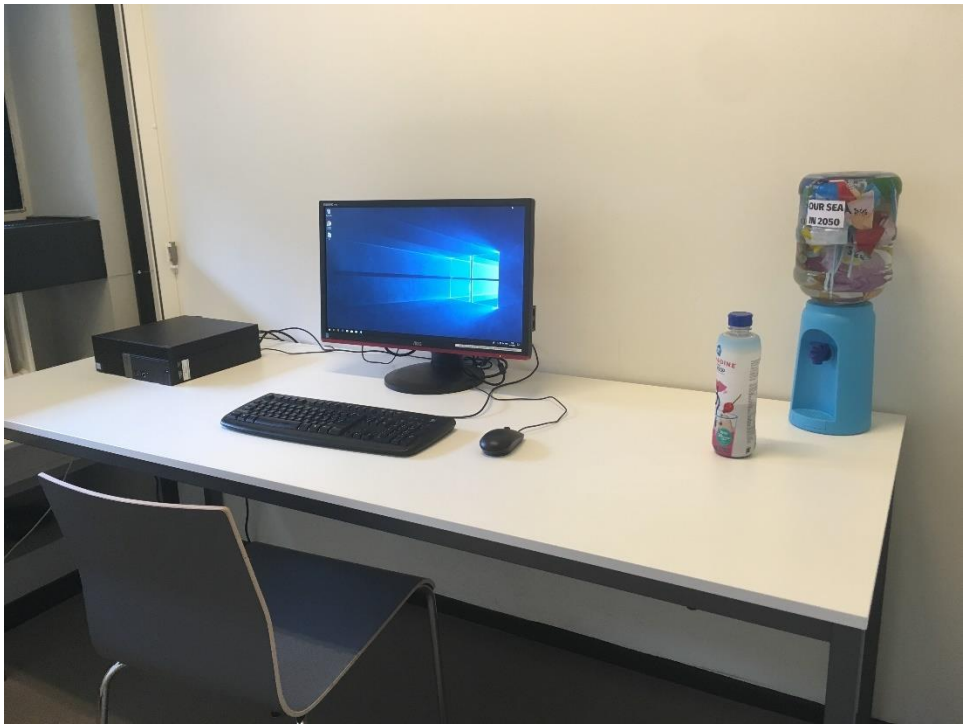


Figure 10. Ambient advertisement setting.

Figure 11. Sight from room 1.

Figure 12. The garbage cans.

Appendix F – Questionnaire attitudes and behavior

Informed consent:

Welcome to the research study!

Dear participant,

In this questionnaire, some general information about your attitudes and behavioral intentions are asked, but also several specific questions relating to the water dispenser you just saw in the other room. This water dispenser is part of a campaign. A number of questions will be asked about the dispenser, whereby reference will be made to the water tap by means of 'advertisement'.

Important! This questionnaire is **unrelated to the previous tasting test**, so you will **not** need to evaluate the lemonade or the lemonade packaging.

The study should take you around 10 minutes to complete, and you can receive study points for your participation. Your participation in this research is voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice. If you would like to contact the Principal Investigator in the study to discuss this research, please e-mail f.j.de.jong-1@student.utwente.nl.

Please be assured that your responses will be kept completely confidential.

By clicking the button below, you acknowledge that your participation in the study is voluntary, you are 18 years of age, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason.

- ○ I consent, begin the study (1)
- ○ I do not consent, I do not wish to participate (2)

Attitude towards waste recycling:

Q2. The next questions are about your attitude towards recycling

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Recycling is good (1)	○	○	○	○	○	○	○
Recycling is useful (2)	○	○	○	○	○	○	○
Recycling is unrewarding (3)	○	○	○	○	○	○	○
Recycling is responsible (4)	○	○	○	○	○	○	○
Recycling takes too much time (5)	○	○	○	○	○	○	○
Recycling is hygienic (6)	○	○	○	○	○	○	○

Q3. Recycling is:

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Bad	○	○	○	○	○	○	○	Good
Useful	○	○	○	○	○	○	○	A waste of time
Not doable	○	○	○	○	○	○	○	Doable
Not responsible	○	○	○	○	○	○	○	Responsible
Rewarding	○	○	○	○	○	○	○	Not rewarding
Not hygienic	○	○	○	○	○	○	○	Hygienic

Behavioral intentions:

Q4. The next questions are about your intentions about waste recycling

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly Agree (7)
I intend to recycle my waste in the next four weeks (1)	○	○	○	○	○	○	○
I am willing to speak to my friends about recycling (2)	○	○	○	○	○	○	○
I will recycle my waste every time I have it for disposal (3)	○	○	○	○	○	○	○
I am willing to spend some time to recycle (4)	○	○	○	○	○	○	○
I am willing to get more information about appropriate ways of recycling (5)	○	○	○	○	○	○	○

Attitude towards advertisement:

Q5. I think the ad on the water dispenser (in the right corner of the desk) was:

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Not attractive	○	○	○	○	○	○	○	Attractive
Bad	○	○	○	○	○	○	○	Good
Unpleasant	○	○	○	○	○	○	○	Pleasant
Unappealing	○	○	○	○	○	○	○	Appealing
Dull	○	○	○	○	○	○	○	Dynamic
Depressing	○	○	○	○	○	○	○	Refreshing
Not enjoyable	○	○	○	○	○	○	○	Enjoyable
Uninteresting	○	○	○	○	○	○	○	Interesting
Not likable	○	○	○	○	○	○	○	Likable

Attention:

Q6. The next questions are about the attention you paid to the advertisement on the water dispenser (in the right corner of the desk)

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I was paying attention to the advertisement (1)	○	○	○	○	○	○	○
I was concentrating on the advertisement (2)	○	○	○	○	○	○	○
I was thinking about the advertisement (3)	○	○	○	○	○	○	○
I was focusing on the advertisement (4)	○	○	○	○	○	○	○
I was spending effort looking at the advertisement (5)	○	○	○	○	○	○	○
I was carefully reading the advertisement (6)	○	○	○	○	○	○	○
I looked longer than normal at the advertisement (7)	○	○	○	○	○	○	○

Q7. List the thoughts that occurred to you while seeing the advertisement on the water dispenser:

- ○ 1. _____
- ○ 2. _____
- ○ 3. _____
- ○ 4. _____
- ○ 5. _____

Processing fluency:

Q8. Based on the ad on the water dispenser:

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I find it difficult to get a clear picture of the problem that is being raised (1)	○	○	○	○	○	○	○
I can make a good impression of the problem (2)	○	○	○	○	○	○	○
I quickly got a clear idea of the problem (3)	○	○	○	○	○	○	○
Based on the advertisement, I can get a good picture of who it is meant for (4)	○	○	○	○	○	○	○

Q9. The image that came up when I looked at the advertisement on the water dispenser was:

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Clear (1)	○	○	○	○	○	○	○
Chaotic (2)	○	○	○	○	○	○	○
Warry (3)	○	○	○	○	○	○	○
Detailed (4)	○	○	○	○	○	○	○
Weak (5)	○	○	○	○	○	○	○
Intense (6)	○	○	○	○	○	○	○
Blurred (7)	○	○	○	○	○	○	○
Lifelike (8)	○	○	○	○	○	○	○
Lively (9)	○	○	○	○	○	○	○
Sharply (10)	○	○	○	○	○	○	○

Q10. The nature of the imaging on the water dispenser was:

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Positive	○	○	○	○	○	○	○	Negative
Unpleasant	○	○	○	○	○	○	○	Pleasant
Annoying	○	○	○	○	○	○	○	Nice

Issue involvement (manipulation check):

Q11.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Recycling is important to me (1)	○	○	○	○	○	○	○
I care about the environment (2)	○	○	○	○	○	○	○
To me, environmental-related issues are relevant and significant (3)	○	○	○	○	○	○	○
I am worried about the problem that plastic waste creates (4)	○	○	○	○	○	○	○
I feel responsible for the environment (5)	○	○	○	○	○	○	○

Level of incongruity (manipulation check):

Q12 The advertisement on the water dispenser was:

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Expected	○	○	○	○	○	○	○	Unexpected
Ordinary	○	○	○	○	○	○	○	Unique
Routine	○	○	○	○	○	○	○	Fresh
Standard	○	○	○	○	○	○	○	Original
Boring	○	○	○	○	○	○	○	Innovative
Predictable	○	○	○	○	○	○	○	Surprising

Appendix G – Scales

Attitude towards waste recycling

Recycling is:

Bad	¦——¦——¦——¦——¦——¦——¦——¦	Good
*Useful	¦——¦——¦——¦——¦——¦——¦——¦	A waste of time
Not doable	¦——¦——¦——¦——¦——¦——¦——¦	Doable
Not responsible	¦——¦——¦——¦——¦——¦——¦——¦	Responsible
*Rewarding	¦——¦——¦——¦——¦——¦——¦——¦	Not rewarding
Not hygienic	¦——¦——¦——¦——¦——¦——¦——¦	Hygienic

***** *reverse coded*

Behavioral intentions

Strongly disagree (1) – Strongly agree (7)

I intend to recycle my waste in the next four weeks.

I am willing to speak to my friend about recycling.

I will recycle my waste every time I have it for disposal.

I am willing to spend some time to recycle.

I am willing to get more information about appropriate ways of recycling.

Attitude towards advertisement

I think the ad on the water dispenser was:

Not attractive	¦——¦——¦——¦——¦——¦——¦——¦	Attractive
Bad	¦——¦——¦——¦——¦——¦——¦——¦	Good
Unpleasant	¦——¦——¦——¦——¦——¦——¦——¦	Pleasant
Unappealing	¦——¦——¦——¦——¦——¦——¦——¦	Appealing
Dull	¦——¦——¦——¦——¦——¦——¦——¦	Dynamic
Depressing	¦——¦——¦——¦——¦——¦——¦——¦	Refreshing
Not enjoyable	¦——¦——¦——¦——¦——¦——¦——¦	Enjoyable

Uninteresting ¦——¦——¦——¦——¦——¦——¦——¦ Interesting

Not likeable ¦——¦——¦——¦——¦——¦——¦——¦ Likeable

Attention

Strongly disagree (1) – Strongly agree (7)

I was paying attention to the advertisement.

I was concentrating on the advertisement.

I was thinking about the advertisement.

I was focusing on the advertisement.

I was spending effort looking at the advertisement.

I was carefully reading the advertisement.

I looked longer than normal at the advertisement.

List the thoughts that occurred to you while seeing the advertisement on the water dispenser:

1.

2.

3.

4.

5.

Processing fluency

Strongly disagree (1) – Strongly agree (7)

*I find it difficult to get a clear picture of the problem that is being raised.

I can make a good impression of the problem.

I quickly got a clear idea of the problem.

Based on the advertisement, I can get a good picture of who it is meant for.

***** *reverse coded*

Strongly disagree (1) – Strongly agree (7)

The image that came up when I looked at the advertisement on the water dispenser was:

Clear

Chaotic

Warry

Detailed

Weak

Intense

Blurred

Lifelike

Lively

Sharply

The nature of the imaging on the water dispenser was:

*Positive	¦——¦——¦——¦——¦——¦——¦——¦	Negative
Unpleasant	¦——¦——¦——¦——¦——¦——¦——¦	Pleasant
Annoying	¦——¦——¦——¦——¦——¦——¦——¦	Nice

***** *reverse coded*

Involvement

Strongly disagree (1) – Strongly agree (7)

Recycling is important to me

I care for the environment

To me, environmental related issues are relevant and significant

I am worried about the problem that plastic waste creates

I feel responsible for the environment

Incongruity

This advertisement on the water dispenser was:

Expected	¦———¦———¦———¦———¦———¦———¦———¦	Unexpected
Ordinary	¦———¦———¦———¦———¦———¦———¦———¦	Unique
Routine	¦———¦———¦———¦———¦———¦———¦———¦	Fresh
Standard	¦———¦———¦———¦———¦———¦———¦———¦	Original
Boring	¦———¦———¦———¦———¦———¦———¦———¦	Innovative
Predictable	¦———¦———¦———¦———¦———¦———¦———¦	Surprising