



Original investigation

Are the Same Health Warnings Effective Across Different Countries? An Experimental Study in Seven Countries

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Abstract

Introduction: More than 100 countries have implemented pictorial health warnings on cigarette packages. However, few studies have compared how consumers from different geographic and cultural contexts respond to health warning content. The current study compares perceptions of warnings among adult smokers and youth in seven countries, to examine the efficacy of different health warning themes and images.

Methods: Between 2010 and 2012, online and face-to-face surveys were conducted with ~500 adult smokers and ~500 youth (age 16–18) smokers and nonsmokers in each of Mexico, United States, China, Germany, India, Bangladesh, and Republic of Korea (total $N = 8182$). Respondents were randomized to view and rate sets of 5–7 health warnings (each set for a different health effect); each set included a text-only warning and various types (ie, themes) of pictorial warnings, including graphic health effects, “lived experience,” symbolic images, and personal testimonials. Mixed-effects models were utilized to examine perceived effectiveness of warning themes, and between-country differences in responses.

Results: Overall, pictorial warnings were rated as more effective than text-only warnings ($p < .001$). Among pictorial themes, “graphic” health effects were rated as more effective than warnings depicting “lived experience” ($p < .001$) or “symbolic” images ($p < .001$). Pictorial warnings with personal testimonials were rated as more effective than the same images with didactic text (p

< .001). While the magnitude of differences between warning themes varied across countries, the pattern of findings was generally consistent.

Conclusions: The findings support the efficacy of graphic pictorial warnings across diverse geographic and cultural contexts, and support sharing health warning images across jurisdictions.

Implications: Although over 100 countries have implemented pictorial health warnings on cigarette packages, there is little research on the most effective types of message content across geographic and cultural contexts. The current study examined perceived effectiveness of text and pictorial health warnings featuring different message content—graphic health effects, “lived experience,” personal testimonials, and symbolic imagery—among more than 8000 adults and youth in Mexico, United States, China, Germany, India, Bangladesh, and Korea. Across countries, “graphic” pictorial messages were rated as most effective. Consistencies across countries in rating message content suggests there may be “globally effective” themes and styles for designing effective health warnings.

Introduction

Tobacco use is the most common preventable cause of death worldwide.¹ Health warnings on tobacco packages represent a fundamental tobacco control policy. Article 11 of the World Health Organization (WHO) Framework Convention on Tobacco Control states that warnings should be large, clear, and include pictures.² To date, more than 100 countries, covering more than half of the world’s population, have implemented pictorial health warnings on tobacco packages.³

Research has clearly established that pictorial health warnings are more effective than text-only warnings in terms of increasing knowledge and perceptions of health risks, reducing the appeal of smoking among youth, motivating smokers to think about quitting, helping former smokers to stay quit, and reducing the overall prevalence of smoking behavior.⁴⁻⁶ Pictorial warnings are also more effective at deterring smoking by young people and those with lower education, since pictorial warnings do not require the same literacy levels as text-only warnings.^{4,7,8} Given their reach and frequency of exposure, health warnings constitute a highly cost-effective policy intervention to communicate health information.⁴

Article 11 of the Framework Convention on Tobacco Control also requires that different warning messages be rotated.² In practice, this means that countries typically introduce sets of multiple individual warnings that appear on different packages during the same period (eg, Canadian cigarette packs must feature one of 12 different warnings).³ Rotation also refers to the practice of changing the sets of individual warnings over time to present new message content. Rotation of warnings helps to minimize “wear out” of warnings over time and increases the extent to which consumers notice and engage with health warnings.⁹ Overall, there is an ongoing need for countries to refresh warnings and design new health warning content.

Much of the experimental literature on health warnings has examined general design principles, such as the size of warnings, or the use of pictorial versus text-only health warnings. However, this literature provides little guidance to countries in terms of how best to update or design specific pictorial warnings. Meanwhile, post-implementation research typically examines the aggregate impact of the entire set of health warnings implemented in a particular country. While these studies have been critically important in demonstrating the impact of health warning policies, they offer limited insight into the differential impact of individual warnings and their design.

Most research on health warning content has been conducted by regulatory agencies as part of the pre-testing, often using focus groups to assess the potential efficacy of different warnings.¹⁰⁻¹³ To

date, there is little published research on different types of message content and different executional themes with respect to how specific health effects are depicted in cigarette package warnings. Research to date suggests that warnings with graphic pictorial content, especially fear-arousing imagery, are more likely to be read and noticed by smokers, and are associated with a greater motivation to quit.^{4,7,14-16} Warnings with symbolic images have been found to be less effective than warnings with graphic images.^{8,17,18} The use of *testimonial* or *narrative* messages that depict real people and stories is a communications approach common in other health domains,¹⁹ but its use for cigarette health warnings has been associated with an inconsistent pattern of effects across studies and populations.¹⁹⁻²²

Most of the evidence on effectiveness of health warning design has been conducted in high-income Western countries. Thus, the extent to which research findings on health warning designs generalize to consumers from different geographic and cultural contexts is unclear. Additional evidence to guide health warning design in low- and middle-income countries (LMICs) is particularly important, because consumers in LMICs tend to have relatively low risk perceptions, tend to have limited access to other sources of health information about tobacco use, and have a higher prevalence of low literacy.²³ In addition, it is common regulatory practice for countries to share health warning images and content. Although this kind of technical assistance and cooperation is consistent with the Framework Convention on Tobacco Control’s call for international cooperation (in Articles 20, 21, and 22),² in many cases, images and themes developed in high-income countries have been implemented in LMICs with little or no pre-testing or modification. Therefore, there is a need to understand the extent to which the effectiveness of health warning themes generalize across jurisdictions with diverse geographic and cultural contexts.

The current study examined the efficacy of key health warning themes and images among adult smokers and smoking and non-smoking youth in seven countries that bear a high burden of tobacco use and were also studied in the International Tobacco Control Policy Evaluation Project (ITC): Bangladesh, China, Germany, India, Mexico, Republic of Korea (ie, South Korea), and the United States. Specific objectives were to examine differences in perceived effectiveness between: (1) text-only versus pictorial warnings; (2) pictorial “themes” across sets of warnings; and (3) testimonial versus non-testimonial content. The study also tested between-country differences, including whether perceived effectiveness of health warning themes varied by country.

Methods

An experimental study was conducted with ~500 adult (aged 19 years and older) smokers and ~500 youth (aged 16–18, male and female, both smoking and nonsmoking) in each of seven countries, between June 2010 and November 2012. Online surveys were self-completed by all respondents in the United States, Germany, and Korea, and youth in China; computer-assisted face-to-face interviews were conducted with all respondents in Mexico, India, and Bangladesh, and adults in China. A complete description of the study protocol is available at <http://davidhammond.ca/projects/packaging-warnings/health-warnings-7-country-study/>.

At the time of data collection, India was the only country included in the study that had implemented pictorial health warnings—on May 31, 2009. India introduced revised pictorial warnings in December 2011, although both sets of health warnings contained images that were considered ineffective despite their pictorial content.²⁴ All other countries had text-only warnings at the time of the study.

Sample and Recruitment

In the countries where face-to-face interviews were conducted, respondents were recruited from public areas in the capital or major city in each country. To minimize self-selection bias, interviewers followed a standard intercept technique whereby a physical landmark at the site was selected, and every n^{th} person to pass the landmark was approached and invited to participate.²⁵ For the youth survey in China only, all grades 11 and 12 students at four schools in Beijing were invited to participate and completed an online survey in their classroom. In the United States, Germany, and Korea, respondents were recruited via email from a consumer panel (Global Market Insite, Inc. and their in-country partners). No female adults were recruited in China, India, Bangladesh, and Korea, due to low female smoking rates and resulting feasibility issues. While adult samples included only smokers, the youth samples included both smokers and nonsmokers, to examine implications for smoking initiation. The sampling strategy employed was not intended to be nationally representative; rather, the goal in each country was to produce a relatively heterogeneous sample for random allocation to the experimental conditions.

Ethics Review and Consent

The study was reviewed by and received ethics clearance from the Office of Research Ethics at the University of Waterloo. In addition, the study received within-country review from the ethical review committees at China CDC (China), Healis-Sekhsaria Institute for Public Health and the Indian Council for Medical Research (India), and the Bangladesh Medical Research Council (Bangladesh). As a token of appreciation, all respondents received some form of remuneration, although the type and amount varied by country, and was determined with the guidance of local partner organizations and scaled to be appropriate in each country.

Protocol

After completing questions on socio-demographics and smoking behavior, respondents viewed a series of health warning images on a computer screen or iPad. Respondents were randomized to view and rate two sets of health warnings (from a possible 15 sets), each set for a different health effect of smoking, and presented in random order. Each set included 5–7 warnings on the same health effect, with each warning representing one (or more) of a number of “themes”

(described below), and warnings presented in random order. Health effects comprising the 15 sets included: addiction, aging, death, emphysema, gangrene, heart disease, impotence, lung cancer, mouth cancer, effects in pregnancy, quitting smoking, secondhand smoke effects, stroke, throat cancer, and toxic constituents. Warnings were kept the same across countries, with minor adaptation for local use, including translation of all text into the local language(s), and use of racially appropriate models in images, where possible.

Warning Label Content and Themes

Warnings for each health effect included one text-only warning, and 4–6 pictorial warnings in a variety of executional styles (“themes”). The number and specific pictorial warnings for each set were based on feasibility and suitability, as well as the content of warnings already implemented or proposed. The text used in all warnings was the same for each warning within a particular set, with the exception of the testimonials. Images were drawn from actual health warnings implemented in different countries and adapted where necessary.

The theme of each pictorial warning was coded as one or more of the following:

1. *Graphic* health effect (vivid depiction of physical effects on the body);
2. *Lived experience* (depiction of personal experience of the consequences of smoking, including social and emotional impact, or implications for quality of life); and,
3. *Symbolic* (representation of message using abstract imagery or symbol).

An additional level of coding specified whether *graphic* warnings featured *internal* health effects (inside the body, eg, heart or lungs) or *external* health effects (externally visible effect, eg, foot or mouth). *Lived experience* images were also coded as either *effects on self* (depiction of personal experience or implications for quality of life on the smoker) or *effects on others* (depiction of personal experience or implications for quality of life on others; eg, children, spouse).

In addition, one *testimonial* pictorial warning was created for each set (with one exception, toxicity, for which a testimonial was not suitable). *Testimonial* warnings used the image from a *lived experience* warning in the same set, but with personalizing text rather than “didactic” text. The text included a personal narrative describing a consequence of smoking, written as a quote from a person in the image and accompanied by their name and age. The testimonial version and its didactic partner formed a pair in the analysis, to examine the incremental effect of the testimonial information.

The warnings (US versions) and coding are presented in [Supplementary Table 1](#).

Measures

Outcome

Although respondents rated each warning on a total of 11 measures, the current paper presents findings on the measure of *overall effectiveness*: “Overall, on a scale of 1 to 10, how effective is this health warning?”, where 1 = “not at all” and 10 = “extremely.” The measure of “overall effectiveness” was highly correlated with the individual measures.²²

Covariates

Covariates included *country* (Bangladesh, China, Germany, India, Korea, Mexico, United States), *age group* (adult, youth) and *sex* (male, female). *Smoking status* was assessed by asking all

respondents “In the last 30 days, how often did you smoke cigarettes?”: those responding “Every day” were categorized as *daily smokers*, “At least once a week” and “At least once in the last month [China: last 30 days]” were *non-daily smokers*, and “not at all” were *nonsmokers*. Models also included *warning set* (1 to 15, for each health effect).

Analysis

Mean effectiveness ratings (across all countries) were estimated for the 79 individual health warnings tested in the study. Repeated measures ANOVA models were used to test all pairwise differences between individual warnings within each of the 15 health effect sets (separately for adults and youth); multiple comparisons were controlled using the false-discovery rate adjustment. Differences between the adult and youth mean scores for each individual warning were examined using *t*-tests; again, multiple comparisons were controlled using the false-discovery rate adjustment.

Linear mixed effects (LME) models were estimated to examine ratings of effectiveness across the 15 health effects by label type. LME models are suitable for the analysis of correlated data, such as the multiple warning label ratings from each respondent. Fixed effects, representing the average effects of covariates on the entire population, were estimated for country, age group, sex, smoking status, health effect set viewed and particular label types/themes. Random effects (ie, random slope parameters), representing how an individual’s response differed from that of the population, were estimated for the particular “theme” that a given warning represented (ie, how the effect of that “theme” varied for a given individual compared to that of the overall population), and to account for repeated observations within particular individuals. All models included random intercepts describing how the mean response of any given individual differs from that of the overall population mean. As a second step, two-way interactions between country and variables of interest (*noted below for each comparison*) were added as fixed effects to the base models. Respondents with missing data on any of the measures included in the models were excluded from analyses on a case-wise basis.

Separate LME models were estimated for each of the comparisons of interest. To compare label types (*text* versus *pictorial warnings*), all observations were included for 15 text-only and 50 pictorial warnings featuring the same text (testimonials were excluded given that their text was different). Different *pictorial warning themes* (*graphic, lived experience, graphic + lived, symbolic*) were compared including only pictorial warnings (50; text-only and testimonial warnings were excluded). Additional LME models were estimated to test characteristics of selected themes using the same approach described above (and including the 50 pictorial warnings): one comparing *external* versus *internal* versus *no* graphic effects, and one comparing lived experience effects on *self* versus *other* versus *none*. *Testimonial* versus *non-testimonial* warnings featuring the same image were compared within a limited data set that included each testimonial warning¹⁴ and its “matching” warning with the same image and didactic text, within each set. To determine whether theme effects varied by country, two-way interactions between theme and country were tested in each model. For each model, the overall theme by country interaction effect was tested. If significant, differences in average effectiveness ratings were tested by theme type within each of the countries. These post hoc tests controlled for multiple comparisons using the false discovery rate correction. All statistical analyses were conducted using SAS version 9.4 (SAS Institute, Inc.; Cary, NC).

Results

Sample Characteristics

The total sample included 8182 respondents: 4077 adults, and 4105 youth aged 16–18. **Table 1** presents the sample characteristics of adult smokers and youth, overall and in each country. As previously noted, according to the sampling plan, the adult samples in China, India, Bangladesh, and Korea included only males, while Germany, Mexico, and the United States also included females. In addition, there were greater percentages of non-daily smokers in the Mexico adult and youth samples, consistent with the country’s profile of tobacco use.²⁶ Among the youth samples, the percentages of daily and non-daily smokers varied widely by country; for example, there

Table 1. Sample Characteristics, by Country and Age Group, %(n) (n = 8182)

	All countries n = 8182	Bangladesh n = 1019	China n = 1070	Germany n = 1206	India n = 1012	Korea n = 1362	Mexico n = 1066	United States n = 1449
Adults (19+)	n = 4077	n = 513	n = 504	n = 623	n = 503	n = 621	n = 542	n = 772
Age (mean; SD)	36.3 (12.8)	29.7 (9.3)	35.1 (11.9)	41.5 (12.0)	30.6 (8.8)	34.4 (9.2)	29.3 (11.5)	47.1 (12.5)
Sex								
Male	76.3 (3112)	100 (513)	100 (504)	52.6 (328)	100 (503)	100 (621)	51.5 (279)	47.3 (365)
Female	23.7 (965)	—	—	47.4 (295)	—	—	48.5 (263)	52.7 (407)
Smoking status								
Daily smoker	86.0 (3505)	93.8 (481)	88.5 (446)	89.6 (558)	96.8 (487)	92.6 (575)	51.5 (279)	88.1 (680)
Non-daily smoker	14.0 (572)	6.2 (32)	11.5 (58)	10.4 (65)	3.2 (16)	7.4 (46)	48.5 (263)	11.9 (92)
Youth (16–18)	n = 4105	n = 506	n = 566	n = 583	n = 509	n = 741	n = 524	n = 677
Age (mean; SD)	17.1 (0.8)	17.2 (0.7)	16.6 (0.7)	17.3 (0.8)	17.4 (0.7)	17.4 (0.7)	17.0 (0.9)	16.7 (0.7)
Sex								
Male	49.9 (2047)	49.6 (251)	53.4 (302)	44.4 (259)	51.1 (260)	47.6 (353)	49.8 (261)	53.5 (362)
Female	50.1 (2058)	50.4 (255)	46.6 (264)	55.6 (324)	48.9 (249)	52.4 (388)	50.2 (263)	46.5 (315)
Smoking status								
Daily smoker	15.2 (625)	18.6 (94)	5.0 (28)	17.0 (99)	41.7 (212)	5.8 (43)	12.8 (67)	12.1 (82)
Non-daily smoker	14.6 (599)	5.9 (30)	3.9 (22)	22.0 (128)	1.6 (8)	12.3 (91)	36.1 (186)	19.4 (131)
Nonsmoker	70.2 (2881)	75.5 (382)	91.2 (516)	61.1 (356)	56.8 (289)	81.9 (607)	51.2 (268)	68.5 (464)

were relatively few smokers in the China sample and a much greater proportion of daily smokers in the India sample.

Warning Label Ratings

Supplementary Table 1 shows the mean overall effectiveness ratings for each warning for youth and adults, along with significant differences between individual warnings within each health effect set, and between adults and youth for each of the 79 warnings, pooling data across countries.

Text Versus Pictorial Warnings

Across all countries, the mean effectiveness score (adjusted for fixed effect covariates and random effects via a LME model; see Supplementary Table 2) for the 15 text-only warnings (one for each health effect) was 4.59, compared to a mean score of 6.45 for the 50 pictorial warnings that used the same text with an image. Country ($p < .001$), health effect set ($p < .001$), label type ($p < .001$), and the country by label type interaction ($p < .001$) were all highly significant in the model; age group ($p = .09$), sex ($p = .21$) and smoking status ($p = .60$) were not. While pictorial warnings were rated higher than text-only warnings in all countries (all $p < .001$), as indicated by statistically significant interactions, the magnitude of this difference varied by country (Figure 1): the largest difference was observed in Korea (2.4) and the smallest in China (1.2).

Pictorial Themes

Among pictorial warning themes (Figure 2), graphic warnings were rated highest across all countries (overall mean = 7.25; adjusted for fixed effect covariates and random effects via a LME model), followed by graphic and lived experience content together (6.78), lived experience (6.02), and symbolic (5.82) warnings; all pairwise comparisons were significant ($p < 0.001$ for all). Country ($p < .001$), theme ($p < .001$) and health effect set ($p < .001$) were significant in the model; age group ($p = .43$), sex ($p = .64$) and smoking status ($p = .14$) were not. There was a significant theme by country interaction ($p < .001$): the same general pattern held across most countries, but with considerable variation in the differences between themes (Supplementary Table 3). The symbolic and lived experience themes

in particular varied substantially between countries, while graphic content was rated more consistently, as depicted in Figure 2.

Graphic Warnings—Internal Versus External

Among graphic warnings, those depicting internal effects were rated as more effective, on average, than those depicting external effects (7.29 and 7.05, respectively; $p < .001$). Both internal and external graphic warnings were rated higher than other pictorial warnings without graphic content (5.97; $p < .001$ in both cases). In addition to significant fixed effects for graphic content (coded as internal, external, or not graphic; $p < .001$) and country ($p < .001$), there was a graphic by country interaction ($p < .001$). The trend in all countries except the United States was similar, with internal graphic images rated as more effective than external (by 0.13–0.43); this trend was significant ($p < .05$) in five of the countries, excluding Germany ($p = .08$). In the United States, a different effect was observed: internal and external graphic images were not rated differently ($p = .56$; Supplementary Table 4).

Lived Experience Warnings—Self Versus Others

Among lived experience warnings, those depicting effects on others were rated as more effective than those depicting effects on the self (7.18 and 6.30, respectively; $p < .001$). In addition to significant fixed effects for lived experience content (coded as self, others, or not lived experience; $p < .001$) and country ($p < .001$), there was a lived experience by country interaction ($p < .001$): warnings depicting effects on others were rated as significantly more effective than those on self in all countries, although the magnitude of this difference varied across countries (from 0.69 [Korea and China] to 1.04 [Mexico]; $p < .001$ for all; Supplementary Table 5).

Testimonials

Overall, the mean effectiveness rating of the 14 warnings featuring a testimonial was 6.73, compared to 6.46 for the same images with non-testimonial, didactic text (Figure 3). Country ($p < .001$), label type ($p < .001$), and health effect set ($p < .001$) were significant in the model; age group ($p = .74$), sex ($p = .27$) and smoking status ($p = .13$) were not. There was a significant interaction with country ($p < .001$): testimonial text was rated significantly higher (with

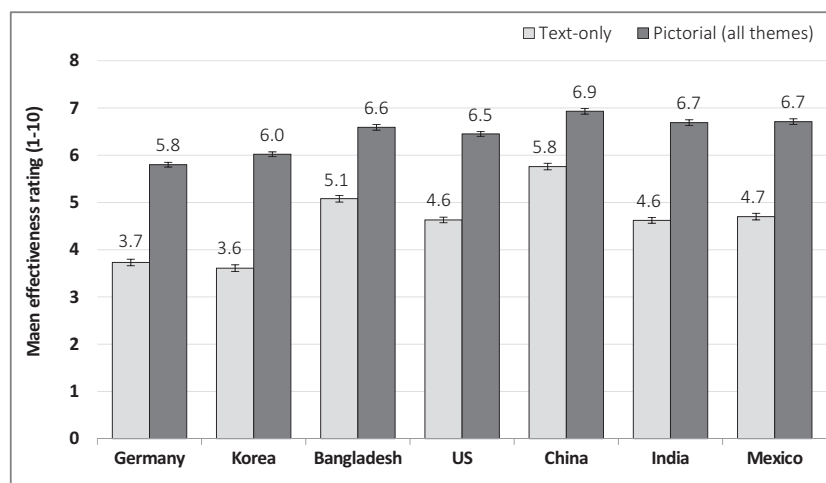


Figure 1. Mean effectiveness scores (adjusted) across text-only and pictorial warnings, by country.

Note: All within-country comparisons of text-only versus pictorial were statistically significant ($p < .05$ for all seven countries; controlling for age group, sex, smoking status, and health effect set viewed).

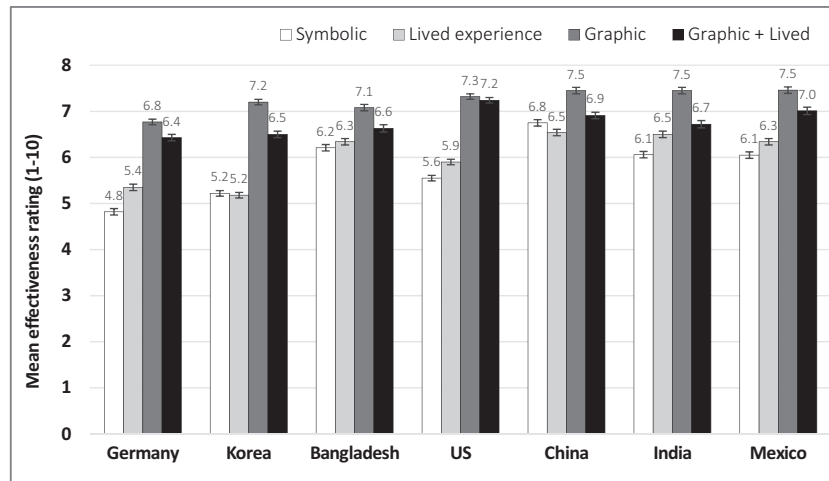


Figure 2. Mean effectiveness scores (adjusted) across warnings, by pictorial label theme and country.

Note: All within-country pairwise comparisons between themes were statistically significant (even after using false-discovery rate adjustment), except the following three: Bangladesh symbolic versus lived experience, Korea symbolic versus lived experience, and US graphic warnings versus graphic + lived experience.

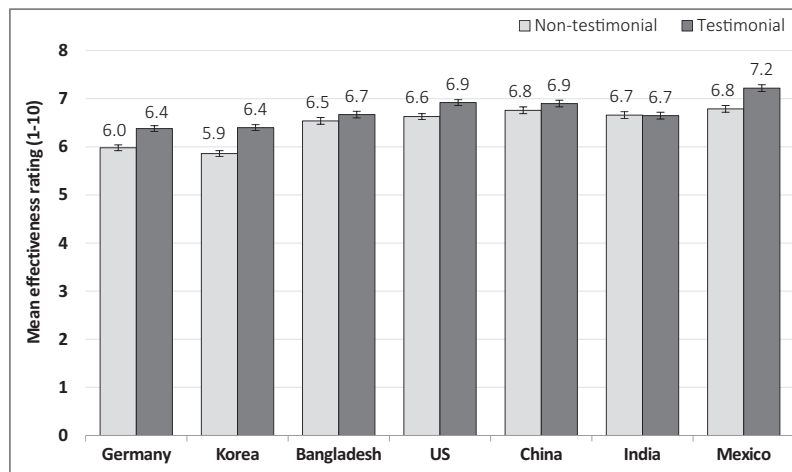


Figure 3. Mean effectiveness scores (adjusted) of testimonial and non-testimonial warnings, by Country.

Note: With the exception of India, all other within-country comparisons for testimonial versus non-testimonial warnings were statistically significant ($p < .05$ for six countries; controlling for age group, sex, smoking status, and health effect set viewed).

varying magnitude; $p < .05$) in all countries except India, where testimonial text did not differ from didactic text ($p = .96$; [Supplementary Table 6](#)).

Significant random effects were also observed in each of the models described above ([Supplementary Tables 2–6](#)), indicating that there was significant variation in the average effectiveness ratings across individuals (ie, random intercepts; $p < .001$)—meaning some individuals ranked all the warning labels that were shown to them higher (or lower) than the average. In addition, most models indicated significant variation in the effect of label type (ie, random slopes; $p < .001$), suggesting that some individuals had different or stronger reactions to particular warning types than others.

When the analyses were stratified by age group, the trends were generally similar among adults and youth overall (data not shown).

Discussion

The current study is among the first to experimentally test the perceived effectiveness of health warning content in non-Western

countries, in addition to Western countries. The findings indicate a general consistency in the types of warnings that were perceived as effective across a diverse selection of countries. In particular, the findings are consistent with the large body of evidence demonstrating that pictorial warnings are rated as more effective than text-only warnings,^{4–6} including in LMICs.^{15,16,18,21} Post-implementation observational studies in LMICs have previously demonstrated that health beliefs are higher and smoking prevalence is lower in countries with more comprehensive health warning policies.^{27–29} In addition, pre-/post-observational studies in LMICs have shown increases in knowledge corresponding to content appearing within new warnings, as well as increases in warning label responses that predict cessation.³⁰

Ratings of health warnings were also similar across population subgroups, including adults and youth, males and females, and smokers and nonsmokers. Given that the study had considerable statistical power to detect small effect sizes, the lack of differences observed among subgroups is notable. These findings are consistent with both experimental findings and observational research in naturalistic settings, which collectively indicate that pictorial warnings have broad

reach among young people and may reduce disparities among disadvantaged subgroups to a greater extent than other health communications.^{4,5,17,20,31–34} The similarity in responses to health warnings both across countries and across socio-demographic subgroups has previously been observed in studies examining antismoking radio and television advertisements across a wide range of LMICs.^{35–37}

Pictorial warnings with graphic content were consistently rated as the most effective health warning theme, while graphic messages depicting “internal” effects were rated as more effective than those depicting “external” effects. The superiority of graphic warnings has been clearly established in the literature, primarily due to their ability to elicit negative emotional responses.⁴ Negative emotions, such as fear, have been hypothesized to mediate the effectiveness of health warnings^{38,39} and have been associated with increases in key outcomes such as intentions to quit, thinking about health risks, and cessation behavior.^{40–45}

There was no evidence that combining themes of lived experience with graphic portrayals of health effects enhanced perceived effectiveness; indeed, warnings with only graphic content were rated as significantly more effective in all countries except the United States. Interestingly, among lived experience warnings, those depicting effects on others were rated as more effective than those depicting effects on the self. This is broadly consistent with research on motivations to quit smoking, in which many smokers cite concern about the effects of their smoking on others, such as their spouse or children.⁴⁶

The use of testimonials enhanced perceived effectiveness in all countries with the exception of India, where ratings of testimonial text did not differ from didactic text. The benefit of integrating testimonial information in most countries is consistent with previous experimental research indicating that testimonial content can enhance the efficacy of warnings in the United States and Mexico,^{18,20} as well as evidence on the use of testimonial content in antitobacco mass media campaigns.^{47,48} The lack of effect for testimonial warnings in India was previously observed in an experimental study of smokeless warnings in India.^{21,49} It remains unclear whether this discrepancy is due to unique cultural factors or the specific testimonial messages tested in the study. However, at least one other study has found evidence of greater impact of didactic text, particularly amongst youth.²⁴ Differences found may be due to study designs, as the other study included a balance between more elaborated testimonials and didactic texts, whereas the current study included one testimonial and 4 to 6 warnings with the same didactic statement within each set that participants evaluated. Future research should examine this issue further.

Finally, there was less consistency across countries in the perceived efficacy of symbolic warnings. Symbolic imagery was rated similarly to lived experience in Korea and Bangladesh, and more highly than lived experience in China, whereas symbolic imagery was rated as significantly less effective in the other four countries. Although some anecdotal information suggests that symbolic imagery may be more prevalent in some Asian societies, we are unaware of any empirical research on this issue. Future research should examine the extent to which cultural context influences the efficacy of symbols commonly used in health warnings. Nevertheless, in China, Korea, and Bangladesh—as in all other countries—symbolic warnings were perceived as significantly less effective than graphic warnings.

Limitations

Participants in the current study were not recruited using probability-based sampling techniques, and the recruitment strategy differed

between high-income countries (email to commercial panels in United States, Germany, and Korea) and LMICs (in-person intercept technique in Mexico, Bangladesh, China, and India). Therefore, the sample cannot be said to be representative of all adult smokers or youth in each country. In addition, the study did not replicate the naturalistic setting in which consumers interact with health warnings: viewing warnings for a brief period during a study does not replicate the repeated exposures of health warnings in “real life.” However, previous studies have demonstrated that findings from the research design used in the current study, including measures of perceived effectiveness,⁵⁰ predicts consumer responses to health warning content in population-based studies examining the same warnings after they have been implemented.⁵¹

Conclusions

The findings demonstrate general consistency in responses to health warning content across seven diverse countries. Although some differences in the magnitude of effects were observed across countries, the findings were strikingly similar across youth and adults, as well as smokers and nonsmokers. Therefore, although tailoring health warnings to specific populations may be warranted in some cases, many of the general themes used to design health warnings appear to have similar effects across diverse cultures. The findings also provide general support for the regulatory practice of sharing health warning images across countries, particularly in jurisdictions with little capacity to develop original health warning content.

Overall, the findings reinforce the importance of using graphic imagery to engage consumers, and suggest that greater use of testimonial content may be effective in enhancing graphic imagery. The use of symbols and “lived experience” themes should be considered secondary options given lower levels of efficacy. Ultimately, the health warning design will depend on the number of warnings—larger “sets” of warnings provide greater flexibility to incorporate different content—as well as the efficacy of the specific images and text. Although the current study did not address stigma, care should also be taken not to stigmatize specific health conditions or marginalized groups.

Supplementary Material

Supplementary Tables 1–6 can be found online at <http://www.ntroxfordjournals.org>

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Declaration of Interests

None declared.

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