

Effects of Antismoking Advertising–Based Beliefs on Adult Smokers’ Consideration of Quitting

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Recent estimates indicate that 24.7% of men and 20.8% of women in the United States currently smoke cigarettes.¹ Moreover, tobacco use is the leading preventable cause of mortality in this country, contributing to more than 440 000 deaths each year and resulting in \$75 billion in direct costs and about \$150 billion in total tobacco-related disease costs.^{2,3} Given these human and financial costs, the Subcommittee on Cessation of the Interagency Committee on Smoking and Health recently issued a national tobacco cessation action plan outlining 10 recommendations to help Americans stop using tobacco.³ One of these recommendations is designing statewide media campaigns that motivate parents to quit via advertising messages stressing the health risks of smoking to both themselves and their children. In the present study, we addressed issues of direct relevance to this recommendation.

Statewide antismoking media campaigns are a critical aspect of tobacco control programs.⁴ A general finding associated with these campaigns is that they are related to decreases in cigarette consumption.^{3,4} For example, over a 2-year period (1990–1991), an anti-tobacco media campaign conducted in California was estimated to have reduced the number of packs of cigarettes sold in that state by 232 million.^{4,5} It was also estimated that this campaign was an important factor in the decisions of 6.7% of Californians to quit, and 34.3% of the state’s former smokers reported that the campaign played a role in their decision to quit.^{4,6} Other research on statewide anti-tobacco campaigns also suggests a positive relationship between exposure to such campaigns and declines in adult cigarette consumption.⁴

A goal of many statewide campaigns is to reinforce *existing general beliefs* about smoking and generate *advertising-based beliefs* that will lead to increases in smoking cessation rates. In this study, we controlled for the effects of existing general beliefs and examined the incre-

Objectives. We examined whether specific antismoking advertising–based beliefs regarding the addictiveness of smoking, the dangers of environmental tobacco smoke, and the tobacco industry’s use of deceptive advertising practices are associated with adult smokers’ consideration of quitting. We also assessed whether interactions between such beliefs and having children living in the home were associated with consideration of quitting.

Methods. We used analyses of smokers’ responses to a telephone survey conducted after completion of the Wisconsin Anti-Tobacco Media Campaign to test hypotheses associated with our study objectives.

Results. Results indicated that advertising-based beliefs regarding smoking addictiveness and the dangers of environmental tobacco smoke were associated with consideration of quitting. The findings also showed that consideration of quitting was positively affected by the interaction between number of children living at home and advertising-based beliefs about deceptive tobacco industry advertising practices designed to induce people to smoke.

Conclusions. Creating advertisements that target specific antismoking beliefs may be the most effective approach to enhancing consideration of quitting among adult smokers, particularly those with children living at home. (*Am J Public Health*. 2005;95:1062–1066. doi:10.2105/AJPH.2004.050195)

mental effects of specific advertising-based messages stressed in a statewide advertising campaign. Specifically, we measured existing general beliefs regarding (1) the addictiveness of smoking, (2) the harmfulness of environmental tobacco smoke (ETS), and (3) the deceptive advertising practices of the tobacco industry. The advertising-related beliefs assessed in our study corresponded to these existing general beliefs but were tied to specific advertising campaign messages and themes. In addition, these are the primary belief messages stressed in many statewide campaigns.^{4,7}

We assessed the effects of advertising-based beliefs (while controlling for the effects of existing general beliefs) within the context of the 2001 Wisconsin Anti-Tobacco Campaign. We sought to extend current knowledge regarding anti-tobacco advertising campaigns by (1) assessing the relations between individual advertising-based beliefs and adult smokers’ consideration of quitting and (2) examining interactions of these beliefs with the presence of children in smokers’ homes in relation to consideration of quitting.

HYPOTHESES

The advertising literature suggests that exposure to specific messages can reinforce people’s existing beliefs and affect their behavior. In the case of beliefs regarding the addictiveness of smoking, evidence suggests that anticigarette advertisements can affect such beliefs.⁸ We predicted that advertisements designed to reinforce the belief that cigarettes are addictive would be positively related to smokers’ consideration of quitting.⁷

It has been shown that children model their parents’ smoking behaviors,⁹ and many parents try to discourage their children from smoking to protect them from its addictive effects.¹⁰ It has also been suggested that addiction-based advertisements providing an emotional “jolt” (such as those used in the Wisconsin Anti-Tobacco Campaign) may affect a smoker’s intent to quit (1) for the smoker’s own health and (2) for the health of his or her loved ones.⁷ Thus, given that adult smokers will try to discourage their children from smoking, we expected that the interac-

tion between number of children living in the home and advertising beliefs regarding the addictiveness of smoking would be related to consideration of quitting among adults.

In addition, research has suggested that most smokers respond favorably to advertisements about the risks of ETS to their loved ones.⁷ That is, some smokers may be willing to change their smoking behavior to protect their family members from the health effects of smoking even if they are unwilling to quit for the sake of their own health. It has also been shown that having children living at home is associated with decreases in smoking among parents and that health education campaigns targeted at adults with children may amplify this effect.¹¹ Furthermore, it has been noted that an important, but unexplored, question regarding ETS is whether tobacco control programs (e.g., advertising campaigns) influence in-home exposures to ETS.¹²

Finally, research has suggested that certain advertising messages may affect in-home smoking prevalence rates. One of the most effective antismoking advertisements aired in California stressed the detrimental effects of ETS on a smoker's wife who did not smoke.⁷ We expected that advertising-based beliefs concerning the harmfulness of ETS would be associated with consideration of quitting. Moreover, we predicted that such beliefs would interact with number of children living at home to produce a positive effect on consideration of quitting.

While the notion of the tobacco industry using deceptive advertisements to induce people to smoke is common, we are not aware of any research examining how adults may alter their behavior in response to such advertisements. However, there is some limited evidence regarding youth. A Florida study showed that anti-tobacco advertisements geared toward attacking the tobacco industry's marketing tactics were strong predictors of adolescents' decision not to smoke, relative to other predictors.¹³ It is unknown whether such an effect would be observed in the case of an adult's decision to quit smoking (or consideration of quitting). Still, the fact that adult smokers may change their smoking behavior to protect family members from negative effects⁷ suggests that smoking parents would react favorably to information designed to

discourage their children from smoking. Thus, we predicted that advertising-based beliefs regarding the deceptive practices of the tobacco industry would be associated with smokers' consideration of quitting. We also predicted that the interaction of these beliefs with number of children living at home would be positively related to consideration of quitting.

In summary, our 2 primary hypotheses were as follows. Hypothesis 1 was that anti-smoking advertising-based beliefs regarding (1) the addictiveness of smoking, (2) the harmfulness of ETS, and (3) the deceptiveness of tobacco industry advertising would be positively associated with people's consideration of quitting smoking. We predicted that these associations would hold when the effects of existing general beliefs about smoking were controlled. Hypothesis 2 was that the number of children (younger than 18 years) living in the home would interact with the 3 advertising-based beliefs assessed to produce a positive association with consideration of quitting. We predicted that these associations would hold when the effects of existing general beliefs regarding smoking and the effects of anti-smoking advertising-based beliefs were controlled.

METHODS

Wisconsin Anti-Tobacco Media Campaign

The Wisconsin Tobacco Control Board was created in 1999 as a result of the 1998 Master Settlement Agreement with the tobacco industry. One objective of the board was to target antismoking messages toward adult smokers, and \$6.5 million was allocated for the state's first major anti-tobacco advertising campaign.¹⁴ The adult campaign began in March 2001 and was designed to reach 95% of Wisconsin residents in each of 7 months through a series of advertisements stressing the 3 primary belief themes we have described here (i.e., addictiveness of smoking, ETS, and tobacco industry advertising practices).

Five specific advertisements ("Unborn/kid," "Rick Stoddard," "Drive," "Janet Sachman," and "Patrick Reynolds") were run on television and radio stations in 7 major Wisconsin markets during the campaign. The advertisements had been successfully tested and run in

other states (e.g., Massachusetts and Minnesota) and were designed to reflect the 3 belief themes. "Unborn/kid" depicts a pregnant woman and the impact of cigarette smoke on her unborn child (ETS theme). "Rick Stoddard" shows a man talking about his wife dying at the age of 46 years as a result of smoking (addictiveness theme). In "Drive," a passenger in a car lights a cigarette and the driver veers the car off the road and makes an analogy to the cigarette endangering her life (ETS theme). "Janet Sachman" features a former cigarette model with a coarse voice discussing how she used to try to convince people to smoke and now tells people to stop smoking (deceptiveness theme). "Patrick Reynolds" shows a man talking about being a part of a family of cigarette manufacturers and wanting people to know that they should not smoke (deceptiveness theme).

Interview Procedure and Sample

Through the use of random-digit dialing procedures, telephone interviews were completed with 1207 adult residents of Wisconsin in late October and early November of 2001. The resulting sample reflected the age, race, and gender distribution of the 2000 Wisconsin population. The response rate, calculated according to the conservative formula of the Council of American Survey Research Organizations (which took into account the unknown eligibility status associated with some of the call attempts), was 20.1%. The survey required between 10 and 15 minutes to complete.

The introduction noted that the firm administering the telephone interviews was conducting "a survey of Wisconsin adults about their attitudes and opinions towards tobacco and other health issues." Given that the focus of our study was on consideration of quitting smoking, the sample was composed of respondents who classified themselves as current smokers on the basis of the question "Do you now smoke cigarettes every day, some days, or not at all?" Respondents who reported that they smoked "every day" or "some days" were classified as current smokers.

Respondents who reported that they were smokers had to meet 2 additional criteria to be included in the analyses: (1) they had to have responded to all independent and con-

trol variable measures, and (2) they had to have recalled the advertisements used in the campaign. Initially, 327 respondents classified themselves as current smokers, and 125 met all of the inclusion criteria. Data were collected in the latter part of 2001, approximately 7 months after the antismoking campaign first began airing.

Measures

The primary independent variables were antismoking advertising-based beliefs in the addictiveness of smoking (1 item), the harmfulness of ETS (2 averaged items), and the deceptiveness of the tobacco companies in their advertising practices (2 averaged items). Each item was measured via cued recalls of the specific advertisements and their respective belief themes. For example, an advertisement involving the “deceptiveness theme” was cued to respondents as follows: “Do you recall seeing or hearing an ad in which a former cigarette model talks with a coarse voice about how she used to convince people to smoke and is now telling people to quit?” If they indicated that they recalled the advertisement, respondents were asked the following: “How did the advertisement make you feel about the tobacco industry? Choose any number from 0 to 10, where 0 means the ad made you feel the tobacco industry is not at all deceptive and 10 means the ad made you feel the tobacco industry is very deceptive.” This cued recall and answering procedure was repeated across the 3 belief themes.

The dependent variable, consideration of quitting smoking, was measured with a single item: “Are you considering stopping smoking within the next 6 months?” (coded as 0 [no] or 1 [yes]). Seventy percent of the study respondents answered “yes” to this question.

As suggested by our hypotheses, a number of control variables also were taken into account. The belief literature and recent evidence on adolescent smoking suggest that existing general beliefs about an action can have pronounced effects on that action.^{15,16} Thus, as a means of controlling for the potential effects of these existing general beliefs, they were included in our analyses before advertising-based beliefs were entered. Data on these existing general beliefs were collected near the beginning of the survey, be-

fore the cued recall and evaluations of advertising-based beliefs. As such, the responses to the existing general beliefs measures were not influenced by the cued advertisement recall procedures. Also, standard discriminant validity tests showed that existing general beliefs were distinct from the corresponding advertising-based beliefs.¹⁷

We used 4-point scales (ranging from “strongly disagree” to “strongly agree”) to measure existing general beliefs regarding the addictiveness of smoking (2 items; $\alpha=0.71$; example item: “Smoking is addictive”), the harmfulness of ETS (3 items; $\alpha=0.81$; example item: “Secondhand smoke is dangerous to nonsmokers”), and the deceptiveness of tobacco company advertising practices (4 items; $\alpha=0.88$; example item: “Tobacco companies use deceptive practices to get people hooked on smoking”). Within each of the themes, scores on items were summed and then averaged to form an overall theme composite.

To assess the number of children living in the home, we summed responses over 3 categories to the question “How many children living in your household are: (1) less than 5 years old; (2) 5 through 12 years old; and (3) 13–17 years old?” Age, gender (0=female, 1=male), race (1=Caucasian, 0=African American/other), and education also were included as control variables in all analyses. The average age of respondents was about 33 years; 57% were female, 64% were Caucasian, and the median education level was high school. Table 1 presents summary statistics and correlations between the study variables.

RESULTS

Given the dichotomous dependent variable and the nature of our hypotheses, we used multiple logistic regression analyses with interaction terms to test our models. All of these analyses were conducted via the SPSS logistic regression algorithm. We mean centered all independent variables (covariates) before estimating the 3 models^{18,19}; results are shown in Table 2. The first model examined the relationships between smokers’ consideration of quitting and demographic characteristics, existing general beliefs, number of children in the household, and the Existing

General Beliefs×Number of Children Living at Home interaction terms. In model 1 ($\chi^2_{11}=36.42$, $P<.01$), the respondent age (odds ratio [OR]=0.97; 95% confidence interval [CI]=0.94, 1.00) and deceptiveness beliefs (OR=3.55; 95% CI=1.25, 10.08) control variables were significantly related to consideration of quitting.

Our first hypothesis predicted that, beyond the effects of the control variables, antismoking advertising-based beliefs would be associated with considering quitting. We added the advertising-based belief measures associated with the Wisconsin Anti-Tobacco Campaign to model 1 to create model 2. Model 2 provided a better fit than model 1 (χ^2_3 difference=11.40, $P<.01$), and the coefficients for the addictiveness (OR=1.35; 95% CI=1.01, 1.79) and ETS (OR=1.20; 95% CI=0.97, 1.48) advertising-based beliefs were significant. The advertising-based belief that tobacco companies have engaged in deceptive practices to encourage people to smoke was not significantly related to consideration of quitting in model 2. Still, much of hypothesis 1 was supported.

Our second hypothesis predicted that the advertising-based beliefs associated with the Wisconsin Anti-Tobacco Campaign would interact with number of children living in the household to produce a positive association with consideration of quitting. To test this hypothesis, we created product terms by multiplying each mean-centered advertising-based belief by mean-centered number of children.¹⁸ These product terms were added to model 2 to create model 3.

Model 3 provided a better fit than model 2 ($\chi^2_3=8.40$, $P<.05$), thus indicating that the interactions had a significant effect overall and providing general support for hypothesis 2. As can be seen in Table 2, the coefficient for the Advertising-Based Deceptiveness Beliefs×Number of Children interaction term (OR=1.40; 95% CI=1.06, 1.85) was significant. The Advertising-Based Addictiveness Beliefs×Number of Children interaction term was not significant, nor was the Advertising-Based ETS Beliefs×Number of Children interaction term (2-tailed). Still, the model was improved by adding the interaction terms, and the second hypothesis, that number of children living in the home would strengthen

TABLE 1—Means, Standard Deviations, and Correlations Among Constructs

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
General beliefs														
1. Addictive	3.42	0.46	1.00											
2. ETS	3.07	0.57	.45	1.00										
3. Deceptive	2.76	0.63	.48	.35	1.00									
Advertising beliefs														
4. Addictive	8.33	2.49	.24	.24	.22	1.00								
5. ETS	7.75	2.79	.22	.55	.29	.42	1.00							
6. Deceptive	6.90	3.09	.20	.25	.36	.53	.29	1.00						
Demographics														
7. Children at home	0.93	1.46	-.12	.07	.01	-.01	.20	-.03	1.00					
8. Age	33.17	14.58	-.08	-.24	-.07	-.08	-.12	-.02	-.15	1.00				
9. Gender	...	...	-.01	-.16	-.02	-.12	-.22	-.02	-.19	-.10	1.00			
10. Education	...	...	-.11	-.20	.05	.11	-.04	-.07	-.06	.02	-.04	1.00		
11. Race	...	...	-.14	-.11	-.17	-.17	-.22	-.03	-.28	-.17	.25	.25	1.00	
Dependent variable														
12. Quitting consideration	0.70	0.46	.35	.32	.33	.41	.40	.22	.02	-.19	-.13	-.07	.11	1.00

Note. ETS = environmental tobacco smoke. All correlations $\geq .15$ in absolute value are statistically significant ($P < .05$ or better).

TABLE 2—Results of Logistic Regression Models Assessing Consideration of Quitting Smoking

Predictor	Model 1	Model 2	Model 3
Demographics			
Age	-0.029 (0.016)*	-0.029 (0.017)*	-0.036 (0.018)**
Education	-.167 (0.236)	-0.365 (0.271)	-0.514 (0.303)*
Gender	0.561 (0.485)	0.441 (0.524)	0.761 (0.584)
Race	0.729 (0.578)	0.434 (0.641)	0.603 (0.731)
General Beliefs			
Addictive	1.054 (0.745)	1.079 (0.871)	1.359 (0.893)
ETS	0.980 (0.777)	0.309 (0.961)	-0.001 (1.208)
Deceptive	1.267 (0.532)**	1.204 (0.587)**	0.492 (0.679)
No. of children	0.352 (0.340)	0.156 (0.340)	-0.100 (0.440)
General Beliefs \times Children interactions			
Addictive \times Children	0.588 (0.771)	0.550 (0.905)	0.875 (0.897)
ETS \times Children	0.765 (0.779)	0.608 (0.952)	0.011 (1.329)
Deceptive \times Children	0.450 (0.526)	0.394 (0.580)	-0.550 (0.730)
Advertising Beliefs			
Addictive		0.299 (0.145)**	0.316 (0.163)**
ETS		0.183 (0.108)*	0.363 (0.156)**
Deceptive		-0.123 (0.120)	-0.053 (0.140)
Advertising Beliefs \times Children interactions			
Addictive \times Children			-0.179 (0.164)
ETS \times Children			0.247 (0.187)
Deceptive \times Children			0.334 (0.143)**

Note. ETS = environmental tobacco smoke. Values are unstandardized coefficients with standard errors in parentheses. * $P < .10$; ** $P < .05$ (2-tailed).

the positive effect of advertising-based beliefs, was partially supported.

DISCUSSION

Our study shows that, beyond demographic characteristics and existing general antismoking beliefs, advertising-based beliefs about the addictiveness of smoking and the dangers of ETS were associated with consideration of quitting among adult smokers sampled in conjunction with the Wisconsin Anti-Tobacco Media Campaign. More important, our findings revealed a significant positive interaction between number of children living in the home and advertising-based beliefs about deceptive tobacco industry practices designed to induce people to smoke. Specifically, as the number of children living in the households of adult smokers increased, advertising-based beliefs about industry deceptiveness had stronger effects in terms of enhancing these smokers' consideration of quitting.

These findings that different advertising themes targeted at adult smokers produced different effects on consideration of quitting smoking are consistent with findings of laboratory²⁰ and field studies²¹ that different advertising themes targeted at adolescents produce different effects on intention not to

smoke. Once adult smokers are addicted, though, it becomes more difficult to strengthen their resolve to quit. However, our study revealed an important leverage point in the case of adult smokers with children: advertising appeals focusing on tobacco industry deception. Creative advertisements that activate key values (e.g., protecting one's children) associated with such leverage points is an important advertising strategy.²² Our study involved a target market (i.e., adult smokers with children) that is "reachable" in terms of media and programming choices. In terms of creative message strategies, appeals that depict industry manipulation and deception to sell cigarettes can operate through the enhancement of persuasion knowledge. A persuasion knowledge effect suggests that individuals discount messages (appeals to smoke) when they suspect the source (tobacco companies) is attempting to persuade them to use a product for the source's own gain.²³

Our findings also indicate that the advertising-based belief that ETS is harmful seems to be particularly effective in that it directly affects consideration of quitting. Although not significant at a 2-tailed level of significance, the ETS×Number of Children Living in the Home interaction term showed directional support ($P < .10$, 1-tailed). Thus, as the number of children living at home increases, the effects of the advertising-based belief that ETS is harmful on consideration of quitting are marginally enhanced. Advertising-based beliefs regarding tobacco industry deceptiveness, on the other hand, appear to work primarily through their positive influences on smokers with children (i.e., a significant positive interaction with number of children but no direct effect). Smokers with children may be particularly sensitive to advertisements that address industry efforts related to influencing their children to begin smoking.

Our study involved potential limitations. For example, longer-running field studies in which longitudinal data are gathered may provide greater insight into causal effects. In addition, experimental manipulation of the 3 different advertising themes assessed in this study may result in an enhanced understanding of higher order interactions related to campaign effectiveness. Despite such limitations, we believe that our study has important implications for

public health officials involved in state anti-tobacco campaigns. In states that have reduced funding for anti-tobacco advertising campaigns,²⁴ more efficient methods are needed for targeting advertisements designed to encourage smokers to quit. As shown in our study, advertisements that focus on tobacco industry deceptiveness and the dangers of ETS can be effective when they are targeted toward adult smokers with children. ■

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Contributors

R.G. Netemeyer formulated the study hypotheses and conducted the analyses. J.C. Andrews assisted in devising the measures and conducting the study and wrote parts of the discussion section. S. Burton conceived the study and assisted in writing the article.

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Human Participant Protection

This study was approved by the institutional review board of Marquette University. Informed consent was obtained from study participants.

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