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# Tobacco Denormalization and Industry Beliefs Among Smokers from Four Countries

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**Background:** Tobacco denormalization is an important concept for understanding smoking behavior. The present study sought to assess beliefs about the tobacco industry and the social acceptability of smoking among nationally representative samples of adult smokers from four countries, and to assess the relationship of these measures to cessation behavior and tobacco-control policy.

**Design:** A longitudinal survey of 9058 adult smokers from Canada ( $n = 2214$ ), the United States ( $n = 2138$ ), the United Kingdom ( $n = 2401$ ), and Australia ( $n = 2305$ ), was conducted in October–December 2002 and again in June and August 2003 (75% follow-up rate). The analyses were conducted in 2005.

**Results:** The findings indicate that few smokers perceive approval for their smoking, and most hold relatively antagonistic beliefs toward the tobacco industry. For example, 80% of smokers reported that society disapproves of smoking, and more than three quarters reported that tobacco companies cannot be trusted to tell the truth. Social and industry denormalization were independently associated with intentions to quit smoking. Baseline levels of social denormalization were associated with abstinence at the 8-month follow-up, as were changes in industry denormalization beliefs between baseline and follow-up. Anti-industry beliefs at baseline did not predict abstinence at follow-up. A similar pattern of findings was observed across all four countries. In addition, social denormalization and anti-industry beliefs were significantly associated with tobacco-control policies, such as noticing health warnings on packages and greater workplace smoking restrictions.

**Conclusions:** Tobacco denormalization constructs were independently linked to cessation-related outcomes among adults from four countries. Tobacco-industry denormalization themes in mass media campaigns may help to reduce tobacco use above and beyond more traditional communications that target social norms.  
(Am J Prev Med 2006;31(3):225–232) © 2006 American Journal of Preventive Medicine

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## Introduction

Tobacco use, as with many health behaviors, is strongly influenced by social norms and one's perception of acceptable behavior. Among youth, for example, peer influences and school smoking prevalence are important determinants of smoking initiation.<sup>1–3</sup> Tobacco industry documents also highlight the importance of social acceptability in the progression toward regular smoking, as well as the maintenance of smoking behavior among established

smokers.<sup>4–6</sup> Indeed, a socially acceptable image of smoking is one of the central themes of tobacco industry marketing, particularly in advertisements aimed at young people.<sup>7</sup>

The public health community has used various media and educational strategies to counter these efforts and to reduce the acceptability of smoking. Traditional social denormalization strategies seek “to change the broad social norms around using tobacco—to push tobacco use out of the charmed circle of normal, desirable practice to being an abnormal practice.”<sup>8</sup>

Thus, social denormalization initiatives commonly target key beliefs about tobacco use, such as challenging the belief that smoking is a “cool” desirable behavior, and correcting the tendency among youth to overestimate the prevalence of smoking.<sup>9</sup>

More recently, a newer generation of tobacco denormalization initiatives has focused specifically on the tobacco industry and its conduct.<sup>10,11</sup> Tobacco industry denormalization seeks “to raise people's awareness of

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the responsibility of the tobacco industry for tobacco-related disease, and to expose the industry's manipulative tactics."<sup>12</sup> In many cases, industry denormalization messages use specific quotes or images drawn from the industry in an effort to resonate with youths' concerns about being manipulated or exploited.<sup>13,14</sup>

Industry denormalization gained widespread prominence following the success of the **truth** media campaigns in the United States, as well as a state-run campaign in California.<sup>15,16</sup> These campaigns gained notoriety for their engaging and, at times, confrontational nature, but also for their effectiveness. Indeed, there is growing evidence that industry denormalization campaigns can change psychosocial predictors of tobacco use, including intentions to smoke among youth, as well as behavior outcomes such as smoking cessation.<sup>17–22</sup>

Although tobacco denormalization is increasingly being recognized as a key component of comprehensive tobacco control programs, many jurisdictions are reluctant to engage in overt industry denormalization due to a lack of political will and fear of industry litigation.<sup>23–25</sup> The question facing many policymakers is whether social forms of denormalization are adequate, or whether campaigns would benefit from incorporating industry themes in their communications. One challenge in answering this question is that industry denormalization is a relatively new construct.<sup>26,27</sup> In addition, we are unaware of any published research that has examined social and industry denormalization concurrently in order to tease out their independent influences on smoking behavior.

Beyond media campaigns that specifically target the tobacco industry or the social acceptability of smoking, other tobacco-control policies may also have a strong influence on tobacco denormalization. For example, environmental tobacco smoke (ETS) laws may marginalize smoking by removing it from indoor public areas and by reinforcing an image of smoking as dangerous to others, as well as to oneself. Pictorial cigarette warning labels may erode brand imagery that is especially appealing to younger smokers, and replace these images with pictures of undesirable health effects.<sup>28</sup> Although these policies are not intended as denormalization policies per se, they may play an important role in shaping the acceptability of smoking, as well as people's attitudes toward the tobacco industry and its products.<sup>29</sup>

Another unknown is the extent to which denormalization beliefs are related to smoking behavior among adults. To date, most of the denormalization research has focused on beliefs among youth. Denormalization beliefs among adults may be important for two reasons: first, denormalization may increase motivation to quit smoking and to remain quit; and second, denormalization may promote support for more-comprehensive tobacco control policies and regulatory restrictions.

The current study sought to (1) characterize social and industry denormalization beliefs among representative samples of adult smokers from four countries—Canada, the United States, Australia, and the United Kingdom; (2) examine whether demographic variables, smoking behavior, and policy-related variables are associated with denormalization; and (3) determine whether social and industry denormalization have independent associations to smoking behavior.

## Methods

The International Tobacco Control (ITC) Four-Country Survey is a cohort survey conducted annually with adult smokers from Canada, the United States, the United Kingdom, and Australia. The ITC Four-Country Survey is designed to evaluate the impact of key nation-level tobacco control policies on behavioral and psychosocial predictors of tobacco use, including tobacco denormalization.

## Sample

Participants in the ITC Four-Country Survey were 9058 adult smokers (aged  $\geq 18$  years, smoked  $>100$  cigarettes in their life, and smoked at least once in the past 30 days) across four countries—Canada ( $n = 2214$ ), the United States ( $n = 2138$ ), the United Kingdom ( $n = 2401$ ), and Australia ( $n = 2305$ ).

## Procedure

The ITC Four-Country cohort was constructed from probability sampling methods with telephone numbers selected at random from the population of each country, within strata defined by geographic region and community size. Eligible households were identified by asking a household informant the number of adult smokers. The next birthday method<sup>30</sup> was used to select the respondent in households with more than one eligible adult smoker.

The surveys were conducted using computer-assisted telephone interviewing software, and were completed in two calls: a 10-minute recruitment call was followed 1 week later by a 40-minute main survey. In order to increase recruitment rates,<sup>31</sup> participants were mailed compensation, equivalent to US\$10, before completing the main survey. The surveys were conducted by two commercial survey firms—Roy Morgan Research in Melbourne, Australia, and Environics Research Group in Toronto, Canada. Each firm has extensive experience conducting large health surveys, and all aspects of the interviewer training and calling protocol were standardized across the two survey firms and closely supervised by the ITC team.

The current analysis presents data from Waves 1 and 2 of the ITC Four-Country Survey. Wave 1 was conducted between October and December 2002. Approximately 75% of respondents ( $n = 6754$ ) completed the Wave 2 survey approximately 8 months later, between June and August 2003. The current analyses were conducted in 2005. A full description of the ITC methodology, sample profile, and survey rates, including comparisons with national benchmarks, is available ([www.itcproject.org](http://www.itcproject.org)).

## Measures

The ITC Four-Country Survey was standardized across the four countries: respondents in each country were asked the same questions, with only minor variations for colloquial speech.

## Demographics

Respondents were asked to report their age, gender, income, ethnicity, and education level. Comparable measures of education in each country were combined into three categories: “less than ‘secondary’ school”/“some post-secondary training”/“postsecondary degree or higher.” Annual income was categorized into <£15,000 or \$30,000, between £15,001 and £30,000 or \$30,000 and \$59,999, and above £30,000/\$60,000. Minority status was measured using a census question for each country and then analyzed as a dichotomous variable to allow for comparisons across countries. In three countries minority status was defined in terms of being nonwhite, whereas in the fourth (Australia) it was defined in terms of not speaking English at home, consistent with the census question.

## Smoking Behavior and Intentions

Respondents were asked to report whether they smoked daily, weekly, or monthly, and were categorized as either daily or non-daily smokers. A heaviness-of-smoking index (range=0–6) comprised the sum of categories reflecting the time to first cigarette.<sup>32</sup> History of quit behavior was coded as a dichotomous variable reflecting at least one attempt to quit in the last year (1) or none (0). Intentions to quit were recoded to reflect no plans to quit (0) or plans to quit (1), whereas cessation was analyzed as point prevalence at the time of the survey. A comprehensive report of cessation behavior within the ITC Four-Country sample is available elsewhere.<sup>33</sup>

## Denormalization

Respondents were asked to report their extent of agreement with six statements, three of which addressed perceptions of the social acceptability of smoking and three of which addressed perceptions of tobacco industry practices (see Table 2 for item wording). Responses were given on a 5-point Likert scale, where 1 equaled strongly disagree and 5 equaled strongly agree. Separate indices of social and industry denormalization were created by standardizing and then summing the three items in each domain. Note that two industry items were recoded before creating the indices so that higher values equaled greater denormalization for each item.

## Policy Exposure

The current analysis includes four measures of policy exposure. **Exposure to pro-tobacco advertising** was measured by asking respondents: “Thinking about everything that happens around you. In the last 6 months, how often have you noticed things that promote smoking?” **Exposure to anti-smoking media** was assessed by asking: “Now I would like you to think about advertising or information that talks about the dangers of smoking, or encourages quitting. In the last 6 months, how often, if at all, have you have noticed such advertising or

information?” **Exposure to warning labels** was assessed by asking: “In the last month, how often, if at all, have you noticed the warning labels on cigarette packages?” Finally, smokers were asked to report the rules about smoking indoors at both restaurants and bars (0=no rules, 1=some restrictions, and 2=completely restricted). Responses to these two items were summed to create an ETS index ranging from 0 to 4.

## Analysis

All analyses were conducted using SPSS, version 12.0 (SPSS Inc., Chicago IL, 2003), and all estimates were adjusted for the sampling strata and sampling weights. Analysis of variance and Bonferroni corrected *t*-tests were used to examine differences between countries in social and industry denormalization measures. Linear regression models were used to examine predictors of social denormalization and industry denormalization, each as a separate dependent variable. Two-way country x policy exposure interaction variables were entered into regression models in separate steps. The change in the *F* statistic was reported for each block of interaction variables. Logistic regression models were used to analyze dichotomous outcomes of interest, such as intentions to quit and self-reported abstinence at follow-up. The social and industry denormalization indices were recoded into tertiles (low, medium, and high) before being included as predictors in these models.

## Results

### Sample Characteristics

Table 1 provides the sample characteristics for each country.

### Denormalization Domains

Table 2 lists each of the items used to assess denormalization beliefs, along with the distribution of responses in each of the ITC countries. Overall, few smokers reported social approval for their smoking. Smokers also reported relatively strong anti-industry beliefs, particularly regarding the extent to which tobacco companies can be trusted to tell the truth. The social and industry scales were moderately correlated with each other ( $r=0.16$ ,  $p<0.001$ ). Differences between the countries were tested in a multivariate model, which is described below.

### Individual Differences Among Denormalization Beliefs

A linear regression model was specified to examine predictors of denormalization beliefs at Wave 1 (Table 3). Smokers who were older, more educated, earning higher incomes, white/English speakers, and who were heavier smokers, were significantly more likely than their counterparts to perceive higher levels of social denormalization regarding smoking. Older, more educated smokers were also more likely to endorse mea-

**Table 1.** Characteristics of ITC Four-Country sample at baseline ( $n=9058$ )

	Canada $n=2114$	United States $n=2138$	United Kingdom $n=2401$	Australia $n=2305$
<b>Gender (%)</b>				
Female	54.3	55.2	56.6	52.7
Male	45.7	44.8	43.4	47.3
<b>Age (%)</b>				
18–24	15.6	15.7	8.5	16.8
25–39	31.8	30.9	32.4	36.8
40–54	34.5	33.9	33.9	32.8
≥55	18.1	19.6	25.2	13.5
<b>Education (%)</b>				
≤12 years	46.9	44.1	64.5	66.8
>12 years	53.1	55.9	35.5	33.2
<b>Ethnicity (%)</b>				
White	87.5	76.4	94.7	86.2
Other/mixed	12.5	23.6	5.3	13.8
Cigarettes per day (standard deviation)	16.0 (9.6)	17.9 (11.7)	16.7 (10.6)	17.9 (12.7)

ITC, International Tobacco Control.

asures of industry denormalization. Women were significantly more likely than men to report social denormalization, but significantly less likely to report industry denormalization beliefs.

### Country-Level Differences Among Denormalization Beliefs

Overall, Canadians reported significantly greater social denormalization than U.S., Australian, and UK smokers, whereas Australian and U.S. smokers each reported greater social denormalization than UK smokers (Table 3). In terms of industry denormalization, Australians reported stronger anti-industry beliefs than Canadian and UK smokers. UK smokers also reported weaker anti-industry beliefs than either Canadian or U.S. respondents.

### Exposure to Policy and Denormalization Beliefs

As Table 3 indicates, social denormalization was associated with noticing anti-smoking information, noticing warning labels, and living in areas with more-comprehensive ETS restrictions. Two-way interaction variables were entered into the regression model presented in Table 3 to examine country-by-policy interactions (data not shown in table). Noticing warning labels was significantly associated with social denormalization to a greater extent in Canada than in the United States ( $\beta=0.06$ ,  $p<0.001$ ) or Australia ( $\beta=0.04$ ,  $p=0.005$ ,  $F_{\text{model}}=6.7$ ,  $p<0.001$ ). Social denormalization was also associated with ETS restrictions to a lesser extent in Canada, than in the other three countries (UK,  $\beta=0.08$ ,  $p<0.001$ ; United States,  $\beta=0.06$ ,  $p=0.002$ ; Australia,  $\beta=0.05$ ,  $p=0.02$ ;  $F_{\text{model}}=5.5$ ,  $p<0.001$ ). In addition, noticing anti-smoking media was associated with social denormalization to a greater extent in the

United States than in either the UK ( $\beta=0.05$ ,  $p=0.004$ ) or Australia ( $\beta=0.05$ ,  $p=0.002$ ;  $F_{\text{model}}=4.08$ ,  $p=0.007$ ).

Anti-industry beliefs were associated with noticing anti-smoking information, tobacco advertising, and ETS restrictions (see Table 3). Two country-by-policy interactions were also significant. First, ETS restrictions were associated with anti-industry beliefs to a greater extent in the UK, than in each of the other countries (Canada,  $\beta=0.07$ ,  $p=0.007$ ; United States,  $\beta=0.11$ ,  $p<0.001$ ; Australia,  $\beta=0.06$ ,  $p=0.02$ ;  $F_{\text{model}}=5.9$ ,  $p<0.001$ ). Second, noticing warning labels in Canada was also associated with greater anti-industry beliefs relative to the other three countries (UK,  $\beta=0.05$ ,  $p=0.01$ ; United States,  $\beta=0.04$ ,  $p=0.03$ ; Australia,  $\beta=0.05$ ,  $p=0.02$ ;  $F_{\text{model}}=2.7$ ,  $p=0.045$ ).

### Intention to Quit at Baseline

At baseline, 74% of respondents intended to quit smoking. The social and industry denormalization indices were recoded into “low,” “medium,” and “high” tertiles before being entered as predictors along with the same set of demographic and smoking behavior covariates listed in Table 3. Smokers reporting medium (odds ratio [OR]=1.84, confidence interval [CI]=1.60–2.18,  $p<0.001$ ) and high social denormalization beliefs (OR=2.6, CI=2.25–3.00,  $p<0.001$ ) were more likely to intend to quit compared with smokers reporting low social denormalization beliefs. In the same model, smokers reporting medium (OR=1.21, CI=1.06–1.37,  $p=0.004$ ) and high industry denormalization beliefs (OR=1.92, CI=1.65–2.24,  $p<0.001$ ) were more likely to intend to quit compared with smokers reporting low industry denormalization beliefs.



**Table 2.** Denormalization beliefs among ITC Four-Country Survey respondents (*n*=8991)

		Canada (%)	United States (%)	United Kingdom (%)	Australia (%)	Overall (%)
<b>Social denormalization</b>						
Society disapproves of smoking.	Agree	88	78	77	82	81
	Neutral	5	7	11	7	7
	Disagree	7	15	12	12	12
There are fewer and fewer places I feel comfortable smoking.	Agree	84	78	77	84	81
	Neutral	3	4	4	3	3
	Disagree	13	18	19	13	16
People who are important to me believe I should not smoke.	Agree	90	90	85	89	88
	Neutral	2	3	4	2	3
	Disagree	8	7	10	9	9
<b>Industry denormalization</b>						
Tobacco companies can be trusted to tell the truth.	Agree	19	19	25	15	20
	Neutral	5	5	5	2	4
	Disagree	76	76	70	83	76
Tobacco companies should take responsibility for the harm caused by smoking.	Agree	51	45	38	45	45
	Neutral	8	8	10	8	8
	Disagree	40	47	52	47	47
Tobacco companies have tried to convince the public that there is little or no health risk from secondhand smoke.	Agree	45	52	42	51	47
	Neutral	10	8	12	9	10
	Disagree	45	40	46	40	43

ITC, International Tobacco Control.

### Cessation Behavior at Follow-up

Of the respondents who were recontacted at Wave 2, approximately 30% made at least one attempt to quit smoking, and 9% reported being abstinent at follow-up. A logistic regression model was specified to examine whether Wave 1 measures of denormalization predicted abstinence at Wave 2, after adjusting for age, gender, ethnicity, education, income, heaviness of smoking, recent quit attempt, and daily versus non-daily smoking, as well as intentions to quit at Wave 1. As in the previous model, social and industry denormalization were recoded to tertiles and included together in the same model in order to determine their independent effects. Smokers reporting medium (OR=1.32, CI=1.02–1.70, *p*=0.035) and high social denormalization beliefs (OR=1.36, CI=1.05–1.75, *p*=0.018) were significantly more likely to be abstinent compared with smokers reporting low social denormalization beliefs. Anti-industry beliefs at Wave 1 did not predict abstinence at Wave 2. A final model was constructed to examine the impact of changes in industry denormalization beliefs from Wave 1 to Wave 2. Participants were classified into two groups: those whose beliefs increased and those whose beliefs stayed the same or decreased. After adjusting for the same variables as listed above, smokers whose industry denormalization beliefs were stronger at Wave 2 than at Wave 1 were more likely to be abstinent than those whose

beliefs did not increase (OR=1.35, CI=1.19–1.54, *p*<0.001).

In addition to the results reported in this paper, a sensitivity analysis was conducted because of concerns about the measurement properties of the social and industry denormalization constructs. In particular, there was concern that combining items with relatively low inter-item reliability into a single, unidimensional measure may have introduced measurement bias. The sensitivity analysis involved treating the items as ordinal effect indicators of latent variables within the structural equation modeling framework.<sup>34</sup> Hence, model estimates included the weighted contribution of each item to the measurement of the underlying latent variable. When the model structures were replicated for the foregoing analyses, the overall fit of the models was within the acceptable range (i.e., comparative fit index >0.90, Tucker-Lewis index >0.90, root mean square error of approximation <0.10), and the results and conclusions drawn from these results were almost identical across the two analytic approaches.

### Discussion and Conclusions

The current study suggests that smokers in Canada, the United States, the United Kingdom, and Australia perceive little approval for their smoking and hold relatively antagonistic beliefs toward the tobacco indus-

**Table 3.** Predictors of denormalization beliefs at Wave 1 (*n*=7335)

Variable	Social denormalization index			Industry beliefs index		
	Beta	<i>p</i> level	95% CI	Beta	<i>p</i> level	95% CI
<b>Demographics</b>						
Gender	-0.17	<0.001***	-0.21-0.15	0.11	<0.001***	0.07-0.14
Age	0.13	<0.001***	0.11-0.14	0.08	<0.001***	0.06-0.10
Ethnicity	-0.06	0.01*	-0.10-0.01	-0.07	0.014*	-0.12-0.01
Education	0.04	0.001**	0.01-0.06	0.11	<0.001***	0.08-0.13
Income	0.08	<0.001***	0.06-0.10	0.01	0.65	-0.02-0.03
<b>Smoking behavior</b>						
Daily vs nondaily smoking	-0.11	<0.001***	-0.16-0.05	0.11	0.002**	0.04-0.19
Heaviness of smoking	0.01	0.021*	0.01-0.02	0.01	<0.001***	0.05-0.08
Quit attempt recency	-0.05	<0.001***	-0.08-0.02	-0.08	<0.001***	-0.11-0.04
<b>Policy exposure</b>						
Noticing tobacco ads	0.01	0.45	-0.01-0.02	0.07	<0.001***	0.05-0.08
Noticing antitobacco information	0.03	<0.001***	0.02-0.05	0.02	0.006**	0.06-0.04
Noticing health warnings	0.01	0.64	-0.01-0.01	-0.01	0.83	-0.01-0.02
ETS restrictions	0.04	<0.001***	0.02-0.05	0.02	0.07	-0.01-0.03
<b>Country<sup>a</sup></b>						
Canada vs U.S.	-0.13	<0.001***	-0.17-0.08	-	-	-
Canada vs UK	-0.27	<0.001***	-0.31-0.22	-0.16	<0.001***	-0.21-0.10
Canada vs Australia	-0.14	<0.001***	-0.18-0.10	0.10	<0.001***	0.05-0.15
Australia vs U.S.	-0.01	<0.001***	-0.06-0.03	-0.13	<0.001***	-0.07-0.18
Australia vs UK	-0.13	<0.001***	-0.18-0.07	-0.26	<0.001***	-0.31-0.20
U.S. vs UK	-0.14	<0.001***	-0.18-0.10	-0.13	<0.001***	-0.19-0.08

<sup>a</sup>Note that only between-country differences are presented.

\**p*<0.05;

\*\**p*<0.01;

\*\*\**p*<0.001 (all bolded).

CI, confidence interval; ETS, environmental tobacco smoke.

try. For example, 80% of smokers agreed that society disapproves of smoking, and more than three quarters did not feel that tobacco companies can be trusted to tell the truth. This is consistent with findings published elsewhere, that virtually all adult smokers regret ever having started smoking, and are well acquainted with the negative aspects of tobacco use, such as the cost of smoking and its addictive nature.<sup>35,36</sup>

One might expect social norms and beliefs about the tobacco industry to vary among subgroups of smokers, and indeed, this was the case in the current study. Higher levels of socioeconomic status were associated with greater social and industry denormalization beliefs. This pattern is consistent with lower rates of smoking among higher socioeconomic strata (SES) in each of the four countries, and may partly reflect a greater exposure to anti-smoking media among higher SES groups.<sup>37</sup> Older smokers were also more likely to report social and industry denormalization beliefs. The fact that older smokers were more likely to regret smoking and may have more experience with the health effects and the difficulties of quitting may explain why they feel more antagonistic toward the tobacco industry and their smoking.<sup>34</sup> Heavier smokers were more likely to report social denormalization beliefs, perhaps because they perceive more resistance to their smoking given the greater frequency with which they smoke. Women also reported greater social denor-

malization beliefs, but weaker anti-industry attitudes than men. Greater social denormalization among women may reflect the traditional belief that smoking is less acceptable for women, despite the fact that smoking prevalence is roughly equivalent between men and women within the four countries. Women may also be more health conscious, and therefore more aware of such normative influences than men. In contrast, men reported greater anti-industry beliefs, although the reasons for this are unclear.

The findings also suggest that social and industry denormalization beliefs are independently associated with intentions to quit, and may predict future abstinence. To the extent that media campaigns and media advocacy can increase denormalization beliefs, these results suggest that using themes related to deceitful industry practices and the socially unacceptable nature of tobacco use may reduce adult smoking. Previous research indicates that these themes are effective among youth; the current findings support evidence from California that these themes are also effective among adult smokers.<sup>8,12,38</sup> Another compelling reason to adopt an industry denormalization focus concerns generating support for tobacco control policies. Indeed, industry denormalization has previously been associated with increased support for government regulation.<sup>39-42</sup>

The relationship between denormalization and tobacco control policies is likely to be reciprocal: Norms provide a supportive environment for policy change, while comprehensive policies may also shape the tobacco-related norms and perceptions of the tobacco industry. Although the direction of influence could not be addressed with this data, the association between policies and denormalization was supported by the current findings. Social denormalization was associated with noticing anti-smoking information, warning labels, and ETS restrictions. Comprehensive ETS restrictions in bars and restaurants may be particularly effective in shaping beliefs about smoking by breaking the association between smoking, drinking, and exciting lifestyles—the very associations portrayed in tobacco marketing. In addition, warning labels and anti-smoking media may influence social norms by communicating the health effects of smoking in a highly visible manner to smokers and those around them. Communicating such information publicly—as opposed to communicating such information in an individual setting such as a doctor's office—may be particularly effective in reducing the perceived acceptability of smoking.

Several interactions were observed between social denormalization and policy exposure. First, noticing warning labels was most strongly associated with social denormalization in Canada. This suggests that the graphic Canadian warnings may be a more powerful denormalizing force than the text warnings present in Australia, the UK, and the United States. The opposite was true for ETS restrictions in restaurants and bars: the level of exposure to these restrictions was associated with social denormalization to a lesser extent among Canadian smokers. The reasons for this are not immediately obvious. Perhaps the only distinctive feature about ETS restrictions in Canada is the harsh winter climate, which makes smoking outdoors a greater inconvenience. One might imagine this would lead to greater beliefs about social denormalization; however, groups of smokers that huddle near entrance ways may actually support one another, thereby countering anti-tobacco norms.<sup>43</sup> Finally, the relationship between noticing anti-smoking information and social denormalization was stronger in the United States than in Australia or the UK. Anecdotal evidence suggests that anti-smoking media in the United States is among the strongest and most confrontational. It may be that the content of U.S. anti-smoking media has a relatively stronger influence on the perceived acceptability of smoking than anti-smoking media in the UK and Australia.

Anti-industry beliefs were generally associated with noticing anti-smoking information, ETS restrictions, and lower awareness to pro-tobacco marketing. Moreover, results indicated that warning labels were associated with anti-industry beliefs, but only in Canada. This finding is consistent with both the current study results

regarding social denormalization and other research on the superiority of graphic warning labels, relative to text warnings.<sup>44,45</sup> It is also interesting to note that ETS restrictions were associated with anti-industry beliefs to a greater extent in the UK than elsewhere. This may reflect the fact that comprehensive ETS restrictions were relatively rare in the UK at the time of the survey. Given their novelty, ETS restrictions may, therefore, have a relatively greater impact on the attitudes and beliefs of UK smokers.

The usual cautions should be noted about inferring causality among the associations reported in this study. Although the longitudinal nature of the study design was a considerable strength when examining quitting behavior, the existence of a third factor that affects both denormalization beliefs and quitting remains a possibility. This possibility would make the apparent relation between the two variables spurious. The issue of confounding and directionality of influence may have been more of an issue in models that used cross-sectional data to examine the relation between denormalization variables and different policies. With data collection scheduled for every year until 2009, the ITC Four-Country Survey will be better able to assess the relationship between policy change and denormalization. Another limitation of the current research concerns the measures of denormalization that were used. Tobacco denormalization is a broad concept and the six measures administered in the ITC Four-Country Survey do not encompass the many facets of social and industry denormalization. Measurement studies among adult smokers are needed, as features of denormalization that appear significant for youth, such as themes of exploitation and manipulation, may help clarify some of the causal mechanisms that underlie denormalization beliefs. Improved measures also could help identify possible third variables and would help to strengthen the validity of the current findings. Despite these limitations, the current measures represent a useful set of indicators that demonstrate good predictive validity and help to lay the foundation for future work in this area.

Overall, this study provides evidence that beliefs about the acceptability of smoking and the tobacco industry are independently related to cessation-related outcomes. To this end, the findings suggest that industry denormalization may be an effective theme for mass media campaigns above and beyond more traditional communications targeting social norms and the acceptability of tobacco use.

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Funding for this article was provided by grants from the National Cancer Institute of the United States (through R01 CA 100362, through the Roswell Park Transdisciplinary Tobacco Use Research Center, P50 CA111236, and through The University of Illinois at Chicago Cancer Center, Cancer Education and Career Development Program, 5 R25

CA57699), Robert Wood Johnson Foundation (045734), Canadian Institutes of Health Research (57897), National Health and Medical Research Council of Australia (265903), Cancer Research UK (C312/A3726), and Canadian Tobacco Control Research Initiative (014578), with additional support from the Centre for Behavioural Research and Program Evaluation, National Cancer Institute of Canada/Canadian Cancer Society, the CIHR Strategic Training Program in Tobacco Research, and the University of Illinois at Chicago Cancer Education and Career Development Program, 5 R25 CA57699.

No financial conflict of interest was reported by the authors of this paper.

## References

- U.S. Department of Health and Human Services. Preventing tobacco use among young people: a report of the Surgeon General, 1994. Atlanta GA: Centers for Disease Control and Prevention, 1994.
- Mayhew KP, Flay BR, Mott JA. Stages in the development of adolescent smoking. *Drug Alcohol Depend* 2000;59(suppl 1):S61–81.
- Flay BR, Hu FB, Richardson J. Psychosocial predictors of different stages of cigarette smoking among high school students. *Prev Med* 1998;27:A9–18.
- Pollay RW. Targeting youth and concerned smokers: evidence from Canadian tobacco industry documents. *Tob Control* 2000;9:136–47.
- Cummings KM, Morley CP, Horan JK, Steger C, Leavell NR. Marketing to America's youth: evidence from corporate documents. *Tob Control* 2002; 11(suppl 1):15–7.
- Ling PM, Glantz SA. Using tobacco-industry marketing research to design more effective tobacco-control campaigns. *JAMA* 2002;287:2983–9.
- Ling PM, Glantz SA. Why and how the tobacco industry sells cigarettes to young adults: evidence from industry documents. *Am J Public Health* 2002;92:908–16.
- Tobacco Control Section. A model for change: the California experience in tobacco control. Sacramento: California Department of Health Services, October 3, 1998.
- U.S. Department of Health and Human Services. A historical review of efforts to reduce smoking in the United States. In: *Reducing tobacco use: a report of the Surgeon General*. Atlanta GA: Centers for Disease Control and Prevention, 2000:29–52.
- Blum A. Medicine vs. Madison Avenue. Fighting smoke with smoke. *JAMA* 1980;243:739–40.
- Blum A. Paid counter-advertising: proven strategy to combat tobacco use and promotion. *Am J Prev Med* 1994;10(suppl 3):8–10.
- Tobacco Control Section. A model for change: the California experience in tobacco control. Sacramento: California Department of Health Services, October 23, 1998.
- Evans D, Wasserman J, Bertolotti E, Martino S. Branding behavior: the strategy behind the truth campaign. *Social Marketing Q* 2002;3:17–29.
- Hersey JC, Niederdeppe J, Evans WD, et al. The theory of "truth": how counter-industry campaigns affect smoking behavior among teens. *Health Psychol* 2005;24:22–31.
- Bal DG, Kizer KW, Felten PG, Mozar HN, Niemeyer D. Reducing tobacco consumption in California. Development of a statewide anti-tobacco use campaign. *JAMA* 1990;264:1570–4.
- Dorfman L, Wallack L. Advertising health: the case for counter-ads. *Public Health Rep* 1993;108:716–26.
- Wakefield M, Chaloupka FJ. Effectiveness of comprehensive tobacco control programmes in reducing teenage smoking in the USA. *Tob Control* 2000;9:177–86.
- Goldman LK, Glantz SA. Evaluation of antismoking advertising campaigns. *JAMA* 1998;279:772–7.
- Siegel M, Biener L. The impact of an antismoking media campaign on progression to established smoking: results of a longitudinal youth study. *Am J Public Health* 2000;90:380–6.
- Sly DF, Heald GR, Ray S. The Florida "truth" anti-tobacco media evaluation: design, first year results, and implications for planning future state media evaluations. *Tob Control* 2001;10:9–15.
- Farrelly MC, Heaton CG, Davis KC, Messeri P, Hersey JC, Haviland ML. Getting to the truth: evaluating national tobacco countermarketing campaigns. *Am J Public Health* 2002;92:901–7.
- Popham WJ, Potter LD, Bal DG, Johnson MD, Duerr JM, Quinn V. Do anti-smoking media campaigns help smokers quit? *Public Health Rep* 1993;108:510–3.
- Steering Committee of the National Strategy to Reduce Tobacco Use in Canada. New direction for tobacco control in Canada: a national strategy. Ottawa: Health Canada 1999. Available at: [www.hc-sc.gc.ca/ahc-asc/alt\\_formats/cmcd-dcmc/rtf/media/releases-communication/1999/99picebk6.rtf](http://www.hc-sc.gc.ca/ahc-asc/alt_formats/cmcd-dcmc/rtf/media/releases-communication/1999/99picebk6.rtf). Accessed January 18, 2006.
- Balbach ED, Glantz SA. Tobacco control advocates must demand high-quality media campaigns: the California experience. *Tob Control* 1998;7:397–408.
- Ibrahim JK, Glantz SA. Tobacco industry litigation strategies to oppose tobacco control media campaigns. *Tob Control* 2006;15:50–8.
- Hersey JC, Niederdeppe J, Evans WD, et al. The effects of state counter-industry media campaigns on beliefs, attitudes, and smoking status among teens and young adults. *Prev Med* 2003;37:544–52.
- Arheart KL, Sly DF, Trapido EJ, Rodriguez RD, Ellestad AJ. Assessing the reliability and validity of anti-tobacco attitudes/beliefs in the context of a campaign strategy. *Prev Med* 2004;39:909–18.
- Wakefield M, Morley C, Horan JK, Cummings KM. The cigarette pack as image: new evidence from tobacco industry documents. *Tob Control* 2002;11(suppl 1):173–80.
- U.S. Department of Health and Human Services. Reducing tobacco use: a report of the Surgeon General. Atlanta GA: Centers for Disease Control and Prevention, 2000.
- Binson D, Canchola JA, Catania JA. Random selection in a national telephone survey: a comparison of the Kish, next-birthday, and last-birthday methods. *J Off Stat* 2000;16:53–60.
- Singer E, van Hoewyk J, Maher MP. Experiments with incentives in telephone surveys. *Public Opin Q* 2000;64:171–88.
- Heatherton TF, Koslowski LT, Frecker RC, Rickert WS, Robinson J. Measuring the heaviness of smoking using self-reported time to the first cigarette of the day and number of cigarettes smoked per day. *Br J Addict* 1989;84:791–800.
- Hyland A, Borland R, Li Q, et al. Individual-level predictors of cessation behaviors among participants in the International Tobacco Control Collaboration Policy Evaluation Study. *Tob Control* 2006;15(Suppl 3):iii83–iii94.
- Bollen KA. Structural equations with latent variables. New York: John Wiley & Sons;1989.
- Fong GT, Hammond D, Laux FL, et al. The near-universal experience of regret among smokers in four countries: findings from the International Tobacco Control Policy Evaluation Survey. *Nicotine Tob Res* 2004;6:S341–52.
- Slovic P. Cigarette smokers: rational actors or rational fools? In: Slovic P, ed. *Smoking: risk, perception, and policy*. Thousand Oaks CA: Sage, 2001:97–126.
- Siahpush M, McNeill A, Borland R, Fong G. Socioeconomic variations in nicotine dependence, self-efficacy and intention to quit across four countries: findings from the International Policy Evaluation Survey. *Tob Control* 2006;15(Suppl 3):iii71–iii75.
- Netemeyer RG, Andrews JC, Burton S. Effects of antismoking advertising-based beliefs on adult smokers' consideration of quitting. *Am J Public Health* 2005;95:1062–6.
- Ashley MJ, Cohen JE. What the public thinks about the tobacco industry and its products. *Tob Control* 2003;12:396–400.
- Borland R, Fong GT, Cummings KM, Hastings G, Hammond D. Attitudes toward the tobacco industry and government interventions across four countries: findings from the International Tobacco Control Policy Evaluation Survey. Society for Research on Nicotine and Tobacco Conference, Scottsdale AZ, February 18–21, 2004.
- Tang H, Cowling DW, Lloyd JC, et al. Changes of attitudes and patronage behaviors in response to a smoke-free bar law. *Am J Public Health* 2003;93:611–7.
- Laforge RF, Velicer WF, Levesque DA, et al. Measuring support for tobacco control policy in selected areas of six countries. *Tob Control* 1998;7:241–6.
- Gottlieb NH, Eriksen MP, Lovato CY, Weinstein RP, Green LW. Impact of a restrictive work site smoking policy on smoking behavior, attitudes, and norms. *J Occup Med* 1990;32:16–23.
- Hammond D, Fong GT, McDonald PW, Cameron R, Brown KS. The impact of the graphic Canadian warning labels on adult smoking. *Tob Control* 2003;12:391–5.
- Hammond D, Fong GT, Borland R, McNeill A, Cummings KM, Hastings G. Health knowledge and tobacco labeling policy: findings from the International Tobacco Control Evaluation Survey. *Tob Control* 2006; 15(Suppl 3):iii19–iii25.