



Evaluation of Graphic Cigarette Warning Images on Cravings to Smoke

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While health warnings are present on cigarette packs around the world, the nature of the warnings varies considerably between countries. In the United States, a small text warning citing the dangers of cigarette smoking is found on the side of all packs. This pilot study sought to determine whether graphic cigarette warning images, like those found in the United Kingdom and Canada, were better at decreasing cravings to smoke than existing text warnings found on cigarette packs in the United States. Twenty-five smokers seeking treatment to quit at a specialty tobacco treatment program were administered the Brief Questionnaire of Smoking Urges (QSU — BRIEF), a validated measure of craving, prior to and following exposure to cigarette pack warning images. The graphic cigarette warning images reduced cravings to smoke (6.20 point decrease) more than neutral images (3.36 point decrease) and current text warnings used in the United States (5.75 point decrease), although this difference was not statistically significant. Based on these pilot data, a larger study could further examine the effectiveness of graphic warning images and whether such warnings hold an advantage over the currently used text warnings.

Keywords: tobacco, craving, graphic, warning, images

Background

Tobacco use is the leading cause of preventable death in the United States and the second major cause of death worldwide (WHO, 2005). Cigarette smoking is a risk factor for a variety of diseases, including cancer, heart disease, stroke and chronic pulmonary disease (U.S. Surgeon General's Report, 2004). Despite the well-known health effects of continued use, tobacco usage and the resulting sequelae remain a global problem. In an effort to communicate effectively the health risks associated with smoking and curb tobacco use among consumers, many countries have instituted the placement of warning labels on cigarette packs, with some countries choosing to use more graphic images (Hammond et al., 2007). More than

140 countries have ratified the Framework Convention on Tobacco Control (FCTC), which mandates the placement of warnings on cigarette packs. The FCTC recommends using 50% of a pack's surface area to display health information and requires covering at least 30% of the pack surface with a consumer warning that clearly states the dangers of tobacco use (FCTC, 2005). The current cigarette warning labelling system in the United States, which consists of a small Surgeon General's text box placed on the sides of a cigarette pack, does not meet the minimum standards set forth by the FCTC (WHO, 2005).

Placement, size, and design contribute to the overall effectiveness of cigarette warning labels. Research indicates that obscure text warnings used in the United States and numerous other countries are less effective at being

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noticed and remembered in comparison to larger, more graphic warnings (Hammond et al., 2007). The use of image-based warning labels has been associated with greater recall of the health warning, as well as an increase in both motivation and number of attempts to quit smoking (Koval, Anbur, Pederson, O'Hegarty, & Chan, 2005). A study by White, Webster, & Wakefield (2008) found that adolescents in particular can be positively influenced by warning images; after viewing the images, adolescents more frequently read, attended to, thought and talked about warning labels at follow-up. Adolescents in Greece rated the European Union (EU) images as effective measures to preventing the initiation of smoking (Vardavas, Connolly, Karamanolis, & Kafatos, 2009).

As a result of these findings, many countries have examined the use of graphic images as warning labels and have demonstrated their effectiveness (Hammond et al., 2007). Recently, the EU has proposed a new series of graphic anti-smoking warning images to be used for any country within the EU. Currently within the EU, Belgium, Romania and the United Kingdom have instituted the use of picture warnings; however, the United Kingdom is the first country to mandate this change on all tobacco products (UK Department of Health, 2009). A commission is currently underway to update the library of images in order to spur more countries to adopt an image-based labelling system (Stafford, 2009).

Despite data supporting the effectiveness of graphic warnings on message recall and impact on initiation, there are little data describing the impact of warnings on cravings to smoke. Craving, defined by Sayette et al. (2000) as the desire to use a drug, has been implicated as the most troublesome symptom experienced during nicotine withdrawal (West, Hajek, & Belcher, 1989). This pilot study sought to measure the impact of proposed cigarette warning images on cravings to smoke among smokers presenting for tobacco dependence treatment at a specialty clinic.

Methods

Subjects

A sample of 25 consecutive subjects were recruited from a population of smokers seeking treatment at the University of Medicine and Dentistry of New Jersey — Tobacco Dependence Program (TDP) between June 1, 2008 and August 1, 2008. Subjects were approached prior to or following their appointments at the TDP, and they were requested to provide written informed consent. There were no specific exclusion criteria to the study, with the exception being that the subjects needed to be able to view all of the images and complete the data collection instrument, which was only made available in English.

Data Collection

Each subject was administered a baseline questionnaire measuring demographic and tobacco use characteristics

followed by an instrument to measure current cravings to smoke. Demographic data included: age, gender, race/ethnicity, education, tobacco use history, quitting history, measures of tobacco dependence, and medical history. All data was collected with an identification code that was not linked to any subject identifiers.

Instrument

To systematically measure subjects' cravings, we utilised the Brief Questionnaire of Smoking Urges (QSU — BRIEF), a validated 10-item questionnaire that provides a composite craving score from 10–70, with higher numbers indicating higher levels of craving. The QSU — BRIEF is a modification of the 35-question Questionnaire of Smoking Urges (QSU; Cox, Tiffany, & Christen, 2001; Tiffany & Drobes, 1991) and has demonstrated equal effectiveness as the QSU in gauging subjects' smoking craving (Cappelleri et al., 2006).

Protocol

Each subject was asked to complete the QSU-Brief before looking at any warnings to establish a baseline reading of the subject's craving level. In an adapted protocol from Harris, Mayle, Mabbott, and Napper (2007), recruited subjects were shown three groups of images in random order: proposed graphic image warnings, currently used text warnings, and neutral images (e.g., nature photographs). The graphic images were selected from warnings approved for use in the United Kingdom, text warnings were selected from US Surgeon General Warnings, and neutral images were taken from stock nature images. The proposed images from the EU, as well as the existing warning images, were obtained from website sources that have hosted the images for public use: <http://www.smoke-free.ca/warnings/countries%20and%20laws.htm>. After each set of images, cravings were re-evaluated by completion of a QSU-BRIEF. A random sequence generator randomised the order of the sets of images shown to subjects in effort to reduce collection bias of image presentation.

Results

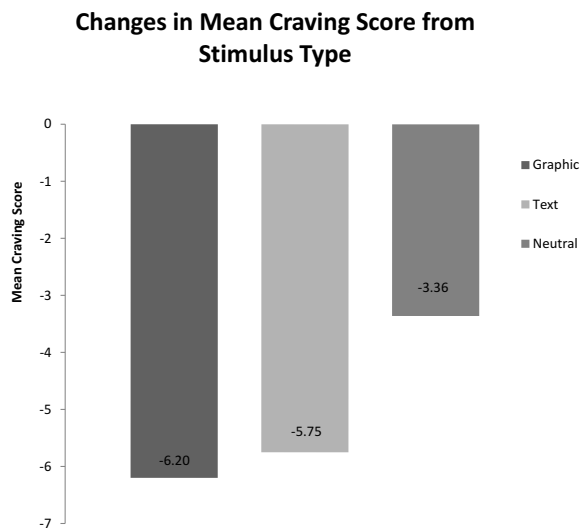
The characteristics of the participants in the study are shown in Table 1. Subjects had a mean age of 49 years (range from 23 to 65). Forty-eight per cent were female, 56% were Caucasian/white, 20% were Hispanic, 16% were African American, and 8% were Asian/Indian. Sixteen per cent of subjects had not completed high school, 36% had graduated from high school, and 48% had completed some college or graduate work. These demographics closely matched the overall profile of patients seen at the clinic. The subjects displayed high levels of tobacco dependence by smoking a mean of 20 cigarettes per day and smoking their first cigarette on average at 22 minutes after waking. The mean number of previous quit attempts among the subjects was three.

Table 1

Participant Demographics

Characteristics	Values
Age (Mean, <i>SD</i>)	49 (11.7)
Gender (<i>n</i> , %)	
Male	12 (48)
Female	13 (52)
Race (<i>n</i> , %)	
Asian/Indian	2 (8)
Black	4 (16)
Hispanic	5 (20)
White	14 (56)
Education (<i>n</i> , %)	
Less than High School	4 (16)
Completed High School	9 (36)
Some College	8 (32)
Completed College	3 (12)
Post Graduate Work	1 (4)

Each subject's total QSU-Brief score (a range of 10–70) represented their craving level at baseline and after each warning/image viewed. Subjects with higher QSU-Brief scores displayed higher levels of craving for cigarettes. The mean scores for each image type were subtracted from the baseline score to determine the impact of viewing the image for each subject. The mean reduction in QSU-Brief craving scores was highest for the graphic warnings (mean = -6.20 points; standard deviation (*SD*) 13.86) compared with text warnings (mean = -5.75; *SD* 13.29) and neutral images (mean = -3.36; *SD* 9.47), although the difference between each of the categories of graphic, neutral, and text warnings was not statistically significant (Figure 1). In addition, 84%

**Figure 1**

Changes in Mean Craving Score (QSU-Brief) from Stimulus Type

of subjects identified the graphic images as the most effective stimuli for motivation to quit smoking. An overwhelming majority of subjects (88%) rated smoking as having the most detrimental effect on their health; 10 on a scale ranging from zero (no effect at all) to 10 (most detrimental effect).

Of the images shown, the one image identified as the most effective was an image of stained teeth that displayed the effects of years of smoking. While the subjects believed that the graphic images evoked a prominent response, this was not shown in the data collected. Anecdotally, many subjects stated their profound disinterest in cigarettes after seeing the graphic images, especially after viewing the graphic images. A few subjects stated the calming aspect of the control images decreased their cravings to smoke.

Discussion

This study found that graphic cigarette warning images presented to this sample of smokers reduced cravings to smoke (-6.20 points) more than neutral images (-3.36 points) and current text warnings (-5.75 points). While there was no statistical difference between the text and images, the subjects rated the graphic images as the most effective images in reducing cravings. Results from this pilot may provide insight on whether image-based cigarette warnings will be more effective than text warnings on reducing cravings to smoke and provide support and therefore provide evidence for implementation by other countries, such as the United States. Such results would be helpful given the recent Senate approval of the *Family Smoking Prevention and Tobacco Control Act*, passed in June 2009, that enables the Food and Drug Administration (FDA) to regulate nicotine content and chemicals in cigarettes, in addition to restricting the advertising and marketing of cigarettes (Wilson, 2009). The FDA has proposed new cigarette pack images be implemented in the near future.

The subject of cigarette packaging as a method of tobacco control remains a popular one. Many countries across the world, not just in the EU, are transitioning to images on cigarette packs. Interestingly, while many countries seem to be using graphic warning images to shock, they have not considered the impact of brand packaging of the cigarette. A study by Wakefield, Germain, and Henriksen (2008) demonstrated that plain and unadorned packing made cigarettes contained within less attractive and desirable. The two extremes of cigarette packaging should be examined in more detail in order to determine the best method of control.

The placement of graphic warnings images on cigarette packs has the potential to influence millions of smokers worldwide to quit smoking. However, there are many concerns with such graphic image warnings that need to be addressed in order to act as a better method of control. Foremost among these concerns is the shock

value of these images. A study by Nascimento et al. (2008) suggested that more arousing warnings that are more shocking would work more effectively as a method of tobacco control. While these graphic warning images can provoke a strong reaction in some individuals, studies have not shown any negative avoidance of the labels themselves (Peters et al., 2007). However, after the introduction of graphic warning labels in the United Kingdom, sales of cigarette cases (large volumes of cigarettes lacking warning labels) and cigarette pack holders (plastic cases for a cigarette pack) greatly increased (Day, 2003). While the graphic images clearly have an effect on people, it remains to be seen whether they truly can affect a person's craving to smoke and their long-term willingness to quit.

As a pilot study, this study was limited by its size and short duration. The sample size of 25 restricts the implications of the study. Additionally, as a sample of smokers who sought face-to-face treatment, it is unclear if these findings are generalizable to all smokers. A larger study is necessary to further examine the effectiveness of graphic warning images and whether such warnings hold an advantage over the currently used text warnings.

Conclusion

In this study, we examined the effects of graphic cigarette warnings on subjects' cravings to smoke and compared the resulting decrease in cravings to the current text based warnings used in the United States. While the graphic warnings led to the largest decrease in cravings to smoke, the difference in reduction between the text and graphic warnings was not significant. However, the majority of the subjects rated the graphic warning images as more effective stimuli for quitting smoking. As pilot data, this study can support the decision to implement proposed stronger warning labels on cigarette packaging in the United States.

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