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Abstract

Objective—To examine factors associated with perceiving different types of pictorial cigarette health warning labels as most effective in motivating smokers to quit or preventing smoking initiation among college students.

Method—We administered an online survey to 24,055 students attending six Southeast colleges in Fall, 2010. We obtained complete data for the current analyses from 2,600.

Results—Current smoking prevalence was 23.5%. The largest majority (78.6%) consistently rated gruesome images as most effective, 19.5% rated testimonial images as most effective, and only a small proportion rated either standard (1.6%) or human suffering images (0.3%) as most effective. Subsequent analyses focused on differences between those endorsing gruesome images or testimonials as most effective. Factors related to ranking testimonials versus gruesome images as most effective included being female (p<0.01), White (p<0.01), and nonsmokers (p=0.04), lower perceived smoking prevalence (p<0.01), and greater receptivity to laws/restrictions around smoking (p<0.01) and tobacco marketing (p=0.01). Among smokers, factors related to ranking testimonials as most effective versus gruesome images included being female (p=0.03), being White (p=0.03), higher autonomous motivation (p=0.03), and greater extrinsic self-efficacy (p=0.02).

Conclusions—Understanding factors related to perceived effectiveness of different pictorial warnings among subpopulations should inform health warning labels released by the FDA.

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Keywords

Smoking; Tobacco Control; Young adults; Prevention; Public Policy

1. INTRODUCTION

Health concerns are the most common motivation for cessation (Hyland et al., 2004). Textual warnings on cigarette packaging increases knowledge regarding smoking-related risks (Hammond, 2011). However, pictorial (versus text-only) warnings are more effective in increasing knowledge and promoting quitting (Borland et al., 2009; Thrasher et al., 2007; Hammond, 2011). Although research suggests that gruesome imagery is more effective than symbolism (Thrasher et al., 2006), most of this research has focused on adult smokers (Hammond et al., 2007; Hammond et al., 2003). Examining those in young adulthood is critical, as it is an important transition period for smoking (Everett et al., 1999). Thus, we examined: (1) perceptions of effectiveness of health warning imagery in preventing uptake of smoking or promoting cessation, and (2) characteristics related to perceiving different types of warnings as effective among college students.

2. METHODS

Participants and Procedures

In Fall, 2010, among 24,055 students at six Southeast colleges recruited to complete an online survey, 4,840 (20.1%) participated, with 2,600 completing all questions on health warning images. As incentive, participants received entry into a drawing for cash prizes (for detailed methods description, see Berg et al., In press). The Emory University Institutional Review Board approved this study, IRB# 00030631.

Measures

Participants were presented with four different message themes (cancer risk, cardiovascular disease risk, avoiding risk of smoking, lung disease risk). For each theme, four pictorial warning styles were shown: gruesome imagery; suffering from smoking-related consequences; suffering with a testimonial quote; and standard (i.e., symbolic) imagery (Figure 1a–1d). Within each theme, participants were presented with all four images and asked to rank them from most to least effective for motivating smokers to quit or preventing people from smoking.

We assessed students' age, gender, ethnicity, and highest parental educational attainment. Students were asked, "In the past 30 days, on how many days did you smoke a cigarette (even a puff)?" Those reporting smoking ≥ 1 day in the past 30 days were considered current smokers; students reporting smoking everyday were considered daily smokers (ACHA, 2009; Office of Applied Studies, 2006). Participants were asked, "What percent of students at your school do you think have smoked at least one cigarette in the past 30 days?" (Choi et al., 2001) and "Out of your five closest friends, how many of them smoke cigarettes?" (Maibach et al., 1996). These following validated scales were administered: the Attitudes Toward Smoking Scale (ATS) (Shore et al., 2000), a 17-item scale assessing attitudes toward smoking across four dimensions—interpersonal relationships with smokers, public smoke-free restrictions, health concerns, and tobacco marketing; the Self-Efficacy Questionnaire (SEQ-12) (Etter, Bergman, Humair, & Perneger, 2000), a 12-item scale measuring confidence in ability to refrain from smoking when facing internal and external stimuli; and the Treatment Self-Regulation Questionnaire (TSRQ) for smoking (Williams et

al., 2004), a 15-item instrument assessing Autonomous Motivation, Controlled Motivation, and Amotivation for cessation.

Data Analysis

We focused on preference for testimonials versus gruesome images because human suffering and standard images were infrequently endorsed as most effective. Bivariate analyses examined factors associated with ranking testimonials as most effective versus gruesome images. Binary logistic regression was used to examine factors associated with ranking testimonials as most effective versus gruesome images (1) among all participants and (2) among current smokers. Age, gender, ethnicity, and parental education were forced into each model, and factors significant at the p<.10 level were entered using backwards stepwise entry. SPSS 18.0 was used. Statistical significance was set at α=.05 for all tests.

3. RESULTS

Participants' mean age was 23.43 years (SD=6.93), the majority (71.1%) was female, 46.2% were non-Hispanic White, 38.2% were Black, 62.4% had parents with <BA degree, and 23.5% were current smokers.

Participants endorsed gruesome images as most effective in each content area, with testimonials rated as most effective second most frequently (Figure 1). We categorized participants who rated three or four of any one approach as most effective into one of four categories. The proportion consistently rating each approach as most effective was as follows: gruesome: 78.6%, n=2,043; testimonial: 19.5%, n=508; standard images: 1.6%, n=41; and human suffering: 0.3%, n=8. Given the small proportion rating suffering or standard images as most effective, subsequent analyses focused on differences between those endorsing testimonials versus gruesome images as most effective.

Binary logistic regression found that among all participants, ranking testimonials as most effective versus gruesome images was related to being female (OR=1.41, CI 1.11, 1.80, p<0.01), being White versus Black (OR=0.49, CI 0.39, 0.61, p<0.01) or Other (OR=0.58, CI 0.42, 0.78, p<0.01), nonsmoking status (OR=0.76, CI 0.58, 0.99, p=0.04), lower perceived smoking prevalence (OR=0.99, CI 0.98, 0.99, p<0.01), and greater receptivity to smoking restrictions (OR=1.03, CI 1.01, 1.05, p<0.01) and tobacco marketing (OR=1.03, CI 1.01, 1.05, p=0.02). Among current smokers, ranking testimonials as most effective versus gruesome images was related to being female (OR=1.80, CI 1.05, 3.09, p=0.03), being White versus Other (OR=0.20, CI 0.06, 0.68, p<0.01), and higher autonomous motivation (OR=1.03, CI 1.01, 1.06, p=0.03) and extrinsic self-efficacy (OR=1.04, CI 1.01, 1.07, p=0.02), but not number of smoking days in the past month.

4. DISCUSSION

This is the first study documenting differences in perceived effectiveness of different types of pictorial warning labels in motivating smokers to quit or preventing smoking initiation among U.S. young adults. Consistent with prior research (Hammond et al., 2007; Hammond et al., 2004; Thrasher et al., 2006; Thrasher et al., 2010), gruesome images were consistently rated most effective (78.6%), whereas one-fifth of participants consistently rated testimonials most effective. Few rated suffering or standard images as most effective. Perhaps gruesome imagery evokes the strongest emotional response, which increases message effectiveness, knowledge of health risks, and motivation and confidence to quit smoking (Hammond, 2011).

Factors related to ranking testimonials versus gruesome images as most effective among all students included nonsmoking status, lower perceived smoking prevalence, and greater receptivity to restrictions around smoking and tobacco marketing. Factors related to ranking testimonials as more effective than gruesome images among smokers included greater autonomous motivation and extrinsic self-efficacy. This implies that those least likely to smoke and smokers most likely to quit (Schnoll et al., 2005) may be more impacted by testimonials, while those at highest risk for smoking may be more impacted by gruesome imagery.

Current findings support prior research indicating that graphic warning labels increase cessation (Hammond, 2011; Hammond et al., 2003) and suggest that young adults at greater risk for smoking uptake and maintenance may be addressed through gruesome images. However, smokers with higher motivation and self-efficacy in quitting may be more impacted by testimonials. Policies and tobacco control interventions and campaigns advising how to frame health warning content should attend to these nuances.

Limitations

Study limitations include a lack of generalizability and a response rate of 20.1%. However, despite lower response rates, internet surveys yield similar statistics regarding health behaviors compared to mail and phone surveys (An et al., 2007).

5. CONCLUSIONS

Individuals at greatest risk for smoking and lowest motivation and self-efficacy for quitting perceive gruesome warning labels to be most effective; thus, this is a promising approach for framing health warning labels. However, some are more appropriately addressed using testimonial messages. Thus, policy should ensure that young adults are being effectively targeted in tobacco control efforts.

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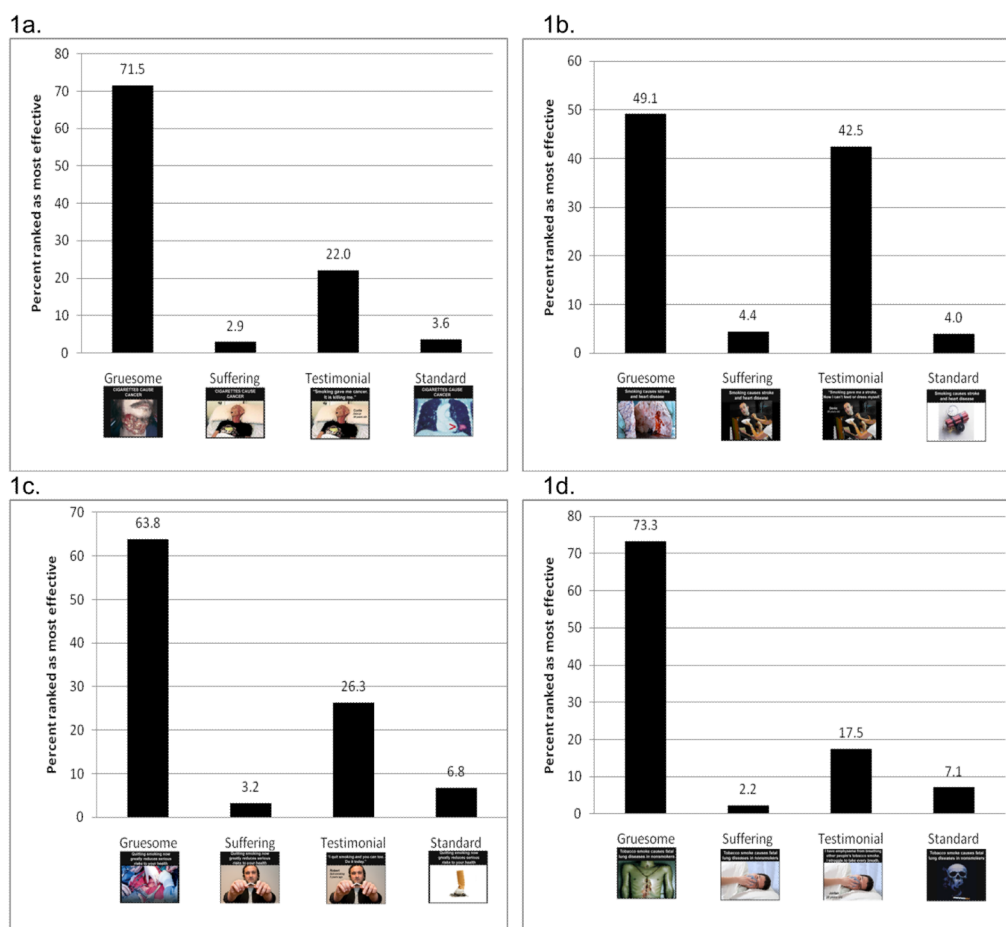
Figure 1.
Proportion of college students endorsing each image as most effective in preventing smoking uptake or promoting smoking cessation in the Southeast U.S., Fall 2010
1a. Cancer risk images; 1b. Cardiovascular disease risk images; 1c. Avoiding risk images; 1d. Lung disease risk images

Table 1

Bivariate analyses examining the preference for testimonials versus gruesome images among college students in the Southeast U.S., Fall 2010

Variable	Gruesome n (%) or Mean (SD)	Testimonial n (%) or Mean (SD)	p
Sociodemographic Variables			
Age (SD)	23.20 (6.62)	23.63 (7.14)	0.20
Gender (%)			<0.01
Male	568 (82.6)	119 (17.3)	
Female	1336 (77.4)	389 (22.6)	
Ethnicity (%)			<0.01
Non-Hispanic White	829 (74.0)	292 (26.0)	
Black	766 (83.6)	150 (16.4)	
Other	309 (82.4)	66 (17.6)	
Parental education (%)			0.08
< Bachelors	1701 (78.7)	460 (21.3)	
≥ Bachelors	168 (83.2)	34 (16.8)	
Psychosocial Variables			
Attitudes Toward Smoking Scale scores (SD)	87.51 (18.25)	92.56 (17.17)	0.07
Interpersonal	21.62 (8.18)	23.23 (8.12)	0.89
Health concerns	35.48 (7.84)	37.37 (6.55)	<0.01
Laws and restrictions	17.92 (4.07)	18.55 (3.89)	<0.01
Tobacco marketing	12.48 (4.95)	13.05 (5.13)	0.08
Social Aspects of Smoking			
Number of friends who smoke (SD)	1.49 (1.57)	1.30 (1.50)	0.02
Perceived % of college students who smoke (SD)	60.07 (22.31)	57.17 (21.90)	<0.01
Smoking Variables			
Smoking status (%)			<0.01
Nonsmoker	1439 (77.8)	410 (22.2)	
Current smoker	465 (82.6)	98 (17.4)	
Smoking status (%)			0.01
Nonsmoker	1439 (77.8)	410 (22.2)	
Nondaily	249 (79.8)	63 (20.2)	
Daily	216 (86.1)	35 (13.9)	
Number of days of smoking in past 30 days (SD)[*]	18.83 (12.34)	16.50 (12.35)	0.09
SEQ-12 (SD)[*]			
Intrinsic self-efficacy	19.49 (8.31)	20.69 (7.30)	0.39
Extrinsic self-efficacy	19.00 (7.67)	20.69 (7.30)	0.03
Treatment Self-Regulation Questionnaire (SD)[*]			
Controlled motivation	24.18 (12.35)	22.56 (11.75)	0.21
Autonomous motivation	31.50 (10.13)	34.58 (7.80)	<0.01
Amotivation	6.26 (3.72)	5.37 (3.48)	0.02

[*] Indicates among current smokers