

**BRIEF REPORT****OPTIMISTIC BIAS IN ADOLESCENT AND ADULT SMOKERS
AND NONSMOKERS**

JEFFREY JENSEN ARNETT

University of Maryland

Abstract — Optimistic biases regarding the risks of smoking were examined among 200 adolescents (aged 12–17) and 203 adults (aged 30–50). Strong majorities of adolescent and adult smokers and nonsmokers agreed that smoking is addictive and causes death for “most people” who smoke. However, for themselves personally, adolescent and adult smokers were more likely than nonsmokers to doubt that they would die from smoking even if they smoked for 30 or 40 years. Furthermore, 60% of adolescent and 48% of adult smokers believed that they “could smoke for a few years and then quit” if they wished, figures far higher than for nonsmokers. Thus an optimistic bias regarding smoking risks appears to be held by both adolescent and adult smokers, especially by adolescents and especially regarding addiction. Implications for smoking prevention programs are discussed. © 2000 Elsevier Science Ltd.

Key Words. Smoking, Optimistic bias, Risk perception, Substance use.

Risk perceptions are widely regarded by scholars to play an important role in the initiation and maintenance of cigarette smoking (U.S. Department of Health and Human Services, 1989, 1994). A particular focus of research on perceptions of smoking risk has been the concept of *optimistic bias*, which refers to people’s tendency to view the risks of various behaviors as lower for themselves than for others engaging in similar behaviors (Weinstein, 1989). In general, studies have found that adolescent and adult smokers believe that the health risks of smoking are lower for themselves than for other, same-age smokers (Weinstein, 1998).

However, surprisingly few studies have compared adolescents to adults on the degree of their optimistic bias in relation to smoking. This is an important issue, because virtually all smokers begin smoking by age 18 (U.S. Department of Health and Human Services, 1994). Part of the explanation for this may lie in differences in perceptions of smoking risk between adolescents and adults, but it is difficult to tell without studies that compare adolescents and adults directly. The goal of the present study was to address this question: Is the optimistic bias related to smoking risks greater for adolescents than for adults, and is it especially high among adolescent smokers?

It is important to clarify at the outset what the optimistic bias in relation to smoking does and does not include. The optimistic bias is not simply a total disregard of the potential risks involved in smoking. In fact, studies consistently find that both adolescents and adults agree, in general terms, that smoking increases the long-term risks of a variety of health problems, such as lung cancer and heart disease (e.g., Leventhal, Glynn, & Fleming, 1987; Viscusi, 1992). Furthermore, adolescent and adult smokers generally concede that smokers are at greater long-term risk for health problems, *compared to nonsmokers* (e.g., Gerrard, Gibbons, Benthin, & Hessling, 1996; McCoy

et al., 1992). However, adolescent and adult smokers tend to see the health risks of smoking as being lower for themselves *compared to other smokers* their age (Hansen & Malotte, 1986; McCoy et al., 1992). This is the heart of the optimistic bias, in the tendency to see risks as lower for oneself than for others engaging in similar behavior (Weinstein, 1989).

The optimistic bias in relation to smoking has been demonstrated with respect to adolescents and adults in studies using a variety of approaches. With regard to adolescents, Hansen and Malotte (1986) asked adolescents (aged 10–18) to consider the likelihood of four smoking-related health problems for a generalized other (who smokes), a hypothetical self (who smokes), and their actual self. In their risk perceptions comparing the generalized other to the hypothetical self, all groups (smokers and nonsmokers, 10- to 14-year-olds and 15- to 18-year-olds) demonstrated the optimistic bias, i.e., they considered the risks to be greater for the generalized other than for the hypothetical self. The strength of this bias was greatest among the youngest (10–14) smokers. However, perceived health risks to the actual self were higher among smokers than nonsmokers.

In one of the few longitudinal studies of smoking risk perceptions, Gerrard et al. (1996) followed 8th and 10th grade adolescents for 2 years to examine the extent to which smoking risk perceptions would predict smoking behavior, and vice versa. The results after 1 year indicated that for adolescents who took up smoking during that year, cognitive distortions occurred. In particular, when adolescents took up smoking the degree of their health and safety concerns related to smoking decreased. By persuading themselves that the health risks of smoking were remote and not worthy of immediate concern, adolescents could justify continued smoking; lower perceptions of smoking risks predicted further increases in smoking in the follow-up at 2 years.

Slovic (1998) showed that although adolescent smokers may concede the long-term risks of smoking, they tend to downplay the short-term risks. Adolescents (aged 14–20) were asked to agree or disagree with three statements about the short-term risks of smoking and one statement about the long-term risk. Nearly all the adolescents (96%) agreed with the long-term risk, that smoking a pack a day will eventually harm health. However, the smokers were much less likely than the nonsmokers to agree with the statements concerning short-term risks. Thirty-three percent (33%) of smokers (vs. 11% of nonsmokers) believed there would be no risk at all for the first few years; 40% of smokers (22% of nonsmokers) believed that the very next cigarette probably would cause no harm; 50% of smokers (32% of nonsmokers) believed that harmful effects rarely occur for many years. Slovic concluded that many young smokers perceive themselves to be at little risk from smoking, because they expect to stop smoking before any damage occurs.

In studies of adults, McCoy et al. (1992) found the optimistic bias in a sample aged 18–80 to be stronger for smokers than for ex-smokers or nonsmokers. The adults estimated the risks of three smoking-related diseases for self as smoker, self as nonsmoker, and for “typical smoker.” The only persons to demonstrate the optimistic bias were the current smokers, who perceived less risk for self as smoker than for the typical smoker. The results were unrelated to age.

Schoenbaum (1997) focused on perceptions of how smoking behavior is related to probability of early death among adults aged 50–62. Participants’ estimates of their likelihood of living to at least age 75 were compared to an objective measure of their likelihood of living to at least age 75, constructed from actuarial studies. Results showed that the estimates of never smokers, former smokers, and current light smok-

ers (fewer than 25 cigarettes a day) were remarkably accurate, with the men's estimates virtually identical to the objective figures (women were less accurate, in the direction of being *less* optimistic than the objective figures). However, heavy smokers (at least 25 cigarettes a day) demonstrated a strong optimistic bias. Their estimates of their likelihood of living to at least age 75 were twice as high as the objective figures for heavy smokers. Even though their estimates were slightly lower than the estimates made by never smokers, former smokers, or current light smokers, given their smoking status they were optimistically biased.

Only one study thus far has included both adolescents and adults. Cohn, Macfarlane, Yanez, and Imai (1995) examined the optimistic bias on smoking and other topics among adolescents and their parents. Responses on a measure of perceived harm indicated a stronger optimistic bias for adolescents, in the sense that adolescents were less likely than their parents to believe that taking part in various activities (including smoking) might result in harm. However, the authors did not compare smokers and nonsmokers, perhaps because smoking was not the focus of the study.

In sum, numerous studies have found evidence of an optimistic bias in relation to smoking. In studies using a variety of methods, the consistent result is that adolescent and adult smokers tend to see the risks of smoking as lower for themselves than for other smokers. However, to date only one study has included both adolescents and adults, and in that study smokers and nonsmokers were not compared.

The goal of the present study was to assess the optimistic bias in relation to smoking among both adolescents and adults. Adolescents and adults were asked about their perceptions of the risks of death from smoking, in general terms as well as for themselves personally. It was hypothesized that the optimistic bias for perceptions of the risk of death from smoking would be stronger for adolescents than for adults, and stronger for smokers than for nonsmokers—strongest of all, then, for adolescent smokers.

However, it was also the goal of the present study to address the issue of the optimistic bias in relation to smoking in a new way, by examining the optimistic bias not just for the long-term health effects of smoking, but with respect to addiction. The Slovic (1998) study indicated that adolescents, especially, exhibit the optimistic bias with respect to short-term consequences of smoking, believing that any serious effects of smoking are unlikely to occur until a person has been smoking for many years. Addiction may be the missing link in this process. That is, it may be that the optimistic bias with respect to smoking lies for many adolescents in the belief that they can smoke for a few years in their youth, then quit before any serious health consequences occur, because they do not believe they will become addicted.

Thus in the present study it was hypothesized that adolescent smokers would be higher than adolescent nonsmokers and higher than adult smokers or nonsmokers in their optimistic bias in relation to smoking addiction—that is, that they would be more likely than the other groups to believe they could smoke for a few years and then quit. However, it was hypothesized that adult smokers would be no more likely than adult nonsmokers to hold an optimistic bias in relation to addiction. It was expected that adult smokers would know all too well that it would be an illusion to believe they could smoke for some years and then quit if they wished (U.S. Department of Health and Human Services, 1988).

M E T H O D

Participants and procedure

The participants were 200 adolescents aged 12–17 (89 males and 111 females) and 203 adults aged 30–50 (95 males, 108 females). Data from half of the adolescents and

adults were collected in Seattle, Washington, and from the other half in Spokane, Washington. Among the adolescents, 80% were White, 5% Asian American, 5% Latino, 3% African American, and 7% other ethnic groups. Among the adults, 83% were White, 7% African American, 3% Latino, 3% Asian American, and 4% other ethnic groups. Socioeconomic status (SES) was estimated using mother's educational attainment for the adolescents; for adults, their own educational attainment was used. For both adolescents and adults, the SES of the sample was diverse.

Data were collected using the consumer intercept method (DiFranza, Eddy, Brown, Ryan, & Bogavlensky, 1994). People who appeared to be in the target age range were approached in shopping malls and asked if they would be willing to take part in the study. Once it was confirmed that they met the age criterion, adolescents were offered a \$10 voucher toward purchases at a mall music store in return for their participation; adults were not offered any compensation. Over 70% of the persons approached agreed to participate. All data were collected by research assistants who were blind to the hypotheses of the study.

Measures

The first part of the questionnaire contained various questions about smoking behavior and attitudes, with most of the items taken from previous studies (e.g., Pierce, Choi, Gilpin, Farkas, & Berry, 1998). Smoking/nonsmoking status was measured by asking participants whether or not they had smoked one or more cigarettes within the past 30 days. This is a measure of smoking status used frequently in research on smoking (U.S. Department of Health & Human Services, 1994).

The second part of the questionnaire contained questions about smoking risk perceptions, intended to measure the extent to which participants held an optimistic bias with regard to smoking risks. The optimistic bias consists essentially of a belief that the risks of a given behavior are lower for oneself than for others. Thus two items were included about the risk of death from smoking, and two items were included about the risk of addiction from smoking. One item on each issue assessed perceived risk to oneself and the other item assessed perceived risk to others. The items are shown in Table 1.

R E S U L T S

Twenty-four percent (24%) of the adolescents and 32% of the adults had smoked at least one cigarette in the past 30 days. There were no gender differences in smoking

Table 1. Optimistic bias, smokers and nonsmokers

	% Agree (slightly or strongly)			
	Adolescents		Adults	
	Nonsmokers	Smokers	Nonsmokers	Smokers
"Most people who smoke all their lives eventually die from an illness caused by smoking."	86	82	85	74
"I doubt that I would ever die from smoking even if I smoked for 30 or 40 years."	12	29	7	22
"Most people who smoke for a few years become addicted and can't stop."	90	71	86	81
"I could smoke for a few years and then quit if I wanted to."	26	60	25	48

prevalence among adolescents, but among adults males were significantly more likely than females to have smoked in the past 30 days—40% males, 24% females; chi-square (1,201) = 5.73, $p < .05$. Smoking prevalence increased with age among adolescents, from 4% of 12-year-olds to 41% of 17-year-olds. There were no age differences in smoking prevalence among adults.

Table 1 summarizes the frequencies of participants' responses to the items assessing optimistic bias, for adolescent and adult smokers and nonsmokers. (Responses were dichotomized in the table for clarity of presentation, but the entire 4-point scale was used in the analyses). Adolescent smokers were significantly less likely than adolescent nonsmokers to agree that most people who smoke become addicted; chi-square (3, 193) = 17.15, $p < .001$. There was also a trend for adult smokers to be less likely than adult nonsmokers to agree that most smokers eventually die from an illness caused by smoking; chi-square (3, 197) = 7.21, $p < .10$. Nevertheless, a strong majority of participants, whether adolescents or adults, smokers or nonsmokers, agree in general terms that smoking is addictive and causes death over the long term.

However, smokers were considerably less likely than nonsmokers to apply those risks to themselves. Among both adolescents and adults, smokers were more than twice as likely as nonsmokers to doubt they would die from smoking even if they smoked for 30 or 40 years; chi-square (3, 193) (adolescents) = 8.45, $p < .05$; chi square (3, 197) (adults) = 12.97, $p < .01$. Still, even among smokers, only 29% of the adolescent smokers and 22% of the adult smokers agreed slightly or strongly that they doubted they would die from smoking even if they smoked for 30 or 40 years.

The disparity between risk to oneself and risk to others was especially pronounced for smokers in their perceptions of the risk of addiction. Sixty percent (60%) of the adolescent smokers and 48% of the adult smokers indicated that they believe they could smoke for a few years and then stop if they wished. Nonsmokers were considerably less likely to believe this, for both adolescents and adults. For adolescents, chi-square (3, 193) = 26.34, $p < .001$; for adults, chi-square (3, 194) = 18.41, $p < .001$.

Logistic regression analyses were conducted to examine the extent to which the optimistic bias items would predict smoking status when key demographic variables—age, gender, and socioeconomic status (SES)—were taken into account. Ethnicity was not included in the analyses because there were too few participants in any given ethnic group to make comparisons possible; they could not be collapsed into a “non-White” comparison group because American ethnic groups vary widely in smoking behavior (U.S. Department of Health and Human Services, 1994). SES was represented by mother's education for the adolescents and by their own educational attainment for the adults. The optimistic bias items were the items assessing perceived risk of death to self from smoking and perceived risk of addiction to self from smoking. The demographic variables and the optimistic bias items were entered simultaneously into each equation. Risk of death and risk of addiction were examined in separate analyses, for adolescents and for adults.

Optimistic bias was used as an independent variable and smoking status as the dependent variable, on the basis of the theoretical view that optimistic bias contributes to smoking initiation. However, it is acknowledged that smoking also influences the optimistic bias and the optimistic bias serves to maintain smoking behavior. The effects are reciprocal, and it would have been possible to use smoking status as an independent variable and optimistic bias as the dependent variable in the analyses.

The results of the logistic regression analyses are shown in Table 2. Optimistic bias was a stronger and more consistent predictor of smoking status than any of the demo-

Table 2. Logistic regression analyses predicting smoking status

	Age	Gender	SES	Optimistic bias	χ^2
Adolescents					
Risk of death	1.42***	.81	.97	1.38*	17.14***
Risk of addiction	1.35**	.90	.91	2.05****	33.51****
Adults					
Risk of death	.96	.38***	.62***	1.67***	28.21****
Risk of addiction	.97	.37***	.56****	1.70****	34.92****

Note. The numbers shown are the odds ratios. SES = socioeconomic status.

* $p < .10$; ** $p < .05$; *** $p < .01$; **** $p < .001$.

graphic variables, for both adolescents and adults. For adolescents, optimistic bias regarding addiction risk was a stronger predictor of smoking status than optimistic bias regarding death risk; optimistic bias regarding death risk only approached significance as a predictor of smoking status ($p < .10$). Age was related to smoking status among adolescents, with older adolescents more likely to have smoked in the past 30 days. Among adults, gender and SES were related to smoking status, with males more likely than females to have smoked in the past 30 days, and with the likelihood of smoking inversely related to SES. Optimistic bias regarding death risk and regarding addiction risk both strongly predicted smoking status for adults.

DISCUSSION

Although optimistic bias has been found to be related to smoking behavior among both adolescents and adults (Weinstein, 1998), up to now only one study (Cohn et al., 1995) had included both adolescents and adults. The results of the present study confirmed the finding of Cohn et al. (1995) that the optimistic bias in relation to smoking is stronger for adolescents than for adults. Furthermore, unlike Cohn et al., the present study also compared the optimistic bias among smokers and nonsmokers. The optimistic bias was found to be stronger among smokers than among nonsmokers, for both adolescents and adults.

Perhaps the most notable findings of the study concerned responses to the items on optimistic bias and smoking addiction. This is an area that has not been investigated previously in the literature on optimistic bias. The findings of the present study indicated that the optimistic bias regarding addiction may play a key role in adolescent smoking. Strong majorities among all groups—adolescents and adults, smokers and nonsmokers—agreed that “Most people who smoke for a few years become addicted and can’t stop.” However, 60% of adolescent smokers nevertheless believed that “I could smoke for a few years and then quit if I wanted to.”

This shows that many adolescent smokers hold an optimistic bias on this issue—they believe that the addictiveness of smoking that applies to “most people” does not apply to themselves. The finding also suggests that their optimistic bias regarding smoking addiction may play an important role in their decision to initiate smoking. Why do so many young people start smoking even though they acknowledge that smoking leads to illness and death over the long term? Partly because some of them (in this study, 29%) believe that they will never die from smoking, even if they acknowledge that most smokers eventually die from smoking. However, an even higher

proportion—60%, in this study—evidently believe that the long-term risks of smoking do not apply to them because they will be able to quit any time they wish. They believe they can take up smoking during adolescence with impunity, because they can quit long before illness and death result from their smoking behavior. Evidence indicates that they are likely to find, after smoking for a few years, that quitting smoking is more difficult than they anticipated. Longitudinal studies by the “Monitoring the Future” project have shown that the majority of high school seniors who smoke but believe they will not be smoking in 5 years nevertheless remain smokers when followed up 5 years later (U.S. Department of Health and Human Services, 1994).

Although it was expected that adolescent smokers would hold an optimistic bias regarding smoking addiction, the finding that adult smokers also hold a substantial optimistic bias regarding smoking addiction was unexpected. Nearly half (48%) of adult smokers believed that they could “smoke for a few years and then quit if I wanted to” (compared to only 25% of adult nonsmokers). This is surprising in light of evidence that over 70% of adult smokers have tried to quit at least once without success (U.S. Department of Health and Human Services, 1988). One would think that most adult smokers would be acutely aware of the addictive power of cigarettes. It may be that adult smokers’ inability to quit, along with their belief that smoking eventually causes a mortal illness, creates an untenable cognitive dissonance that they resolve by continuing to believe that they will be able to quit “someday,” soon enough to avoid an early death. This finding should be explored further in interviews with adult smokers.

Implications for smoking prevention programs

The findings of the present study contain important implications for programs intended to prevent youth smoking. Because the optimistic bias regarding smoking addiction is so strong among adolescent smokers, the effectiveness of prevention programs may be enhanced if they focus on awareness of the risk of addiction rather than solely on the long-term consequences of smoking. To adolescents at the prime ages for smoking initiation—ages 12 to 17—the potential danger of lung cancer or heart disease 30 or 40 years from the present may seem too remote to be worth considering as part of their decision of whether to begin smoking. However, it may be possible to make the potential danger more real and present to them by stressing addiction, and how addiction in turn can make it difficult to quit in order to avoid eventual illnesses from smoking.

This finding also suggests that it may be useful to include a statement on the risk of addiction as one of the warning statements required on cigarette packs. As part of a settlement of tobacco litigation, tobacco manufacturer Liggett recently agreed to include the statement “Smoking is addictive” on all cigarette packs they produce. A similar statement could be sought from other tobacco manufacturers as well, perhaps as part of the settlement of current or future litigation against these manufacturers.

Summary and conclusion

The results of the present study indicate that the optimistic bias contributes to smoking behavior, especially with respect to addiction and especially among adolescents. It appears to be easy for many adolescents to believe that they are exempt from the risk of addiction that applies to others. How to persuade them of the reality of the risk of addiction to themselves, and the risk of an eventual early death from smoking if they cannot break the addiction, is a question that presents a serious challenge to the efforts of those constructing smoking prevention programs.

R E F E R E N C E S

- Cohn, L. D., Macfarlane, S., Yanez, C., & Imai, W. K. (1995). Risk-perception: Differences between adolescents and adults. *Health Psychology, 14*, 217–222.
- DiFranza, J. R., Eddy, J. J., Brown, L. F., Ryan, J. L., & Bogavlenky, A. (1994). Tobacco acquisition and cigarette brand selection among youth. *Tobacco Control, 3*, 334–338.
- Gerrard, M., Gibbons, F. X., Benthin, A. C., & Hessling, R. M. (1996). A longitudinal study of the reciprocal nature of risk behaviors and cognitions in adolescents: What you do shapes what you think, and vice versa. *Health Psychology, 15*, 344–354.
- Hansen, W. B., & Malotte, K. (1986). Perceived personal immunity: The development of beliefs about susceptibility to the consequences of smoking. *Preventive Medicine, 15*, 363–372.
- Leventhal, H., Glynn, K., & Fleming, R. (1987). Is the smoking decision an “informed choice?” *Journal of the American Medical Association, 257*, 3373–3376.
- McCoy, S. B., Gibbons, F. X., Reis, T. J., Gerrard, M., Luus, C. A. E., & Sufka, A. V. W. (1992). Perceptions of smoking risk as a function of smoking status. *Journal of Behavioral Medicine, 15*, 469–488.
- Pierce, J. P., Choi, W. S., Gilpin, E., Farkas, A. J., & Berry, C. C. (1998). Tobacco industry promotion of cigarettes and adolescent smoking. *Journal of the American Medical Association, 279*, 511–515.
- Schoenbaum, M. (1997). Do smokers understand the mortality effects of smoking? Evidence from the Health and Retirement Survey. *American Journal of Public Health, 87*, 755–759.
- Slovic, P. (1998). Do adolescent smokers know the risk? *Duke Law Journal, 47*, 1133–1141.
- U.S. Department of Health and Human Services. (1988). *The health consequences of smoking: Nicotine addiction*. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention.
- U.S. Department of Health and Human Services. (1989). *Reducing the health consequences of smoking: 25 years of progress*. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention.
- U.S. Department of Health and Human Services. (1994). *Preventing tobacco use among young people: A report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention.
- Viscusi, W. K. (1992). *Smoking: Making the risky decision*. New York: Oxford University Press.
- Weinstein, N. D. (1989). Optimistic biases about personal risks. *Science, 246*, 1232–1233.
- Weinstein, N. D. (1998). Accuracy of smokers' risk perceptions. *Annals of Behavioral Medicine, 20*, 135–140.