



Testing competing explanations for graphic warning label effects among adult smokers and non-smoking youth

Chris Skurka^{a,*}, Sahara Byrne^a, Julie Davydova^a, Deena Kemp^a, Amelia Greiner Safi^b,
Rosemary J. Avery^c, Michael C. Dorf^d, Alan D. Mathios^e, Jeff Niederdeppe^a

^a Department of Communication, Cornell University, 450B Mann Library Building, Ithaca, NY, 14853, USA

^b Department of Communication and Department of Population Medicine and Diagnostic Sciences, Cornell University, 450B Mann Library Building, Ithaca, NY, 14853, USA

^c Department of Policy Analysis and Management, Cornell University, 2301G Martha Van Rensselaer Hall, Ithaca, NY, 14853, USA

^d Cornell University Law School, 247 Hughes Hall, Ithaca, NY, 14853, USA

^e College of Human Ecology, Cornell University, 1300 Martha Van Rensselaer Hall, Ithaca, NY, 14853, USA

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ABSTRACT

Rationale: The United States courts have blocked the implementation of graphic warning labels on cigarette packages (GWLs). This decision was based, in part, on the premise that GWLs are unnecessarily emotional and are meant to scare rather than inform consumers about smoking's health effects. However, research in judgment and decision-making suggests these relationships are more complex.

Objective: In this article, we draw on several theoretical frameworks that lead to competing hypotheses about the relationships between negative affect, health risk beliefs, and quit intentions (among adult smokers) or susceptibility to start smoking (among non-smoking youth).

Method: We tested these competing mediation models using data from two experiments with two populations each—adult smokers ($N_s = 313$ and 238) and primarily non-smoking middle-school youth ($N_s = 340$ and 237). Using mobile recruitment methods, we focused specifically on individuals from socioeconomically disadvantaged communities in rural and urban areas of the Northeastern United States.

Results: The best fitting model across all four datasets was one in which label-induced negative affect (a) directly predicted intentions/susceptibility but also (b) indirectly predicted intentions/susceptibility via risk beliefs. Although mediation analyses did not demonstrate significant serial mediation effects of label exposure on intentions/susceptibility through negative affect then risk beliefs, there was some evidence that label exposure indirectly promoted adults' quit intentions through negative affect. Additionally, negative affect consistently mediated the indirect effect of label exposure on strengthened risk beliefs among adults and youth.

Conclusions: These results speak to the importance of negative affect in directly motivating adult smokers' quit intentions but also serving an informational function, directing adult smokers and non-smoking youth to accept the health risks of smoking.

1. Introduction

Tobacco use is estimated to be responsible for the deaths of one in 10 people globally (Reitsma et al., 2017). One evidence-based strategy to address the tobacco epidemic, endorsed by the World Health Organization's Global Framework on Tobacco Control and implemented by over 100 countries/jurisdictions, is to require graphic warning labels (GWLs) on cigarette packages (Canadian Cancer Society, 2016). GWLs use hard-hitting imagery and text to convey the risks of tobacco use to consumers and potential consumers (Hammond, 2011). Strengthening

GWLs (e.g., including images, increasing GWL size) is associated with greater recall, more quit attempts, and increased rates of successful quitting (Brewer et al., 2016; Noar et al., 2015).

The United States has not implemented GWLs, in part, because of a 2012 federal appeals court decision blocking mandatory GWLs on free speech grounds. The court concluded that GWLs are unnecessarily emotional and intend to scare rather than inform consumers about smoking's health effects ("RJ Reynolds Tobacco Co. v. Food and Drug Admin," 2012). This argument implicitly assumes that graphic, pictorial warnings are emotional whereas text-based warnings are

* Corresponding author.

E-mail address: cjs396@cornell.edu (C. Skurka).

informational (Jolls, 2015; Popova et al., 2017). Research in human judgment and decision-making, however, suggests these relationships are more complex. Considering legal uncertainty and gaps in extant theory as well as research on the roles of emotion and cognition in shaping behavior, we tested competing explanations for the indirect effects of GWL exposure on behavioral intentions (among adult smokers) and susceptibility to starting smoking (among youth) via affective and non-affective pathways. We take a strong inference approach (Platt, 1964), which requires the researcher to test several competing explanations for the phenomenon under investigation. To do so, we assessed the fit of multiple theoretical models using data from two between-subjects, randomized experiments—each with adult smokers and (largely non-smoking) middle-school youth.

1.1. The U.S. legal question: Emotion and the law

The 2009 Family Smoking Prevention and Tobacco Control Act required the U.S. Food and Drug Administration (FDA) to regulate the marketing of tobacco products. The FDA later proposed nine full-color GWLs to inform consumers about the harmful effects of smoking. Five tobacco companies sued the FDA, alleging that the proposed GWLs violated their First Amendment right to free speech (“*RJ Reynolds Tobacco v. US Food and Drug Admin.*,” 2011). Attorneys representing the tobacco industry claimed that the warnings intended to scare consumers through unduly emotional tactics rather than inform consumers about the risks associated with cigarette smoking.

After the Court of Appeals for the Sixth Circuit court initially sided with the tobacco companies, the Court of Appeals for the DC Circuit (in a 2-1 decision) again sided with the tobacco companies. Writing for the majority, Judge Brown argued that the proposed GWL images are not factual, not uncontroversial, and therefore are subject to misinterpretation by consumers. Furthermore, Brown reasoned that the GWLs could not be factual as they were “primarily intended to evoke an emotional response, or, at most, shock the viewer into retaining the information in the text warning” (“*RJ Reynolds Tobacco Co. v. Food and Drug Admin.*,” 2012). Although a disagreement between Circuits can be a basis for Supreme Court review, the FDA did not seek review of the DC Circuit decision and as of June 2018 has yet to issue revised GWLs.

A key concern in the DC court's ruling (and for the legality of GWLs moving forward) is whether GWLs sidestep consumers' ability to make “rational” decisions by evoking emotions (Cortez, 2013). Emotion researchers (Peters et al., 2016) and legal experts (Goodman, 2013; Tushnet, 2014) have criticized the court's decision for its reliance on lay theories in which emotions are thought to be irrational impulses that impede the consumer from making sensible judgments. This thinking contradicts decades of psychological research that suggests effective decision-making requires the integration of affect and analytic thinking (Peters et al., 2016). Nevertheless, the tobacco industry is likely to bring suit again once the FDA proposes a new set of GWLs. It is therefore critical that researchers in this domain have a firm understanding of the psychological processes that best explain how smokers (and potential smokers) respond to strengthened GWLs (Cappella, 2016). In the sections that follow, we elaborate on different psychological perspectives on how people process risk information, which lead us to several competing hypotheses about the mechanisms of GWL effects.

1.2. Processing GWLs analytically

Dual-process theories of information processing identify two routes by which people process messages and make decisions—one analytic and one experiential. The first route involves careful deliberation in which the individual expends considerable cognitive energy and draws on formal logic to make judgments. Psychologists have used the terms central processing (Petty and Cacioppo, 1986), systematic processing (Chaiken, 1980), the rational system (Epstein, 1994), and the analytic

system (Slovic et al., 2004) to describe this kind of processing. In this article, we use the phrase *risk as analysis*, a phrase consistent with research in the risk perception literature (Slovic et al., 2004). Using the risk-as-analysis framework, one would predict that exposure to GWLs has downstream effects on behavior by instilling beliefs about the presented health risks associated with smoking. To the extent that tobacco consumers (or potential users) adopt those risk beliefs, quit intentions (or susceptibility to try smoking) should be indirectly influenced. This argument aligns with predictions made by the health belief model (Rosenstock, 1974) in that increased threat perceptions (consisting of perceived severity and susceptibility) should motivate protective action.

There is some evidence, albeit limited, to support this pathway of GWL effects. One study found that adult smokers who notice GWLs were more likely to hold beliefs about smoking's health risks (e.g., heart disease, stroke, lung cancer in non-smokers) (Hammond et al., 2006). Among adolescents, the implementation of more prominent GWLs in Australia (including color images, increasing size) was associated with greater beliefs related to some new claims made by the GWLs (e.g., that smoking causes diseases of the fingers, toes, and mouth) (White et al., 2008). Furthermore, smokers who endorse more beliefs about the health effects of smoking are more likely to plan to quit (Hammond et al., 2006). We thus offer our first competing hypothesis about the indirect effect of label exposure (i.e., including an image or text on a branded cigarette pack) on quit intentions (adults) or smoking susceptibility (youth) through risk beliefs.

Competing H1: Smoking risk beliefs will mediate the effect of label exposure on behavioral intentions.

For simplicity, throughout this section we use “behavioral intentions” as shorthand for both quit intentions among adults and smoking susceptibility (which contains items linked to theories of both behavioral intentions and behavioral willingness) among middle-school youth.

1.3. Processing GWLs emotionally

Psychologists have described a second route of information processing that involves less effortful, cognitive deliberation of information and is instead characterized by employing mental shortcuts (when available) to base judgments. This route has been referred to as peripheral route processing (Petty and Cacioppo, 1986) or heuristic processing (Chaiken, 1980). For some theorists, this second processing pathway can involve relying on feelings when making decisions (Epstein, 1994; Slovic et al., 2004). This is the *risk-as-feelings* framework within the risk perception literature (Loewenstein et al., 2001). It posits that feelings can have two kinds of effects. First, feelings can motivate behavior independently of cognitive evaluations of risk, and second, they can also inform those cognitive evaluations. These feelings on which we draw may be simple *affect*, i.e., general positive or negative feelings (Slovic et al., 2004), or more complex *emotional* states like fear or anxiety.

1.3.1. Affect as behavior motivator

In the context of health communication, Peters et al. (2006) argue that affect can serve multiple functions. One such function is motivating behavior. Emotion theorists have long recognized that discrete emotions are associated with specific action tendencies (Frijda, 1986). Fear, for example, is accompanied by a flight response to avert a threatening situation, whereas anger predisposes a person to retaliate against the perceived source of some wrongdoing. In this way, emotion can motivate behaviors directly, bypassing effortful deliberation associated with analytic processing of risk information. Pursuant to this claim, emotion theorists generally agree that emotions are functional (Izard, 2010) insofar as they allow humans to flexibly adapt to unique situations by coordinating response systems, directing attention, and organizing

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