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Smoking attitudes, intentions, and behavior among college student smokers: Positivity outweighs negativity

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Abstract

Smokers' attitudes toward smoking tend to be characterized by ambivalent feelings of positivity and negativity, thereby raising the question of whether the effect of smoking attitudes on smoking behavior is mediated by the absence of negativity and/or by the presence of positivity. In two studies, undergraduate smokers rated how positive and negative they felt about smoking and reported how much they had smoked the previous month. Study 2's participants also reported how much they intended to smoke over the next month and, at 1-month follow-up, how much they actually had smoked during the previous month. Positivity, but not negativity, toward smoking predicted past smoking behavior, concurrent intentions to smoke, and future smoking behavior. Results suggest that weakening positive reactions toward smoking may deter smoking more than strengthening negative reactions does. Potential mechanisms are discussed, as well as the prospect of increasing negativity's deterrent effect.

Keywords: *Smoking, attitudes, ambivalence, positivity, negativity*

Introduction

Smoking related illnesses such as lung cancer, emphysema, and chronic bronchitis kill more than 430,000 Americans annually, making smoking the nation's primary cause of preventable death (Fiore et al. 2000). Those who are not killed by smoking are nevertheless susceptible to medical conditions such as heart disease, stroke, and chronic obstructive pulmonary disease (Fiore et al. 2000). Recent statistics indicate that $\approx 20.9\%$ of the general United States population currently smokes cigarettes (CDC 2005). Of more concern is that 24.4% of young adults aged 18–24 reported being current smokers, which represents the

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highest prevalence rate for any age group (CDC 2006). Despite the many known health risks associated with continued use of cigarettes, smokers also perceive smoking as having positive consequences. Many college student smokers, for instance, think that smoking helps them relax and be more sociable (Brandon and Baker 1991).

Smokers' potentially conflicting reactions to smoking may make it difficult to make sense of their attitudes toward smoking because attitudes are typically conceptualized as being positive or negative, not both. In contrast, Cacioppo et al. (1997) evaluative space model conceptualizes positivity and negativity as separable and partially distinct. Thus, the evaluative space model allows for the possibility that smokers may have ambivalent attitudes toward smoking. Attitudes researchers (e.g., Thompson et al. 1995) distinguish between *potential ambivalence*, which occurs when individuals have both positive and negative feelings toward the attitude object; and *felt ambivalence*, which occurs when people feel conflicted about an attitude object. In an initial study of ambivalence toward smoking, Lipkus et al. (2001) found that most of the American college-aged smokers they sampled endorsed feeling both positive and negative about smoking felt conflicted about smoking. In other words, they could be characterized as being high in potential ambivalence and felt ambivalence.

Lipkus et al. (2001) also found that smokers' positive and negative reactions to smoking were uncorrelated, which raises an intriguing question about the effects of attitudes toward smoking on smoking behavior. Attitudes toward smoking predict smoking behavior (e.g., Fishbein 1982; van der Pligt and de Vries 1998; Ajzen 2001), but the extent to which positivity promotes smoking and negativity deters smoking remains unclear. Bipolar attitudes are a joint function of positivity and negativity: whereas positivity results in more positive attitudes and negativity results in more negative attitudes. Understanding whether smoking behavior is influenced to a greater extent by positivity or negativity toward smoking may help guide public health campaigns designed to reduce cigarette smoking. If perceived positivity promotes smoking, advertising campaigns would be well-served by undermining smokers' positive perceptions of smoking. Conversely, if perceived negativity reduces smoking, it would make sense to highlight the negative aspects of smoking.

A common finding in a wide variety of domains including risky choice (Kahneman and Tversky 1979) and impression formation (Skowronski and Carlston 1989) is that negativity has a greater impact on subsequent cognition than does positivity. In light of this *negativity bias* (Cacioppo et al. 1997), one possibility is that the negative effect of negativity toward smoking on smoking behavior outweighs the positive effect of positivity. In fact, negativity has been shown to have stronger impact on behavior in political decision-making, where people's negative perceptions of candidates influence voting behavior more than their positive perceptions do (Holbrook et al. 2001).

Voting behavior is noteworthy because it has both approach- and avoidance-related aspects: to vote for one candidate is to vote against another. Positivity may nonetheless have more impact on predominantly approach-related behaviors (J.T. Cacioppo, personal communication, September 2005). For instance, college students' positive perceptions of their roommates predict how much time they spend with their roommates better than their negative perceptions do (Cacioppo et al. 1997). Similarly, the positive effect of positivity toward blood donation is a stronger predictor of intention to donate than the negative effect of negativity (Gardner and Cacioppo 1995). In that smoking is also an approach-related behavior, positivity toward smoking may stimulate smoking more than negativity deters smoking.

Moreover, some evidence from the smoking literature indicates that positive expectancies toward smoking predict smoking behavior better than negative expectancies

do (Brandon et al. 1999). Siegel et al. (1994), for example, found that adolescents' perceptions of the benefits of smoking predicted their current smoking behavior better than their perceptions of the risks of smoking did. Parsons et al. (1997) extended Siegel and co-workers' findings by investigating the relative effects of perceived risks and benefits on intentions and future engagement in risky behavior. Perceived benefits, but not perceived risks, predicted a cluster of what the authors termed imprudent behaviors (i.e., cigarette smoking, failure to use seatbelts, binging/purging). It remains unclear whether perceived benefits would have had a stronger effect on behavior if smoking behavior had been analyzed separately from the other imprudent behaviors.

Moreover, other research suggests that positive expectancies may actually have weaker effects on smoking outcomes than negative expectancies do (e.g., Morgan and Grube 1989; Greening 1997). In one study, Halpern-Felsher et al. (2004) asked high school freshmen to rate their own chances of experiencing 11 specific smoking-related risks (e.g., "smelling like an ashtray," "have a heart attack") and six benefits (e.g., "look cool," "feel relaxed") associated with smoking cigarettes. Hierarchical regressions indicated that perceived risks accounted for more variance in behavioral intentions than perceived benefits.

The increasing interest in the relative influence of positive and negative expectancies on smoking represents a promising development in the study of the causes of smoking. As Halpern-Felsher et al. (2004) pointed out, smoking prevention campaigns' tendency to highlight the risks of smoking (e.g., surgeon general's warnings) assume that perceptions of risk, as opposed to benefits, drive smoking behavior. Comparing the effects of positive and negative expectancies can be difficult because different investigators have operationalized expectancies in different ways (Brandon et al. 1999). For instance, important benefits or risks of smoking may have been omitted from Halpern-Felsher and co-workers' measures. Further, perceived risks may have accounted for more variance simply because the regression analyses conducted by Halpern-Felsher and co-workers included nearly twice as many risks as benefits.

In contrast to the multiplicity of measures of positive and negative expectancies, basic research on attitudinal ambivalence (e.g., Priester and Petty 1996) and mixed emotions (Larsen et al. 2001, 2004) has yielded straightforward measures of positivity and negativity (e.g., Russell and Carroll 1999). Moreover, the effect of expectancies on intentions and behavior is mediated by attitudes toward smoking (Fishbein and Ajzen 1975). Thus, investigating relationships between attitudinal positivity and negativity toward smoking and smoking behavior may help clarify inconsistencies in the smoking expectancies literature.

A bivariate, as opposed to bipolar, conceptualization of attitudes also calls attention to the potential consequences of ambivalence toward smoking. An influential bipolar model of attitudes, the Theory of Reasoned Action (TRA; Fishbein and Ajzen 1975) acknowledges that individuals can have ambivalent reactions to an attitude object, but regards such ambivalence as inconsequential. What is consequential, according to the TRA, is the resulting bipolar attitude: the net difference between the underlying levels of positivity and negativity. In other words, the TRA predicts that a middling attitude toward smoking should motivate the same amount of smoking whether that middling attitude reflects ambivalence or indifference (i.e., the absence of positivity and negativity). In contrast, if positivity and negativity toward smoking have asymmetric effects on smoking behavior, smokers who are ambivalent about smoking may smoke more or less than those who are indifferent. For instance, if positivity predicts smoking behavior but negativity does not, people who feel both good and bad about smoking would be expected to smoke more than those who feel neither good nor bad.

In sum, the question of whether attitudinal positivity and negativity toward smoking have distinct effects on smoking behavior has practical and theoretical implications, as does the question of whether ambivalence toward smoking affects smoking behavior. College-aged adults (e.g., those aged 18–25) are a particularly important group to study because they are more likely to smoke than any other age group (Substance Abuse and Mental Health Services Administration [SAMHSA] 2005). To that end, we conducted two studies of college-aged smokers' smoking attitudes and behaviors; in the General Discussion, we consider whether the obtained results will generalize to other populations of smokers.

Study 1

Method

Participants. Participants were 181 smokers enrolled in Introductory Psychology at Texas Tech University who were among the 707 students who completed a mass survey at the beginning of the Spring 2003 semester in exchange for partial course credit.¹ The students were asked to indicate whether they use a variety of products containing nicotine, including cigarettes, chewing tobacco, cigars, and pipes. The students were also asked to indicate whether, in terms of cigarette smoking, they considered themselves a “non-smoker,” “daily smoker,” “occasional smoker (less than daily),” “ex-smoker,” or had “tried smoking (1–10 times) but do not currently smoke at all.” We classified as smokers those 181 (24.2%) students who (a) indicated that they used cigarettes (alone or along with other products containing nicotine) and (b) identified themselves as “daily” “occasional” smokers. Of the smokers, 81 (47%) were women, 90 (53%) were men, and the remaining 10 (6%) declined to report their gender. The sample included 158 Caucasians (87%), 14 Latinos (8%), 2 Asian-Americans (1%), and 1 Native American (1%).²

Measures. Participants completed the Tobacco Use and Smoking Questionnaire (TUASQ), an eight-item questionnaire designed for the purpose of these studies, which includes the two questions described above and also assesses various aspects of tobacco use including how often individuals smoke and how many cigarettes they smoke. Participants also reported how positive and negative they felt about smoking. Positivity was assessed with the question, “Ignoring any negative feelings you might have about smoking, do you have any POSITIVE FEELINGS about smoking?” If participants endorsed the dichotomous (i.e., yes/no) question, they then rated the intensity of their positive feelings on a five-point scale ranging from “slightly” (1) to “extremely” (5). An initial response of “no” was assigned a rating of 0. Following Russell and Carroll (1999), the dichotomous question was intended to prevent participants from mistaking the unipolar attitudinal measures for bipolar measures. Negativity was assessed with an analogous pair of questions about negative feelings.

Results and discussion

Despite being smokers, participants tended to report feeling more negative ($M=3.28$; $SD=1.19$) than positive ($M=1.75$; $SD=1.28$) about smoking. Negativity scores were negatively skewed, so this difference was assessed with the Freedman test, which is a rank-based nonparametric equivalent of the t -test. The Freedman test revealed that participants

reported feeling significantly more negative than positive, $\chi^2(N=181)=78.57, p<0.001$. Replicating the findings of Lipkus et al. (2001), the majority of participants ($n=137$; 76%) also reported feeling both positive and negative about smoking.

Relationships between positivity/negativity and behavior. To correct for the negative skew in negativity scores, log-transformed negativity scores were used for all correlational analyses, but in both studies and for all transformed variables, all reported results were also obtained when raw variables were analyzed. In contrast to the findings of Lipkus et al., positivity and negativity were negatively correlated, $r(181)=-0.26, p<0.001$.

To estimate how many cigarettes participants smoked daily, we transformed each scale response to the mean of its range. For example, those who indicated that they had smoked ≤ 5 cigarettes/day were estimated as having smoked 2.5 cigarettes/day. Participants reported that in the last month they had smoked an average of 5.65 (SD = 5.20) cigarettes/day and 4.79 (SD = 2.29) days/week. We created a single index of smoking behavior by computing a quantity/frequency index, which is the product of the number of cigarettes smoked per day and the number of days smoked per week. Quantity/frequency indices are common in the study of alcohol use (e.g., Greenfield 2000) and are useful for measuring smoking behavior among younger, less dependent smokers because these smokers exhibit a broad range of smoking frequency and have less regular smoking patterns than older, more dependent smokers. Smoking behavior scores were positively skewed, so log-transformed smoking behavior scores were used for all analyses.

We computed a pair of correlations to compare the relationships among self-reported evaluative reactions (i.e., positivity and negativity) and the quantity/frequency index of smoking behavior. To facilitate comparison of smoking behaviors' correlations with positivity and negativity, negativity scores were multiplied by -1 . Thus, a positive correlation between negativity and behavior would indicate that smoking decreases with increases in negativity. Positivity predicted amount of smoking, $r(181)=0.24, p<0.001$, but negativity did not, $r(181)=-0.06, ns$.

One explanation for the asymmetric effects of positivity and negativity on behavior is that positivity can subordinate negativity (Eyal et al. 2004). Consider smokers for whom smoking elicits no positivity. It is possible that no amount of negativity can inhibit these individuals from smoking because even those for whom smoking elicits little negativity do not smoke very often. To address this possibility, we conducted separate analyses on data from the 143 participants who reported at least some level of positivity (i.e., positive rating ≥ 1). Even among this subset of participants, negativity was uncorrelated with smoking behavior, $r(143)=-0.01, ns$. Similarly, negativity was uncorrelated with smoking behavior among the 100 participants who were at or above the median level of positivity (i.e., positive rating > 2), $r(100)=-0.07$. Thus, it appears that negativity toward smoking has little effect on smoking behavior regardless of how positive people feel about smoking.

The finding that reports of positivity, but not negativity, toward smoking were significantly correlated with smoking behavior does not imply that the correlation between positivity and behavior was significantly stronger than the correlation between negativity and behavior. Cohen and Cohen (1983; pp. 56–57) provided a test of the significance of the difference between dependent correlation coefficients. This test indicated that the correlation between self-reported positivity and smoking behavior was significantly larger than the correlation between self-reported negativity and smoking behavior, $t(178)=3.47, p<0.001$.

Relationship between ambivalence and behavior. The finding that positivity, but not negativity, is correlated with smoking behavior suggests that ambivalent smokers will smoke more than indifferent smokers even when they have comparable bipolar attitudes (i.e., positivity – negativity). To test this hypothesis, we first quantified the magnitude of participants' ambivalence toward smoking as the average of their positivity and negativity ratings. Among the 27 participants who reported equal levels of positivity and negativity toward smoking, the magnitude of ambivalence toward smoking was positively correlated with smoking behavior, $r(27) = 0.48$. In contrast to the TRA (Fishbein and Ajzen 1975), these results suggest that ambivalence can be consequential such that those who feel comparably positive and negative toward smoking smoke more than those who feel neither positive nor negative about smoking.

Study 2

The purpose of Study 2 was to address two limitations of Study 1. In Study 1, We assessed positivity and negativity with single-item measures, which can be unreliable. We also used positivity and negativity to predict past behavior, but predicting future behavior is far more informative. In Study 2, we overcame these limitations by assessing positivity and negativity with multiple-item measures and including measures of intentions and future behavior.

Method

Participants. At the beginning of the Fall 2003 semester (Time 1), 1507 undergraduates enrolled in Introductory Psychology at Texas Tech University completed a mass survey in exchange for partial course credit. A total of 327 of these students (22%) were classified as smokers based on the same criteria as those in Study 1. Of these, 154 (47%) were contacted by telephone 4–6 wk later (Time 2; M 4.6 weeks, SD = 0.64) and consented to answer further questions for additional course credit.³ The remaining 173 smokers indicated at Time 1 that they did not wish to be contacted at Time 2, could not be contacted at Time 2 (e.g., because they failed to provide telephone numbers at Time 1 or failed to return our telephone calls), or were contacted but declined to participate (e.g., because they had already completed their research requirement). Two-sample *t*-tests indicated that smokers who did *versus* did not provide data at Time 2 did not differ on any Time 1 measures (all *ps* > 0.4). The majority of participants in the final sample were women ($n = 93$; 60%). In addition, the sample included 134 Caucasians (87%), 11 Latinos (7%), 3 Asian–Americans (2%), 1 African–American (1%), and 5 (3%) participants who declined to report ethnicity.

Measures. At Time 1, participants completed the TUASQ. Participants also completed three sets of questions designed to assess their positive reactions to smoking. As in Study 1, for instance, they were asked, “Ignoring any negative feelings you might have about smoking, do you have any POSITIVE FEELINGS about smoking?” If participants endorsed the dichotomous (i.e., yes/no) question, they then rated the intensity of their positive feelings on a five-point scale ranging from “slightly” (1) to “extremely” (5). An initial response of “no” was assigned a rating of 0. In all, participants were asked whether they “have any positive feelings,” “feel good about,” and “like” smoking

cigarettes ($\alpha = 0.77$). Similarly, participants' negative reactions toward smoking were assessed by asking them whether they have "any negative feelings," "feel bad about," and "dislike" smoking cigarettes ($\alpha = 0.82$). The attitudinal items appeared in the following order for all participants: "good," "dislike," "positive feelings," "bad," "like," and "negative feelings." Intentions to smoke were measured by asking participants to indicate (a) how many days per week (out of 7) they expected to smoke during the next month, and (b) how many cigarettes they were likely to smoke, on average, each day during the next month. There were seven response options ranging from "I do not smoke cigarettes" (0) to "more than a pack a day" (6).

At Time 2, participants were asked two retrospective questions analogous to Time 1's prospective intention questions. Specifically, they were asked to indicate (a) how many days per week (out of 7) they had smoked during the previous month, and (b) how many cigarettes they had smoked, on average, each day during the past month.

Results

At Time 1, participants in the final sample reported that in the last month they had smoked an average of 5.00 cigarettes/day ($SD = 5.04$) and 4.34 days/week ($SD = 2.42$). Similarly, in the next month they expected to smoke 4.93 cigarettes/day ($SD = 4.94$) and 4.08 days/week ($SD = 2.34$). Consistent with these predictions, at Time 2 participants reported that in the last month they had smoked an average of 5.48 cigarettes/day ($SD = 5.43$) and 4.01 days/week ($SD = 2.64$). To compute single indices of prior smoking behavior, smoking intentions, and subsequent smoking behavior, we again computed three separate quantity/frequency index using the product of the number of cigarettes that participants had smoked or expected to smoke per day and the number of days they had smoked or expected to smoke per week. These scores were again positively skewed, so all subsequent analyses of these variables were conducted on log-transformed data. In keeping with evidence that smoking behavior is fairly stable over time (Chassin et al. 1996), the three quantity/frequency indices were strongly correlated, $r_s = 0.71-0.92$.

As in Study 1, at Time 1 participants reported feeling more negative ($M = 2.14$; $SD = 1.41$) than positive ($M = 1.24$; $SD = 1.13$) about smoking, $t(153) = -6.11$, $p < 0.001$. Moreover, half the sample ($n = 83$; 54%) reported feeling both positive and negative about smoking. The distribution of positivity scores was J-shaped with a mode of 0, so all correlational analyses were conducted on arcsine-transformed positivity scores.⁴ Unlike in Study 1, positivity and negativity were uncorrelated, $r(154) = -0.09$, *ns*, thereby replicating the findings of Lipkus et al. (2001).⁵

Relationships between positivity/negativity and behavior. We computed a series of correlations to examine the effects of positivity and negativity ratings on past behavior, intentions, and future behavior. Negativity scores were multiplied by -1 to facilitate comparison of the effects of positivity and negativity. Thus, a positive correlation between ratings of negativity and intentions would indicate that smoking behavior decreases with increases in negativity. Replicating the findings of Study 1, positivity ratings predicted amount of smoking during the past month, $r(154) = 0.30$, $p < 0.001$, as well as intentions to smoke during the next month, $r(154) = 0.30$, $p < 0.001$, and actual amount of smoking during the next month, $r(154) = 0.25$, $p = 0.002$. In contrast, negativity ratings did not predict any of these variables, $r(154) = -0.03$, 0.03 , and -0.07 , respectively, all *ns*. In addition, negativity was not correlated with any of these variables even among the 100 participants who reported at least

some positivity (i.e., positive rating ≥ 0.33) and the 86 participants who were at or above the median level of positivity (i.e., positive rating ≥ 1.00), all $r_s < 0.12$. Moreover, the effect of positivity was significantly stronger than the effect of negativity on past behavior, intentions, and behavior, $t(151) = 3.21, 2.59, \text{ and } 3.02$, respectively, all $p_s \leq 0.01$.

Relationships between ambivalence and intentions/behavior. As in Study 1, we quantified the magnitude of participants' ambivalence toward smoking as the average of their positivity and negativity ratings. Among the 55 participants whose mean positive ratings fell within one scale point of their mean negative ratings, the magnitude of ambivalence toward smoking was positively correlated with past behavior, intentions, and behavior, $r(55) = 0.29, 0.34, \text{ and } 0.24$, $p = 0.03, 0.01, \text{ and } 0.07$, respectively. These results replicate those of Study 1 and provide additional evidence that those who feel comparably positive and negative toward smoking smoke more than those who feel neither positive nor negative about smoking.

General discussion

The present studies replicate Lipkus et al.'s (2001) findings that college smokers tend to feel both good and bad about smoking and that they tend to feel less good than bad. Our studies also extend those of Lipkus and co-workers by examining the relative effects of positivity and negativity toward smoking on smoking behavior. Study 1 revealed that positivity ratings, but not negativity ratings, predicted amount of smoking during the past month. Study 2 replicated and extended the findings of Study 1 in two ways. First, Study 2 included multiple measures of positivity and negativity. More important, Study 2 revealed that positivity, but not negativity, predicted how much individuals intended to smoke during the next month and how much they actually did smoke during the next month.

Theoretical implications

Attitudes are generally conceptualized along a bipolar valence continuum ranging from negative to positive. In light of previous findings that most smokers report negative attitudes toward smoking on bipolar scales (e.g., Chassin et al. 1991) and our own findings that most smokers report feeling more negative than positive about smoking, it is unclear from a traditional attitudes perspective why smokers smoke (Huijding et al. 2005). By focusing on the underlying levels of positivity and negativity toward smoking and their potentially distinct effects on smoking behavior, our findings may help solve this puzzle. To the extent that positivity toward smoking predicts smoking behavior more than negativity does, it makes sense that smokers smoke even though they feel predominantly negative about smoking.

The TRA (Fishbein and Ajzen 1975) contends that intentions and behavior are governed by bipolar attitudes rather than by the positive and negative substrates of those bipolar attitudes. In both studies, we found that participants who felt comparably positive and negative about smoking smoked more than those who felt neither positive nor negative about smoking. These results indicate that ambivalence is consequential for smoking behavior. Interestingly, people with higher levels of ambivalence reporting smoking more in our study even though Lipkus et al. (2001) found that people with higher levels of felt

ambivalence (i.e., those who reported feeling more conflicted about smoking) had a stronger desire to *quit* smoking. The reason for this apparent discrepancy lies in the distinction between potential and felt ambivalence. Despite being conceptually related, potential and felt ambivalence are typically only moderately correlated (Thompson et al. 1995; Priester and Petty 1996). Lipkus and co-workers, for instance, found that measures of potential ambivalence accounted for only 3–5% of the variance in measures of felt ambivalence. Thus, our observation that those who feel both good and bad about smoking tend to smoke more is not incompatible with Lipkus and co-workers' observation that those who felt conflicted were more likely to want to quit. To the contrary, our findings together with those of Lipkus and co-workers indicate that potential and felt ambivalence toward smoking can have opposite effects on smoking behavior.

Underlying mechanisms

We focused on explicit attitudes (i.e., attitudes of which the individual is aware), which generally affect behavior via intentions (Ajzen 1988). Though some have called for caution in interpreting the available data (Dar and Frenk 2002), it is generally agreed that nicotine is physically addictive (e.g., U.S. Department of Health and Human Services [DHHS] 1988), which may lead individuals to smoke despite their best intentions. The interplay of intentional and unintentional processes may help explain why negativity was uncorrelated with smoking behavior. Specifically, the effect of physical addiction may override the effect of attitudinal negativity such that smokers who have negative feelings toward smoking continue to smoke despite intending not to. On the other hand, there is little reason to expect physical addiction to override the effects of attitudinal positivity on smoking behavior because both physical addiction and positivity would be expected to increase smoking behavior. In sum, whereas the effect of negativity on smoking behavior may be overridden by the effect of physical addiction, the effect of positivity may be exacerbated by the effect of physical addiction. As a result, one would expect smoking behavior to be more strongly associated with positivity than negativity, which is exactly what we found.

Two decision-making principles may also help explain why smoking behavior is more strongly associated with positivity toward smoking than with negativity toward smoking. First, people tend to be unrealistically optimistic (Taylor and Brown 1988), so smokers may recognize the dangers of smoking but downplay their own risk. Consistent with this hypothesis, Williams and Clarke (1997) found that smokers judged their own likelihood of suffering lung cancer, heart disease, and emphysema as lower than that of the average smoker.

Second, people tend to ignore future consequences of their actions in favor of immediate consequences (Loewenstein and Thaler 1989). Halpern-Felsher et al. (2004) suggested that the perceived benefits of smoking may have more impact because perceived benefits (e.g., improved mood) tend to be more immediate than perceived risks (e.g., lung cancer). As one of Shervington's (1994) interviewees remarked, "I don't think about what are the harmful effects of my cigarettes. The only thing I think about is 'Oh, this is wonderful for now'" (p. 339). Our sample consisted almost entirely of college-aged smokers, for whom the most serious negative consequences of smoking (e.g., lung cancer) lie especially far off in the future, which might help explain why their negativity toward smoking has negligible effect on their smoking intentions and behavior.

Potential limitations and directions for future research

Above we raised the possibility that negativity was uncorrelated with smoking behavior in our college student samples because they are less likely than older, long-term smokers to suffer the most negative consequences of smoking. If so, negativity toward smoking may provide a stronger deterrent among older smokers, which represents an interesting question for future research. In addition to exploring whether our results generalize to older adults, future research should examine whether our results generalize beyond convenience samples of predominantly white American college students to members of other racial and ethnic groups and citizens of other countries.

There are other potential limitations of our findings. For instance, cigarette smoking has been considered socially undesirable in the United States for some time (Warner 1978), which makes it likely that some participants reported less negativity and more positivity toward smoking than they actually felt and that they reported smoking less often than they actually did. We took several steps to minimize social desirability concerns. Participants were assured of confidentiality, gave their consent before answering the mass survey and Study 2's telephone survey, completed the survey in classroom settings, only provided their names after completing the survey, and had the option of withholding their names altogether.

In any event, it is not clear how socially desirable responding could account for our primary finding that positivity toward smoking was more highly correlated with smoking behavior than negativity toward smoking. It is feasible that reported negativity toward smoking was uncorrelated with smoking behavior because participants misrepresented their attitudes and/or behavior. Yet those who misrepresented their negativity would also presumably misrepresent their positivity. Thus, to the extent that socially desirable responding attenuated the observed correlation between negativity and smoking behavior, it would attenuate the observed correlation between positivity and smoking behavior to the same degree. In sum, social desirability concerns presumably introduced some inaccuracy into participants' self-reports and may have attenuated the observed correlations, but the most plausible interpretation of the entire pattern of findings is that positivity toward smoking was a better predictor of smoking behavior than negativity toward smoking.

It is also the case that participants' self-perceptions about how much they had smoked in the previous month (Bem 1972) may have affected their reports about their attitudes toward smoking (Studies 1 and 2) and their reports about how much they expected to smoke in the next month (Study 2). This possibility does call into question the extent to which participants accurately reported their future intentions. As with the concern about socially desirable responding discussed above, however, it is unclear how self-perception processes can account for the finding that positivity was more strongly correlated with self-reported intentions to smoke and smoking behavior than was negativity.

Establishing causality

To strengthen the inference that a predictor measured at Time 1 has a causal influence on a criterion at Time 2, researchers often control for the effect of the predictor measured at Time 1 on the predictor measured at Time 2. In this domain, such an approach is unfeasible because smoking behavior tends to be fairly stable over time. In the current Study 2, self-reported smoking was highly correlated. As a result, controlling for the effect of Time 1 behavior on Time 2 behavior would greatly attenuate the correlation between Time 1 attitudes and Time 2 behavior. One possible explanation for such findings would be that attitudes toward smoking have little effect on smoking behavior. In light of decades of

evidence that attitudes generally do affect behavior (e.g., Eagly and Chaiken 1993), a more plausible explanation is that participants' attitudes prior to the study had enduring influence on smoking behavior at both Time 1 and Time 2 and that controlling for Time 1 smoking behavior masked the effect of pre-existing smoking attitudes on Time 2 smoking behavior.

A more fruitful approach to examining causal influences of positivity and negativity toward smoking on smoking behavior in future research may be to selectively manipulate the salience of smokers' positivity and negativity. If positivity toward smoking does have a stronger effect on smoking behavior than negativity toward smoking, prompting smokers to think about their positive expectancies about smoking should increase smoking behavior in a controlled laboratory setting. Conversely, prompting smokers to think about their negative expectancies should have a weaker effect on smoking behavior.

Practical implications

The possibility that experimentally manipulating the positive and negative bases of attitudes toward smoking affects smoking behavior highlights the practical implications of our findings. Most public health communications aimed at smokers (e.g., surgeon general's warnings) attempt to intensify their negativity toward smoking. As Halpern-Felsher et al. (2004) have noted an alternative strategy is to weaken smokers' positivity. Our finding that positivity is more strongly correlated with smoking than is negativity suggests that undermining positivity may be the more effective of the two approaches. Schneider et al. (2001) reached the same conclusion from their finding that gain-framed messages describing the benefits of not smoking reduced participants' smoking more than loss-framed messages describing the costs of smoking. Thus, our results provide converging evidence that public health communications targeting current smokers should seek to eliminate the perceived positive aspects of smoking.

To the extent that highlighting the negative aspects of smoking is not especially effective, a more subtle approach may be to magnify the deterrent effect of those negativity aspects. In regards to the decision-making principles identified above, prevention campaigns that reduce unrealistic optimism about the health risks and highlight the short-term negative consequences of smoking (e.g., bad breath) may effectively magnify negativity's deterrent effect on smoking behavior (Glasgow et al. 1981; Weinstein 1983).

Summary and conclusion

If attitudes fall along a bipolar continuum, smoking prevention campaigns that change attitudes by informing people of the negative aspects of smoking make sense. Yet, smokers are already aware of the negative aspects of smoking, as evidenced by our finding that 89% of our participants report some amount of negativity toward smoking. Moreover, 66% felt both good and bad about smoking, which suggests that attitudes toward smoking are best conceptualized as falling within a bivariate space, rather than along a bipolar continuum.

From this perspective, attitudinal negativity need not influence smoking behavior even though global attitudes do. Indeed, our findings suggest that it is the presence of positivity, rather than the absence of negativity, that leads to smoking. One implication is that dispelling people's positive reactions toward smoking may be a more effective deterrent than intensifying their negative reactions. Alternatively, it may be effective to enhance the

deterrent effect of negativity by making the immediate negative consequences of smoking more salient or by combating smokers' illusions of invulnerability.

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Notes

1. In order to reduce coercion, Introductory Psychology students can opt to write several short papers rather than participate in research studies. Students who chose to complete the mass survey used in Studies 1 and 2 provided informed written consent. All procedures were approved by the university's Institutional Review Board and all data were kept confidential.
2. In both Studies 1 and 2, Cohen and Cohen's (1983; pp. 53–54) test of the difference between independent r s revealed no gender effects on any of the reported correlations.
3. More students completed the mass survey in Fall 2003 than in Spring 2003 because, as is typical, many more students take Introductory Psychology in the fall than in the spring.
4. As in Study 1, all reported results were also obtained when we included raw positivity, intention, and behavior scores in the analysis rather than the transformed scores.
5. Thompson et al. (1995) found that measures of attitudinal positivity and negativity are more highly negatively correlated when they are assessed closer together in time, ostensibly because of participants' desire to appear consistent. Thus, positivity and negativity may have been negatively correlated in Study 1 because negativity was assessed immediately after positivity. In contrast, in both Study 2 and Lipkus et al.'s (2001) study, measures of polar opposite constructs (e.g., *good* vs. *bad*, *like* vs. *dislike*) were separated by two other items. Even if they are moderately negatively correlated, the current findings indicate that positivity and negativity toward smoking are sufficiently independent to have distinct effects on behavior.

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