Cartoon Characters as Tobacco Warning Labels

Sonia A. Duffy, PhD, RN; Dee Burton, PhD

Background: Multiple studies have indicated that the Joe Camel advertising campaign has been successful in marketing tobacco to children and adolescents, whereas other studies have reported that current tobacco warning messages are ineffective.

Objective: To determine the importance and believability of familiar and novel tobacco warning messages with and without cartoons that were modeled after Joe Camel.

Design: Children and adolescents (N=580) in Chicago, Ill, public schools were surveyed to determine the believability and importance of 3 cartoon tobacco warnings modeled after Joe Camel developed with the messages “Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy” or “Smoking Kills” and the same 2 messages without cartoons.

Results: Respondents rated all 3 cartoons significantly more believable than the plain condition regardless of the message (P<.05). Furthermore, respondents rated the “Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy” warning significantly more believable and important than the “Smoking Kills” message across all 4 cartoon conditions (walrus, penguin, bear, and no cartoon) (P<.01). Selected demographic groups found particular cartoon and warning messages more believable and/or important than others.

Conclusions: The finding that cartoon tobacco warnings are more believable than plain warnings suggests that it may be desirable to include cartoons in future tobacco warning labels. The lower ratings of believability and importance of the “Smoking Kills” warning is a concern because similar warnings have recently been implemented in at least 2 countries (Australia and Canada) and have been considered for implementation in the United States.


Although there has been a moderate decline in adolescent smoking in the United States during the last 3 years, the rates remain higher than those of 1991. For example, among high school seniors, smoking (in the past month) has decreased slightly in the last year (1998-1999) from 36.5% to 34.6%, but remains higher than the 1991 rate of 28.3%. Among eighth graders, 17.5% said that they had smoked 1 or more cigarettes in the past 30 days. Persons who begin smoking at younger ages are at increased risk of becoming regular smokers, heavy smokers, and ill, or of dying from smoking attributable causes. In 1993, cigarette advertising and promotional expenditures increased an estimated $6 billion, which is approximately 3 times the budget of the National Cancer Institute for research on all cancers. Numerous studies have shown that children and adolescents are attracted to tobacco advertisements, that recall of cigarette brand names and advertisement themes is extraordinarily high, and that the amount of recall is related to smoking or intention to smoke. Perhaps the most compelling evidence that advertising influences children and adolescents is that they tend to smoke the 3 most advertised brands, Marlboro, Camel, and Newport, and the market share of the most advertised brands decreases with age. In 1988, R. J. Reynolds launched the “smooth character” advertising campaign featuring Joe Camel, a cartoon camel modeled after James Bond and the actor Don Johnson of “Miami Vice.” Research has shown that children were more likely than adults to report prior exposure to the Joe Camel cartoon character, identify the product being advertised, and find the advertisement appealing. In com-
METHODS AND PARTICIPANTS

PROCEDURES

Before the main study, a focus group was conducted to determine (1) the appealing characteristics of Joe Camel and (2) which of the 4 current US tobacco warnings adolescent smokers found most believable. When shown pictures of Joe Camel, focus group participants used the following words to describe strong characteristics of Joe Camel: "cool dude," "girls like him," "smooth character," "has money," "has cars," "likes to party," "likes the fast life," and "sugar daddy." The participants all agreed that the warning label "Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy" was the most believable of the 4 tobacco warning labels currently in use.

An advertising agency was paid to sketch cartoon characters modeled after the characteristics of Joe Camel identified by focus group participants. The artist sketched 4 cartoons, including a buzzard, walrus, penguin, and bear. The cartoon sketches were pretested as to their likeness to the characteristics of Joe Camel by children and adolescents (N=146) in an elementary school (grades 7-8) and a high school (grades 9-12). Neither elementary nor high school students rated the buzzard to have characteristics like Joe Camel; thus, the buzzard was eliminated.

The walrus, penguin, and bear cartoon sketches were further developed by the advertising agency into color cartoon tobacco warning labels (see Figures 1, 2, and 3 for examples of the cartoon warning labels). Each of the cartoons was developed with the warning label "Smoking Kills," because this was the label hypothesized in the literature to have the greatest recall. For comparison, each of the 3 cartoons were also developed with the currently used warning "Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy." In addition, each of the 2 warning messages was shown to the respondents without being associated with a cartoon (plain). The 8 tobacco warning label conditions were rated by children and adolescents in Chicago, Ill, public school classrooms on the 2 distinct characteristics of believability and importance on a scale of 1 to 4, ranging from "not like this" to "very much like this." The sequence of the slides was changed at each school to reduce the possibility of response bias related to the order of the presentation of the 8 tobacco warning label conditions.

Adolescents were surveyed in their classrooms during their regularly scheduled class period. Two researchers and the classroom teacher were present. One classroom period (45-50 minutes) was allotted for data collection. The students were asked to complete a survey that included demographic and smoking questions (sex, grade, race). Students were then shown the slides of the 8 warning label conditions and asked to rate each condition as to its believability and importance using the survey instrument. Although it would have been preferable to display the warnings on cigarette packs, this was not practical, so the warnings were shown as slides to minimize logistic details and costs.

Institutional review board approval for this study was received from the University of Illinois at Chicago. Verbal and written consent and assent were received from participants of the focus group and their parents. All participants were offered the telephone number of the investigator to call if they or any one they knew was interested in quitting smoking.

SAMPLE

Since the literature indicates that grade and academic achievement are correlates of smoking status and the researchers wanted to represent as many types of schools and students as possible, the schools were stratified into elementary (grades K-8) and high schools (grades 9-12) and then by school type, including (1) vocational/technical schools, (2) magnet/community academies, and (3) regular schools. A stratified random sample of 10 schools was selected, including 5 elementary schools (1 magnet/community academy and 4 regular schools) and 5 high schools (1 vocational/technical school, 1 magnet/community academy, and 3 regular schools). Entry into the schools was negotiated with the school administrators, who were asked to select up to 4 classrooms that reflected the general population of their school.

A total of 580 students from Chicago public schools participated in the study, which was conducted in 1995. Since all of the respondents did not answer all of the questions, the reported sample size may vary for different results. There were slightly more female (57.2%, n=329) than male students (42.8%, n=246) and more elementary (66.7%, n=387) than high school students (33.3%, n=183). The sample overrepresents blacks, 71.1% compared with 54.5% in Chicago public schools, and underrepresents Latinos and Hispanics, 8.7% compared with 31.3% in Chicago public schools. When asked whether they smoked in the last year, 23.6% (n=132) reported smoking, whereas 76.3% (n=426) indicated that they did not smoke. Of those who smoked, 55.8% smoked a few cigarettes each month, 17.5% smoked a few more days, and 13.3% smoked half a pack or more a day.

STATISTICAL ANALYSIS

Since the dependent variables (ratings of the cartoon tobacco warning labels on their believability and importance) used a 4-point scale, the data were analyzed using a random-effects regression model for ordinal outcomes. The MIXOR program was chosen for data analysis because, unlike other statistical programs, it was able to treat the dependent variable as an ordinal outcome and account for repeated measures. The primary analyses were conducted on the MIXOR program, and means were calculated to aid in describing the directions of the significant effects. In addition, respondents were clustered within 10 schools, so all analyses controlled for school effects. Cartoon-by-message interactions were initially included in the model but were removed since none were significant.

Comparison to advertisements for Marlboro and Newport cigarettes, Camel advertisements were identified by children 10 to 13 years old as those seen most often; the greatest familiarity with Joe Camel was shown by subjects who had been younger than 18 years when the campaign was launched. The greatest recognition of the Joe Camel advertising campaign occurred in the youngest age group examined in the study (12- to 13-year-olds), and the proportion of smokers who reported smoking Camel cigarettes decreased with age.

©2000 American Medical Association. All rights reserved.
Although recognition of the Joe Camel character does not necessarily translate into smoking behavior, it cannot be ignored that Camel’s share of the illegal children’s cigarette market segment has increased from 0.5% to 32.8%, representing sales estimated at $476 million per year.17

Results of an Advertising Age survey reported a 90% Camel brand recall among children 8 to 13 years of age.18 In addition, Mizerski19 found that Joe Camel had relatively high recognition compared with several trade characters because more than 50% of children 3 to 6 years of age correctly matched the Joe Camel trade character with cigarettes. Furthermore, advertisements featuring Joe Camel were found to be significantly more appealing to both black and white students than were advertisements with human models and text only. Both groups also found Joe Camel to be “cool” and “fun.”20

Although the Joe Camel campaign has been successful in marketing cigarettes to children and adolescents, multiple research studies21-28 have shown that current tobacco warning labels are ineffective. The small size and positioning of the warning label compared with the other distracters on the package (brand name and colors) detract from the warning label. The messages are lengthy, not personally relevant, and watered down by words such as “can,” “may,” and “The Surgeon General.”

On the other hand, another study22 tested newly developed warning labels that were placed inside the same-size warning label box of a contemporary Marlboro advertisement, although the print on the new warnings was bigger and different. Sixty-six percent (n=220) of the adolescent respondents recalled the new warning labels (which were developed with input from adolescent focus groups) compared with a 15% recall of a mandated warning label. The researchers concluded that warnings that are novel, targeted, and developed through creative processes function more effectively as communication devices.

The format, color, and placement of the warning label may affect the degree to which it is noticed. There is evidence that pictures can increase the attention drawn to a warning label. Pictures produce greater recall than words.29,30 In addition, larger type, contrasting color, and standard position represent familiar advertising design elements capable of enhancing attention. To increase the size of the warning, the length of the warning would need to be shortened considerably. Several authors25,31,32 have suggested that the simpler “Smoking Kills” message could be particularly effective compared with the current lengthy and more technical messages.

Blum33 argues that although counteradvertising can work very well, it should be image based rather than fact based. Several image-based antismoking campaigns tar-

Figure 1. Walrus sketch.

Figure 2. Penguin sketch.

Figure 3. Bear sketch.
geted toward children and adolescents have recently been launched, including “Nicotine Monkey on the Back,” which depicts a man smoking with a monkey clinging to his back; the “Animals” campaign, which shows animals smoking to convey the message “It looks just as stupid when you do it”; and “DOC’s Deck-O-Butts: Fakes, Facts and Farts,” which consists of 21 collecting cards aimed at undermining brand names and changing attitudes. These campaigns have several themes that may make them appealing to children and adolescents, including the use of animals, humor, cartoons, and rebelliousness. A cartoon tobacco warning label with a “smart aleck” character (such as Joe Camel) may be particularly appealing to the rebellious nature of adolescents.

Since the Joe Camel campaign works so well in selling cigarettes, it may be advantageous to have a similar cartoon character sell the warning label. Accordingly, the objectives of this study were to (1) develop tobacco warning labels that feature cartoons with characteristics similar to the Joe Camel cartoon shown in cigarette advertisements and (2) test the perceived importance and believability of familiar and novel tobacco warning messages with and without cartoons.

**RESULTS**

**CARTOON**

Although the difference was small, respondents rated all 3 cartoons significantly more believable than the plain condition regardless of the message (P<.05). There was some variation in this trend-by-demographic subgroups. Specifically, whites rated the walrus more believable than the plain condition, whereas blacks rated the walrus and plain condition similarly (P<.01). Furthermore, elementary school students rated the penguin more believable than the plain condition, whereas high school students rated the plain condition slightly higher than the penguin cartoon (P<.05) (Table 1). massage

**MESSAGE**

In general, respondents rated the “Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy” warning significantly more believable and important than the “Smoking Kills” message across all 4 cartoon conditions (walrus, penguin, bear, and no cartoon) (P<.01). Although both whites and blacks rated the “Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy” warning more important than the “Smoking Kills” warning, the effect of the message was greater for whites than for blacks (P<.01). In addition, although both elementary and high school students rated the “Smoking Kills” message less important than the “Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy” warning, this difference was greater for elementary than high school students (P<.05). Furthermore, while both male and female students rated the “Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy” warning more believable than the “Smoking Kills” message, this difference was greater for female than male students (P<.05) (Table 2). Finally, smokers rated the warning labels significantly less important across all cartoon and message conditions than did nonsmokers (P<.05).

**COMMENT**

Prior research indicates that pictures and color can increase the noticeability of warning labels. Of course, noticeability of a tobacco warning label does not necessarily lead to believability of the message. However, before consumers learn, they must notice and read. Although this research study did not directly measure noticeability, all 3 cartoon warning labels in this study were found to be more believable than the plain condition by the respondents.

Table 1. Mean Believability Ratings for Significant Demographic Variable by Cartoon Interactions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cartoon Believability</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plain</td>
<td>Walrus</td>
<td>Penguin</td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White (n = 55)</td>
<td>2.74</td>
<td>3.42</td>
<td>. . .</td>
<td></td>
</tr>
<tr>
<td>Black (n = 408)</td>
<td>3.23</td>
<td>3.21</td>
<td>. . .</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary school (n = 387)</td>
<td>2.97</td>
<td>. . .</td>
<td>3.14</td>
<td></td>
</tr>
<tr>
<td>High school (n = 183)</td>
<td>3.41</td>
<td>. . .</td>
<td>3.36</td>
<td></td>
</tr>
</tbody>
</table>

* Believability ratings were based on a scale of 1 to 4, ranging from “not like this” to “very much like this.” Ellipses indicate that the interaction was not significant.

Table 2. Mean Importance and Believability Ratings for Significant Demographic Variables by Message Interactions

<table>
<thead>
<tr>
<th>Variable</th>
<th>“Smoking Kills” Message</th>
<th>“Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy” Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance rating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White (n = 55)</td>
<td>3.24</td>
<td>3.83</td>
</tr>
<tr>
<td>Black (n = 408)</td>
<td>3.54</td>
<td>3.67</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary school (n = 387)</td>
<td>3.39</td>
<td>3.67</td>
</tr>
<tr>
<td>High school (n = 183)</td>
<td>3.63</td>
<td>3.70</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n = 246)</td>
<td>3.39</td>
<td>3.59</td>
</tr>
<tr>
<td>Female (n = 329)</td>
<td>3.53</td>
<td>3.75</td>
</tr>
<tr>
<td>Believability rating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n = 246)</td>
<td>3.09</td>
<td>3.32</td>
</tr>
<tr>
<td>Female (n = 329)</td>
<td>3.02</td>
<td>3.37</td>
</tr>
</tbody>
</table>

* Mean importance and believability ratings were based on a scale of 1 to 4, ranging from “not like this” to “very much like this.”
For example, whites rated the walrus more believable than the plain condition, whereas blacks rated the walrus and plain condition similarly. Hence, cartoon tobacco warning labels might be best targeted toward specific demographic groups.

Elementary school students rated the penguin more believable than the plain condition, whereas high school students rated the plain condition more believable than the penguin cartoon. Just as the Joe Camel cartoon attracted 8- to 13-year-olds, a cartoon warning label might be more believable to children and younger adolescents, one of the fastest growing groups of smokers. On the other hand, a plain warning message may be more believable to older adolescents because it is less childlike or more adultlike than a cartoon warning label.

**MESSAGE**

Although prior research indicates that the “Cigarettes Kill” warning is easier to recall by adolescents than US tobacco warning labels (F. Roberta et al, unpublished data, 1999), this study indicates that the similar “Smoking Kills” warning was perceived as less believable and important than the currently used, longer “Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy” warning. Prior research studies on the “Smoking Kills” or similar warnings focused on recall of the message, whereas this study focused on the believability and importance of the message. This distinction is important, since exposure and attention to a warning do not ensure that warnings are perceived as important and believable. This is similar to what MacKinnon et al found about adolescents’ awareness and believability of alcohol warning labels; there were increases in awareness, exposure, and recognition, but the communicated risks were not believable. When a warning has high recognition and does not communicate risk, it may, in fact, be an attractive feature to adolescents considering use of the product.

Magat et al reported that overexposure to a warning may diminish its effect. It has been suggested that the 4 warning labels currently in use in the United States since 1984 are overexposed and worn out. However, Zajonc introduced the concept of a “mere exposure phenomenon,” which he defines as occurring when “mere repeated exposure of an individual to a stimulus is a sufficient condition of enhancement of attitude toward it.” In other words, familiarity leads to liking. Although the “Smoking Kills” warning may be more novel, the respondents may have had greater exposure to the “Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy” warning, therefore perceiving it as more believable and important.

An evaluation of antismoking campaigns found that communicating the long-term effects of smoking is one of the least effective strategies for reaching adolescents for 2 reasons: (1) most already know the potential health hazards of smoking, and (2) young people live in the present and believe they are invulnerable. Adolescents and young children may think that they do not smoke enough for negative consequences to occur and that they will quit before they are harmed. Elementary school students in this study rated the “Smoking Kills” message even less important than did high school students. This may be because the long-term health consequences are even more remote for children and younger adolescents, making the “Smoking Kills” message even less personally relevant for them. As identified in focus groups conducted in Canada, younger people were more concerned about the immediate health effects from smoking that could affect their social standing, such as effects on breath, teeth, and skin.

Market research conducted by the Federal Trade Commission concluded that disease-specific warnings were more effective than general warnings. In this study, the disease-specific warning “Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy” was rated more believable and important by both male and female subjects, but even more so by female subjects. This is similar to the findings of Beltramini, who noted that college students found this tobacco warning the most believable of the 4 tobacco warning labels currently used in the United States. As Beltramini suggested, the word “pregnancy” makes this message more personally relevant to young adults and, in this study, particularly personally relevant to adolescent girls.

Smokers rated the 8 warning labels less important than did nonsmokers across cartoon and message conditions. As Imperial Tobacco Company noted, “Starters do not really believe the dangers of smoking, but they assume that the risks will not apply to themselves because they will not become addicted. Once addicted, it becomes necessary to make peace with the hazards.” Thus, tobacco warning labels targeted at adolescents may be more effective in preventing the onset of smoking rather than encouraging cessation.

**PUBLIC HEALTH AND POLICY IMPLICATIONS**

Cigarettes are simultaneously the source of more death and disability than any other products ever invented and are also the object of the largest marketing effort devoted to any product in the United States. Of great public health concern is the possibility that the seductive imagery of advertising entices children and adolescents to start using tobacco. When exposed to tobacco advertisements, adolescents chose image-based advertisements more than fact-based advertisements. Until recently, most public health campaigns have focused on communicating the adverse effects of smoking rather than countering images portrayed in tobacco advertising. The cartoon warning labels used in this study were designed based on techniques of counteradvertising by modeling the cartoons after the competition, Joe Camel.

Image-based advertisements facilitate the attainment of information by the individual who desires the image that the advertisement promises. The more highly valued the image, the more persuasive the advertisement is expected to be to those seeking such self-images. A truly compelling image will reinforce the other components of the message. The health behavior with a strong, appealing image can look different from, and better than, competing behaviors.

The Proposed Global Settlement between several state attorneys general and the tobacco companies was...
initially drafted to reform and restructure the way tobacco is manufactured, marketed, and distributed. The Global Settlement, among other things, suggested prohibiting the use of human and cartoon characters such as Joe Camel and the Marlboro man in tobacco advertising. In addition, the Global Settlement suggested that part of the payments ($386.5 billion over 25 years) by the tobacco companies to federal and state governments be used for “countermarketing” to youth. The more recent January 1999 tobacco settlement with individual states is less specific about how individual states will use the tobacco settlement dollars. However, the results of this study suggest that counteradvertising dollars need to be spent on image-based campaigns that target adolescent market segments that are receptive to particular images and messages. Recently, the Canadian government passed legislation to implement image-based tobacco warnings, which use pictures and color and occupy 50% of the front and back of the pack.35

Tobacco companies target ethnic, racial, sex, and age groups with their advertising.36 Warning effectiveness depends on the extent to which the message content and presentation format are consistent with the needs of the receivers to whom the information is directed.37 As identified in this study, all of the respondents were more receptive to the cartoon tobacco warning labels compared with the plain warnings, but whites and children and younger adolescents were particularly receptive to the image-based cartoon tobacco warnings. To compete with tobacco advertising, antismoking information must also be targeted toward specific market segments.

The finding that the “Smoking Kills” message was less believable and important than the “Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy” warning is important because the “Smoking Kills” warning (and other similar warnings) are currently being used by at least 2 countries (Australia and Canada). Furthermore, the “Smoking Can Kill You” warning is 1 of 8 rotating tobacco warnings that were outlined in the initial Global Settlement between several state attorneys general and the tobacco companies in the United States. The more recent January 1999 tobacco settlement with the individual states no longer includes legislation that addresses tobacco warning labels, and future legislation regarding tobacco warning labels is, to date, unclear. However, given the results of this study, further evaluation of the “Smoking Kills” warning (or similar warnings) should be conducted before considering this warning for implementation in the United States.

LIMITATIONS AND STRENGTHS OF THE STUDY

One limitation of this study was that the warning labels (both cartoon and plain) were shown to the respondents as slides rather than on tobacco packs. Although the warning labels on the slides were all of the same size and quality, there is no indication that the results would be the same once the cartoon warnings were placed on cigarette packages, especially since cigarette packages are much smaller in size. Further research is necessary to determine the believability and importance of cartoon warning labels once placed on cigarette packages.

Another limitation of the study was that the research focused on believability and importance but did not include measures of the respondents’ recall of the cartoon messages or whether the messages were appealing. Further research is necessary to determine whether the cartoon warning labels can be easily recalled by and are appealing to children and adolescents. Moreover, further research is necessary to determine whether the cartoon tobacco warning labels, once placed on cigarette packages, would not in fact make the cigarette packages more appealing to children and adolescents. A recent Institute of Medicine document indicates that experimentation with the content and style of tobacco counteradvertising should continue, subject to evaluation to enable improvements and increase their impact.38

Although many significant cartoon and message effects were found, many of the differences appeared to be small. Since many of the responses were in the highest category (4 on a scale of 1 to 4), the differences may have been minimized because of a ceiling effect. Alternate measures may have been able to detect greater differences.

A final limitation of the study was that, in the analysis, schools were treated as fixed rather than random effects and classroom effects were not included in the model. As a result, the error term (variance) may not be as accurate as possible. However, the MIXOR program (which could not handle an additional set of random effects) was used because, unlike other statistical programs, it was able to treat the dependent variable as an ordinal outcome and account for repeated measures.

The finding that cartoon tobacco warning labels are more believable than plain warning labels suggests that it may be desirable to include cartoons such as the walrus and penguin used in this study in future tobacco warning labels. The lower rating of the “Smoking Kills” warning is a concern, because this warning and other similar warnings have recently been implemented in other countries and the “Smoking Can Kill You” warning is 1 of 8 rotating tobacco warnings that may be implemented in the United States. If health care policies regarding tobacco warning labels are to be changed, careful market research needs to be conducted to ensure that the new labels are effective in reaching children and adolescents.

Accepted for publication July 24, 2000.

This dissertation project was in part supported by the National Cancer Institute, Bethesda, Md (for a predoctoral fellowship) (Dr Duffy), and the Robert Wood Johnson Foundation, Princeton, NJ (for funding the larger study with which the dissertation was associated).

For their insightful direction in shaping the dissertation from which this article was generated, Dr Duffy thanks the members of her committee, Brian Flay, PhD, Fred Kviz, PhD, Don Hedeker, PhD, and Diana Hachibar, PhD, and especially her chairperson, Dee Burton, PhD. In addition, she thanks the members of the research team, including re-
search associates Jane Zaragoza, MPH, and Vinod Palli, MD, and the Chicago public school administrators, teachers, and students who participated in this study. Also, she thanks her colleagues at the VA Ann Arbor Healthcare System, especially David Ronis, PhD, and Laurel Copeland, PhD, for the generous support during the dissertation process.

Corresponding author: Sonia A. Duffy, PhD, RN, VA Ann Arbor Healthcare System, Center for Practice Management and Outcomes Research, PO Box 130170, Ann Arbor, MI 48113-0170 (e-mail: sonia.duffy@med.va.gov).

REFERENCES