Youth Perceptions on Anti-Texting and Driving Advertisements: an Eye-Tracking Approach

Dominique Leroux

Laurentian University

Abstract

Texting and driving has become a prevalent public health issue, especially in youth. The current study recorded eye movements of young adults to texting and driving prevention advertisements to determine the format that attracted the most attention. Thirty-three participants (Mean age 19) viewed three types of advertisements (non-driving related, general distracted driving and texting and driving specific) with three types of contents (text only, image only and text and image) while their eye movements were recorded. Participants also completed a survey evaluating their self-reported texting and driving behaviours. When comparing eye-tracking results for participants who self-report texting and driving with those who do not, no significant differences were observed. Results revealed an interaction of the types of advertisements and types of content on dwell time. More precisely, when ads comprised text only, participants spent more time viewing the texting and driving ads than the other types. For the texting and driving ads, participants spent more time viewing when they comprised text only and, more time when they comprised image only than both image and text. Regardless of the type of ads, when ads comprised both text and image, participants spent more time viewing the images than the text. Since viewing behaviour did vary whether participants text and drive or not, results do not provide clues to produce more effective ads for the target audience. Nevertheless, results suggest that in order to influence young adult's attention to texting and driving prevention advertisements, text-only display would be preferable.

Keywords: Eye-tracking; Texting and driving; Public health advertisements; Young adults; Distracted driving.

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Introduction

Technology has developed rapidly influencing how many individuals rely on it. The use of cell phones has become a common necessity in people's lives. Consistent cell phone use includes keeping in contact with others through text messaging and phone calls. With this constant ability to contact others, today's society has been found to feel the pressure to stay connected (Lee, Champagne, & Francescutti, 2013). As a result of this, people now continue to converse through their cell phones in situations they may never have before. Research has shown that people have been increasingly incorporating phone conversations while conducting their day to day activities such as driving, walking, as well as bicycling (Thumser & Stahl, 2013). In particular, texting has become an increasing issue today due to individuals feeling the urge to text while driving. Texting and driving is a public health issue because when individuals use their cell phones while driving it takes their attention away from the road for sections of a time. This public health issue has caused an increasing amount of motor vehicle accidents and fatalities each year due to distracted driving from cell phone conversations, like texting and driving (Lee et al., 2013). In sum, the dependency on cell phones and frequency of texting and driving, has become a prevalent issue today.

Texting while driving can be considered a distraction because it causes the driver to balance their attention between driving and their cell phones (Llerena, Aronow, Macleod, Bard, Salzman, Greene, Haider, & Schupper, 2015). This type of divided attention reflects upon how reactive the driver can be while they are driving. These delayed reactions can be explained by "inattention blindness" that occurs when individuals text and drive (Strayer, Drews, & Johnson, 2003). Inattention blindness has been found to cause a decrease in the processing of the driver's environmental information by up to 50 percent. Thus, while texting and driving, the driver's

attention to their environment and surroundings are severely reduced. An effect like inattention blindness contributes to why texting and driving is dangerous, resulting in an increase in collision risk by 23 times (Lee et al., 2013). This increase in collision rates can be explained due to the split attention between driving and texting. Due to inattention blindness this divided attention results in lack of ability to process the driver's surroundings, putting themselves in danger as well as everyone else on the road at risk (Adeola & Gibbons, 2013).

In the same vein, there are multiple other behaviours that have been found to be affected when individuals text and drive. Texting and driving affects the performance of the driver including: the hazard response time, speed, and headway (Caird, Johnston, Willness, Asbridge, & Steel, 2014). For example, changed hazard results in the driver to have a delayed reaction while driving. These delayed reactions could result in the individual not to be as fast to avoid obstacles, such as if there were an animal in the middle of the street causing the driver to need to press their brakes all of sudden. In addition to behavioural changes when texting and driving, the physical manipulation of a cell phone and the mental effort of holding a conversation results to a decline in motor and in cognitive control (Savage, Potter, & Tatler, 2013). The behavioural changes in driving performance provide an explanation as to why there has been a 28 percent increase of vehicle crashes each year that are due to cell phone use (Rumschlag, Palumbo, Martin, Head, George, & Commissaris, 2015). Due to cell phones taking the driver's attention away from the road they can be considered a distraction while driving that can be a danger to those who are on the road.

Texting and driving has been found to affect young adults more so than older adults. Given that teens and young adults are known as the "texting generation" it is not unusual for this generation to be more affected by distractions while driving (Fofanova & Vollrath, 2011).

Research has indicated that 21 percent of fatal crashes involving young adults has been caused by texting while driving (Tucker, Pek, Morrish, & Ruf, 2015). This research indicates that young adults are one of the most susceptible groups for injuries caused by texting and driving. Research has also indicated that young adults have poor perceptual, physical and cognitive performance while driving compared to more mature drivers (Sawyer, Teo, & Mouloua, 2012). Hence, young adults lack the experience to properly adjust and to safely respond to some driving conditions (Adeola & Gibbons, 2013). Furthermore, beginner drivers also have trouble keeping their attention and have tendencies to participate in risky driving behaviours (Sawyer et al., 2012). This in combination with young adults' tendencies to text and drive makes this age group particularly at risk for collisions while driving.

In investigating how aware young adults are about texting and driving as a public health issue, research has indicated that they do know it is a dangerous behaviour (Tucker et al., 2015) Although it has been found that they are aware of the dangers, young adults also indicated that they would use their cell phone while driving if they felt that the call or text was important (Nelson, Atchley, & Little, 2009). Therefore, young adults are aware that texting and driving is dangerous, but they admit that they will still continue to do so (Tucker et al., 2015). Furthermore, even though there are laws against texting and driving in Ontario (Ministry of Transportation, 2015), research has indicated that people still tend to think they are able to balance their attention between texting and driving, especially young adults (Adeola & Gibbons, 2013). Therefore, texting while driving is especially a public health issue for today's younger generation because young adults are more susceptible to distractions behind the wheel and admit that they will continue to behave as so even though they are aware it is dangerous. This information is an indication that current prevention strategies for young adults may not be effective in changing

their behaviour. Consequently, research on how to prevent this age group from texting and driving is crucial (National Safety Council, 2010).

In current years, public health campaigns, media reports, and law proposals have been formed to restrict the use of cell phones while driving. Public health campaigns on texting and driving in particular, aim to increase the driver's public awareness that using a cell phone while driving is a dangerous act. Prevention strategies are created in hopes to deter the public from this danger, especially for young adults. Some of the prevention strategies use public health advertisements and media campaigns. There are multiple ways that public health advertisements are implemented such as advertisements on the radio, in the newspaper, in magazines, on billboards, on posters, and in pamphlets. They have been used to encourage people to fasten seatbelts (Robertson, Kelley, O'Neill, Wixom, Eiswirth, & Haddon, 1974), to quit smoking (Flay, 1987), to use contraceptives (Udry & Bauman, 1974), to "just say no" to drugs and to use condoms to protect against the spread of the AIDS virus (Backer, 1988). These types of media campaigns and public health advertisements are used because they are thought to play an important role in increasing awareness about the benefits of healthy lifestyle choices (Kahn, Ramsey, Brownson, Heath, Howze, Powell, Stone, Rajab, & Corso, 2002). Research on the effectiveness of osteoporosis awareness media campaigns reveals that print advertisements were a good way to communicate and educate about this disease (Bell, Kravitz, & Wilkes, 1999). However, little research has investigated the effectiveness of texting and driving public health advertisements, particularly on the highest-risk age groups such as young adults.

The use of advertisements by media campaigns is common today as a way to get a public message across (McQuarrie & Phillips, 2005). However, the ability to captivate attention is important with public health advertisements in order for them to prevent the actual issue

(O'Malley, Latimer, & Berenbaum, 2011). Given that each day, thousands of different advertisements compete for people's attention, the conflict becomes creating prevention advertisements on texting and driving that are interesting and would attract the most attention (McQuarrie & Phillips, 2005). Although the goal of public health advertisements is to captivate the public's attention in order to prevent people from texting and driving, there are some issues with this method of information delivery. For one, whether the advertisement has captivated attention long enough can influence their perceptions about the message (Mackenzie, 1986). Secondly, it is uncertain whether the behaviour has actually changed due to the advertisement (Ulleberg & Rundmo, 2003). This is a major issue with public health advertisements, has the advertisement captivated attention, and if so was it long enough to change the behaviour. If attention is not spent on the advertisements, the message may not get across the public as they are intended to. Therefore, it is important to explore and examine what components of an advertisement attracts the most attention in order to create the most effective type of advertisement in hopes to change the unhealthy behaviour.

There are many components to an advertisement that may influence how much attention it holds. For example, the audience's attention may be influenced by the use and types of images and text on an advertisement (Pieters & Wedel, 2004). Although these aspects of an advertisement are important in obtaining the viewer's attention, little is known about how the use of textual and pictorial information affects viewers' level of interest (Rayner, Rotello, Stewart, Keir, & Duffy, 2001). Currently, it is still uncertain if text and pictures cooperate together or compete against one another for attention (Wedel & Pieters, 2008). Research on attention to public health messages have used eye-tracking technology to examine the differences in attention to various messages. Studies by Fox, Krugman, Fletcher, & Fischer (1998); Krugman, Fox,

Fletcher, & Rojas (1994) examined the impact of images on text health warning labels on cigarette packages and beer cases. Their research indicated that warning labels that had text, attracted the attention faster and kept attention longer than other visual features. Therefore, in warning messages on cigarettes and alcohol, text-based messages are more effective than the image-based messages. However, these results may only be true to this specific type of message in this situation, and do not necessarily mean text-based messages are always most effective.

Contrary to the public health warning labels research, Pieters & Wedel (2004), examined the amount of attention people paid to text and pictures in advertisements. The study used 812 national and international brands of magazines in 71 product categories, such as airlines, alcoholic and non-alcoholic beverages, cars, cleansing products, clothing, financial products, fragrances, home entertainment, personal care, pet foods, photo equipment, real estate, restaurants, and retail stores. Their results are contradictive of the results on warning messages, finding that a picture, no matter what its size, was the most essential part of what the participants attended to on advertisements. This study also showed that if the viewers were familiar with the images source, it reduced the attention to the brand element, altogether causing an increase in attention to the text element. Thus, although the image resulted in more attention, if the image was familiar the text became attended to more. These results indicate that brand based advertisements that succeed at making people look at their brand can most likely also succeed at transferring their attention to the message of the advertisement; which has the text and the images (Pieters & Wedel, 2004). Similarly, another study found that viewers first looked at the image portion, but then migrated and stayed longer over the text portion of an advertisement (Rayner, Miller, & Rotello, 2008). This study found that when the people looked at the images and then on to the text portion, they usually did not go back and forth, they typically stayed to

one or the other. Thus, although warning labels were found to be most effective when they are text-based, research on brand based advertisements show contrary results, and are found to be more effective when they are more image based.

Similarly, to the previous research on attention to advertisements, a recent study by O'Malley and colleagues (2011) examined which aspects of public health advertisement for osteoporosis are most influential in grasping the viewer's attention, with the use of eye-tracking. In order to investigate this questions, they manipulated public health advertisements on osteoporosis to contain different content and asked participants to view them. To determine which types of advertisements attracted the most attention, the advertisements were altered to be either more text-based, image-based or to be a combination of both. Results of this study indicated that image-text format of advertisements would get the most attention. In which, they explained that it may have been caused by the complexity of their advertisements, a previous study showed that eye movements are influenced by the complexity of visual stimuli (Vlaskamp & Hooge, 2006). The study indicated that participants fixated more frequently and longer on something when it is cluttered or complicated to understand. Also, for total dwell time there were significantly more fixations on the text-only format than the image-only format. These observations similar to those of Rayner et al. (2001), which found that for dwell time on zones of the ads that were unaltered, the text region of the ads received more fixations than the image region. The lower fixation counts on the image-only format may be because viewers did not fixate on every part of an image because they could rapidly gain the message of an image from a single fixation, as information can be obtained over a wider region when viewing images compared to reading text (Castelhano & Rayner, 2008). In sum, previous research on attentional patterns to warning labels, general advertisements and public health advertisements have been

found to vary. It is possible that these variations are due to the type of message that is being presented.

The goal of the current study is to further understand which format type on public health advertisements is most successful at attracting attention for texting and driving advertisements, whether text-based, image-based or a combination of both. The varying types of advertisements used in the current study will be advertisements related to texting and driving, distracted driving (including intoxication, and eating and drinking), and general advertisements (that are unrelated to driving). The current study will also examine varying types of public advertisements in order to understand which type of advertisements attracted the most attention in young adults between the ages of 16 to 24 years old, the most susceptible age group for texting and driving. It is hypothesized that a combination of image and text advertisements will attract the most attention, as previously supported in the O'Malley, et al., (2011) study on osteoporosis public health advertisements. However, it is possible that the results from the current study could also be similar to Fox, et al., (1998); Krugman, et al., (1994) indicating that textual information attains the most amount of attention compared to image based. In relation to the type of public health advertisement that will generate the most attention, it is expected that the texting and driving and distracted driving advertisements will attract more attention. This is hypothesized because texting and driving as well as all forms of distracted driving is a more specific public health issue with the age group being examined.

Methods

Participants

Thirty participants from the Sudbury community were recruited for the current study. There were 32 participants, consisting of 23 females and nine males between the ages of 16 to 24 years old (M = 19.72; SD = 1.52). All the participants reported normal or corrected to normal vision and had a valid driver's licence. Participants were recruited through acquaintances, public advertisements throughout Laurentian University and a volunteer pool of student participants cumulated by the Cognitive Health Science Lab.

Materials

Visual stimuli

Throughout the study participants viewed three different types of public health advertisements. The advertisement conditions consisted of texting and driving, distracted driving (including intoxication, eating and drinking all while driving) or general public health advertisements that are unrelated to driving. Five advertisements were used for each of the conditions, consisting of fifteen original advertisements (see Figure 1 for an example of each type). All fifteen original advertisements were then altered to create an image only condition of the advertisements and text only condition, creating a final total of forty-five public advertisements used throughout the study (see Figure 2 for an example of the conditions). Participants viewed all of the advertisement conditions, original/unaltered, text-only and image-only in a counterbalanced order.

Figure I. Advertisement Types: Texting and Driving, Distracted Driving and General

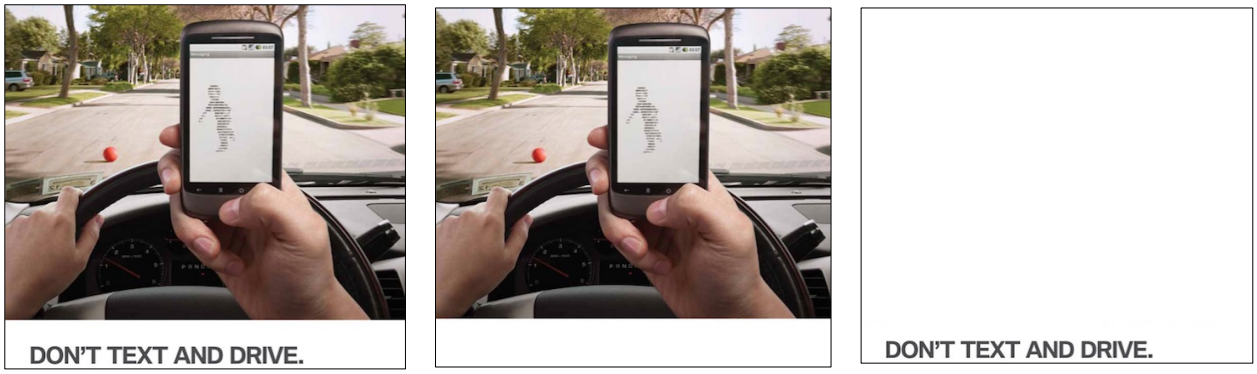

Figure II. Content Types: such as unaltered condition, image only condition and text only condition

Eye-tracking

Participants eye movements were tracked through the duration of the study while they viewed the public advertisements. Their eye movements were recorded with the SR Research Eye Link 1000 system. The system consisted of an infrared camera that tracks participants' corneal reflection. Two monitors were used, one for the participant (21" ViewSonic monitor) and the other for the experimenter. The participants monitor displayed the stimuli and the experimenter's monitor was used for the calibration process. The eye-tracking equipment also consisted of a head, and chin rest used to stabilize head movements.

Survey

After the eye-tracking portion, all participants completed a survey evaluating their perceptions and opinions on texting and driving as well as their own personal experience with it. The survey was created by Sudbury and District Health Unit (SDHU) and was administered through FluidSurveys. However, for this study the survey was administered by paper and then submitted online. The eye-tracking portion and the survey needed to be evaluated together for each participant, as to see if the advertisements encouraged a positive or a negative behaviour towards their opinions on texting and driving. The survey consisted of both open and closed ended questions. The questions evaluated whether the participants had texted and drived before, where, why and under what conditions. Throughout the survey participants were able to enter their names in a draw for a gift card worth one hundred dollars when they decided to volunteer for the study.

Procedure

The study was conducted in the Cognitive Health Science Lab at Laurentian University. Each session was between thirty and sixty minutes in length. Participants were asked to read a letter of information and to sign an informed consent form. Before the study began, participants were calibrated on the eye-tracking equipment. Participants were informed that they would be viewing multiple advertisements with an unlimited time for each image. They were told to view the advertisements like they were flipping through a magazine or through social media, and to press the left click on the mouse to move on to the next advertisement. Once completing the eye-tracking portion, the participants were seated at a different table to complete the SDHU survey. Once they completed the survey, they were finished the experiment and were debriefed.

Data analysis

Eye movement measures were coded using the Eyelink Data viewer software. This program presents the advertisements and superimposes the position of all fixations onto them. Eye movement measures of interests for the present study are dwell time spent on the text and the image for each advertisement conditions (Roy-Charland, Saint-Aubin, & Evans, 2007). Eye-tracking variables that will be measured are: mean dwelling time on each of the whole advertisements as well as dwell time on specific zones on the ads (e.g. image zones and text zones). ANOVAs were used to compare differences in attention across advertisement types and content. Correlations were also used to compare texting and driving self-report behaviour to eye-tracking results. For all analyses, an alpha level of .05 was used, unless otherwise indicated.

Results

Total dwell time

Table 1 presents the means and standard deviations for total dwell time as a function of ad type (distracted driving, general and texting and driving) as well as type of content (text only, image only and text and image). A 3 X 3 repeated-measures ANOVA with ad type and content type as within-subjects variables was computed on total dwell time. Results revealed a main effect ad type, $F(2, 62) = 33.37$, $\eta^2_p = .52$, $p < .001$, a main effect of content type, $F(2, 62) = 10.76$, $\eta^2_p = .26$, $p < .001$, and a significant interaction, $F(4, 124) = 30.75$, $\eta^2_p = .50$, $p < .001$. Simple ANOVAs were computed to decompose the significant interaction. Dunn's correction was applied to alpha levels. Thus, to be considered significant alpha needed to be smaller than .025. More precisely, for ad comprising text and image and image only, results revealed a significant effect of ad type, respectively, $F(2, 62) = 48.71$, $\eta^2_p = .61$, $p < .001$; $F(2, 62) = 51.40$, $\eta^2_p = .62$, $p < .001$. Post hoc texts (LSD) revealed that participants spent more time on the general ads than texting and driving ads and more time on texting and driving ads than distracted

driving ads, both for ads comprising text and images and image only. For ads comprising text only, results revealed a significant effect of ad type, $F(2, 62) = 11.73$, $\eta^2_p = .27$, $p < .001$. However, post hoc texts (LSD) revealed that participants spent more time on the texting and driving ads than the other two types of ads that did not differ significantly between each other. For distracted driving ads, results revealed a significant effect of content type, $F(2, 62) = 6.35$, $\eta^2_p = .17$, $p < .004$. Post hoc tests (LSD) revealed that participants spent more time on text only ads than text and image ads. No other difference was significant. For general ads, results revealed a significant effect of content type, $F(2, 62) = 58.87$, $\eta^2_p = .66$, $p < .001$. Post hoc tests (LSD) revealed that participants spent more time on image only ads than text and image and more on text and image than text only ads. For texting and driving ads, results revealed a significant effect of content type, $F(2, 62) = 18.38$, $\eta^2_p = .37$, $p < .001$. Post hoc tests (LSD) revealed that participants spent more time on text only ads than image only ads and more time on image only than text and image ads.

Table I

Means and standard deviations for total dwell time on advertisement types as a function of content type

	Advertisement Types					
	Texting and Driving		Distracted Driving		General	
Content Type	M	SD	M	SD	M	SD
Text Only	4547	1376	3529	1507	2980	1005
Image Only	3760	990	2887	843	5467	1076
Text and Image	2996	795	2562	654	4646	1131

Dwell time on text and image zones

For ads that contain image and text, analyses were conducted on the dwell time spent in each of these zones (text vs. image) as a function of ad type (distracted driving, general and texting and driving). Means and standard deviations are presented in Table 2. A 2 X 3 repeated-

measures ANOVA with zone and ad type as within-subjects variables was computed on dwell time. Results revealed a main effect ad type, $F(2, 62) = 33.34$, $\eta^2_p = .52$, $p < .001$, a main effect of zone, $F(1, 31) = 296.34$, $\eta^2_p = .91$, $p < .001$, and a significant interaction, $F(2, 62) = 20.04$, $\eta^2_p = .39$, $p < .001$. Simple ANOVAs were computed to decompose the significant interaction. Dunn's correction was applied to alpha levels. Thus, to be considered significant alpha needed to be smaller than .03. More precisely, for all types of ads (respectively, distracted driving, general and texting and driving) participants spent more time on images than text, $F(1, 31) = 79.85$, $\eta^2_p = .72$, $p < .001$; $F(1, 31) = 209.37$, $\eta^2_p = .87$, $p < .001$; $F(1, 31) = 46.90$, $\eta^2_p = .60$, $p < .001$. For the image zone and text zone, respectively, results revealed differences between types of ads, $F(2, 62) = 38.10$, $\eta^2_p = .55$, $p < .001$; $F(2, 62) = 8.30$, $\eta^2_p = .21$, $p < .002$. Post hoc tests (LSD) revealed that participants spent more time on the image and text for general ads that the other two types that did not differ significantly.

Table II

Means and standard deviations for total dwell time on advertisement type as a function of image and text zone

	Advertisement Types					
	Texting and Driving		Distracted Driving		General	
Content Zone	M	SD	M	SD	M	SD
Text Zone	1152	463	967	545	1535	602
Image Zone	2194	771	2144	687	3753	1124

Total dwell time on texting and driving ads

For texting and driving ads, analyses were conducted on the total dwell time as a function of self-reported texting and driving behaviours (does text and drive vs. doesn't text and drive) as a function of ad content (text only, image only and text and image). Means and standard deviations are presented in Table 3. A 2 X 3 mixed-design ANOVA with texting behaviours as a between-subjects variable and ad content as within-subjects variable was computed on total

dwell time. Results revealed a main effect content type, $F(2, 60) = 17.91$, $\eta^2_p = .37$, $p < .001$, but no effect of texting behaviour, $F(1, 30) = 0.19$, $\eta^2_p = .006$, $p = .67$, or interaction $F(2, 60) = 0.21$, $\eta^2_p = .007$, $p = .81$. As previously mentioned, post hoc tests (LSD) revealed that participants spent more time on text only ads than image only and more on image only than image and text ads.

Table III

Means and standard deviations for total dwell time on advertisement types types as a function of self-report texting and driving behavior

	Advertisement Types					
	Texting and Driving		Distracted Driving		General	
Behaviours	M	SD	M	SD	M	SD
Texters	4397	1495	2993	1063	3754	1144
Non-texters	4696	1276	2999	418	3765	848

Discussion

The objective of the current study was to examine which format and content types of public health advertisements are most successful at attracting youths' attention. Specifically, the current study directly examined youth's perceptions on texting and driving advertisements in order to determine which presentation method was most successful at attracting and maintaining their attention. Young adults were used in the current study because they have been found to be the population most at risk for texting and driving (Fofanova & Vollrath, 2011). Therefore, studying young adults is especially important in order to indicate which advertisement prevention methods works best for them. In order for public health advertisements to be successful, they must maintain attention long enough to convey the message that is meant to get across (McQuarrie & Phillips, 2005; O'Malley, et al., 2011). In determining which advertisement content type was most effective at attracting attention, participants viewed varying public health advertisements (general, distracted driving and texting and driving) that were altered to contain

either text only, image only, or altered with both information. Throughout the study, all the participants viewed the advertisements while their eye-movements were tracked in order to determine which advertisement type and content type was best at attracting attention the longest. Furthermore, the participants completed a self-report survey on their texting and driving behaviours in order to determine if texters and non-texters differ in their viewing and attentional patterns, therefore future advertisements could be specifically made to target them.

In examining total dwell time on advertisements types (distracted driving, general and texting and driving), as well as total dwell time on types of content (text only, image only and image-text), it is possible to determine which advertisements and which content resulted in the most attention. Results revealed that the ads containing image-text and image only resulted in more time spent on the general advertisements, followed by the texting and driving advertisements, and then distracted driving ads. Therefore, the general advertisements examined in this study, using both image only was the most successful strategy for maintaining attention. Furthermore, for overall content type, the advertisements containing text only information resulted in participants spending most time on the texting and driving advertisements, followed by the other two types of advertisements. However, on the distracted driving advertisements, although they did spend the most amount of time on the image content, participants spent more time on text only content than the image-text ads. Therefore, due to the amount of time spent on the text only content for texting and driving and distracted driving advertisements in comparison to when both text and image were provided, it is evident that when given just textual information young adults spend more time reading the message whereas when the image is also provided dwell time decreases, presumably causing the entire text not to be read. Nevertheless, when examining content effects on the general ads, participants continued to spend more time on

image only content than text and image content and least amount of time on text only content. Thus, the results for content types differ depending on the advertisement message that is being conveyed. Specifically, for the importance of this study texting and driving advertisements were found to be most effective in conveying attention in young adults when they were viewing a text only message.

The results from the current study indicating that text only message on advertisements are best for having young adults attend to texting and driving advertisements can be supported with previous research by Fox et al. (1998) and Krugman et al. (1994). In examining attention to image or text based warning labels on alcohol beverages and cigarette packages with eye-tracking Fox et al. (1998) and Krugman et al. (1994) discovered that text-based messages resulted in the most amount of attention in comparison to image based. However, the results from the current study are contradictive to the results by O'Malley et al. (2011) indicating that on osteoporosis public health advertisements image and text ads attracted the most attention. Thus, it is evident through these contradicting results that the best type of content for advertisements is very specific to the type of message that is being presented. As for why the current study may have similar results to Fox et al. (1998) and Krugman et al., (1994) it is possible that the type of message that the warning labels conveyed may have been more alarming in nature, unlike the osteoporosis adds by O'Malley et al., (2011). Therefore, it is possible that the texting and driving advertisements were similar to the warning labels at conveying an alarming message. Furthermore, although the O'Malley (2011) study did consist of public health advertisements, the advertisement themselves may not have been similar enough to the texting and driving advertisements. The osteoporosis advertisements resulted in similar attentional patterns as the general advertisements in the current study. Many of the general advertisements in the current

study consisted of reminders for healthy lifestyles (for example smoke-free environment), which would be similar to the message conveyed by the osteoporosis advertisements directed towards women.

In further examinations on amount of dwell time spent on zones (text vs. image) on advertisements that were unaltered (image and text) as a function of advertisement types, overall participants spent more time on images than text. Additionally, for the image zone and text zone results revealed that participants spent more time on general advertisements than the other two types of advertisement. From these results, it is indicated that the images cause the participants to withdraw their attention from the text in order to attend to the image. Therefore, the current study exemplified that images can be a distraction when advertisements have image and text information combined. Hence, images in the current study were found to deplete attention, contrary to what O'Malley et al., (2011) had found. From the results of the current study, it is evident that the best prevention advertisements content in conveying young adults' attention on texting and driving advertisements should contain only text information.

In addition, correlation analyses were conducted on attentional patterns in viewing the advertisements depending on texting and driving behaviour (texters vs. non-texters) as obtained from the self-report survey. These correlations were conducted in hopes to indicate the most useful prevention advertisements for young adults who text and drive. However, in comparing the eye-tracking results for texters and non-texters no significant relationship was made. Therefore, whether an individual is a texter or a non-texter the prevention advertisements should be text-based in order to attract the most attention.

To summarize, the purpose of this study was to find out which content types on public health advertisements are most successful at attracting youths' attention for texting and driving

advertisements. This study was specifically examining young adults as they are the most susceptible age group for this behaviour (Fofanova & Vollrath, 2011; Tucker, et al., 2015). The results of this study, indicated that text-based advertisements were most effective at attracting attention for the prevention advertisement of the texting and driving public health issue. As young adults have poor perceptual, physical and cognitive performance while driving (Sawyer, et al., 2012) it is important to create successful prevention advertisements. Young adults also lack the experience to properly adjust and to safely respond to some driving conditions (Adeola & Gibbons, 2013). Therefore, especially for advertisements on billboards on the side of the roads or on the highways, it is important for them to only contain clear textual messages.

Limitations

The current study was not without limitations. A main limitation of this study is that the advertisements were targeted toward young adults of a specific demographic and, consequently, the observations may not draw varying types of people who could benefit from texting and driving prevention advertisements. Furthermore, another limitation is that the text and images differed in terms of proportion and size. This could be a possible issue because the variables are not totally consistent across the experiments. Therefore, size differences may have influenced the observed differences in the experiment. In addition, there were also variations in font type across all advertisements, to increase internal validity, future research should replicate our study findings controlling for advertisement characteristics. Finally, another limitation is that the sample consisted of an unbalanced gender representation. This is due to the sampling pool recruited in undergraduate psychology classes, which are constituted of a majority of females. It is difficult to make any gender comparisons due to the small male population. Although, this is the first study to examine attention to texting and driving advertisements and the current results

provided a possible answer to which future advertisement types would be the most effective at attracting attention. Future research should further investigate what types of text-based information attract the most attention, for example a statistics-based message or an emotional message.

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