



Published in final edited form as:

Cancer Causes Control. 2012 March ; 23(0 1): 69–80. doi:10.1007/s10552-012-9899-8.

Can pictorial warning labels on cigarette packages address smoking-related health disparities?: Field experiments in Mexico to assess warning label content

James F. Thrasher^{1,2}, Edna Arillo-Santillán², Victor Villalobos², Rosaura Pérez-Hernández², David Hammond³, Jarvis Carter¹, Ernesto Sebríe⁴, Raul Sansores⁵, and Justino Regalado-Piñeda⁶

¹Department of Health Promotion, Education & Behavior, Arnold School of Public Health, University of South Carolina, Columbia, SC, USA

²Centro de Investigación en Salud Poblacional, Instituto Nacional de Salud Pública, Cuernavaca, México

³Department of Health Studies & Gerontology, University of Waterloo, Canada

⁴Roswell Park Cancer Institute, Buffalo, NY, USA

⁵Instituto Nacional de Enfermedades Respiratorias, Mexico City, Mexico

⁶Consejo Nacional contra Adicciones, Secretaría de Salud, México

Abstract

Objective—This study aimed to determine the most effective content of pictorial health warning labels (HWLs) and whether educational attainment moderates these effects.

Methods—Field experiments were conducted with 529 adult smokers and 530 young adults (258 nonsmokers; 271 smokers), wherein participants reported responses to different HWLs printed on cigarette packages. One experiment involved manipulating textual form (testimonial narrative vs didactic) and the other involved manipulating imagery type (diseased organs vs human suffering).

Results—Tests of mean ratings and rankings indicated that HWLs with didactic textual forms had equivalent or significantly higher credibility, relevance, and impact than HWLs with testimonial forms. Results from mixed-effects models confirmed these results. However, responses differed by participant educational attainment: didactic forms were consistently rated higher than testimonials among participants with higher education, whereas the difference between didactic and testimonial narrative forms was weaker or not statistically significant among participants with lower education. In the second experiment, with textual content held constant, greater credibility, relevance and impact was found for graphic imagery of diseased organs than imagery of human suffering.

Conclusions—Pictorial HWLs with didactic textual forms appear to work better than with testimonial narratives. Future research should determine which pictorial HWL content has the greatest real-world impact among consumers from disadvantaged groups, including assessment of how HWL content should change to maintain its impact as tobacco control environments strengthen and consumer awareness of smoking-related risks increases.

Keywords

product labeling; health communication; tobacco; health policy

INTRODUCTION

Policies that establish prominent, pictorial health warning labels (HWLs) on tobacco packaging are a key intervention promoted by the World Health Organization – Framework Convention on Tobacco Control (WHO-FCTC).¹² HWL messages on tobacco packaging can inform consumers and potential consumers about toxic constituents in tobacco and tobacco smoke, the health effects of smoking, and methods for quitting smoking. From the vantage of public health information campaigns,^{3–5} HWLs can convert tobacco packaging into a powerful public health intervention because of its broad reach, ability to frequently expose target audiences to an array of HWL messages, and the potential for periodic refreshing of HWL content and design.

For countries with few resources to conduct media campaigns and educational interventions, HWLs can be critical for disseminating information on the risks of tobacco products.⁶ Through 2011, 39 countries had implemented pictorial HWLs, 22 of which were in lower-middle and upper-middle-income countries.⁷ Eight of these countries are in Latin America, including Mexico and Uruguay, whose HWLs cover more package surface area than anywhere else in the world (80% and 65% of primary pack surfaces, respectively).⁸ Research is needed to inform the selection of pictorial and textual content for countries that newly implement pictorial HWL policies, as well as for countries that have adopted this policy and can periodically change HWL content.

Low- and middle-income countries face a growing morbidity and mortality burden from tobacco-attributable disease.⁹ In many of these countries, smoking has been more prevalent within higher socioeconomic status (SES) groups, but smoking is becoming more concentrated among disadvantaged populations.¹⁰ Survey data indicate that this process may be underway in Mexico. Socioeconomic status (SES) is unassociated with smoking prevalence among men, and women in high SES strata have only a slightly higher prevalence of smoking than women in low SES strata.^{11,12} To ensure that smoking does not further exacerbate impoverished conditions and associated health-disparities,¹³ HWL policies, as well as other WHO-FCTC policies, should be designed to ensure equivalent or greater impact among disadvantaged groups. Otherwise, low- and middle-income countries may follow the pattern of some Western countries, where smoking prevalence and the smoking-related disease burden has become increasingly concentrated in disadvantaged groups with lower education and fewer resources.^{14,15}

Experimental and survey research on HWLs has mostly focused on the added impact of pictorial content compared to text-only content, and pictorial HWLs perform better at engaging smokers, increasing knowledge about tobacco-related risks, promoting thoughts about quitting, and decreasing demand for cigarettes.^{16–23} Pictorial HWLs may overcome literacy issues,^{17,24} which are more prevalent in disadvantaged groups.²⁵ Panel and cross-sectional data from Australian, UK and Brazilian smokers after implementation of prominent HWLs with graphic, evocative imagery found that HWL impact was greater among smokers with lower educational attainment.^{24,26} Education was unassociated with HWL impact in the United Kingdom and Mexico, where text-only HWLs had been implemented, as well as in Uruguay, where prominent pictorial HWLs included symbolic imagery of danger HWLs (e.g., time bomb to represent pending danger).^{24,26} These results suggest that pictorial warnings with evocative, graphic imagery have a greater impact among

lower SES groups than only text or non-graphic, abstract imagery. This is consistent with US research indicating that cessation ads on television that include emotionally evocative content and testimonials have a greater impact among smokers from lower than from higher SES groups.²⁷

The current study builds upon field experiments conducted among adolescents and adult smokers in Mexico.²⁸ HWLs with graphic imagery (i.e., vivid depiction of the physical effects of smoking) were more effective than other visual strategies. Furthermore, pictorial HWLs that included testimonial content (i.e., a brief narrative describing a personal consequence of smoking, written as a quote from a person in the image, accompanied by their name and age) had a greater impact than the same HWL image with a simple didactic statement (e.g., *Smoking causes lung cancer*). Although educational attainment did not moderate these effects, the sample was more highly educated than the general population.

The present study involved two experiments to determine the relative impact of pictorial HWLs with different textual forms (i.e., Experiment 1: testimonial narrative vs. didactic) and different imagery types (i.e., Experiment 2: imagery of diseased organs vs. human suffering). Our secondary aim was to determine whether the effects for different pictorial HWL content varied across levels of educational attainment. Based on previous findings,²⁸ we hypothesized that testimonial forms would have a greater message acceptance (i.e., credibility, relevance) and perceived impact than didactic forms, with stronger effects found for participants with lower educational attainment, due to lower health literacy in this group. Our studies responds to the broader need for research on the vehicles and contexts in which narrative communication may be more effective than didactic forms for cancer prevention and health promotion more generally.²⁹

MATERIAL & METHODS

Development and design of experimental stimuli

Cigarette packages were designed according to Mexican law: 30% of the upper front face of the pack included both pictures and text, and 100% of the back and one side contained only text. A graphic artist designed the packs, including imagery for a fake cigarette brand (See Figure 1). We selected HWL topic areas and imagery that previous research indicated to have the greatest impact among Mexican adult smokers and adolescents (for details, see²⁸). Pictorial HWLs were printed on packages that contained 20 cigarettes, so that the weight and feel of the pack was realistic.

Experiment 1 stimuli—For each of six different smoking-related health effects (i.e., lung cancer, throat cancer, stroke, heart disease, premature birth, and addiction), three packs were designed that had the same HWL image, textual content on toxic constituents,³⁰ and textual “call to action” for a free telephone quitline. The primary experimental manipulation involved textual form (testimonial vs. didactic) of the text that appeared in the upper 2/3 of the back of the cigarette package (see Figure 1). The content across manipulations was explicitly linked to knowledge about and expectancies regarding susceptibility and severity of the health effect topic illustrated in the HWL image that appeared on the pack. For any particular health effect topic and corresponding image, three textual variants were developed: 1) two warnings contained testimonial narratives gathered from real people, which briefly described the impact of the health effect on the lives of smokers’ themselves or their family members (mean of 29 words; range 21–34 words). Testimonials appeared in quotes and included attribution to a person with a name and age; 2) one warning contained didactic text that described the impact of smoking on the smoker’s body and daily functioning (mean 32 words, range 27–39 words), which was adapted from HWL content from other countries (e.g., Australia) and educational material.

Experiment 2 stimuli—The second experiment involved manipulation of the graphic imagery (i.e., damaged organs or human suffering). For each of two different health effects (i.e., gangrene and emphysema), two packs were designed that varied HWL imagery, while maintaining the same testimonial and accompanying textual content.

Field experiment protocol

In November and December 2010, field experiments were conducted in supermarkets and public parks in Mexico City and Cuernavaca, Mexico. Systematic selection procedures were used to invite every third person to participate. Members of two groups were eligible: 1) 18 to 24 years old; 2) older than 25, had smoked in the previous month and had smoked 100 or more cigarettes in their lifetime. For the group of young adults, we established equal quotas by sex and smoking status (i.e., having smoked in the previous 30 days), with a target of 500 complete interviews. For the group of adult smokers, we had no quotas for our target of 500 complete interviews. The survey and experimental protocol was interviewer-administered and lasted 15 to 20 minutes, with participants receiving a \$50 peso (approximately \$4 USD) voucher for use in diverse stores. The protocol was approved by the IRB at the Mexican National Institute of Public Health.

Experiment 1—The entire sample participated in the first experiment, which involved evaluation of nine different HWLs representing three of six possible health effect topics (i.e., three textual manipulations per topic). Participants were randomized to evaluate one of two blocks of HWLs (i.e., Group A1 topics = addiction, stroke and lung cancer; Group B1 topics = throat cancer, premature birth and heart attack). Within each health topic, participants were presented with all three HWLs stimuli in random order; however, due to computer programming constraints, the order of presentation of the health effect topics was the same within either of the blocks of HWLs. Before evaluating HWLs for a different topic, participants rank-ordered the HWLs that they had just individually evaluated according to how much the HWLs made them want to not smoke (i.e., to not start for nonsmokers and to quit for smokers).

Experiment 2—The second experiment was conducted only with the subsample from the first experiment that participated in the initial fieldwork period (a different HWL manipulation replaced the one under consideration and is irrelevant to the current study). Participants were randomized to evaluate one of two possible health effect topics (i.e., Group A2 topic = gangrene; Group B2 topic = emphysema). Within each health effect topic, participants evaluated two different HWL stimuli presented in random order. After individually rating each of these HWL stimuli, participants selected the HWL that made them most want to not smoke (i.e., to not start for nonsmokers and to quit for smokers).

Measurement

All participants began by responding to validated questions on sociodemographics (i.e., age; sex; educational attainment - primary school or less; secondary school; technical or commercial school; high school; college or more) tobacco use, and attitudes about smoking.³¹ Smoking questions included frequency of current consumption, and participants who had smoked in the previous month were classified according to previous research on tertiles of smoking intensity in Mexico (i.e., nondaily; daily, but less than 5 cigarettes per day; daily, 5 or more cigarettes per day).³² Participants who had not smoked in the previous month were classified as nonsmokers.

Ratings of HWLs were based on characteristics of effective communication.³³¹ Indicators of message acceptance included credibility (i.e., Is this HWL believable?) and relevance (i.e., Is this HWL message for someone like you).³²⁹ Perceived impact was assessed with four

questions (i.e., This HWL would: ...make people more worried about the harms of smoking; ...keep kids from starting to smoke; ...motivate smokers to quit; Overall, how effective is this HWL). Response options for all of these questions involved a 10-point scale with verbal anchors at either end (i.e., Not at all/*Para nada*; Extremely/*Totalmente*), and another verbal anchor between 5 and 6 (moderately/*en el medio*). The projected impact indicators had high internal consistency (Cronbach alpha range 0.88 – 0.93) and were averaged to create a single measure. For ranking all HWLs within health effect topics, smokers were asked which HWL motivated them most to quit smoking, whereas nonsmokers were asked which HWL motivated them most to not smoke. A single variable was also derived to indicate selection of either HWL with a testimonial as more effective than the HWL with the didactic textual form. For experiment 1, warning labels were classified as having either testimonial or didactic textual form. For experiment 2, warning labels were classified as containing either graphic imagery of human suffering or of diseased organs. Before fieldwork, all questions were assessed with cognitive interviewing techniques³³³⁴ and adjustments were made to address potential response error issues.

Analysis

STATA, version 11.0 was used for all analyses. Sociodemographic and smoking-related characteristics were examined for the entire study population, as well as within young adult and adult smoker groups. Ratings and rankings were assessed for each HWL within a block of material (i.e., health effect topic), while stratifying the analyses by educational attainment level. For ratings of message credibility, relevance and impact, paired t-tests were used to determine the statistical significance of mean differences between ratings of HWLs within a block. The percent for selecting each HWL as most effective within a block was also determined, with the youth population separated into smokers and nonsmokers, given the slightly different nature of the question asked. To determine statistical significance of differences in these percentages, separate logistic mixed effects models were estimated for observations within each block, regressing selection as most effective on dummy variables indicating HWLs content (e.g., didactic vs testimonial 1 vs testimonial 2).

Mixed effects models were also estimated in order to determine whether testimonial or didactic HWL content was more effective. The analytic sample for these analyses involved pooling adult smoker and young adult samples, and including all observations associated with HWL topics that had both testimonial and didactic content as alternatives. The mixed effects models were specified to adjust for within-individual correlation of responses across HWLs, and the fixed effects parameters were examined as representing the average effects of covariates within the population. When examining a rating as the dependent variable, bivariate and adjusted linear mixed effects models included person-level characteristics (i.e., sociodemographics, smoking behavior) and HWL characteristics (i.e., dummy variables for health effect topics; dummy variable for didactic vs. testimonial content). In adjusted models, we also tested a multiplicative interaction between the HWL textual form variable and educational attainment (in its original, ordinal format). When this interaction was statistically significant, bi-variate and adjusted models were re-run after stratifying the sample by education level (technical school or less vs. high school or more). Bivariate and adjusted logistic mixed effects models were also estimated for selecting HWLs as most effective, pooling together all observations from smokers and nonsmokers. Bivariate and adjusted models involved the same variables as in the linear mixed effects models, including the test of interaction between HWL textual content and education. Finally, sensitivity analyses were conducted with these logistic models, stratifying data for smokers and nonsmokers, to determine the consistency of results across these subpopulations.

RESULTS

Sample description

Of 2928 people approached, 1066 (36%) were eligible and agreed to participate. The Experiment 1 sample had an average age of 26.6 years (range 18 to 80), and more than half of the participants (56%) were males. About one quarter of the sample (23%) had a secondary education, 11% completed a technical school, half (50%) had a high school education, and 16% had completed a university degree or higher. About a quarter were nonsmokers (26%), a third were nondaily smokers (34%), and of the daily smokers, 58% smoked five or fewer cigarettes and 42% smoked more than five cigarettes a day. Sex was the only sample characteristic for which there was a significant difference between populations assigned to evaluate different blocks of HWL stimuli ($p=0.007$, see Table 1). Sample characteristics for Experiment 2 (which is a subsample of the Experiment 1 population) had similar characteristics. There were no differences between the populations assigned to either HWL condition (see Table 1).

Experiment 1: Credibility, relevance, and impact of textual narrative genre

Mean ratings of credibility, relevance, and overall impact were assessed for HWLs that manipulated the form of textual content (Table 2). Participants with higher educational attainment (i.e., high school or more) consistently rated as stronger the HWLs with didactic text compared to HWLs with testimonial text. For those with lower educational attainment, at least one and sometimes both of the HWLs with testimonial text were rated as strongly as the HWLs with didactic textual content.

To assess the independence of these differences, adjusted linear mixed effects models were estimated with each person contributing one observation for each HWL evaluated. Bivariate coefficients were estimated regressing ratings for credibility, relevance, and overall impact on a dummy variable indicating didactic compared to testimonial HWL content, as well as on other person- and HWL-level characteristics. In bivariate and multivariate models, higher ratings were found for HWLs that contained didactic text compared to testimonials, for people with lower compared to higher educational attainment, and for nondaily smokers compared to daily smokers (See Table 4). Interactions between the textual form dummy variable and education were statistically significant across all indicators, so analyses were rerun after stratifying the population into low and high educational strata (i.e., technical school or less; high school or more).

Bivariate and adjusted models were re-run within educational strata. In all models for participants with higher education, ratings for HWL acceptance and impact were significantly higher when they were didactic compared to testimonial textual forms. Among people with lower educational attainment, the bivariate model results indicated that the narrative genre had no statistically significant association with any indicators. However, in the adjusted models, some of the HWL ratings that were higher for didactic compared to testimonial text became statistically significant (i.e., credibility, impact). Post-hoc stepwise elimination of covariates in the adjusted model indicated that this suppression effect was due to the inclusion of dummy variables for the health effect topics, particularly health effects where the testimonials were rated most similarly to didactic text.

Experiment 1: Prevalence and correlates of selecting HWLs with testimonials as more effective than HWLs with didactic textual content

Table 2 shows the percentage of participants selecting pictorial HWLs with didactic and testimonial forms as most effective in motivating them to quit (for current smokers) or to not start smoking (for current nonsmokers). The didactic text was selected more frequently than

either of the testimonial options among those with higher educational attainment, whereas those with lower education selected the testimonial textual form equally or more often than the didactic textual form.

We estimated logistic mixed effects models, with the dependent variable as selection of the HWL as the most effective (model results not shown). Crude and adjusted odds ratios (ORs) were estimated to indicate likelihood of the didactic HWL texts selected as better than the testimonial texts. Both were statistically significant (OR=1.72, 95%CI 1.57, 1.88; AOR 1.68, 95% CI 1.53, 1.88). A statistically significant interaction with education was found, and in stratified models, both crude and adjusted ORs indicated greater likelihood of didactic text being selected among participants with higher educational attainment (OR=2.21, 95%CI 1.98, 2.47; AOR=2.14, 95%CI 1.91, 2.40). No association was found in models that included only participants with lower educational attainment (OR=1.06, 95%CI 0.91, 1.23; AOR=1.06, 95%CI 0.91, 1.23). Sensitivity analyses produced the same pattern of results for smokers as for nonsmokers (results not shown).

Experiment 2: Ratings and rankings of image type

Mean ratings of HWL material for two health effects (i.e., emphysema and gangrene) involved evaluating two HWL alternatives that had the same testimonial content, but varied the graphic image (see Table 3). Within both strata of educational attainment, the HWL with the image of diseased organs mostly had significantly higher ratings than the HWL with the image of human suffering. The only exception was the lack of a statistically significant difference in ratings for relevance among participants with lower education. People in both educational strata selected as more effective the HWLs with graphic imagery of diseased organs over those with imagery of human suffering at a 3 to 1 ratio.

DISCUSSION

Our study results suggest that graphic pictorial HWLs with textual risk-information (i.e., susceptibility, severity) in didactic form is generally perceived as having greater credibility, relevance, and impact than HWLs with testimonial narrative forms. These results were unexpected given prior research indicating that testimonials have a greater impact than standard HWL text.²⁸ However, this previous research used short, didactic phrasing (e.g., *Smoking causes gangrene*), whereas our didactic texts were more elaborated, more comparable in length to the testimonial forms, and involved more similar content than in the previous study. Other research that has tested the effects of presenting more comparable narrative and didactic forms of risk information has found no difference in their relative impacts on attitudes, beliefs, and intentions, even though testimonial-type narrative forms were perceived as more relevant than “statistical” forms.³⁵³⁶ The fact that participants showed more resistance against messages in the testimonial narrative form than in the didactic form may reflect the need for clear and simple propositional language on pictorial HWLs in the early stages of strengthening the tobacco control environment and communication interventions. Indeed, one area for future research not considered in a recent review²⁹ concerns whether narratives work better than didactic forms after populations are exposed to pictorial HWLs or when transmitted through nonprint media or in other print media that allow for greater quantity of information, such as pamphlets. Future research should also examine message for different types of HWL content, such as messages regarding self-efficacy to quit, for which narrative forms may be more effective than for risk information.²⁹

Differences in the stimuli used across our study and the previous study may also help explain divergence in findings regarding the most effective textual content. In other experimental research²⁸³⁷ participants viewed HWLs on a computer screen without brand

imagery, whereas our textual content appeared on realistic cigarette packs. In our study, a fragment of testimonial text was overlaid on the picture that appeared on the front of the pack, and the primary testimonial text appeared on the back of the pack, along with additional information (i.e., toxic constituents, call to action). Unlike in the previous study, participants who read the testimonial narrative could not simultaneously view the HWL picture, which may account for its reduced impact. Our testimonial material also may not have been as powerful as that used in the previous study; however, testimonials came from real patients suffering from smoking-related disease, and their content was similar to that of the previous study. In the end, our results suggest that elaborated didactic texts on HWLs with graphic imagery will have a broader, population impact in Mexico than testimonial forms. Indeed, this conclusion was supported in subsequent focus groups conducted with populations that had similar educational and age profiles as our sample.²⁸

It is noteworthy that daily smokers generally perceived the pictorial HWLs as less credible and having lower impact than nondaily smokers, even though daily and nondaily smokers had similar perceptions of the relevance of the pictorial HWLs. This may be due to greater resistance to health risk messages among heavier smokers, as they may be more likely to engage in rationalizing beliefs and unrealistic optimism regarding smoking risks.³⁸ Future research should determine whether the effects of pictorial HWLs are modified by level of addiction and other characteristics related to motivation to process messages about smoking risks, such as intention to quit.

Educational attainment moderated evaluations of pictorial HWL content for indicators of message acceptance (i.e., credibility and relevance) and perceived impact. In populations with high school or greater educational attainment, the didactic textual form was clearly rated as more effective than testimonial form; however, in populations with lower educational attainment, testimonials were generally evaluated similarly to didactic texts. Studies of smoking cessation media campaigns in the US have found that evocative testimonials produce a greater impact among adult smokers lower than higher SES.²⁷ Television ads and videos that contain testimonial elements may produce stronger emotional responses and effects than static, textual HWL content. Evidence from Australia^{39,40} and Mexico⁴¹ suggests that media campaigns can create synergistic effects with pictorial HWLs, perhaps making their content more salient, credible and relevant. Research should determine complementary campaign and HWL content that works best among disadvantaged populations. In Mexico, half the population has a secondary school education or less, and this population may require novel communication strategies to promote understanding of the risks of smoking. In this regard, future research should more squarely focus on the issue of literacy and health literacy, which have been shown to mediate the relationship between educational attainment and health knowledge and behavior,^{42,43} although not always.^{44,45} Indeed, some of our study participants may not have had the requisite literacy to adequately distinguish didactic and testimonial textual forms, which could help explain why no difference was found within the less-educated population.

Interpretation of study results should be tempered by some limitations. The study protocol directed participants to attend to HWLs, an experience which differs from exposure in everyday life. To make exposure naturalistic, participants were recruited from public settings in or around places where cigarettes were sold, and the HWLs were printed on realistic cigarette packages with brand imagery. Nevertheless, participation in the study protocol and self-reported evaluations may have biased the results in unpredictable ways. The order of presenting health effect topics was not randomized, which may have introduced an ordering effect that could bias results; however, we expect that any bias is minimal due to the random order in which HWL stimuli were presented with respect to primary study manipulations (i.e., didactic vs. testimonial textual form; diseased organ vs. human suffering

imagery type). Furthermore, we also assessed participants' first exposure to novel HWL material, and their responses to HWL material will change as exposure is frequently repeated.²⁶ The first pictorial HWLs in Mexico had not yet saturated points of sale when this study was fielded, and populations already exposed to prominent pictorial HWLs may respond differently after they habituate to these stimuli. Research on strategies to stave off "wear out" is sorely needed as governments face the issue of selecting new content for their pictorial HWLs.

A number of issues likely compromise the external validity of our study, including focused recruitment in six sites in two major Mexican cities, thereby limiting our ability to generalize results. Indeed, participants were generally more highly educated and younger than the general population of smokers⁴⁶⁻⁴⁸ A more representative sample might have allowed a more detailed examination of how education modifies HWL responses, particularly at lower education levels where our sample was too small to conduct stratified analyses. Nevertheless, the prevalence of nondaily smokers and low intensity daily smokers was similar to the broader Mexican population,⁴⁸ and the consistency of effects generally suggest that the use of elaborated didactic textual forms is an appropriate messaging strategy. Finally, Mexico is somewhat unique for the great amount of space dedicated to text only HWLs (100% of the back and 100% of one side) compared to pictorial elements (30% of the front). Our results may have differed if the HWLs had a different allocation of space, content and design features.

This study suggests that pictorial HWLs with didactic textual forms and imagery of diseased organs are likely to have broad population impact in Mexico. The consistency of this result across population groups suggests that this diverse messaging strategies are currently unnecessary for targeting disadvantaged groups of smokers. However, the greater impact found for the didactic form among people with higher as opposed to lower educational attainment suggests that this strategy may ultimately produce smoking-related disparities among people with lower educational attainment. Future research should continue to examine the textual and pictorial content that will produce a greater impact among disadvantaged groups, in order to stave off smoking-related disparities in countries that are only beginning to experience prevalence shifts toward more disadvantaged populations.

Acknowledgments

Funding for data collection and analyses on this study came from the Union against Tuberculosis and Lung Disease (Mexico 7-1), with additional support for analysis coming from CONACyT (Convocatoria Salud-2007-C01-70032) and the US National Cancer Institute (P01 CA138389). Dr Ernesto Sebríe was supported by the Flight Attendant Medical Research Institute (FAMRI).

REFERENCES

1. WHO. Geneva, Switzerland: World Health Organization, Tobacco Free Initiative; 2003. Framework Convention on Tobacco Control.
2. WHO. Geneva: World Health Organization; 2009. Guidelines for implementation of Article 11 of the WHO Framework Convention on Tobacco Control (Packaging and labelling of tobacco products).
3. IOM. Speaking of health: Assessing health communication strategies for diverse populations. Washington DC: National Academy of Sciences, Institute of Medicine; 2002.
4. Rice, RE.; Atkin, CK., editors. Public communication campaigns. Thousand Oaks, CA: Sage; 2001.
5. Hornik, R., editor. Public health communication: Evidence for behavior change. Mahwah, NJ: Lawrence Erlbaum; 2002.

6. WHO. Geneva: World Health Organization; 2010. Guidelines for implementation of Article 12 of the WHO Framework Convention on Tobacco Control - education, communication, training and public awareness.
7. Cunningham, R. Cigarette Package Warning Size and Use of Pictures: International Summary. Ottawa: Canadian Cancer Society; 2011.
8. Sebríe EM, Blanco A, Glantz SA. Cigarette labeling policies in Latin America and the Caribbean: Progress and obstacles. *Salud Pública de México*. 2010; 52(Supp 2):233–243.
9. Murray CJL, Lopez AD. Global mortality, disability, and the contribution of risk factors: Global Burden of Disease Study. *Lancet*. 1997; 329:1436–1442. [PubMed: 9164317]
10. WHO. Geneva: World Health Organization; 2008. WHO report on the global tobacco epidemic, 2008: The MPOWER package.
11. Franco-Marina F. Adult smoking trends in Mexico: An analysis of the Mexican National Addictions Surveys. *Salud Pública de México*. 2007; 49(Supp 2):S137–S146.
12. Campuzano, JC.; Hernández-Avila, M.; Samet, J.; Méndez, I.; Tapia, R.; Sepúlveda, J. Comportamiento de los fumadores en México según las Encuestas Nacionales de Adicciones 1988 a 1998. In: Valdés- Salgado, R.; Lazcano-Ponce, E.; Hernández-Avila, M., editors. Primer informe sobre combate al tabaquismo. México ante el Convenio Marco para el Control del Tabaco. Cuernavaca: Instituto Nacional de Salud Pública; 2005. p. 21-27.
13. WHO. Geneva, Switzerland: World Health Organization; 2004. Tobacco and poverty.
14. Link B. Epidemiological sociology and the social shaping of population health. *Journal of Health and Social Behavior*. 2008; 49:367–384. [PubMed: 19181044]
15. Garrett BE, Dube SR, Troscclair A, Caraballo RS, Pechacek TF. Cigarette Smoking --- United States, 1965–2008. *MMWR*. 2011; 60(01):109–113. [PubMed: 21430635]
16. Borland R, Wilson N, Fong GT, Hammond D, Cummings KM, Yong H, et al. Impact of graphic and text warnings on cigarette packs: Findings from four countries over five years. *Tobacco Control*. 2009; 18:358–364. [PubMed: 19561362]
17. Fong GT, Hammond D, Hitchman SC. The impact of graphic pictures on the effectiveness of tobacco health warnings. *Bulletin of the World Health Organization*. 2009; 87:640–643. [PubMed: 19705020]
18. Hammond D, Fong GT, Borland R, Cummings KM, McNeil AD, Driezen P. Text and graphic warnings on cigarette packages: Findings from the International Tobacco Control Four Country Study. *American Journal of Preventive Medicine*. 2007; 32(3):210–217. [PubMed: 17296473]
19. Hammond D, Fong GT, MacDonald P, Cameron R, Brown K. Impact of graphic Canadian warning labels on adult smoking behavior. *Tobacco Control*. 2003; 12:391–395. [PubMed: 14660774]
20. Hammond D, Fong GT, McNeil A, Borland R, Cummings KM. Effectiveness of cigarette warning labels in informing smokers about the risks of smoking: Findings from the International Tobacco Control (ITC) Four Country Survey. *Tobacco Control*. 2006; 15(Supp 3):iii19–iii25. [PubMed: 16754942]
21. O'Hegarty M, Pederson LL, Nelson DE, Mowery P, Gable JM, Wortley P. Reactions of young adult smokers to warning labels on cigarette packages. *American Journal of Preventive Medicine*. 2006; 30(6):467–473. [PubMed: 16704939]
22. Thrasher JF, Rousu MC, Anaya-Ocampo R, Reynales-Shigematsu LM, Arillo-Santillán E, Hernández-Ávila M. Estimating the impact of graphic warning labels on cigarette packs: The auction method. *Addictive Behaviors*. 2007; 32(12) 2916-15.
23. Thrasher JF, Hammond D, Fong GT, Arillo-Santillan E. Smokers' reactions to cigarette package warnings with graphic imagery and with only text: A comparison between Mexico and Canada. *Salud Pública de México*. 2007; 49(Sup 2):S233–S240. [PubMed: 17607485]
24. Thrasher J, Villalobos V, Szklo A, Fong GT, Pérez C, Sebríe EM, et al. Assessing the impact of cigarette package warning labels: a cross-country comparison in Brazil, Uruguay and Mexico. *Salud Pública de México*. 2010; 52(Sup 2):S206–S215. [PubMed: 21243191]
25. Kutner, M.; Greenberg, E.; Jin, Y.; Paulsen, C. The health literacy of America's adults: Results from the 2003 National Assessment of Adult Literacy. Washington, DC: National Center for Education Statistics; 2006.

26. Thrasher JF, Price AE, Thompson ME, Borland R, Yong H, Fong GC, et al. A latent growth curve analysis of cigarette warning label wear out: Findings from the ITC Four Country Survey. under review.
27. Durkin SJ, Biener L, Wakefield M. Effects of different types of antismoking ads on reducing disparities in smoking cessation among socioeconomic subgroups. *American Journal of Public Health*. 2009; 99(12):2217–2223. [PubMed: 19833980]
28. Thrasher, J.; Arillo-Santillán, E.; Pérez-Hernández, R.; Sansores, R.; Regalado-Piñeda, J. Cigarette package warning labels: Four studies of impact and recommendations for the second round of pictorial warning labels in Mexico. Cuernavaca, México: Instituto Nacional de Salud Pública; 2011. Evaluación de advertencias sanitarias de las cajetillas de tabaco: Cuatro investigaciones del impacto y recomendaciones para la Segunda Ronda de Pictogramas en México.
29. Kreuter M, Green M, Cappella J, Slater M, Wise M, Storey D, et al. Narrative communication in cancer prevention and control: A framework to guide research and application. *Archives of Behavioral Medicine*. 2007; 33(3):221–235.
30. USDHHS. Washington, DC: US Department of Health and Human Services; 2006. The health consequences of involuntary exposure to tobacco smoke: A report of the Surgeon General.
31. IARC. IARC Handbooks of Cancer Prevention: Tobacco Control. Volume 12. Methods for Evaluating Tobacco Control Policies. Lyon, France: International Agency for Research on Cancer; 2009.
32. Swayampakala K, Thrasher JF, Sansores RH, Regalado J, Berg C, Carpenter M, et al. Low cigarette consumption and smoking cessation in Mexico. under review.
33. Willis, GB. Cognitive interviewing. London: Sage; 2005.
34. Thrasher JF, Quah ACK, Dominick G, Awang R, Omar M, Borland R, et al. Mixing cognitive interviewing and behavioral coding methods to determine measurement equivalence across linguistic and cultural groups: An example from international tobacco survey research. *Field Methods*. In press.
35. Cox D, Cox A. Communicating the consequences of early detection: The role of evidence and framing. *Journal of Marketing*. 2001; 65:91–103.
36. Slater M, Rouner D. Value-affirmative and value-protective processing of alcohol education messages that include statistical evidence or anecdotes. *Communication Research*. 1996; 23:210–235.
37. Hammond, D.; Thrasher, JF.; Reid, JL.; Daniel, S.; Driezen, P.; Boudreau, C. United States health warning study: International packaging study, preliminary results. Waterloo, Canada: University of Waterloo; 2011.
38. Weinstein ND. Accuracy of smokers' risk perceptions. *Nicotine & Tobacco Research*. 1999; 1:S123–S130. [PubMed: 11184311]
39. White V, Webster B, Wakefield M. Do graphic health warning labels have an impact on adolescents' smoking-related beliefs and behaviors? *Addiction*. 2008; 103(9):1562–1571. [PubMed: 18783508]
40. Brennan E, Durkin S, rish Cotter T, Harper T, Wakefield MA. Mass media campaigns designed to complement new pictorial health warnings on cigarette packets: Evidence of a complementary relationship. *Tobacco Control*. 2011
41. Thrasher JF, Murukutla N, Arillo-Santillán E, Pérez-Hernández R, Alday J. Creating synergies between pictorial warning labels on cigarette packages and media campaigns: A case study of Mexico. under review.
42. Pandit AU, Tang JW, Cooper Baily S, Davis TC, Bocchini MV, Persell SD, et al. Education, literacy, and health: Mediating effects on hypertension knowledge and control. *Patient Education and Counseling*. 2009; 75:381–385. [PubMed: 19442477]
43. Schillinger D, Barton LR, Karter AJ, Wang F, Adler N. Does literacy mediate the relationship between education and health outcomes? A study of a low-income population with diabetes. *Public Health Reports*. 2006; 121:245–254. [PubMed: 16640146]
44. Matsuyama RK, Wilson-Genderson M, Kuhn L, Mohganaki D, Vachhani H, Paasche-Orlow M. Education level, not health literacy, associated with information needs for patients with cancer. *Patient Education and Counseling*. 2011:1–8.

45. Paasche-Orlow MK, Clarke JG, Hebert MR, Ray MK, Stein MD. Educational attainment but not literacy is associated with HIV risk behavior among incarcerated women. *Journal of Women's Health*. 2005; 14(9):852–859.
46. CONAPO. Delimitación de las zonas metropolitanas de México 2005. Distrito Federal, México: Consejo Nacional de Población, México; 2007.
47. Saenz de Miera B, Thrasher JF, Chaloupka FJ, Watters H, Hernández-Avila M, Fong GT. Self-reported price, consumption and brand switching of cigarettes in a cohort of Mexican smokers before and after a cigarette tax increase. *Tobacco Control*. 2010; 19:481–487. [PubMed: 20870740]
48. INSP. Cuernavaca, México: Instituto Nacional de Salud Pública & PanAmerican Health Organization; 2010. Encuesta Mundial de Tabaquismo en Adultos, México 2009 [Global Adult Tobacco Survey, México 2009].




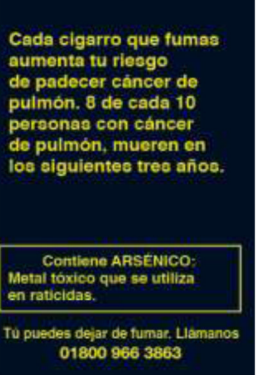
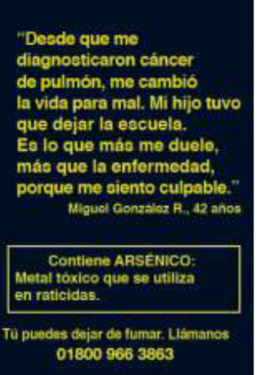
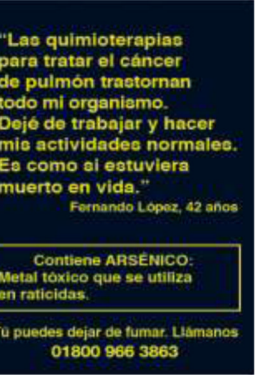
HWL characteristics	HWL with Didactic content	HWL with Testimonial content 1	HWL with Testimonial content 2
<p>30% of the front of the pack contains pictorial content and brand imagery</p> <p>Didactic title phrase is short (i.e., Smoking causes...)</p> <p>Testimonial title uses the same testimonial fragment</p>	 <p>Fumar causa cáncer de pulmón</p> <p>LED S FILTER CIGARRETES</p> <p>CONT. 20 CIGARROS CON FILTRO</p> <p>Cancer causes lung cancer</p>	 <p>... es como si estuviera muerto en vida</p> <p>LED S FILTER CIGARRETES</p> <p>CONT. 20 CIGARROS CON FILTRO</p> <p>“...it is as if he is dead, while he’s still living”</p>	 <p>... es como si estuviera muerto en vida</p> <p>LED S FILTER CIGARRETES</p> <p>CONT. 20 CIGARROS CON FILTRO</p> <p>“...it is as if he is dead, while he’s still living”</p>
<p>100% of the back of the pack contains only textual content</p>	 <p>Cada cigarro que fumas aumenta tu riesgo de padecer cáncer de pulmón. 8 de cada 10 personas con cáncer de pulmón, mueren en los siguientes tres años.</p> <p>Contiene ARSENICO: Metal tóxico que se utiliza en raticidas.</p> <p>Tú puedes dejar de fumar. Llámamos 01800 966 3863</p>	 <p>“Desde que me diagnosticaron cáncer de pulmón, me cambió la vida para mal. Mi hijo tuvo que dejar la escuela. Es lo que más me duele, más que la enfermedad, porque me siento culpable.” Miguel González R., 42 años</p> <p>Contiene ARSENICO: Metal tóxico que se utiliza en raticidas.</p> <p>Tú puedes dejar de fumar. Llámamos 01800 966 3863</p>	 <p>“Las quimioterapias para tratar el cáncer de pulmón trastornan todo mi organismo. Dejé de trabajar y hacer mis actividades normales. Es como si estuviera muerto en vida.” Fernando López, 42 años</p> <p>Contiene ARSENICO: Metal tóxico que se utiliza en raticidas.</p> <p>Tú puedes dejar de fumar. Llámamos 01800 966 3863</p>
<p>The upper 2/3 is didactic or testimonial textual form</p>	<p>Every cigarette that you smoke increases your risk of getting lung cancer. 8 of every 10 people with lung cancer die within the next three years.</p>	<p>“Since they diagnosed me with lung cancer, my life has changed for the worse. My son had to leave school. This is what is most painful, more than the sickness, because I feel responsible”</p>	<p>“The chemotherapy to treat the lung cancer messes up my entire body. I had to stop working and doing normal things. It’s as though I’m dead, while still living.”</p>
<p>The box contains toxic constituent information</p>	<p>Contains ARSENIC: A toxic metal used to kill rats</p>	<p>Contains ARSENIC: A toxic metal used to kill rats</p>	<p>Contains ARSENIC: A toxic metal used to kill rats</p>
<p>The bottom contains a call to action</p>	<p>You can quit. Call us 1800 966 3863</p>	<p>You can quit. Call us 1800 966 3863</p>	<p>You can quit. Call us 1800 966 3863</p>

Figure 1. Example cigarette package warning label specifications for the health effect of lung cancer

Characteristics of samples randomly allocated to evaluate different groups of pictorial health warning labels in Experiment 1 & 2

Table 1

Characteristics	Experiment 1 (textual content)		Experiment 2 (imagery type)	
	Group A1 ¹ (n=510)	Group B1 ² (n=556)	Group A2 ³ (n=320)	Group B2 ⁴ (n=341)
Age (mean and range)	26.9 (18 to 72)	26.4 (18 to 80)	26.9 (18 to 72)	26.5 (18 to 68)
Sex [*]				
Female	48%	40%	53%	48%
Male	52%	60%	47%	52%
Education				
Secondary or less	23%	24%	23%	20%
Technical school	13%	10%	13%	8%
High school	50%	50%	50%	54%
University or more	15%	16%	13%	18%
Smoking behavior				
Nonsmoker	26%	26%	23%	23%
Nondaily smoker	32%	36%	33%	39%
Daily smoker, < 5 per day	24%	23%	27%	24%
Daily smoker, 5 or more per day	19%	15%	18%	14%

¹ Group A1 evaluated three textual variants for each of three topics (Throat cancer, Premature birth, Heart attack)

² Group B1 evaluated three textual variants for each of three topics (Addiction, Stroke, Lung cancer)

³ Group A2 evaluated two image variants (i.e., diseased organs, human suffering) for the topic of gangrene

⁴ Group B2 evaluated two image variants (i.e., diseased organs, human suffering) for the topic of emphysema

^{*} males less likely to have been assigned to evaluate stimuli in Group A1 than stimuli in Group B1 (p=0.007). No other statistically significant differences were found for sample characteristics, comparing Groups A1 with B1 and A2 with B2.

Mean ratings and top rankings for warning labels by narrative form for each health effect, among Mexicans with low and high educational attainment

Table 2

Health effect	Label and sample characteristics			Ratings			Ranking (% chosen as most effective)
	Education attainment*	Narrative type	Credibility	Relevance	Overall Impact		
Stroke	<i>Low</i>	Didactic	7.7 ^{a,d}	4.7	7.0 ^e	39%	
		Testimonial 1	7.4	4.7	6.8	36%	
		Testimonial 2	7.4	4.4	6.7	24%	
	<i>High</i>	Didactic	7.4 ^{c,f}	4.8 ^{b,f}	6.6 ^{c,f}	50%	
		Testimonial 1	6.8	4.4	6.2	22%	
		Testimonial 2	6.8	4.3	6.3	28%	
Premature birth	<i>Low</i>	Didactic	7.6	4.5	6.7	35%	
		Testimonial 1	7.6	4.4	6.6	30%	
		Testimonial 2	7.6	4.4	6.8	35%	
	<i>High</i>	Didactic	7.9 ^{c,f}	4.7 ^{a,d}	6.8 ^{c,f}	48%	
		Testimonial 1	7.3	4.5	6.4	22%	
		Testimonial 2	7.5	4.5	6.6 ^h	30%	
Lung cancer	<i>Low</i>	Didactic	8.3 ^a	5.3 ^b	7.4 ^{a,d}	36%	
		Testimonial 1	8.0	4.8	7.2	38%	
		Testimonial 2	8.1	5.3 ^g	7.2	26%	
	<i>High</i>	Didactic	8.0 ^{c,f}	5.2 ^{c,f}	7.0 ^{c,f}	47%	
		Testimonial 1	7.2	4.6	6.5	24%	
		Testimonial 2	7.4 ^h	4.8	6.6	29%	
Heart attack	<i>Low</i>	Didactic	7.6 ^b	5.5 ^c	6.9 ^c	36%	
		Testimonial 1	7.2	5.0	6.5	38%	
		Testimonial 2	7.5 ^g	5.5 ⁱ	6.8 ^g	26%	
	<i>High</i>	Didactic	7.7 ^{c,f}	5.3 ^c	6.7 ^{c,e}	46%	
		Testimonial 1	6.9	4.6	6.1	24%	
		Testimonial 2	7.3 ⁱ	5.2 ⁱ	6.5 ⁱ	30%	

Health effect	Label and sample characteristics			Ratings			Ranking (% chosen as most effective)
	Education attainment*	Narrative type	Credibility	Relevance	Overall Impact		
Addiction	<i>Low</i>	Didactic	7.4	4.8	6.6	34%	
		Testimonial 1	7.5	5.2	6.7	34%	
		Testimonial 2	7.4	4.8	6.6	33%	
	<i>High</i>	Didactic	7.0 ^e	4.8 ^{a,e}	6.0	41%	
		Testimonial 1	6.8	4.4	5.9	24%	
		Testimonial 2	6.6	4.3	6.0	35%	
Throat cancer	<i>Low</i>	Didactic	7.4	4.7	6.5	28%	
		Testimonial 1	7.3	4.7	6.5	45%	
		Testimonial 2	7.3	4.5	6.5	27%	
	<i>High</i>	Didactic	7.5 ^{c,f}	4.7 ^{a,e}	6.5 ^{b,f}	43%	
		Testimonial 1	6.9	4.5	6.2	33%	
		Testimonial 2	6.8	4.3	6.0 ^h	24%	

* Low educational attainment is at least technical or secondary school; high educational attainment is high school or more

Didactic vs testimonial 1: a p<0.05; b p<0.01; c p<0.001

Didactic vs testimonial 2: d p<0.05; e p<0.01; f p<0.001

Testimonial 1 vs testimonial 2: g p<0.05; h p<0.01; i p<0.001

Mean ratings and top rankings for warning labels by graphic image type and health effect, among Mexicans with low and high educational attainment

Table 3

Health effect	Label and sample characteristics			Ratings		Ranking (% chosen as most effective)
	Education attainment*	Graphic image type	Credibility	Relevance	Overall Impact	
Emphysema	<i>Low</i>	Damaged organs	8.1 ^c	5.2	7.0 ^c	83%
		Human suffering	7.4	4.8	6.6	17%
	<i>High</i>	Damaged organs	8.3 ^c	5.3 ^c	7.3 ^c	82%
		Human suffering	7.5	4.6	6.2	18%
Gangrene	<i>Low</i>	Damaged organs	7.8 ^a	4.4	7.4 ^c	73%
		Human suffering	7.4	4.4	6.8	27%
	<i>High</i>	Damaged organs	7.0 ^a	4.5 ^a	6.8 ^c	78%
		Human suffering	6.7	4.2	6.1	22%

* Low educational attainment is at least technical or secondary school; high educational attainment is high school or more

^a Damaged organs v human suffering, $p < 0.05$;

^b Damaged organs v human suffering, $p < 0.01$;

^c Damaged organs v human suffering, $p < 0.001$

Bivariate and adjusted linear mixed effects model results for ratings of health warning label credibility, relevance and impact

Table 4

	Credibility		Relevance		Perceived impact	
	Bivariate B (SE)	Adjusted B* (SE)	Bivariate B (SE)	Adjusted B* (SE)	Bivariate B (SE)	Adjusted B* (SE)
Age (continuous)	0.02[0.01] ^c	0.04[0.01] ^c	0.06[0.01] ^c	0.07[0.01] ^c	0.02[0.01] ^c	0.04[0.01] ^c
Sex						
Female	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Male	-0.05[0.11]	-0.05[0.11]	0.23[0.17]	0.12[0.17]	0.14[0.12]	0.15[0.12]
Education						
Secondary or less	Ref.	Ref.	Ref.	Ref.	Ref.	ref
Technical school	-0.41[0.20] ^a	-0.45[0.20] ^a	-0.47[0.30]	-0.53[0.30] ^a	-0.25[0.21]	-0.3[0.21]
High school	-0.49[0.14] ^b	-0.39[0.14] ^b	-0.53[0.21] ^a	-0.34[0.21]	-0.50[0.15] ^b	-0.40[0.15] ^b
University or more	-0.54[0.16] ^b	-0.58[0.17] ^c	0.03[0.24]	-0.12[0.24]	-0.42[0.17] ^a	-0.47[0.17] ^b
Smoking behavior						
Nonsmoker	-0.03[0.15]	0.14[0.15]	0.02[0.22]	0.43[0.22] ^a	-0.04[0.15]	0.15[0.16]
Nondaily smoker	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Daily smoker, < 5 per day	-0.36[0.16] ^a	-0.46[0.16] ^b	0.19[0.24]	0.03[0.24]	-0.40[0.17] ^a	-0.50[0.17] ^b
Daily smoker, 5 or more per day	-0.34[0.15] ^a	-0.52[0.15] ^b	0.71[0.23] ^b	0.37[0.23]	-0.38[0.16] ^a	-0.58[0.16] ^b
Warning topic						
Throat cancer	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Stroke	0.05[0.12]	0.05[0.12]	0.01[0.18]	-0.01[0.17]	0.22 [0.12]	0.23[0.12] ^a
Premature birth	0.39[0.06] ^c	0.39[0.06] ^c	-0.02[0.07]	-0.01[0.07]	0.31[0.04] ^c	0.31[0.04] ^c
Lung cancer	0.54[0.12] ^c	0.60[0.12] ^c	0.38[0.17] ^a	0.40[0.17] ^a	0.55[0.12] ^c	0.60[0.12] ^c
Heart attack	0.12[0.05] ^a	0.19[0.05] ^c	0.53[0.06] ^c	0.57[0.06] ^c	0.19[0.04] ^c	0.23[0.04] ^c
Addiction	-0.10[0.12]	-0.11[0.12]	0.14[0.18]	0.12[0.17]	-0.09[0.12]	-0.09[0.12]
Textual content						
Testimonial	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Didactic	0.36[0.03] ^c	0.41[0.03] ^c	0.23[0.04] ^c	0.31[0.04] ^c	0.22[0.03] ^c	0.27[0.03] ^c
Interaction*						

	Credibility		Relevance		Perceived impact	
	Bivariate B (SE)	Adjusted B* (SE)	Bivariate B (SE)	Adjusted B* (SE)	Bivariate B (SE)	Adjusted B* (SE)
Text X Education		0.14[0.02] ^c		0.08[0.03] ^b		0.07[0.018] ^c
Low education stratum**						
Testimonial	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Didactic	0.03[0.11]	0.13[0.07]	0.10[0.08]	0.15[0.05] ^b	0.08[0.08]	0.13[0.04] ^c
High education stratum**						
Testimonial	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Didactic	0.33[0.08] ^c	0.40[0.05] ^c	0.49[0.06] ^c	0.55[0.04] ^c	0.30[0.06] ^c	0.55[0.03] ^c

^a p<0.05;

^b p<0.01;

^c p<0.001

* adjusted model results include all variables shown in the table, except for the interaction coefficient. Adjusted models with interactions were estimated in a separate model that included all covariates (coefficients not shown).

** results from analyses stratified by education level, with low education having technical, secondary education or lower, and high education having high school or higher. Adjusted models included the same variables described above (covariate coefficients not shown).