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The near-universal experience of regret among smokers in four countries: Findings from the International Tobacco Control Policy Evaluation Survey

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Regret may be a key variable in understanding the experience of smokers, the vast majority of whom continue to smoke while desiring to quit. We present data from the baseline wave (October–December 2002) of the International Tobacco Control Policy Evaluation Survey, a random-digit-dialed telephone survey of a cohort of over 8,000 adult smokers across four countries—Canada, the United States, the United Kingdom, and Australia—to estimate the prevalence of regret and to identify its predictors. The proportion of smokers who agreed or agreed strongly with the statement "If you had to do it over again, you would not have started smoking" was extremely high—about 90%—and nearly identical across the four countries. Regret was more likely to be experienced by older smokers, women, those who had tried to quit more often, those who perceived quitting as conferring benefits, those with higher levels of perceived addiction, those who worried about future damage to health, those who perceived smoking as lowering their quality of life, those who perceived higher monetary costs of smoking, and those who believed that smoking is not socially acceptable. This predictive model was the same in all four countries. Regret is thus a near-universal experience among smokers in all four countries, and the factors that predict regret are universal across these four countries. Among other implications for cessation treatment and smoking prevention, this near universality of regret casts doubt on the view of some policy analysts and economists that the decisions to take up and continue smoking are welfare-maximizing for the consumer.

Introduction

Perhaps the most striking phenomenon in tobacco use is the fact that many smokers simply do not want to smoke. About 80% report that they want to quit. Between 40% and 50% try to quit in any given year, but only 3%–5% quit successfully in any given year for at least 12 months (Centers for Disease Control and Prevention, 2002; Health Canada, 2002; Hyland et al., 2004).

How do smokers reconcile this discrepancy between their behavior and their desire to quit? According to one classic theory from psychology, smokers experience cognitive dissonance (Festinger, 1957), an unpleasant emotional state, and the smoker alleviates it by enhancing the positive features of the dissonant behavior (e.g., smoking reduces stress and increases concentration), diminishing the negative features of the undesirable consequences (e.g., minimizing the health risks of smoking), or reducing the importance of this conflict altogether. Research in smoking and dissonance has demonstrated that smokers engage in these kinds of dissonance-reduction activities (e.g., Chapman, Wong Leng, & Smith, 1993, Johnson, 1968; McMaster & Lee, 1991).

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Dissonance reduction, however, may have its limits as a coping method. In recent years, smokers in a growing number of countries have encountered increasingly stronger messages from media, family, and friends, along with policies such as smoking bans and more graphic warning labels, that they are engaging in a behavior that is hazardous to themselves and to those around them. In recent years, then, smokers likely have had a more difficult time attempting to reduce their dissonance. When dissonance reduction fails, what then?

One likely consequence is that smokers experience regret. Regret is an emotion that arises from a comparison of one's current reality and a possible alternative reality. Regret is related to, but distinct from, other emotions such as disappointment, remorse, and guilt (Landman, 1993). We focus in this article on the experience of regret among smokers; we assess its prevalence and identify key predictors of regret among smokers in a large representative survey of smokers in four countries: Canada, the United States, the United Kingdom, and Australia.

Given the prominent role that regret plays in anecdotal accounts among smokers (e.g., Walker, 1990), it is surprising that regret has not been the topic of much systematic research. Standard economic models of smoking have not dealt with regret. In rational addiction models (e.g., Becker & Murphy, 1988), the smoker is described as a carefully calculating utility maximizer who takes into account all past, present, and expected future consequences of his or her consumption decisions. In such models, regret has no real place. These models assume that preferences do not change over time and that, even if smokers were to express despair over their current cigarette addiction, if faced with the same choice again, they would choose to take up smoking and even to become addicted again. If this were not the case, these simple models assume, then these smokers would never have started smoking in the first place.[1]

In more recent economic analyses, the assumption of time-consistent preferences with future-oriented decision-making has been replaced by other, more realistic assumptions, for example, allowing preferences to vary over time (Laux, 2000) or allowing for present-oriented preferences (Gruber & Koszegi, 2000), both of which lead to time-inconsistent preferences, thereby opening the door to the possibility of regret. Regret is mentioned explicitly in the work of some economists (e.g., Orphanides & Zervos, 1995; Suranovic, Goldfarb, & Leonard, 1999) but, to date, no empirical economic studies have examined regret among smokers.

Although the psychosocial literature contains research on regret (e.g., Gilovich & Medvec, 1994; Kahneman & Miller, 1986; Kahneman & Tversky, 1982; Landman, 1987), few studies have examined regret among smokers. In a telephone survey of a representative sample of U.S. respondents, Slovic (2001) found that 85% of adult smokers and 80% of young smokers stated that they would not start smoking if they had to do it over again. In a representative national survey of 893 U.K. smokers, 83% stated that they "would not start smoking if they had their time again" (Jarvis, McIntyre, & Bates, 2002).

We conducted an empirical investigation of regret among smokers from the baseline wave of the International Tobacco Control Policy Evaluation Survey (ITCPES), a cohort survey of a representative sample of over 2,000 adult smokers in each of four countries: Canada, the United States, the United Kingdom, and Australia. The present study had three main goals. Our first goal was to estimate the prevalence of regret among adult smokers in each of the four countries. Our second goal was to identify the predictors of regret. We conducted analyses that included a variety of demographic, psychosocial, and behavioral predictors. This allowed us to test whether regret was related to some of the same factors found to be important for predicting and understanding continued smoking or quitting, including perceived addiction, perceived financial cost, already-experienced costs of smoking on health and quality of life, perceived risk and worry about future costs of smoking on health and quality of life, whether the smoker's usual brand was a light brand, and perceived social norms. Our third goal was to determine the extent to which the level of regret and the predictors of regret differed across the four countries. The four countries vary in the level of tobacco control policies. Generally speaking, Australia and Canada have more stringent tobacco control policies than do the United States and the United Kingdom in terms of warning labels (Fong et al., 2004), smoking restrictions (Borland et al., 2004), and controls on advertising and promotion (Hastings et al., 2004). Consistent with differences in the policy environment, smokers in Australia and Canada have more negative attitudes toward the tobacco industry and stronger beliefs that smoking is not socially acceptable than do smokers in the United States and the United Kingdom (Hammond et al., 2004). Because of these substantial differences across the four countries, the level of regret might be expected to vary across the four countries in the same way: Smokers in Canada and Australia might be more likely to experience regret because of

[1]Becker and Murphy argue that despite their assumption that the preferences of consumers are perfectly fixed and unchanging, addiction can occur in these models because, by smoking, an individual accumulates an "addictive stock," something analogous to a disability, which makes him or her more inclined to smoke in the future. In other words, they argue that addiction occurs in these models because of changes in a consumer's capacities, rather than changes in the consumer's preferences. Whether this distinction between preferences and capacities actually serves to clarify the analysis of what constitutes consumer welfare in the consumption of addictive substances such as tobacco is open to debate.

their greater exposure to a variety of policies that restrict their smoking and that remind them of the detrimental effects of smoking.

In addition, the factors that predict regret might be expected to differ. For example, the four countries vary in the extent to which price promotions play a role in the tobacco industry's strategy, with such promotions being used much more extensively in the United States than in the other three countries. In addition, compared with adult smokers in the other three countries, those in the United States are more likely to report responding to price increases by reducing consumption, switching to cheaper brands, and hunting for cheaper sources (Cummings et al., 2004). As a result, it could be predicted that perceived financial cost might play a weaker role in predicting regret in the United States because of the greater array of strategies that U.S. smokers have (or perceive themselves to have) for dealing with the financial costs of smoking. Thus we addressed the basic question, Are the experience of regret and the factors that relate to regret the same or different across the four countries?

Method

Sample

Participants were respondents to the ITCPES, a cohort survey of adult smokers (aged 18 years or older) in each of four countries (Canada, the United States, the United Kingdom, and Australia) who reported having smoked at least 100 cigarettes in their lifetime and who had smoked at least once in the past 30 days. Participants were recruited through a 10-minute telephone survey, followed 1 week later by the 40-minute main survey.

The cohort was constructed from probability sampling methods (random-digit-dialing methods from list-assisted phone numbers) with numbers selected at random from the population of each country within strata defined by geographic region and community size. We obtained samples of phone numbers for three of the countries (the United States, Canada, and the United Kingdom) from Survey Sampling International, which uses RDD-B methodology in generating and screening number banks in each of those three countries. Because Australia has no comparable source for number banks generated from such methods, we developed our own comparable probability sampling methods to generate number banks in that country. Next-birthday method (Binson, Canchola, & Catania, 2000) was used to select the respondent in households with multiple smokers. Cooperation rates (the proportion of eligible respondents who completed the survey; Cooperation Rate # 4 from the American Association for Public Opinion Research [2000]) were high for a survey of this kind: United States = 77.0%, Canada = 78.5%, United Kingdom = 78.7%, and Australia = 78.8%.

The data reported in this article are from the baseline main survey, which was conducted October–December 2002, with sample sizes as follows: Canada ($N = 2{,}193$), United States ($N = 2{,}115$), United Kingdom ($N = 2{,}344$), and Australia ($N = 2{,}271$). The sample sizes in the analyses reported below are lower than these sample sizes owing to missing responses.

The survey fieldwork was conducted by two survey firms: Environics Research Group, Toronto (Canada and the United States), and Roy Morgan Research, Melbourne (Australia and the United Kingdom). All aspects of the training and calling protocol were standardized across firms.

The study protocol was cleared for ethics by the institutional review boards or research ethics boards of the University of Waterloo (Canada), Roswell Park Cancer Institute (U.S.), University of Illinois at Chicago (U.S.), University of Strathclyde (U.K.), and the Cancer Council Victoria (Australia).

Measures

Regret. Respondents indicated whether they strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree with the statement "If you had to do it over again, you would not have started smoking." The wording of this question, which is a variant of the question used by Slovic (2001), measures regret in a precise way that allows a focal test of the assumption of some economic models that preferences (and the decisions arising from those preferences) are time-invariant. In the logistic regression analyses reported, the regret variable was dichotomized, with those who agreed or strongly agreed with the statement being contrasted with those in the other three categories.

Demographic measures. In addition to measures of gender and age, ethnicity was measured in accordance with the census categories in each country. In the analyses presented in here, ethnicity was used as a binary variable: White vs. non-White (in Australia, respondents were categorized into English-speaking vs. non-English-speaking because, in Australia, ethnicity is not assessed explicitly in population surveys or in the census).

Education was measured using standard categories in each country. However, to systematize the categorization across countries, we created three categories for education: 1 = completed high school or less, 2 = technical or trade school or community college (some or completed) and/or some university (but no degree), and 3 = completed at least a university degree.

Income was measured by asking respondents to report their annual household income. Data on income were collected in the ITCPES by using questions from existing national census surveys, which varied across countries, ranging from six to eight categories. We matched these categories to the extent possible so that they would be comparable in the rough income distributions across three categories. For Canada, the United States, and Australia, the following income categories were used: Low = less than $30,000; moderate = $30,000–$59,999; high = $60,000 or greater (CAD, USD, and AUD, respectively). For the United Kingdom, the following income categories were used: Low = less than £30,000; moderate = £30,000–£44,999; high = £45,000 or higher.

Smoking- and quitting-relevant variables. These smoking- and quitting-relevant variables consisted of cigarettes smoked per day. Two items were related to addiction: the first was an item from the Fagerström Dependence Scale (Fagerström, 1978) concerning time after waking before the first smoke of the day; the second was a perceived addiction question: "Do you consider yourself addicted to cigarettes?" Response categories were "Not at all," "Yes, somewhat addicted," or "Yes, very addicted."

Two items were associated with quitting: (a) prior quit attempts, and (b) perceived benefits of quitting: "How much do you think you would benefit from health and other gains if you were to quit smoking permanently in the next 6 months?" Response categories were as follows: "Not at all," "Slightly," "Moderately," "Very much," and "Extremely."

We assessed whether smokers smoked light cigarettes from responses to a self-report question: "Some cigarettes are described as light, mild, or low in tar. Do you currently smoke these types of cigarettes?"

Health-relevant variables. Overall health was measured by asking respondents, "In general, how would you describe your health?" Response categories were as follows: "Poor," "Fair," "Good," "Very good," and "Excellent."

Perceptions that smoking had already damaged respondents' health was measured by asking, "To what extent, if at all, has smoking damaged your health?" Response categories were as follows: "Not at all," "Just a little," "A fair amount," and "A great deal." This item was followed by one that asked, "How worried are you, if at all, that smoking will damage your health in the future?" The response categories were the same as for the preceding question.

A second pair of items asked about the impact of smoking on quality of life. Respondents were asked, "To what extent, if at all, *has* smoking lowered your quality of life?" and "How worried are you, if at all, that smoking *will* lower your quality of life in the future?" The response categories were the same as for the preceding two questions.

Perceived financial cost. One item asked respondents the extent of their agreement or disagreement with the statement "You spend too much money on cigarettes." Responses were on a five-point scale, ranging from "strongly agree" to "strongly disagree."

Perceived social norms. Three items measured perceptions of norms about smoking. Respondents were asked the extent of their agreement or disagreement with these statements: "There are fewer and fewer places where you feel comfortable about smoking," "Society disapproves of smoking," and "People who are important to you believe that you should not smoke." Each question was answered on a five-point scale, ranging from "strongly agree" to "strongly disagree."

Analyses

Survey weights. Weights were constructed for each country, using census figures (to adjust for differential achieved sampling fractions) and benchmark estimates of smoking prevalence for Canada (region × sex × age), the United States (sex × age × White vs. non-White), the United Kingdom (region × sex and sex × age), and Australia (state × sex × age). Also included in the construction of the weights were adjustments for multiple phones within a household. Analyses were conducted using weighted and unweighted data for all models, with no significant differences observed between weighted and unweighted analyses. Results are presented for weighted analyses, with standard errors and model coefficients adjusted accordingly. We conducted logistic regression analyses using SPSS 11.0 for Windows.

Results

Characteristics of the sample

Table 1 presents the characteristics of respondents who were included in the logistic regression analysis predicting regret.

Prevalence of regret

Figure 1 presents the weighted percentage of respondents in each response category of the regret question for each of the four countries. Figure 1 shows that a very high percentage of smokers in each country agreed or strongly agreed with the regret statement "If you had to

Table 1. Weighted descriptive statistics on respondents in each of the four countries.

Characteristic	Canada	United States	United Kingdom	Australia
Total number of respondents	2,193	2,115	2,344	2,271
Number of respondents with nonmissing values on all variables included in the analyses predicting regret	1,762	1,708	1,913	1,934
Gender (percent male)	54.4	53.1	51.8	55.6
Age				
18–24 years (percent)	11.1	13.0	11.7	15.1
25–39 years (percent)	32.7	32.0	35.9	37.0
40–54 years (percent)	38.2	36.5	29.6	32.4
55 + years (percent)	18.1	18.5	22.8	15.5
Mean (years)	41.9	41.8	42.5	39.8
Ethnicity (percent White)	89.3	78.0	94.9	87.2[a]
Education (percent university graduates)	12.7	10.4	12.2	12.7
Mean cigarettes per day	18.0	20.1	17.0	18.5
Percent intending to quit within the next year	82.1	75.6	66.9	77.5

Note. Proportions and means are weighted. See text for description of the weighting procedure. [a]Respondents in Australia were asked about their primary language in accordance with the census in Australia. The Australia percentage represents those who indicated that English was their primary language.

do it over again, you would not have started smoking.'' Moreover, the high prevalence of regret was consistent across the four countries: Canada = 91.3%, the United States = 91.2%, the United Kingdom = 89.2%, Australia = 89.6%. The analyses described here test this consistency more formally.

Predictors of regret: Logistic regression model

We conducted weighted logistic regression analyses in which the dependent variable was the dichotomized regret variable, with those who agreed and strongly agreed with the regret question comprising the higher category. (We also conducted parallel analyses in which regret was left in its original five-point scale form and obtained essentially the same pattern of results.) Variables were entered in blocks as follows:

- Block 1: Demographic variables, variables relevant to smoking and quitting, health-relevant variables, perceived financial cost, and perceived social norms
- Block 2: Country variables (dummy coded with the United States as the baseline category)
- Block 3: Product terms, crossing the three country dummy variables with each of the variables in Block 1

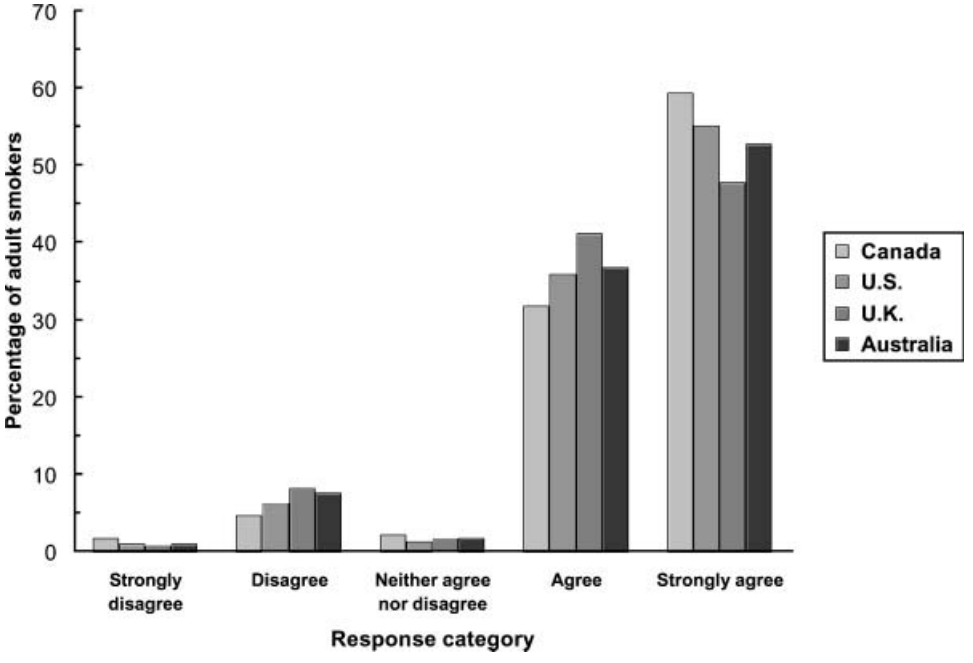

Figure 1. Percentage of adult smokers responding to the regret question "If I had it to do over again, I would not have started smoking" by country.

The variables in Block 1 yielded a generalized R^2 value (Cox & Snell, 1989) of .109 and a rescaled R^2, adjusting the generalized R^2 by its upper bound (Nagelkerke, 1991), of .229. The addition of Block 2 tested whether the four countries differed in their mean level of regret, controlling for the other predictor variables in Block 1. Adding the country dummy variables did not lead to a significant improvement in the predictability of regret, χ^2 ($df = 3$) = 3.76, $p = .289$. In other words, adjusting for the covariates in the model, we found that smokers in the four countries did not differ in the overall level of regret. The main effects model (Block 1 and Block 2 together) is presented in Table 2, which also presents the prevalence of regret for each response category of each predictor. Because the odds ratios presented in Table 2 are adjusted for the other predictors in the model, whereas the regret prevalences are not, some slight discrepancies occur, although for the great majority of predictors the pattern of the regret prevalences is consistent with the corresponding adjusted odds ratios in the multivariate analysis.

Demographic predictors of regret

Of the five demographic variables, three were statistically significant predictors of regret. Regret was more likely to be reported by females, older smokers, and those with lower levels of educational attainment (those whose educational attainment below a university degree). Neither ethnicity nor self-reported income was a significant predictor of regret.

Smoking- and quitting-relevant variables

Cigarettes smoked per day was not a consistent predictor of regret ($p = .080$). The contrast between the two addiction measures was striking. The "objective" measure of dependence of the time after waking until the first cigarette, was not related to regret ($p = .766$). But the "subjective" measure—perceived addiction—was a strong predictor, with those considering themselves to be somewhat or very addicted to cigarettes being much more likely to experience regret ($OR = 1.73$, $p < .001$). Regret was more likely to be reported by those who had attempted to quit and much more likely to be reported by those who believed that quitting would confer benefits.

Smokers of light cigarettes were more likely ($OR = 1.28$, $p = .005$) to regret smoking, consistent with the studies showing that smokers of light or mild cigarettes are more worried about the health consequences of smoking (e.g., Etter, Kozlowski, & Perneger, 2003; Giovino et al., 1996). Note, however, that in the present analysis, worry about the consequences of smoking is present in this predictive model; thus, the greater likelihood of regret experienced by light smokers is above and beyond that which is explained by perceived health consequences and worry about future health consequences.

Health-relevant variables

Two of the health-relevant variables were not significant predictors of regret: overall self-rating of health and the perception that smoking had already damaged the respondent's health. For the latter variable, although a simple bivariate relationship existed between perceived health damage and regret, this relationship was not statistically significant in the multivariate model.

Worry that smoking will damage health in the future was a very strong predictor of regret, at both the bivariate and the multivariate levels ($OR = 1.50$, $p < .001$). Regret was more likely among those who perceived that smoking had already lowered their quality of life ($OR = 1.47$, $p = .013$) and among those who worried that smoking would lower quality of life in the future ($OR = 1.37$, $p = .006$).

Perceived financial cost

Respondents agreeing or agreeing strongly that they spent too much money on cigarettes were more likely to regret smoking, compared with those who did not agree ($OR = 1.41$, $p < .001$).

Perceived social norms about smoking

Two of the three measures of perceived norms were significant predictors of regret. Regret was more likely to be experienced by smokers who perceived that there are fewer places where one can smoke ($OR = 1.19$, $p < .001$) and for smokers who agreed that "People who are important to you believe that you should not smoke" ($OR = 1.29$, $p < .001$). The third measure—"society disapproves of smoking"—was a predictor of regret in the expected direction ($OR = 1.09$), although it fell short of statistical significance ($p = .088$).

Interactions between the predictors and country

The results presented so far have identified some strong predictors of regret among smokers in the four countries. The addition of Block 3 was a test of whether the four countries differed in the predictors of regret. Block 3 consisted of the product terms of the country dummy variables with each of the predictor variables presented in Table 2. If the addition of these product terms led to a significant increase in the prediction of regret, this would indicate that the four

Table 2. Weighted logistic regression analysis of regret.

Predictor	Regret[a]	Adjusted odds ratio (95% *CI*)	*p* value
Demographic variables			
Gender			
Male	88.5%	1.00 (reference)	
Female	92.3%	1.33 (1.11–1.59)	.002
Age (years)			
18–24	86.0%	1.00 (reference)	
25–39	90.8%	1.46 (1.12–1.89)	.005
40–54	91.8%	1.58 (1.19–2.08)	.001
55+	89.3%	1.53 (1.13–2.09)	.007
Ethnicity[b]			
White	90.5%	1.00 (reference)	
Non-White	88.3%	0.89 (0.69–1.14)	.356
Education			
Completed high school or less	90.5%	1.00 (reference)	
Technical or trade school or community college (some or completed) and/or some university (but no degree)	91.1%	0.91 (0.71–1.18)	.334
Completed at least a university degree	86.9%	0.60 (0.45–0.75)	<.001
Income[c]			
Low	90.0%	1.00 (reference)	
Medium	91.0%	0.96 (0.78–1.18)	.694
High	89.6%	0.90 (0.72–1.13)	.361
Country			
United States	91.3%	1.00 (reference)	
Canada	91.1%	0.86 (0.66–1.11)	.246
Australia	89.3%	0.89 (0.69–1.14)	.344
United Kingdom	89.6%	1.06 (0.82–1.36)	.680
Smoking- and quitting-relevant variables			
Cigarettes smoked per day		0.99 (0.99–1.00) (Continuous)	.080
1–10	87.2%		
11–20	92.3%		
21–30	89.7%		
31+	89.8%		
Time after waking until first cigarette: How soon after waking do you usually have your first smoke?		1.00 (1.00–1.00) (Continuous)	
Within 5 minutes	91.2%		
6–30 minutes	92.2%		
31–60 minutes	88.9%		
More than 60 minutes	84.7%		
Perceived addiction: Do you consider yourself addicted to cigarettes?		1.73 (1.49–2.00) (Continuous)	<.001
Not at all	68.5%		
Yes, somewhat addicted	87.1%		
Yes, very addicted	94.1%		
Prior quit attempts: Number of prior quit attempts (transformed; see text)		1.41 (1.26–1.58) (Continuous)	<.001
0	80.4%		
1–3	91.4%		
More than 3	94.6%		
Perceived benefits of quitting: How much do you think you would benefit from health and other gains if you were to quit smoking permanently in the next 6 months?			
Not at all/Slightly	76.8%	1.00 (reference)	
Moderately/Very much/Extremely	93.1%	1.90 (1.56–2.31)	<.001
Smoker of "light" cigarettes: Some cigarettes are described as light, mild, or low in tar. Do you currently smoke these types of cigarettes?			
No (current brand = non-"light")	88.6%	1.00 (reference)	
Yes (current brand = "light")	91.7%	1.28 (1.08–1.52)	.005
Health-relevant variables			
Overall self-rating of health: In general, how would you describe your health?		0.99 (0.90–1.08) (Continuous)	.765
Poor	91.5%		
Fair	92.5%		
Good	90.7%		
Very good	89.5%		
Excellent	84.5%		
Perception that smoking has already damaged health: To what extent, if at all, *has* smoking damaged your health?			
Not at all/A little	88.1%	1.00 (reference)	
A fair amount/A great deal	94.6%	0.94 (0.74–1.19)	.616

Table 2. *Continued.*

Predictor	Regret[a]	Adjusted odds ratio (95% *CI*)	*p* value
Worry that smoking will damage health in the future: How worried are you, if at all, that smoking *will* damage your health in the future?			
Not at all worried/A little worried	82.4%	1.00 (reference)	
Moderately worried/Very worried	94.5%	1.50 (1.21–1.86)	<.001
Perception that smoking has lowered quality of life: To what extent, if at all, *has* smoking lowered your quality of life?			
Not at all/A little	88.2%	1.00 (reference)	
A fair amount/A great deal	96.5%	1.47 (1.08–2.00)	.013
Perception that smoking will lower quality of life in the future: How worried are you, if at all, that smoking *will* lower your quality of life?			
Not at all worried/A little worried	83.6%	1.00 (reference)	
Moderately worried/Very worried	95.1%	1.37 (1.10–1.72)	.006
Perceived financial cost			
Perceived financial cost of smoking: you spend too much on cigarettes		1.41 (1.31–1.53) (Continuous)	<.001
Strongly disagree	64.1%		
Disagree	75.3%		
Neither agree nor disagree	81.2%		
Agree	90.4%		
Strongly agree	95.4%		
Perceived social norms			
Perception that there are fewer places where one can smoke: There are fewer and fewer places where you feel comfortable about smoking.		1.19 (1.09–1.30) (Continuous)	<.001
Strongly disagree	84.4%		
Disagree	81.8%		
Neither agree nor disagree	84.7%		
Agree	91.2%		
Strongly agree	94.1%		
Society disapproves of smoking		1.09 (0.99–1.20) (Continuous)	.088
Strongly disagree	84.0%		
Disagree	82.7%		
Neither agree nor disagree	88.3%		
Agree	90.3%		
Strongly agree	94.2%		
Subjective norms: People who are important to you believe that you should not smoke		1.29 (1.18–1.42) (Continuous)	<.001
Strongly disagree	78.2%		
Disagree	74.1%		
Neither agree nor disagree	75.0%		
Agree	91.1%		
Strongly agree	94.1%		

Note. Canada $N=1{,}762$; United States $N=1{,}708$; United Kingdom $N=1{,}913$; Australia $N=1{,}934$. [a]The regret prevalences presented for each response category of each predictor are not adjusted for the other predictors in the model. [b]In Australia, "White" was defined as those whose primary language was English, and "non-White" was defined as those whose primary language was some other language. [c]For Canada, the United States, and Australia, the following income categories were used: low = <$30,000; moderate = $30,000–$59,999; high = $60,000+ (CAD, USD, and AUD, respectively). For the United Kingdom, the following income categories were used: low = <£30,000; moderate = £30,000–£44,999; high = £45,000 or higher.

countries varied in the factors related to regret. Of the 60 product terms, only two were statistically significant at the $p=.05$ level (one of them at $p=.017$ and the other at $p=.045$), but the Bonferroni adjustment for multiple post-hoc tests easily rendered these two nonsignificant. Thus the addition of the product terms was nonsignificant, χ^2 $(df=60)=74.67$, $p=.096$, which indicates that the four countries did not vary in the factors that predicted regret.

Discussion

The findings from this large representative survey demonstrate that the overwhelming majority—about 90%—of adult smokers across Canada, the United States, the United Kingdom, and Australia regret having started smoking. These smokers stated that, if they had it to do over again, they would not have started smoking. These findings cast doubt on the views of some policy analysts and economists who oppose tobacco control on the grounds that tobacco regulation, because it is an intervention in the free marketplace, hurts consumer welfare. These findings also cast doubt on economic models (such as the rational addiction model) that assume smokers take into account the future consequences of current decisions in a time-consistent manner. How can such high levels of near-universal regret be reconciled with rationality? Although some theoretical work by economists has dealt with this issue of regret vs. rationality (e.g., Orphanides & Zervos, 1995), to date there has been little

or no empirical investigation of these models.[2] Incorporating regret into existing economic decision models of smoking may hold promise in developing a richer understanding of tobacco use.

The overall level of regret was no different across the four countries. Whatever the cultural, social, and historical differences may be, and regardless of differences that may exist in tobacco control policies and industry strategies across the four countries in the present study, the experience of regret among smokers unites them. Moreover, the predictive model of regret was no different across the four countries. Thus both feelings of regret about one's smoking and the predictors of regret represent a rather remarkable near-universal experience for smokers across the four countries.

The following overall portrait of the smoker emerges from the findings of this study—in sharp contrast to the tobacco industry's effective efforts to associate smoking with a wide range of positive benefits: Nearly all smokers regret having started smoking. Regretful smokers are those who believe themselves to be addicted. These regretful smokers report that smoking has lowered their quality of life and will continue to do so in the future. Although they are more likely to perceive that there are benefits of quitting, they have tried to quit multiple times, they have failed, and now they fear the future consequences to their health. As one reflection of this concern over the impact of smoking on their health and quality of life, regretful smokers smoke light cigarettes, which are positioned by the tobacco industry to appeal to these concerns. They know they spend too much money on smoking, and they perceive not only that there are fewer places where one can smoke these days but that their significant others believe they should not be smoking. As mentioned earlier, this depiction of smokers casts doubt on the view that choosing to smoke is a rational and welfare-maximizing decision for the consumer. It presents an image of a consumer who expresses preferences and faces constraints that were largely unimaginable to her younger self when she took up the habit of smoking.

These findings also connect with recent work in psychology regarding the importance of affect and other noncognitive factors in judgment and decision making (e.g., Epstein, 1994; Loewenstein, 1996; Schwarz, 1990; Slovic, 2001; Zajonc, 1984). So far, the cognitive aspects of decision and judgment have been studied heavily, whereas the experiential, affective contributions to decision, judgment, and behavior have been underrepresented in research.

Research on the relationship between affect and smoking is not new. The interplay between mood and smoking behavior has been explored (e.g., Kahler et al., 2002; Shiffman et al., 1997). In contrast to mood, which is a relatively transient variety of affect, regret is a kind of affect that is generally thought of as arising from reactions to a past action (or inaction)—it is focused on the past. In the present study, two of the strongest predictors of regret were related to worry over future consequences—that smoking would lead to future adverse effects on health and on quality of life, even after controlling for already experienced effects on health and quality of life. This finding suggests that our measure of regret was sensitive to both the reaction of smokers' past experiences and their anticipatory regret over future consequences. This further suggests that important connections may exist between regret and consideration of future actions related to smoking, such as cutting back or quitting. If this is the case, regret may play a role not only as an effect (as we have suggested in this article) but also as a possible cause of future outcomes, for example, increased intentions to quit and a greater likelihood of quit attempts. Consistent with the possibility that regret may play a role as a mediator in models that would explain the effects of tobacco control policies and other interventions on cessation, the cross-sectional correlation between regret and intentions to quit was +.24. (Intentions to quit was a dichotomous variable, where 0 = no intentions to quit within 6 months vs. 1 = intentions to quit within 6 months.)

These findings suggest possible strategies for quit smoking campaigns. Most such campaigns focus on future consequences to health, but these data suggest the potential effectiveness of highlighting the effects of smoking on quality of life. Financial cost also was a strong predictor, which suggests that campaigns that make the financial costs of smoking more salient may enhance regret. A third strong predictor of regret was social norms against smoking, in particular, the belief that there were fewer and fewer places where one can smoke, which suggests that heightened feelings of regret over smoking may play a role in the effects of smoking restrictions on quitting (e.g., Fichtenberg & Glantz, 2002; Glasgow, Cummings, & Hyland, 1997; Hyland, 2003).

[2]The Orphanides and Zervos model attempts to reconcile regret with rationality by assuming that consumers take up smoking because, although the future costs of smoking are uncertain to them, the *expected value* of these future costs is less than the expected benefits to them of smoking. Thus their model is an extension that in no way contradicts the spirit of the original Becker and Murphy model of rational addiction. Our regret measure essentially asks smokers, if they had it to do over again, would they make the same decision? The fact that approximately 90% of adult smokers in these four countries would not is troubling when viewed through the lens of the Orphanides and Zervos model. Considering a reasonable range of values for what the typical adult smoker would be willing to pay to reverse his or her decision, accepting the Orphanides and Zervos model implies either that there must have been enormous unexpected benefits of smoking to a large population of ex-smokers or that our respondents, when answering our question, neglected to account for significant benefits that they received from smoking prior to our survey. The Laux (2000), Gruber and Koszegi (2000), and Suranovic, Goldfarb, and Leonard (1999) interpretations thus seem more consistent with our survey findings. It is unclear how one can reconcile this extremely high incidence of regret with assumptions of stability in preferences and pure rationality.

One limitation of the dataset reported here is its cross-sectional design, but in future waves of the ITCPES, we will be able to explore the possible role of regret as a mediator in the full longitudinal dataset. A second limitation is that our data speak to the near universality of regret among smokers only in four highly developed countries. We suspect that the prevalence of smoker regret in countries where the harms of smoking are not as widely recognized is likely to be lower than that found in the present study, but it remains to be seen whether the prevalence of regret and the sources of regret differ across a broader set of countries and cultures.

In conclusion, then, we argue that regret is a key concept in understanding smoking behavior because it captures the considerable and continual struggle that many smokers face. The near universality of regret is compelling evidence against models that view smoking as a free choice and highlights the need to ensure that smokers have ready access to methods that will allow them to dispel their regret through quitting.

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References

American Association for Public Opinion Research. (2000). *Standard definitions: Final dispositions of case codes and outcome rates for survey*. Retrieved from http://www.aapor.org/default.asp?page=survey_methods/standards_and_best_practices/standard_definitions

Becker, G. S., & Murphy, K. M. (1988). A theory of rational addiction. *Journal of Political Economy*, *96,* 675–700.

Binson, D., Canchola, J. A., & Catania, J. A. (2000). Random selection in a national telephone survey: A comparison of the Kish, next-birthday, and last-birthday methods. *Journal of Official Statistics*, *16,* 53–60.

Borland, R., Yong, H. H., Fong, G. T., Hammond, D., Cummings, K. M., & Hastings, G. for the ITCPES Research Team. (2004, February). Restrictions on smoking across four countries: Findings from the International Tobacco Control Policy Evaluation Survey. In G. T. Fong (Chair), *Evaluating and building an evidence base for the Framework Convention on Tobacco Control: Recent findings from the International Tobacco Control Policy Evaluation Survey*. Symposium presented at the annual meeting of the Society for Research on Nicotine and Tobacco, Scottsdale, Arizona.

Centers for Disease Control and Prevention. (2002). Cigarette smoking among adults—United States, 2002. *Morbidity and Mortality Weekly Report*, *51,* 642–645.

Chapman, S., Wong Leng, W., & Smith, W. (1993). Self-exempting beliefs about smoking and health: Differences between smokers and ex-smokers. *American Journal of Public Health*, *83,* 215–219.

Cox, D. R., & Snell, E. J. (1989). *The analysis of binary data* (2nd ed.). London: Chapman & Hall.

Cummings, K. M., Hyland, A., Travers, M., Higbee, C., Fong, G. T., Chaloupka, F. J., Ross, H., & Laux, F. (2004, February). Cigarette purchase patterns and cigarette prices in four countries: Findings from the International Tobacco Control Policy Evaluation Survey. In G. T. Fong (Chair), *Evaluating and building an evidence base for the Framework Convention on Tobacco Control: Recent findings from the International Tobacco Control Policy Evaluation Survey*. Symposium presented at the annual meeting of the Society for Research on Nicotine and Tobacco, Scottsdale, Arizona.

Epstein, S. (1994). Integration of the cognitive and the psychodynamic unconscious. *American Psychologist*, *49,* 709–724.

Etter, J.-F., Kozlowski, L. T., & Perneger, T. V. (2003). What smokers believe about light and ultralight cigarettes. *Preventive Medicine*, *36,* 92–98.

Fagerström, K. O. (1978). Measuring degree of physical dependence to tobacco smoking with reference to individualization of treatment. *Addictive Behaviors*, *3,* 235–241.

Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.

Fichtenberg, C. M., & Glantz, S. A. (2002). Effect of smoke-free workplaces on smoking behaviour: Systematic review. *British Medical Journal*, *325,* 188–194.

Fong, G. T., Hammond, D., Borland, R., Hastings, G., & Cummings, K. M. for the ITCPES Research Team. (2004, February). Quasi-experimental evaluation of the enhancement of warning labels in the United Kingdom: Initial findings from the International Tobacco Control Policy Evaluation Survey. In G. T. Fong (Chair), *Evaluating and building an evidence base for the Framework Convention on Tobacco Control: Recent findings from the International Tobacco Control Policy Evaluation Survey*. Symposium presented at the annual meeting of the Society for Research on Nicotine and Tobacco, Scottsdale, Arizona.

Gilovich, T., & Medvec, V. H. (1994). The temporal pattern to the experience of regret. *Journal of Personality and Social Psychology*, *67,* 357–365.

Giovino, G. A., Tomar, S. L., Reddy, M. N., Peddicord, J. P., Zhu, B., Escobedo, L. G., & Eriksen, M. P. (1996). Attitudes, knowledge, and beliefs about low-yield cigarettes among adolescents and adults. In *The FTC cigarette test method for determining tar, nicotine, and carbon monoxide yields of U.S. cigarettes: Report of the NCI Expert Committee* (NIH Publication No. 96-4028; pp. 39–57). Bethesda, MD: National Institutes of Health.

Glasgow, R. E., Cummings, K. M., & Hyland, A. (1997). Relationship of worksite smoking policies to changes in employee tobacco use: Findings from COMMIT. *Tobacco Control*, *6*(Suppl. 2), S44–S48.

Gruber, J., & Koszegi, B. (2000). Is addition "rational"? Theory and evidence. *Quarterly Journal of Economics*, *116,* 1261–1303.

Hammond, D., Fong, G. T., Elton, T. E., & Zanna, M. P. for the ITCPES Research Team. (2004, February). *Tobacco denormalization and intentions to quit among smokers from four countries: Findings from the International Tobacco Control Policy Evaluation Survey*. Poster presented at the annual meeting of the Society for Research on Nicotine and Tobacco, Scottsdale, Arizona.

Hastings, G., Fong, G. T., Mackintosh, A. M., Anderson, S., McNeill, A., Borland, R., & Cummings, K. M. for the ITCPES Research Team. (2004, February). Evaluation of the comprehensive ban on tobacco advertising and promotion in the United Kingdom: Initial findings from the International Tobacco Control Policy Evaluation Survey. In G. T. Fong (Chair), *Evaluating and building an evidence base for the Framework Convention on Tobacco Control: Recent findings from the International Tobacco Control Policy Evaluation Survey*. Symposium presented at the annual meeting of the Society for Research on Nicotine and Tobacco, Scottsdale, Arizona.

Health Canada, Tobacco Control Programme. (2002). *Canadian Tobacco Use Monitoring Survey, February–December 2001*. Ottawa, Canada: Author.

Hyland, A. (2003). Smoke-free workplace regulations reduce smoking prevalence and encourage smokers to reduce cigarette consumption. *Evidence-based Healthcare*, *7,* 10–11.

Hyland, A., Li, Q., Bauer, J., Giovino, G., Steger, C., & Cummings, K. M. (2004). Predictors of cessation in a cohort of current and former smokers followed over 13 years. *Nicotine & Tobacco Research*, *6*(Suppl. 3), S363–S369.

Jarvis, M. J., McIntyre, D., & Bates, C. (2002). Effectiveness of smoking cessation initiatives [Letter]. *British Medical Journal*, *324,* 608.

Johnson, R. E. (1968). Smoking and the reduction of cognitive dissonance. *Journal of Personality and Social Psychology*, *9,* 260–265.

Kahler, C. W., Brown, R. A., Ramsey, S. E., Niaura, R., Abrams, D. B., Goldstein, M. G., Mueller, T. I., & Miller, I. W. (2002). Negative mood, depressive symptoms, and major depression after smoking cessation treatment in smokers with a history of major depressive disorder. *Journal of Abnormal Psychology*, *111,* 670–675.

Kahneman, D., & Miller, D. T. (1986). Norm theory: Comparing reality to its alternatives. *Psychological Review*, *93,* 136–153.

Kahneman, D., & Tversky, A. (1982). The simulation heuristic. In D. Kahneman, P. Slovic, & A. Tversky (Eds.), *Judgment under uncertainty: Heuristics and biases* (pp. 201–208). Cambridge, England: Cambridge University Press.

Landman, J. (1987). Regret and elation following action and inaction: Affective responses to positive versus negative outcomes. *Personality and Social Psychology Bulletin*, *13,* 524–536.

Landman, J. (1993). *Regret: The persistence of the possible*. New York: Oxford University Press.

Laux, F. L. (2000). Addiction as a market failure: Using rational addiction results to justify tobacco regulation. *Journal of Health Economics*, *19,* 421–437.

Loewenstein, G. (1996). Out of control: Visceral influences on behavior. *Organizational Behavior and Human Decision Processes*, *65,* 272–292.

McMaster, C., & Lee, C. (1991). Cognitive dissonance in tobacco smokers. *Addictive Behaviors*, *16,* 349–353.

Nagelkerke, N. J. D. (1991). A note on a general definition of the coefficient of determination. *Biometrika*, *78,* 691–692.

Orphanides, A., & Zervos, D. (1995). Rational addiction with learning and regret. *Journal of Political Economy*, *103,* 739–758.

Schwarz, N. (1990). Feelings as information: Informational and motivational functions of affective states. In R. M. Sorrentino & E. T. Higgins (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 527–561). New York: Guilford.

Shiffman, S., Hufford, M., Hickcox, M., Paty, J. A., Gnys, M., & Kassel, J. D. (1997). Remember that? A comparison of real-time versus retrospective recall of smoking lapses. *Journal of Consulting and Clinical Psychology*, *65,* 292–300.

Slovic, P. (2001). Cigarette smokers: Rational actors or rational fools? In P. Slovic (Ed.). *Smoking: Risk, perception, and policy* (pp. 97–126). Thousand Oaks, CA: Sage.

Suranovic, S., Goldfarb, R., & Leonard, T. (1999). An economic theory of cigarette addiction. *Journal of Health Economics*, *18,* 1–29.

Walker, E. (1990). *Smoker: Self-portrait of a nicotine addict*. San Francisco: Harper & Row.

Zajonc, R. B. (1984). On the primacy of affect. *American Psychologist*, *39,* 117–123.