

Are smokers adequately informed about the health risks of smoking and medicinal nicotine?

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The present study assessed smokers' beliefs about the health risks of smoking and the benefits of smoking filtered and low-tar cigarettes, and their awareness of and interest in trying so-called reduced-risk tobacco products. Results were based on a nationally representative random-digit-dialed telephone survey of 1,046 adult (aged 18 years or older) current cigarette smokers. Data were gathered on demographic characteristics, tobacco use behaviors, awareness and use of nicotine medications, beliefs about the health risks of smoking, content of smoke and design features of cigarettes, and the safety and efficacy of nicotine medications. In addition, respondents were asked about their interest in and perceived ability to stop smoking and about their desire for more information about the health risks of smoking. Smokers were least knowledgeable about low-tar and filter cigarettes (65% of responses were incorrect or "don't know") and most knowledgeable about the health risks of smoking (39% of responses were incorrect or "don't know"). The smokers' characteristics most commonly associated with misinformation when all six indices were combined into a summary index were as follows: those aged 45 years or older, smokers of ultralight cigarettes, smokers who believe they will stop smoking before they experience a serious health problem caused by smoking, smokers who have never used a stop-smoking medication, and smokers with a lower education level. Those who believed they would stop smoking in the next year were more knowledgeable about smoking. Some 77% of respondents reported a desire for additional information from tobacco companies on the health dangers of smoking. The present findings demonstrate that smokers are misinformed about many aspects of the cigarettes they smoke and stop-smoking medications and that they want more information about ways to reduce their health risks.

Introduction

Cigarette advertising and promotional campaigns are designed to create a specific brand image for the smoker (e.g., lower risk of disease, latest technology utilized) (Hastings & MacFadyen, 1998, 2002; Pollay, 2000). Cigarette manufacturers use colors (e.g., dark vs. light), images (e.g., healthy, sexy, serious), and words such as *full flavored*, *light*, *mild*, *smooth*, *natural*, and *low tar* to communicate specific product features to consumers (Cummings, Morley, Horan, Steger,

& Leavell, 2002; Kozlowski, 2000). Industry documents also reveal that the companies have carefully researched ways to use pack design and color to communicate the impression of lower tar or milder smoke while preserving taste "satisfaction" (Pollay & Dewhirst, 2002; Wakefield, Morley, Horan, & Cummings, 2002). Despite the cigarette industry's use of advertising and marketing to promote specific product features to induce smokers to select their brand, tobacco control interventions have largely ignored providing smokers with product-related information as a way of counteracting the false illusions created by the colors, images, and words conveyed in cigarette brand advertising.

The relative lack of effort to better inform smokers about the products they use is partly the result of the common assumption that smokers are already adequately informed about the health risks of smoking (Viscusi, 2002). In fact, one of the legal defenses used

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by the tobacco industry rests on the premise that smokers are adequately informed about the health risks of smoking (Cummings, Morley, & Hyland, 2002). Although population surveys show that most people today recognize major health risks from smoking, this general knowledge does not necessarily translate into a belief that one is personally at higher risk of becoming seriously ill as a result of smoking (Weinstein, 1982). Moreover, general awareness of health risks does not mean that people are adequately informed about smoking in ways that might influence their smoking behavior. For example, many smokers fail to appreciate that switching to a low-tar or filtered cigarette does not make smoking less hazardous (Shiffman, Pillitteri, Burton, Rohay, & Gitchell, 2001). Cohen (1996) reported results of a national probability telephone survey in which he found that few smokers knew the tar levels of their own cigarettes and most did not know how to interpret the tar ratings. Kozlowski et al. (1998) found that most Massachusetts cigarette smokers were unaware of the filter vents in their cigarettes. Hastrup, Cummings, Swedrock, Hyland, and Pauly (2001) found that 58% of smokers surveyed believed incorrectly that the addition of a filter would make the cigarette safer.

To date, no comprehensive study of a nationwide sample of smokers has been conducted to document what smokers do and don't know about the risks of smoking. This article presents the results of a nationally representative survey of adult cigarette smokers undertaken to assess what smokers believe about the health risks of smoking and the effects of smoking filtered and low-tar cigarettes, as well as their awareness of and interest in trying so-called reduced-risk tobacco products and nicotine medications.

Method

A nationally representative, random-digit-dialed telephone survey of adult (aged 18 years or older) current cigarette smokers was conducted between May and September 2001 to assess smokers' beliefs about alternative nicotine delivery devices. A current smoker was defined as someone who reported having smoked at least 100 cigarettes in their lifetime and who currently smokes daily or on some days. Within selected households, we identified all adult members of the household who were current cigarette smokers. If more than one adult smoker lived in the household, then we selected the smoker with the most recent birthday for interviewing; otherwise, we asked to speak with the smoker. A total of 49,593 households were screened to form the achieved survey group of 1,046 current smoking adults. The response for the survey was 77%, computed as the proportion of households originally designated for the sample that provided information for the research (American

Association for Public Opinion Research, 2000). The data were weighted to adjust for the probability of selection and the age, race, and gender distribution of U.S. adult smokers, using estimates from the 1998–1999 Current Population Survey Tobacco Use Supplement (U.S. Bureau of the Census, 2001). Proportions of the original sample were comparable in age, race, and education level to the national estimates of adult smokers, with a slightly higher percentage of women than men in the sample. All statistics were run using proportions obtained by this weighting procedure, with weighted N values normalized to the original sample size (1,046).

The survey consisted of a 25-minute interview administered by trained interviewers using computer-assisted technology for online data entry. Interviewers were trained on the interview forms, and a sample of each interviewer's work was monitored covertly to ensure accuracy of the recorded responses to questions. The survey instrument was developed by project staff and used research findings based on the investigators' clinical experiences with smokers, focus groups, and two rounds of pilot testing that assisted in instrument development. The survey instrument included questions on the following subjects: demographic characteristics, tobacco use behaviors, awareness and use of nicotine medications, beliefs about the health risks of smoking and whether they felt fully informed about the risks of smoking, content of smoke and design features of cigarettes, and the safety and efficacy of nicotine medications. In addition, respondents were asked about their interest in and perceived ability to stop smoking and their desire for more information from tobacco companies about the health risks of smoking, constituents of tobacco smoke, and ways to reduce health risks.

Table 1 shows the demographic and tobacco use characteristics of survey respondents. The average age of respondents was 40 years; 52% were male, and 78% were White (non-Hispanic). The median number of years reported smoking was 22 years, 25% were daily smokers of 25 or more cigarettes per day, and 54% reported smoking light or ultralight cigarettes. Table 2 shows the current cigarette brands smoked by respondents. The demographic characteristics, tobacco use behaviors, and cigarette brand preferences of survey respondents were consistent with the characteristics of the U.S. population of adult cigarette smokers.

Knowledge indices

In an attempt to summarize the knowledge that smokers possessed on different tobacco-related topics, we constructed indices to reflect the range of knowledge in the following six areas: (a) health risks of smoking, (b) content of cigarette smoke, (c) safety of nicotine, (d) low-tar and filtered cigarettes, (e) additives in cigarettes, and (f) nicotine medications.

Table 1. Demographics and tobacco use characteristics among 1,046 smokers in the United States, 2001.

| Characteristic | <i>n</i> ^a | % ^b |
|---|-----------------------|----------------|
| Gender | | |
| Male | 475 | 52% |
| Female | 571 | 48% |
| Age (years) | | |
| Mean: 40 | | |
| 18–24 | 182 | 19% |
| 25–34 | 213 | 18% |
| 34–44 | 261 | 27% |
| 45–54 | 210 | 21% |
| ≥ 55 | 180 | 15% |
| Race | | |
| White, non-Hispanic | 816 | 78% |
| Black, non-Hispanic | 88 | 8% |
| Hispanic | 75 | 8% |
| Other, non-Hispanic | 54 | 6% |
| Highest education level completed (years) | | |
| < 12 | 125 | 12% |
| 12 | 436 | 41% |
| 13–15 | 313 | 31% |
| ≥ 16 | 163 | 16% |
| Tar level | | |
| Ultralight cigarette smokers | 147 | 14% |
| Light cigarette smokers | 431 | 40% |
| Regular cigarette smokers | 453 | 46% |
| Filter | | |
| Filtered cigarette smokers | 1015 | 97% |
| Non-filtered cigarette smokers | 29 | 3% |
| Menthol | | |
| Mentholated cigarette smokers | 301 | 29% |
| Nonmentholated cigarette smokers | 737 | 71% |
| Cigarettes smoked per day | | |
| < 15 | 366 | 33% |
| 15–24 | 432 | 42% |
| ≥ 25 | 246 | 25% |
| Number of years reported smoking | | |
| 0–9 | 220 | 22% |
| 10–19 | 237 | 22% |
| 20–29 | 258 | 27% |
| 30–39 | 179 | 18% |
| ≥ 40 | 126 | 11% |
| Previous quit attempts | | |
| Yes | 824 | 78% |
| No | 222 | 22% |
| Ever use of any stop-smoking medication | | |
| Yes | 419 | 40% |
| No | 609 | 60% |

Note. ^aUnweighted frequencies shown. ^bPercentage estimates are weighted to the national current smoker age, race, and gender distribution in the United States.

The index for a given subject area (e.g., health risks) was defined by scoring the responses given to a particular question on that subject as either correct or incorrect/“don’t know” and then counting up the total number of correct responses for all questions assigned to the index. A standardized knowledge score was computed for each index by summing the number of correct answers to questions and dividing this number by the total number of questions to which the person responded. Table 3 displays the knowledge questions making up each index and the presumed correct responses to each question. Because it is possible for a smoker to be more knowledgeable about certain characteristics of their cigarettes, a summary score was analyzed to help capture these differences and

Table 2. Self-reported current brand of cigarettes smoked by 1,046 smokers in the United States, 2001.

| Brand | <i>n</i> ^a | Percent ^b | Cumulative percent ^b |
|-----------------------------------|-----------------------|----------------------|---------------------------------|
| Marlboro | 382 | 37.3% | 37.3% |
| Ultralight | 31 | 3.1% | |
| Light | 197 | 18.4% | |
| Regular | 154 | 15.9% | |
| Newport | 110 | 10.7% | 48.0% |
| Ultralight | 0 | 0.0% | |
| Light | 23 | 2.4% | |
| Regular | 87 | 8.3% | |
| Camel | 79 | 7.7% | 55.7% |
| Ultralight | 7 | 0.7% | |
| Light | 37 | 3.6% | |
| Regular | 35 | 3.4% | |
| Basic | 59 | 5.5% | 61.2% |
| Ultralight | 13 | 1.4% | |
| Light | 24 | 1.8% | |
| Regular | 22 | 2.3% | |
| Doral | 46 | 4.3% | 65.5% |
| Ultralight | 14 | 1.2% | |
| Light | 18 | 1.6% | |
| Regular | 14 | 1.4% | |
| Winston | 41 | 3.8% | 69.3% |
| Kool | 30 | 3.3% | 72.6% |
| Salem | 32 | 2.8% | 75.4% |
| GPC | 25 | 2.5% | 77.8% |
| Virginia Slim | 27 | 2.0% | 79.8% |
| Benson and Hedges | 14 | 1.4% | 81.2% |
| Merit | 12 | 1.1% | 82.3% |
| Pall Mall | 9 | 1.0% | 83.3% |
| Capri | 10 | 1.0% | 84.3% |
| Other current brand | 154 | 14.1% | 98.4% |
| Did not report a current brand | 16 | 1.6% | 100.0% |

Note. ^aUnweighted frequencies shown. ^bPercentage estimates are weighted to the national current smoker age, race, and gender distribution in the United States.

assess knowledge of the product as a whole. Reliability coefficients were calculated to measure the internal consistency of each index. These values demonstrate that some of the indices hold together better than others. Again, it is possible for smokers to know more about one aspect of their cigarette than others. Further research is needed to improve the psychometric properties of indices used to assess an individual’s knowledge about product features.

Data analysis

Descriptive statistics, such as simple percentages and means, were used to measure respondents’ knowledge about smoking and nicotine medications. In addition, regression models were constructed modeling each knowledge index as a function of the respondent’s age (18–24 years, 25–34 years, 35–44 years, 45–54 years, or 55+ years), gender (male or female), race/ethnicity (White, non-Hispanic; Black, non-Hispanic; Hispanic; or other, non-Hispanic), education level, cigarettes smoked per day (<5, 5–14, 15–24, 25–34, or 35+), type of cigarette smoked (unfiltered regular, filtered regular, or light or ultralight), use of noncigarette tobacco products (yes or no), history of quit attempt

Table 3. Summary of responses to knowledge indices by 1,046 smokers in the United States, 2001.

| Knowledge index | Correct response | Correct | | Incorrect/don't know | |
|---|------------------------|----------------|----------------------|----------------------|----------------------|
| | | n ^a | Percent ^b | n ^a | Percent ^b |
| Health risks of smoking (range=0–7) | | | | | |
| Reliability coefficient=0.69 | | | | | |
| Average percent incorrect responses = 39% | | | | | |
| 1. Do you think your risk of having a heart attack is higher, lower, or about the same as other (men/women) your age? | Higher | 574 | 54% | 470 | 46% |
| 2. Do you think your risk of cancer is higher, lower, or about the same as other (men/women) your age? | Higher | 607 | 58% | 437 | 42% |
| 3. Do you think your risk of lung cancer is higher, lower, or about the same as other (men/women) your age? | Higher | 643 | 62% | 401 | 38% |
| 4. Cigarettes still have not been proven to cause cancer. | Disagree | 689 | 67% | 355 | 33% |
| 5. If a person smokes only 5 cigarettes per day, their chances of getting cancer from smoking are about the same as someone who never smokes. | Disagree | 600 | 59% | 444 | 41% |
| 6. Only about 1 out of 10 smokers die because of smoking. | Disagree | 522 | 50% | 522 | 50% |
| 7. If you don't inhale, smoking is not really dangerous. | Disagree | 798 | 75% | 248 | 25% |
| Content of cigarette smoke (range=0–6) | | | | | |
| Reliability coefficient=0.58 | | | | | |
| Average percent incorrect responses = 53% | | | | | |
| 1. Cigarette smoke contains nicotine. | Agree | 957 | 92% | 89 | 8% |
| 2. Cigarette smoke contains carbon monoxide. | Agree | 898 | 86% | 148 | 14% |
| 3. Cigarette smoke contains lead. | Agree | 212 | 21% | 833 | 79% |
| 4. Cigarette smoke contains radioactive materials. | Agree | 143 | 14% | 901 | 86% |
| 5. Cigarette smoke contains ammonia. | Agree | 338 | 33% | 708 | 67% |
| 6. Cigarette smoke contains arsenic. | Agree | 339 | 34% | 707 | 66% |
| Safety of nicotine (range=0–3) | | | | | |
| Reliability coefficient=0.29 | | | | | |
| Average percent incorrect responses = 52% | | | | | |
| 1. Has the reduction of nicotine made cigarettes less dangerous to the smoker? | No | 484 | 46% | 562 | 54% |
| 2. Nicotine is a cause of cancer. | No | 347 | 33% | 698 | 67% |
| 3. The claim that a cigarette brand is low in nicotine means that it is less addictive. | Disagree | 653 | 63% | 392 | 37% |
| Low-tar and filter cigarettes (range=0–8) | | | | | |
| Reliability coefficient=0.65 | | | | | |
| Average percent incorrect responses = 65% | | | | | |
| 1. Has the reduction of tar made cigarettes less dangerous to the smoker? | No | 365 | 36% | 680 | 64% |
| 2. High-tar cigarettes are at least twice as likely to cause illness as ones that are low in tar. | Disagree | 341 | 33% | 704 | 67% |
| 3. How many light cigarettes would someone have to smoke to get the same amount of tar as from one regular cigarette? | 1 light cigarette | 135 | 12% | 911 | 88% |
| 4. How many ultralight cigarettes would someone have to smoke to get the same amount of tar as from one regular cigarette? | 1 ultralight cigarette | 101 | 9% | 945 | 91% |
| 5. Are light cigarettes more likely, about the same, or less likely to cause someone to become addicted as regular cigarettes? | About the same | 599 | 56% | 438 | 44% |
| 6. The milder the smoke, the less dangerous the cigarette. | Disagree | 677 | 66% | 369 | 34% |
| 7. Has the addition of filters made cigarettes less dangerous to the smoker? | No | 376 | 35% | 670 | 65% |
| 8. Do you think a filter makes a cigarette less dangerous than the same cigarette without a filter? | No | 307 | 29% | 735 | 71% |
| Additives in cigarettes (range=0–4) | | | | | |
| Reliability coefficient=0.25 | | | | | |
| Average percent incorrect responses = 56% | | | | | |
| 1. Additive-free cigarettes have no nicotine. | Disagree | 294 | 26% | 752 | 74% |
| 2. Has the removal of additives made cigarettes less dangerous to the smoker? | Disagree | 432 | 40% | 614 | 60% |
| 3. Cigarettes with additives are more harmful than the ones that don't have additives. | Disagree | 288 | 27% | 758 | 73% |
| 4. The claim that a cigarette has "no additives" means that it includes only natural tobaccos. | Disagree | 359 | 34% | 686 | 66% |

Table 3. *Continued.*

| Knowledge index | Correct response | Correct | | Incorrect/don't know | |
|--|------------------|-----------------------|----------------------|-----------------------|----------------------|
| | | <i>n</i> ^a | Percent ^b | <i>n</i> ^a | Percent ^b |
| Nicotine medications (range = 0–7) | | | | | |
| Reliability coefficient = 0.58 | | | | | |
| Average percent incorrect responses = 56% | | | | | |
| 1. Are nicotine patches more likely, about the same, or less likely to cause someone to become addicted as regular cigarettes? | Less likely | 471 | 46% | 566 | 54% |
| 2. Is nicotine gum more likely, about the same, or less likely to cause someone to become addicted compared to regular cigarettes? | Less likely | 478 | 47% | 562 | 53% |
| 3. Are nicotine patches more likely, about the same, or less likely to cause someone to have a heart attack as cigarettes? | Less likely | 370 | 35% | 665 | 65% |
| 4. Nicotine medications work by completely eliminating the urge to smoke. | Disagree | 639 | 60% | 407 | 40% |
| 5. Nicotine medications work by making you physically sick if you take them and smoke at the same time. | Disagree | 319 | 31% | 727 | 69% |
| 6. It is easy to get addicted to nicotine gum. | Disagree | 286 | 27% | 759 | 73% |
| 7. Nicotine medications like the patch and gum improve a smoker's chances of quitting successfully. | Agree | 610 | 59% | 435 | 41% |

Note. ^aUnweighted frequencies shown. ^bEstimates are weighted to the national current smoker age, race, and gender distribution in the United States.

of 24 hours or longer (yes or no), expectation about stopping smoking in the next year (yes or no), belief that they will stop smoking before experiencing serious health problems from smoking, and previous use of nicotine medications (yes or no).

Results

When respondents were asked whether they consider themselves to be adequately informed about the health risks of smoking, 94% answered affirmatively. However, as shown in Table 3, a substantial percentage of respondents either answered incorrectly or responded “don't know” to questions about health risks of smoking (39%), content of cigarette smoke (53%), safety of nicotine (52%), low-tar cigarettes and filtered cigarettes (65%), additives in cigarettes (56%), and nicotine medications (56%).

Table 4 shows the findings from a series of regression analyses to evaluate the relationship among demographic and smoking history variables and the different knowledge indices. The percentages shown in the table indicate the proportion giving a correct answer in comparison with a particular reference group. For example, compared with respondents aged 18–24 years, those aged 55 years or older gave an average of 14.3% fewer correct responses to the health risk questions. As indicated in Table 4, smokers aged 55 years or older were consistently less knowledgeable about smoking compared with their younger counterparts. Also, those with past experience using nicotine medications tended to be more knowledgeable about the safety and efficacy of these products. Those who believed they would stop smoking in the next year also were more knowledgeable about smoking, whereas those who expressed the

belief that they would stop smoking before experiencing serious health problems were less knowledgeable about smoking.

Table 5 shows responses to questions about information received from tobacco companies and the respondents' desire for more information about smoking. Over 70% of respondents reported having received discount coupons and promotions from tobacco companies in the mail. Few respondents (3%) reported that a cigarette company had ever advised them how they could change their smoking to make it less risky. Some 77% of respondents indicated they would like the cigarette companies to provide them with more information on the health risks of smoking, 83% wanted information on the chemicals in cigarette smoke, 68% wanted information on screening for diseases caused by smoking, and 63% wanted information on methods to stop smoking.

Discussion

The suggestion that the health risks of smoking are universally known and appreciated is clearly wrong (Viscusi, 2002; Viscusi, 1992). The findings from the present study demonstrate that smokers are misinformed about many aspects of the cigarettes they smoke and that they want more information about ways to reduce their health risks. For example, a recent study found that 100% of smokers calling a quitline accepted the offer for information about the cigarettes they smoke (Bansal et al., 2004). Moreover, knowledge about smoking was associated with the person's intention to stop smoking, indicating that being misinformed about smoking is not a trivial issue.

Table 4. Linear regression analyses of knowledge indices by demographic and tobacco use predictors.^{a,b}

| Characteristic | Health risks of smoking (%) | Content of cigarette smoke (%) | Safety of nicotine (%) | Low-tar and filtered cigarettes (%) | Additives in cigarettes (%) | Nicotine medications (%) | Summary measure (%) |
|---|-----------------------------|--------------------------------|------------------------|-------------------------------------|-----------------------------|--------------------------|---------------------|
| Age (years) | | | | | | | |
| 18–24 | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| 25–34 | 2.8% | –3.8% | 0.0% | 5.6%* | 5.3%* | –4.6% | 1.0% |
| 34–44 | –0.1% | –1.6% | –1.7% | 4.4%* | 1.5% | –6.5%* | –0.5% |
| 45–54 | –4.7% | –2.6% | –4.3% | –4.5% | –3.7% | –7.8%* | –4.7%* |
| ≥55 | –14.3%* | –6.4%* | –6.7% | –4.4% | –10.0%* | –11.8%* | –9.0%* |
| Gender | | | | | | | |
| Male | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| Female | –2.5% | –2.0% | 1.9% | 2.2% | –0.3% | 5.3%* | 0.8% |
| Race | | | | | | | |
| White, non-Hispanic | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| Black, non-Hispanic | –10.4%* | 4.9% | –4.2% | 0.8% | 7.4%* | –11.7%* | –2.9% |
| Hispanic | –9.3%* | 3.9% | –0.8% | 4.8% | 1.0% | –3.7% | –0.9% |
| Other, non-Hispanic | –10.1%* | 11.3%* | –1.7% | –4.1% | –6.3% | –3.4% | –2.6% |
| Highest education level completed (years) | | | | | | | |
| <12 | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| 12 | 9.1%* | 3.3% | –0.2% | 3.7% | 6.5%* | 5.1%* | 4.9%* |
| 13–15 | 9.4%* | 7.0%* | 5.0% | 4.1% | 8.4%* | 7.1%* | 6.8%* |
| ≥16 | 8.9%* | 5.4%* | 3.6% | 1.1% | 8.3%* | 13.7%* | 6.9%* |
| Cigarettes smoked per day | | | | | | | |
| <5 | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| 5–14 | 0.6% | –3.1% | –5.4% | 2.0% | 4.2% | 3.0% | 1.0% |
| 15–24 | 4.5% | –3.2% | –4.0% | 1.6% | 2.3% | 6.1% | 2.1% |
| 25–34 | 3.4% | –4.9% | –5.5% | 5.6% | 1.4% | 7.1% | 2.5% |
| ≥35 | 0.8% | –6.1% | 1.2% | 0.6% | 2.8% | –1.5% | –0.4% |
| Current cigarette type | | | | | | | |
| Regular, filtered | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| Regular, unfiltered | –7.9% | –5.4% | 1.4% | 8.6% | 5.5% | 3.3% | 1.0% |
| Light, filtered | –1.2% | 0.2% | –0.9% | –2.5% | –1.4% | –1.3% | –1.2% |
| Ultralight, filtered | –0.5% | –4.4%* | 0.2% | –5.4%* | –1.6% | –2.8% | –2.7%* |
| Current use of a noncigarette tobacco product | | | | | | | |
| No | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| Yes | –3.9% | –0.1% | 8.2%* | 4.5%* | 4.3% | –2.1% | 1.1% |
| Ever attempted to quit smoking | | | | | | | |
| No | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| Yes | 2.3% | –1.2% | –3.4% | 2.2% | 0.6% | 4.5%* | 1.4% |
| Believe will stop smoking in the next year | | | | | | | |
| No | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| Yes | 5.7%* | 6.3%* | 12.6%* | 12.3%* | 9.2%* | 0.3% | 7.2%* |
| Believe will stop smoking before serious health problem | | | | | | | |
| No | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| Yes | 3.2% | –1.5% | –13.0%* | –8.3%* | –4.4%* | 3.0% | –2.5%* |
| Previous use of nicotine medications | | | | | | | |
| No | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| Yes | 9.6%* | 5.5%* | 3.8% | 3.9%* | 1.2% | 10.2%* | 6.3%* |
| Adjusted model F^2 | 0.12 | 0.06 | 0.06 | 0.09 | 0.07 | 0.12 | 0.17 |

Note. ^aEstimates are weighted to the national current smoker age, race, and gender distribution in the United States. ^bOutcome is the number of correct responses divided by the number of total questions responded to within a particular knowledge index. A positive value indicates relatively more accurate knowledge than the referent group. Estimates of effect are reported where all characteristic variables are considered.

* $p \leq .05$.

The findings from this study also support the general observation that people tend to underestimate risks to their own health (Avis, Smith, & McKinlay, 1989; Skinner, Kreuter, Kobrin, & Strecher, 1998; Slovic, 2001; Weinstein, 1982, 1984). Weinstein (1982) termed an individual's unrealistic optimism regarding susceptibility to disease as "optimistic bias," which is observed when an individual perceives his or her risk of a particular health condition to be low or average, when it is actually above average. Previous research has shown that smokers tend to be overly optimistic about their personal risk of illness (Ayanian & Cleary,

1999). This misperception is due in part to the belief that the person will be able to stop smoking before health problems occur (Slovic, 2001). The present findings support this view: 60% of smokers in our study stated they would stop smoking before experiencing a serious health problem.

Smokers are often conflicted about their smoking behavior because they recognize that smoking is dangerous while at the same time deriving pleasure from smoking. To reduce this conflict, smokers downplay the risks of smoking to themselves by developing rationalizations such as "I'll quit smoking

Table 5. Correspondence with tobacco companies by 1,046 smokers in the United States, 2001.

| | Yes | |
|--|-----------------------|----------------------|
| | <i>n</i> ^a | Percent ^b |
| Receipt of information | | |
| Have cigarette companies ever mailed you discount coupons? | 686 | 66% |
| Have cigarette companies ever mailed you information on how to get free merchandise or free trips? | 619 | 59% |
| Have cigarette companies ever mailed you information on the dangers of smoking? | 170 | 17% |
| Have cigarette companies ever mailed you advice about how to oppose restriction of smoking in public places? | 114 | 11% |
| Has a cigarette company ever advised you about how you could change your smoking to make it less risky? | 28 | 3% |
| Desire for additional information | | |
| Have you ever called or written a cigarette company for information on health issues related to smoking? | 53 | 5% |
| Have you ever gone to any of the cigarette companies' Web sites for information? | 44 | 4% |
| Do you think cigarette companies should be required to provide you with more information about the chemicals in cigarette smoke? | 900 | 83% |
| Do you think cigarette companies should be required to provide you with more information about how to stop smoking? | 688 | 63% |
| Do you think cigarette companies should be required to provide you with more information about the health dangers of smoking? | 819 | 77% |
| Do you think cigarette companies should be required to provide you with more information about how to get screened for diseases caused by smoking? | 739 | 68% |

Note. ^aUnweighted frequencies shown. ^bPercentage estimates are weighted to the national current smoker age, race, and gender distribution in the United States.

before I have health problems” or “these low-tar cigarettes aren’t so bad for me.” Cigarette manufacturers, knowing that smokers are experiencing cognitive dissonance, have designed and marketed cigarettes to help smokers address the psychic conflict caused by worries about health risks (Pollay & Dewhirst, 2002). Cigarette marketers have cleverly incorporated the health warnings of the public health community (i.e., too much tar and nicotine is bad) into their brand advertising (e.g., government testing methods show that Carlton brand is the lowest in tar and nicotine) to specifically address and allay smokers’ fears about health risks. The smoker’s desire to believe that smoking a filtered or low-tar brand can actually lower one’s health risks also has contributed to the development of strong loyalties to particular product features and brands.

Unfortunately, smokers have not been educated adequately about some of the problems associated with cigarette design features common to the brand of cigarettes they smoke. More research is needed to better define and measure knowledge deficits. The low reliability of some of the knowledge indices suggests the need for more work to develop reliable measures of knowledge of product characteristics. Also, research is needed to determine how information on product features might be communicated to smokers and what effect such information might have on a person’s knowledge, beliefs, and tobacco use behaviors.

The main sources of information about cigarettes are the cigarette manufacturers themselves. Thus, smokers form beliefs about product features based primarily on the images portrayed in cigarette marketing, which are reinforced by the “feel sensations” of the smoke carefully designed into the product (e.g., smooth, not harsh, cool) (Kozlowski & O’Connor, 2002; Shiffman et al., 2001). Unfortunately, smokers’ misperceptions about the benefits of product features such as low tar and filter efficacy help immunize smokers against health messages about the health dangers of smoking.

Cigarette companies have argued that they are not responsible for any health problems that might arise from smoking because smokers are aware of the health risks involved with smoking (Cummings, Morley, & Hyland, 2002; Herzog & Lotts, 2000; Spencer, 1999, 2000). This argument is false. The results from the present study demonstrate a continuing need to educate smokers about health risks. This would include monitoring what smokers believe about personal health risks from smoking, nicotine addiction, compensation, and ways to reduce one’s health risks from smoking. So far, cigarette manufacturers have been unwilling to do this and probably cannot be trusted to do so, given the profit motive that drives their business.

Given reluctance of the cigarette companies to communicate openly and honestly with consumers about health risks in the past, government agencies,

charged with protecting the public's health, would be justified in taking more aggressive steps to regulate the marketing of tobacco products and to educate the public about the risks of smoking. For example, given the lack of convincing evidence to demonstrate a measurable public health benefit gained from lowering of the machine-measured tar yield of cigarettes, appropriate steps would include banning these products or at a minimum regulating the marketing claims that continue to give the illusion that lower-tar products are less dangerous (National Cancer Institute, 2001). Similarly, adoption of stronger, more prominent warnings on cigarette packages analogous to those adopted in Canada appears to be warranted (Mahood, 1999). Cigarette companies should be held accountable for monitoring what smokers do and don't know about the health risks of smoking to ensure that smokers are adequately informed. They should contribute resources to pay for an independent group to monitor misperceptions and educate consumers about the risks of smoking, much as they have already agreed to do as part of the Master Settlement Agreement to prevent children from smoking.

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