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Using eye-tracking to examine how embedding risk corrective statements improves cigarette risk beliefs: Implications for tobacco regulatory policy

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ABSTRACT

Background: Tobacco companies have deliberately used explicit and implicit misleading information in marketing campaigns. The aim of the current study was to experimentally investigate whether the editing of explicit and implicit content of a print advertisement improves smokers' risk beliefs and smokers' knowledge of explicit and implicit information.

Methods: Using a 2(explicit/implicit) × 2(accurate/misleading) between-subject design, 203 smokers were randomly assigned to one of four advertisement conditions. The manipulation of graphic content was examined as an implicit factor to convey product harm. The inclusion of a text corrective in the body of the ad was defined as the manipulated explicit factor. Participants' eye movements and risk beliefs/recall were measured during and after ad exposure, respectively.

Results: Results indicate that exposure to a text corrective decreases false beliefs about the product ($p < .01$) and improves correct recall of information provided by the corrective ($p < .05$). Accurate graphic content did not alter the harmfulness of the product. Independent of condition, smokers who focused longer on the warning label made fewer false inferences about the product ($p = .01$) and were more likely to correctly recall the warning information ($p < .01$). Nonetheless, most smokers largely ignored the text warning.

Conclusions: Embedding a corrective statement in the body of the ad is an effective strategy to convey health information to consumers, which can be mandated under the Tobacco Control Act. Eye-tracking results objectively demonstrate that text-only warnings are not viewed by smokers, thus minimizing their effectiveness for conveying risk information.

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1. Introduction

An increased public awareness of health risks of smoking has led the tobacco industry to develop “new” products that have been marketed as less harmful than regular cigarettes. The development, advertising and marketing of “new” products started with the promotion of light cigarettes in the 1960s (National Cancer Institute, 2001), and continued with the marketing of potentially reduced exposure products (PREPs), to the most recent marketing of Modified Risk Tobacco Products (MRTPs), which are often

developed as lower tar/nicotine cigarettes (Dunsby and Bero, 2004; U.S. Department of Health Human Services, 2000). In the aggressive marketing of harm reduction, tobacco companies have effectively used cigarette pack design, colors, labels and descriptive terms to communicate strength, harshness, lower nicotine, tar levels and risk of their products (Anderson et al., 2006; Bansal-Travers et al., 2011; Philip Morris, 1981; Pollay and Dewhirst, 2001; Pollay and Dewhirst, 2002; Slade, 1997; Wakefield et al., 2002).

While previous efforts under the Tobacco Control Act (TCA) have successfully mandated removal of descriptive terms, other actions to convey health information to consumers, for example the implementation of graphic warning labels, have been upheld by U.S. federal courts. Given evidence that many smokers misinterpret the information contained in cigarette marketing and perceive a modified type of cigarette as safer or having lower health risks than

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regular cigarettes (Hamilton et al., 2004; O'Connor et al., 2005; Parascandola et al., 2009; Shadel et al., 2006; Shiffman et al., 2007, 2004), it is important to develop more accurate advertising and to counter misinformation in order to better inform smokers of their risks. This correction of misinformation in advertisements calls for and requires a better understanding of how accurate information can be conveyed to smokers. The TCA empowered the Food and Drug Administration (FDA) to review MRTPs to ensure that marketing and advertising claims are supported by scientific evidence and are not misleading (U.S. FDA Center for Tobacco Products, 2015). Further, in 2006, the U.S. District Court ordered the use of corrective statements in advertising and promotion to correct past deceptive practices of the tobacco companies and to enhance knowledge among consumers (Smith et al., 2011; U.S. District Court DC. U.S. v. Philip Morris USA, 2006).

Few studies have investigated the effects of counter-advertising and corrective messages on risk perception of cigarette products (Biener et al., 2007; Kozłowski et al., 2001, 1999, 2000; Shiffman et al., 2001; Strasser et al., 2008; Tangari et al., 2010). Some studies demonstrated that counter-marketing ads on TV (Kozłowski et al., 2000) and radio (Kozłowski et al., 2001, 1999) can improve the risk perception of light cigarettes, and that corrective print advertisements can influence consumers' beliefs about smoking (Tangari et al., 2010). With regard to correctives in print advertisements, Biener et al. (2007) found that providing health information (adding explicit content) in the form of a box at the bottom of print advertisements had only little impact on the risk perception of the product. It remains unknown whether and how much attention smokers paid to the health information that was provided in a box similar to a text warning label at the bottom of the ad. Previous research has shown that viewers rarely focus on a text warning label (Fischer et al., 1989; Munafo et al., 2011). Given these results and the fact that the center of the ad is viewed more attentively (Strasser et al., 2012), integrating explicit corrective text messages in the body of the ad might be a more effective strategy. In a study where smokers were either exposed to the original Quest print advertisement, an ad in which the cigarette packages were altered to the color red (altering implicit content), or an ad where all text was removed from the ad (removing explicit content), it was found that removing the text affects beliefs about the harmfulness of the product (Strasser et al., 2008). Smokers who were exposed to the altered implicit ad did not report fewer false beliefs about the harmfulness of the product than smokers exposed to the original advertisement. It is plausible but remains unknown whether an ad with combined explicit and implicit accurate content would be associated with a more accurate understanding of harm exposure.

These studies demonstrate that the risk perception of a product can be corrected by altering explicit and implicit content of the ad. However, it remains unclear whether adding explicit accurate information (i.e., a corrective statement about product risk) in the body of the ad and altering implicit information (i.e., cigarette package color) affects smokers' risk perception of the product. Therefore, using a 2(explicit/implicit) × 2(accurate/misleading) between-subject design, we investigated the effect of manipulating advertisement content on smokers' false beliefs about the product and smokers' recall of explicit and implicit information after viewing the advertisements. The manipulated explicit factor was the inclusion of a text corrective about tar and nicotine content which has been shown to have a sustained effect on perceived product risk (Kozłowski and Sweeney, 1997). The manipulation of the cigarette package color and background images that have been shown to impact risk perception and have been increasingly used to imply health claims (Bansal-Travers et al., 2011) were examined as an implicit factor.

Additionally, to better understand how smokers view implicit and explicit content, we assessed attention to different parts of the

advertisement using eye-tracking. We hypothesized that smokers who were exposed to the explicit and implicit accurate ads, compared to those exposed to the misleading ads, will report fewer false beliefs about the product and will better recall the information stated by the corrective. The results of the present study will provide valuable information on what content of the advertisement draws attention, what content distract smokers from viewing health information, where corrective health information needs to be placed in an ad, and how implicit and explicit information in cigarette advertisements affect risk beliefs about nicotine products. Given the continuous introduction of nicotine-containing products (e.g., low nicotine cigarettes, little cigars, e-cigarettes) and the significant marketing of these products, it is critical that regulatory efforts are aware of how product users can be misled.

2. Material and methods

2.1. Sample and procedure

A total of 203 current smokers participated in the study. Inclusion criteria were: currently smoking a minimum of 10 cigarettes/day (non-menthol) for a minimum of 5 years; not currently trying to quit or intending to do so in the next two months; between 21 and 65 years old; speaking English fluently; no current substance abuse; no visual impairments. Participants responding to advertisements were screened for eligibility by telephone and those deemed eligible were scheduled. The study consisted of a 90-min single session where participants were randomly assigned to view one of four versions of the Quest advertisement while eye movements (EM) were measured. After a research assistant explained the procedure and demonstrated the equipment, participants gave informed consent and completed baseline questionnaires (see demographic and smoking history measures). Then, participants provided a carbon monoxide breath sample to biochemically verify smoking status. Based on sensitivity analysis by Raiff et al. (2010), a 5 parts per million (ppm) threshold was used for study inclusion. None of the participants fell under this threshold. Then, participants smoked one of their own cigarettes to standardize time since their last cigarette. They were seated in front of the eye-tracking device, were calibrated and asked to view the advertisement for 30 s. After viewing, participants completed post-advertisement measures (risk belief and recall measures). Finally, participants were debriefed to the purpose of the study, had any questions answered and received \$50 compensation. The protocol was approved by the University of Pennsylvania Institutional Review Board.

2.2. Advertisement design

We used a 2(explicit/implicit) × 2(accurate/misleading) between-subject design (see Fig. 1 for an illustration of the advertisement conditions). The inclusion of a corrective statement in the body of the ad was investigated as an explicit factor to decrease misinformation about the product. The explicit misleading conditions portrayed the text of the current Quest advertisement, which has been associated with smokers making false inferences about the product (Shadel et al., 2006; Strasser et al., 2008). The explicit accurate conditions were altered and the corrective statement "Nicotine free does not mean risk free. Quest contains as much tar as a light cigarette" replaced the text "Real cigarettes, real premium tobacco, real smoking enjoyment" in the body of the advertisement. The theme of the corrective statement was chosen because this message had been found effective, recalled easily in previous research (Kozłowski et al., 1999), and provided information about nicotine, risk and tar which

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