



BSc in Psychology

The Emotional Impact of Tobacco-Warning Images for Icelandic Smokeless Tobacco

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Foreword

Submitted in partial fulfilment of the requirements of the BSc psychology degree, Reykjavik University, this thesis is presented in the style of an article for submission to a peer-reviewed journal.

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Abstract

Millions of people all over the world are addicted to smokeless tobacco, and the use of smokeless tobacco is growing in many countries, especially among young individuals. The tobacco industry has used both advertisements and mass media for years to encourage the use of tobacco and affect people's consumption of tobacco products. The objective of the present study was to identify the emotional effects of TWIs on a container of Icelandic smokeless tobacco on users or non-users of smokeless tobacco; more specifically, to identify the emotional responses elicited by TWIs (with and without a warning text) in users, if placed on the side of the container (smaller-sized TWIs), compared with a positioning on the lid of the container (larger-sized TWIs). The participants observed four sets of TWIs. Furthermore, 18 images from the International Affective Picture System were displayed as comparison stimuli and to minimize the influence of habituation. Self-Assessment Manikins were used to assess valence, arousal, and dominance dimensions. The results showed that larger-sized TWIs evoked more unsettling emotions, more arousal, and less dominance compared to smaller-sized TWIs. Furthermore, the results suggest that larger-sized TWIs may be sufficiently large to provoke negative emotions and avoidant behavior in users and non-users of smokeless tobacco.

Keywords: smokeless tobacco, Tobacco-Warning Images (TWIs), valence, arousal, dominance.

Útdráttur

Milljónir einstaklinga í heiminum eru háðir reyklauðu tóbaki og neysla þess er að aukast í mörgum löndum, sérstaklega á meðal ungra einstaklinga. Árum saman hefur tóbaksíðnaðurinn notað bæði auglýsingar og fjölmiðla bæði til að stuðla að neyslu tóbaks og til að hafa áhrif á notkun einstaklinga á tóbaki. Markmið þessarar rannsóknar var að greina tilfinningaleg áhrif tóbaksvarnar mynda, á íslensum neftóbaks dollum, á einstaklinga sem neyta reyklauðu tóbaks og einstaklinga sem gera það ekki. Þá sérstaklega að greina áhrifin eftir því hvort myndirnar voru staðsettar æa hlið dollunnar (minni mynd), samanborið við lokið á dollunni (stærri mynd). Þátttakendur virtu fyrir sér fjögur sett af tóbaks-varnar myndum. Auk þess voru 18 myndir frá International Affective Picture System sýndar sem samanburðar áreiti og til að koma í veg fyrir viðvönun. Self-Assessment Manikins voru notaðar til að meta víddir fyrir hamingju, örvun og tilfinningastjórn. Niðurstöðurnar sýndu að stærri tóbaksvarnar myndir vöktu upp óþægilegri tilfinningar, meiri örvun, og minni tilfinningastjórnun samanborið við minni tóbaksvarnar myndirnar. Jafnframt gefa niðurstöðurnar til kynna að stærri tóbaksvarnar myndir séu nógu stórar til að kalla fram neikvæðar tilfinningar og forðunar hegðun bæði hjá neytendum reyklauðu tóbaks og þeirra sem neyta þess ekki.

Efnisorð: reyklaust tóbak, tóbaks-varnar myndir, hamingja, örvun, tilfinningastjórn.

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The Emotional Impact of Tobacco-Warning Images for Icelandic Smokeless Tobacco

Millions of people all over the world are addicted to smokeless tobacco, and the use of smokeless tobacco is growing in many countries, especially among young individuals (Cogliano et al., 2004; Lilja Sigrún Jónsdóttir & Viðar Jensson, 2012, 2016). ‘Smokeless tobacco’ denotes types of tobacco products used without burning; they are generally chewed, sucked, placed between the lip and the gum, or sniffed through the nose (Al-hebshi, Alharbi, Mahri, & Chen, 2017). There are various types of smokeless tobacco around the world; however, all smokeless tobacco products are effective nicotine distribution vehicles that lead to tobacco dependency (Hecht et al., 2007). Although less harmful than smoking cigarettes (Accortt, Waterbor, Beall, & Howard, 2002; Foulds, Ramstrom, Burke, & Fagerström, 2003; Gartner et al., 2007; Huhtasaari, Asplund, Lundberg, Stegmayr, & Wester, 1992), smokeless tobacco products may cause serious diseases that can lead to death (Roosaar, Johansson, Sandborgh-Englund, Axéll, & Nyrén, 2008). Smokeless tobacco consumption is accompanied by various health risks and the level of risk is subject to the type, consumption, and manner of utilization of the products (Andersson, Björnberg, & Curvall, 1994). The predominant disease states associated with smokeless tobacco are oral cancer (Roosaar et al., 2008), pancreatic cancer (Alguacil & Silverman, 2004; Boffetta, Aagnes, Weiderpass, & Andersen, 2005; Boffetta, Hecht, Gray, Gupta, & Straif, 2008; Luo et al., 2007), and esophageal cancer (Boffetta et al., 2008). Some studies have indicated enhanced risk factors for cardiovascular disease (Ashley et al., 2008; Boffetta & Straif, 2009; Connolly et al., 2009). Furthermore, use of smokeless tobacco leads to enhanced rates of gum recession (Andersson & Axéll, 1989), gum inflammation (Hatsukami & Severson, 1999), periodontal alveolar bone loss (Cullen et al., 1986), damage to the oral tissue and advanced periodontal destruction (Brubaker & Mitby, 1990; Ekfeldt, Hugoson, Bergendal, & Helkimo, 1990; Hirsch, Livian, Edward, & Noren, 1991; Johansson, Tidehag, Lundberg, & Hallmans, 1994).

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Moreover, it is evident that smokeless tobacco use causes enhanced heart rate and blood pressure (Westman, 1995), premature birth, and preeclampsia (England et al., 2003, 2010), diabetes, and metabolic syndromes (e.g., impotence) (Norberg, Stenlund, Lindahl, Boman, & Weinehall, 2006).

The tobacco industry has used both advertisements and mass media for years to encourage the use of tobacco and affect people's consumption of tobacco products (Wakefield, Flay, Nichter, & Giovino, 2003). It is well recognized that emotions can play a critical role in increasing the effectiveness of advertisements across a range of merchandise categories and market states (MacInnis, Rao, & Weiss, 2002). Tobacco product packaging is an important marketing tool for the tobacco industry with its multifunctioning tasks, such as drawing attention, characterizing the product and assisting to make the sale (Slade, 1997). Therefore the tobacco industry has, for example, made tobacco packages more attractive (Wakefield, Morley, Horan, & Cummings, 2002). In addition to strengthening the attraction of the brand and serving different types of marketing, packaging can likewise provide comfort to health-apprehensive tobacco users (Bansal-Travers, Hammond, Smith, & Cummings, 2011).

Whilst tobacco product packaging constitutes a major portion of marketing attempts to make tobacco use attractive (Moodie & Hastings, 2010), regulators can use the same packaging to convey the health effects of tobacco products to tobacco users (Centers for Disease Control and Prevention (CDC), 2009). Since the 1980s, various legislative initiatives have been used to inhibit the consumption of tobacco by the public (Muñoz et al., 2013). The objective has been to place a certain restraint on the tobacco market as well as to manage the labeling of tobacco products (Aftab, Kolben, & Lurie, 1999). In 2005 the World Health Organization (WHO) created the Framework Convention on Tobacco Control (FCTC), which is designed to strengthen national and international commitment to fight the tobacco endemic

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(Hammond, 2011). The WHO FCTC requires that tobacco warnings occupy a minimum of 30% of the visible area of the tobacco package (Hammond et al., 2007). Health warnings on tobacco packages have arisen as an important outlet for informing consumers about the health effects of tobacco use to individuals (Hammond, 2011). Warning texts and tobacco-warning images (TWIs) have been used to encourage the decision to quit, enlighten smokers about the health effects of smoking, and provide information on support for cessation (O'Hegarty, Pederson, Asman, Malarcher, & Kruger, 2013). Studies have found that graphic health warnings on cigarette packages are significantly associated with enhanced awareness about the health risk of smoking as well as with changes in behavior (Awaisu, Hagi, Ashour, & Kheir, 2013). However, the efficacy of these warnings hinges on their size, location and design, and varies considerably across regions (Gantiva et al., 2016; Hammond et al., 2007)

Using emotions in a reinforcement paradigm, along with the concept of direct and indirect inducements of these emotional states, can open up many new opportunities for the advertiser (Mizerski & White, 1986). Numerous studies have examined the emotional influence of TWIs (Gantiva et al., 2016; Hammond, 2011). Studies have found, for example, that graphic TWIs elicit more negative emotions from smokers than text-only warnings (Borland et al., 2009; Evans et al., 2017; Kees, Burton, Andrews, & Kozup, 2010; Noar et al., 2016). Additionally, studies have found that larger TWIs are significantly more efficient than smaller ones (Bansal-Travers et al., 2011; Fong, Hammond, & Hitchman, 2009; Germain, Wakefield, & Durkin, 2010; Hammond et al., 2007).

One reliable approach to examine emotions is the Affective Image Visualization Paradigm (Lang, Greenwald, Bradley, & Hamm, 1993). This depends on the idea of emotions as a propensity to action, beginning with the initiation of either the appetitive or defensive motivational framework (Lang, 1995). This model suggests that emotional experience comprises three pervasive dimensions: valence (pleasant/unpleasant) which reflects the

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motivational direction of behavior, arousal (low/high intensity) which reflects the response intensity, and dominance (low/high control) which is identified with the sense of control or level of power over the emotion (Lang & Bradley, 2010; Lang et al., 1993; Muñoz et al., 2010). Studies have shown that pleasant images elicit high levels of arousal and are accompanied by approach behaviors. Unpleasant images elicit high levels of arousal as well but are accompanied by avoidance behaviors. Neutral images elicit low levels of arousal and no behavioral propensity (Lang, 2010; Lang & Bradley, 2010). Likewise, unpleasant and highly arousing images result in low levels of dominance, and pleasant images result in higher levels of dominance (Bradley, Codispoti, Cuthbert, & Lang, 2001).

Gantiva et al. (2016) executed a study with the aim of identifying the effects of cigarette package brand presentation on the emotional influence of TWIs that covered 30% of the package. Their results were that cigarette package brand presentation diminished the levels of aversion and arousal that were elicited by the TWIs and increased the perception of emotional control among smokers. Furthermore, their results indicated that the minimum size of TWIs (30%) (Hammond et al., 2007) was inadequate to accomplish the objective of eliciting avoidance behavior because the image must contend with the visual properties of the other 70% of the package, which is styled to catch attention and is visually engaging. These findings indicate that the emotional effects of TWIs that cover 30% of cigarette packs might, therefore, be more prominent in non-smokers than in smokers, which can result in a weakening of the desire to start smoking.

In contrast to the extensive evidence on the effectiveness of TWIs for cigarettes (Hammond, 2011), there is less evidence on the influence and effectiveness of TWIs for smokeless tobacco (Callery, Hammond, O'Connor, & Fong, 2011). Given that smokeless tobacco products have different contents, consumption patterns and health influences, it is largely unknown whether TWIs on smokeless tobacco products would have greater or lesser

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effect than TWIs on cigarette products (Callery et al., 2011).

The objective of the present study was to identify the emotional effects of TWIs on a container of Icelandic smokeless tobacco on users or non-users of smokeless tobacco; more specifically, to identify the emotional responses elicited by TWIs (with and without a warning text) in users, if placed on the side of the container (smaller-sized TWIs), compared with a positioning on the lid of the container (larger-sized TWIs).

Method

Participants

Sixty-nine students from Reykjavik University (41 males and 28 females), ranging in age from 19 to 35 years old, were selected by purposive sampling to participate in the experiment. Participants were divided into two groups; smokeless tobacco users ($n = 48$, 19-35 years, $M = 23.92$ years, $SD = 2.82$ years) and non-users of smokeless tobacco ($n = 21$, 19-35 years, $M = 24.65$ years, $SD = 2.76$ years), $t(66) = 0.98$, $p = .33$. The majority of the smokeless tobacco user group (65.31%) reported using smokeless tobacco daily while 34.69% of the group reported using smokeless tobacco less than daily. Of all the smokeless tobacco users, 78.10% had used smokeless tobacco in the two hours before participating in the experiment. In this sample, men (85.40%) were more likely to use smokeless tobacco than women (48.10%), $\chi^2(1, N = 68) = 10.86$, $p = .001$.

Stimuli

Four TWIs with and without text warnings (i.e., oral and esophageal cancer, teeth and gum damage, premature birth, and impotence) were used that were soon to be a part of the Icelandic tobacco control campaign against smoking tobacco, thus assuring that participants had not seen them before. Each of the TWIs was presented in four versions: (1) large, with text warnings, on the lid of the smokeless tobacco container, (2) large, without text warnings, on the lid of the smokeless tobacco container, (3) small, with text warnings, on the side of the

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smokeless tobacco container, and (4) small, without text warnings, on the side of the smokeless tobacco container. All versions of the TWIs were presented in the form of photographs of a real Icelandic plastic smokeless tobacco container of the same size (with a height of 10 cm on a 19" DELL monitor). Additionally, two images of a plain Icelandic smokeless tobacco container (one showing the lid, the other showing the side) were presented. Furthermore, 18 colored images were selected (six pleasant, six neutral, and six unpleasant) from the International Affective Picture System (IAPS; image codes 2057, 2095, 2205, 2274, 2347, 4645, 6520, 7009, 7026, 7041, 7052, 7061, 7080, 7405, 9904, 8021, 9163, and 9927). These 18 images were used as comparison stimuli, and to minimize the influence of habituation to the TWIs. In selecting the IAPS images, the intention was to have similar arousal ratings for pleasant and unpleasant images ($p = .425$). The IAPS images were all presented in their authentic layout and without the Icelandic smokeless tobacco container.

Measures

The Self-Assessment Manikin (SAM) (Bradley & Lang, 1994) was used to evaluate the emotional effects of the TWIs and the IAPS images. The SAM is a figure-oriented non-verbal measure of emotions (valence, arousal, and dominance) that in this study consisted of three 9-point rating scales for each dimension (Bradley & Lang, 1994; Gantiva et al., 2016). It ranges from a smiling, happy figure to a frowning, unhappy figure, when representing the valence scale. The SAM ranges from an excited, wide-eyed figure to a relaxed, sleepy figure, for the arousal dimension. For the dominance scale, the SAM ranges from a large figure (in control) to a small figure (dominated). Participants selected any of the 9 figures comprising each scale when evaluating the emotional influence of the TWIs and the IAPS images, in which figure 9 represents a high rating in each dimension (i.e., high valence, high arousal, high dominance), and figure 1 represents a low rating on each dimension (i.e., low valence, low arousal, low dominance) (Lang, Bradley, & Cuthbert, 1997). It has been shown that the

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SAM is a reliable measure to evaluate the emotional impact of TWIs (Gantiva et al., 2016; Muñoz et al., 2013; Nascimento et al., 2008). Participants were additionally asked to indicate how long it had been since they last used smokeless tobacco.

Procedure

The experiment was conducted in May 2017, in a small laboratory room in Reykjavik University. Seven tables (80 x 80 cm) were placed in rows up against the walls of the room, spaced one meter apart. On each table, there was a 19" DELL monitor, a keyboard, and a pen. No more than seven participants performed the experiment simultaneously. The experiment was run in Microsoft PowerPoint, which controlled the timing of the stimulus presentation. Participants were instructed that a series of images would be presented on a computer screen and that they would have to rate each image using the SAM figures in a booklet placed on the table in front of them. Participants were also informed that each image would be displayed on the monitor for 6 seconds, and that they should look at the slide for the entire period during which it was displayed.

The procedure for each session was as follows: Participants entered the laboratory room at the same time and took a seat in front of a computer screen. They were instructed to read the instructions on the experiment and how to use the SAM figures; the instructions were placed on the table in front of them. Following a practice session, in which three IAPS images (image codes 7010, 8496, and 9421) were used to ensure that participants were capable of using the SAM scales, they were asked to evaluate the 36 images. Each trial consisted of three parts: A slide instructed participants to get ready to evaluate an image (3 seconds), the image was displayed for 6 seconds and the participants were given 15 seconds to rate the image using the SAM scale.

Two different semi-randomized image presentations were used to avoid influence from the presentation order. Each presentation contained the same set of 36 images (four

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TWIs, small, or large, with or without warning texts, two images of a plain smokeless tobacco container, and 18 IAPS images). The images were randomized with the constraint that images in the same image category were not presented consecutively.

Statistical Analysis

A mixed analysis of variance (ANOVA) was used to assess the emotional impact of the TWIs (with and without a warning text) in users and non-users of smokeless tobacco. A 2x2x2x5 design was carried out with gender, stimulus order, and users and non-users of smokeless tobacco as between-subject factors, and images (smaller-sized TWIs, large-sized TWIs, pleasant images, neutral images, and unpleasant images) as the within-subject factors. The Greenhouse-Geisser correction was applied when the assumption of sphericity was not met. A post hoc pairwise comparison was performed using Bonferroni correction. The level of significance was set at $p < .05$ for all analyses, and the effect size (η^2_p) was reported. All of the statistical analyses were executed using IBM SPSS Statistics 24.0 software.

Results

Emotional Dimensions

Valence

For the valence dimension, there was a significant main effect of image, $F(2.04, 122.38) = 188.66, p < .001, \eta^2_p = .76$. Significant differences were found between pleasant, neutral, and unpleasant images (all $p < .001$). The smaller-sized TWIs that were placed on the side of the container were perceived as less aversive than the larger-sized TWIs that were placed on the lid of the container ($p < .001$) (Figure 1), and less aversive than the unpleasant images ($p = .003$). The smaller-sized TWIs were perceived as more aversive than both the pleasant images ($p < .001$), and the neutral images ($p < .001$). Similarly, larger-sized TWIs were perceived as more aversive than both the pleasant images ($p < .001$) and the neutral images ($p < .001$). No differences were found however, between the larger-sized TWIs and

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the unpleasant images ($p = .620$). No other significant main effects or interactions were found.

Arousal

For the arousal dimension, there was a significant main effect of image, $F(1.15, 129.18) = 11.83, p < .001, \eta^2_p = .17$. Pleasant and unpleasant images were perceived as more arousing than neutral images (both $p < .003$), and there was no difference between pleasant and unpleasant images ($p = .225$). The smaller-sized TWIs were perceived as less arousing than the larger-sized TWIs ($p = .041$) (Figure 1) and the unpleasant images ($p = .036$), but more arousing than the neutral images ($p = .002$). The smaller-sized TWIs were perceived as generating the same degree of arousal as the pleasant images ($p = 1.000$). The larger-sized TWIs were perceived as more arousing than the neutral images ($p < .001$) with no difference between the larger-sized TWIs and the pleasant and unpleasant images (both $p > .05$). No other significant main effects or interactions were found.

Dominance

For the dominance dimension, there was a significant main effect of image, $F(2.50, 150.18) = 83.27, p < .001, \eta^2_p = .58$. The unpleasant images had lower dominance ratings compared with the pleasant and neutral images (both $p < .001$). No difference was found, however, between the pleasant and neutral images ($p = .092$). The smaller-sized TWIs had higher dominance ratings than the larger-sized TWIs and the unpleasant images (both $p < .001$). The larger-sized TWIs had lower dominance ratings than the pleasant and neutral images (both $p < .001$). However, there was no difference between the larger-sized TWIs dominance ratings and the ratings for the unpleasant images ($p = .076$). Additionally, there was a significant main effect of gender, $F(1,60) = 4.25, p = .044, \eta^2_p = .07$, in which men gave lower dominance score than women. No other significant main effects or interactions were found.

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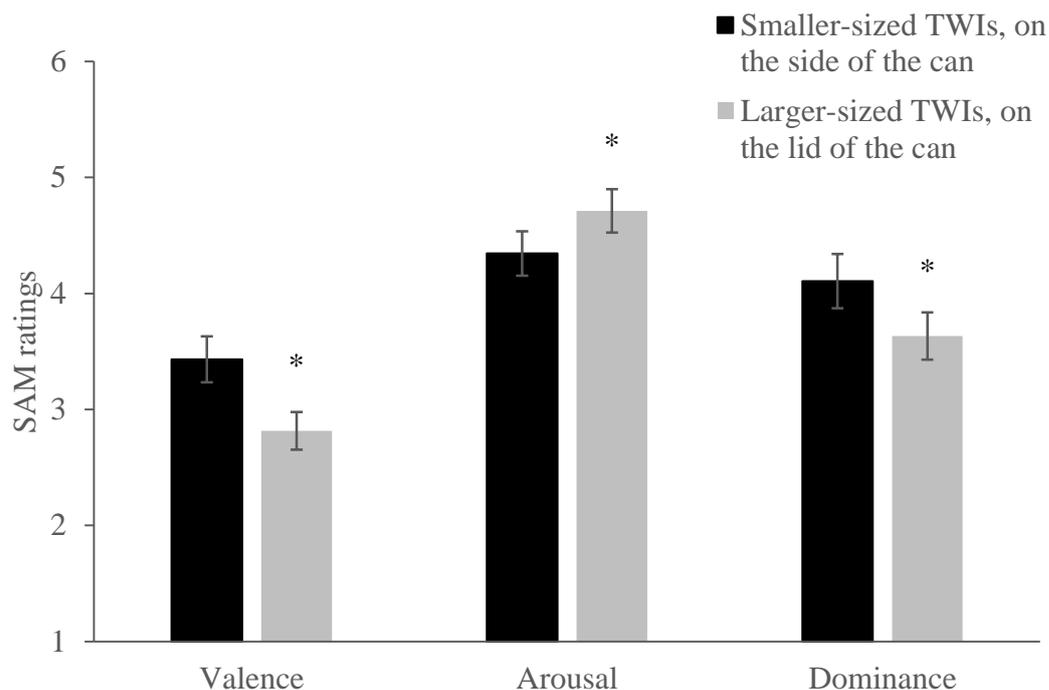


Figure 1. Emotional reaction to smaller-sized TWIs compared to larger-sized TWIs. Bars illustrate the standard error of the mean. * $p < .05$.

Discussion

The objective of the present study was to identify the emotional effects of TWIs on a container of Icelandic smokeless tobacco on users or non-users of smokeless tobacco; more specifically, to identify the emotional effects of TWIs placed on the side of the container (smaller-sized TWIs) compared with those placed on the lid of the container (larger-sized TWIs). The results showed that larger-sized TWIs evoked more unsettling emotions, more arousal, and less dominance compared with smaller-sized TWIs. These emotions were perceived both in users of smokeless tobacco and non-users of smokeless tobacco. These results are consistent with previous studies that found that larger-sized TWIs were significantly more efficient than smaller-sized TWIs (Bansal-Travers et al., 2011; Fong et al., 2009; Germain et al., 2010; Hammond et al., 2007).

Previous studies have shown that pleasant images elicit high arousal and approach

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behaviors. Furthermore, unpleasant images elicit high arousal as well, but with avoidance behaviors. Neutral images elicit low arousal and no behavior propensity (Lang, 2010; Lang & Bradley, 2010). The results of the current study are in line with previous results. Pleasant images were perceived as highly arousing, and unpleasant images were perceived more arousing compared to pleasant images. Neutral images were perceived lower in arousal compared to both pleasant and unpleasant images. In addition, the results showed that both unpleasant images and TWIs were associated with low levels of dominance, and pleasant images were associated with higher levels of dominance. These results are consistent with previous research that found that low levels of dominance were followed in exposure to both unpleasant and highly arousing images, and pleasant images associated with higher levels of dominance (Bradley et al., 2001).

In the reporting of the valence dimension, no differences were found between how the larger-sized TWIs and the unpleasant images were perceived. However, differences were found between smaller-sized TWIs and the unpleasant images, where the former were perceived as less aversive. No differences were found between larger-sized TWIs and both the pleasant and unpleasant images, in reporting of the arousal dimension. Differences between smaller-sized TWIs and the unpleasant images were found in reporting of the arousal dimension; however, no differences were found between smaller-sized TWIs and the pleasant images. In reporting of the dominance dimension, no differences were found between the larger-sized TWIs and the unpleasant images. These results are consistent with previous studies that found that unpleasant and highly arousing images were accompanied by low levels of dominance (Bradley et al., 2001; Gantiva et al., 2016). However, differences were found in the levels of dominance reported by participants on exposure to the smaller-sized TWIs and the unpleasant images.

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The results of the present study suggest that smaller-sized TWIs placed on the side of the smokeless tobacco container are ineffective in terms of the aim of eliciting avoidant behavior. These results are in line with Gantiva et al. (2016), where the results suggested that the minimum size of TWIs (covering 30% of cigarette packages) was not sufficient to achieve the aim of eliciting avoidant behavior. However, larger-sized TWIs, such as those used in the present study, may be sufficiently large to elicit negative emotions and avoidant behavior in users and non-users of smokeless tobacco. This suggests that placing larger-sized TWIs on the lids of the smokeless tobacco containers could discourage individuals from using smokeless tobacco. Furthermore, placing larger-sized TWIs, with warning text, on the lids of the smokeless tobacco containers, may have greater effects on provoking avoidant behavior as well as evoking negative emotions toward the use of smokeless tobacco.

Limitations

The present study has several limitations. First, the sample consisted exclusively of university students from the age of 19 to 32. Similar studies should be conducted with a larger sample that does not solely consist of university students. Nonetheless, previous studies have shown that the majority of smokeless tobacco users in Iceland are males between 18 to 34 years old, and that the use of smokeless tobacco in Iceland amongst females is infrequent (Lilja Sigrún Jónsdóttir & Viðar Jensson, 2012, 2016). The results showed a significant main effect of gender in which men gave lower dominance scores than women, which could indicate inflated impact of the TWIs on dominance even though the model was adjusted for gender.

Second, participants in this study, evaluated TWIs with and without a warning text, instead of only evaluating TWIs without a warning text as is commonly seen in research on the emotional impact of TWIs on smoking (e.g. Gantiva et al., 2016; Muñoz et al., 2013). Recent studies have shown that graphic TWIs elicit more negative emotions from smokers

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than text-only warnings (Borland et al., 2009; Evans et al., 2017; Kees et al., 2010; Noar et al., 2016), however, when joined (warning images and text) the emotional impact could be greater than that of warning images alone. Therefore, because the evaluation of the TWIs with and without warning texts was combined in the statistical analysis, the influence of the larger-sized TWIs might be overestimated as compared with the results that would have been produced if TWIs without warning texts only had been used. Taking this into account, future studies should evaluate the impact of TWIs with and without warning texts separately.

In conclusion, the results of the present study suggest that placing larger-sized TWIs on the lids of the smokeless tobacco containers could have a great effect in eliciting avoidant behavior and negative emotions toward the use of smokeless tobacco. Based on these findings, placing larger-sized TWIs on the lids of smokeless tobacco containers might be worthy of consideration for global tobacco control.

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