

Cognition at Risk: Gestalt/Feature-Intensive Processing and Cigarette Smoking in College Students

MATTHEW J. SHARPS, AMY BOOTHBY VILLEGAS,
AND JUSTIN MATTHEWS
California State University, Fresno

Although previous research has shown the importance of feature-intensive processing of relevant information in the staving off of addictive behaviors, the present study examined the possibility that a more global, gestalt rejection of cigarette smoking may be operating to reduce smoking behavior. The present study addressed this possibility through the use of a decision efficacy rating procedure, in which smoking and nonsmoking respondents were asked to determine whether an individual was justified in smoking in a variety of given situations. Nonsmokers tended to reject smoking under any circumstances, whereas smokers tended to entertain mitigating circumstances more favorably in justifying smoking, especially when smoking could be construed as providing some perceived positive gains in serious situations. Results are discussed in terms of the gestalt/feature-intensive processing theory of cognition, and in terms of the importance of cognitive approaches to the understanding of addictive behaviors.

Decision-making is one of the most enigmatic of human activities. Human beings are literally by definition (*Homo sapiens sapiens*) intelligent. And yet human thought is often overshadowed by “mindlessness” when it comes to actual decision-making (Sharps & Martin, 2002). Human minds, for example, are capable of developing space flight, but also of simple, but important, errors in actually engaging in it; witness the 1999 failure to convert English units to the metric units required by the Mars orbiter’s programming, resulting in the loss of the spacecraft (Cowen, 1999). Humans are able to make pesticides, but fail to contain them appropriately, with well-known consequences for the environment and for human health (e.g., Matthiessen, 1987). There are many other examples (Dorner, 1996).

These issues assume special significance in the realm of self-destructive behaviors such as cigarette smoking. As is well known, cigarette smoking is extraordinarily destructive, with highly negative and frequently lethal consequences for human health in virtually every physiological system, including especially the respiratory and cardiovascular organs. Yet nearly one-quarter of American adults engage in this destructive and addictive habit (e.g., Schmitz, Jarvik, & Schneider, 1997). The problem is particularly pervasive in members of some minority groups, especially multi-ethnic individuals (Unger et al., 2000), and in individuals of more limited education (e.g., Leischow, Ranger-Moore, and Lawrence, 2000). White male and female adolescents initiate smoking more

than do their Hispanic or African American counterparts, however, and smoking rates in female adolescents have risen relative to rates in males (Anderson & Burns, 2000). Similar demographic trends have been observed in college students. In a study of the Florida state university system, Moskal, Dziuban, & West (1999) found that white students were more likely to try smoking, and that women were actually more likely than men to smoke regularly.

Indeed, rates of smoking in college students are mounting alarmingly. In rough parallel with adolescent smoking trends, which have increased since 1991, college smoking has also increased. Wechsler et al. (1998) found in a survey of 116 colleges that student smoking rates increased by 27.8% between 1993 and 1997. This increase was statistically significant in 23% of the colleges examined. DeBernardo et al. (1999) found that 13% of undergraduates identified themselves as smokers, even though 98% considered themselves knowledgeable about the dangers of smoking. Everett et al. (1999), in an evaluation of data from the 1995 National College Health Risk Behavior Survey, found that 70% of students had tried smoking, an alarming 42% were at least occasional smokers, and that 19% and 13% considered themselves frequent and daily smokers, respectively. Emmons et al. (1998) make the point that there is considerable experimentation with smoking in college, without which smoking habits and addictions are unlikely to develop, and that it is therefore crucial to understand the pathways by which heavier smoking in college students develop, both physically and psychologically.

What are the factors that contribute to smoking in college students? Obviously, nicotine is physically addictive, and it is also psychologically reinforcing in terms of its influence on affective and cognitive processes, as well as on arousal (e.g., Waters & Sutton, 2000). Perceived invulnerability to the dangers of smoking (Milam et al., 2000) can play a powerful role, as can optimistic bias (Arnett, 2000). Social influences of course are also crucially important. Peer pressure or its absence can massively influence decisions to smoke (e.g., Balch, 2000; Epstein, Griffin, & Botvin, 2000), as can advertising (e.g., Balch, 2000) and social learning. For example, Tickle et al. (2001) have shown that tobacco use in the movies, on the part of favorite actors, can significantly increase tobacco use in adolescent fans.

A variety of strategies have been used, with varying degrees of success, to combat the factors which contribute to smoking. Some of the more effective of these have included aggressive media campaigns, smoking cessation programs, changes in local or larger social environments, community-based interventions, and, of course, increasing cigarette prices (Lantz et al., 1999). In younger people, the teaching of refusal skills has proven useful, as has the teaching of general competence skills, highlighting the importance of cognitive processing in the decision to smoke or to refrain from smoking (Epstein, Griffin, & Botvin, 2000).

It will be noted from this discussion, however, that there has been very little recent emphasis on the cognitive aspects of smoking. Intervention programs, as noted by Lantz et al. (1999) tend to focus on various aspects of the social or economic environment in which smoking occurs, rather than upon the internal cognitive processes underlying the decision to smoke. Even within direct psychological approaches to the smoking prob-

lem, the focus tends to be on social and personality factors, rather than on decision making *per se* (e.g., Gilbert, 1995). The 1992 structural model of Viscusi stands as an exception, focusing on factors such as risk information, prior risk beliefs, and the effects of advertising and related factors on the subjective expected utility of smoking for the individual. Viscusi's work pointed to an important point in this relatively neglected area. He showed that there is substantial awareness of the risks of smoking on the part of the average individual, and that there is, of course, some influence of this awareness on the frequency and intensity of smoking behavior.

However, more modern work has pointed to an intriguing disparity in the quantitative levels of these effects. As Keeling (1999) points out, DeBernardo et al. (1999) found that 98% of the undergraduates surveyed claimed to be fully aware of the dangers of smoking; in fact, 90% reported that they wanted no more information on the topic. "Been there, learned that," as Keeling put it (1999: 51). Yet despite this apparent understanding of the dangers and risks of smoking on the part of undergraduates, the evidence reviewed here shows that the majority of college students have been experimental smokers at one time or another, and that a significant minority are relatively heavy smokers.

This is the paradox that must be addressed, and that can profit significantly from the use of a cognitive perspective on the relevant decision-making processes themselves: How is it that college students can possess understanding of the risks of smoking behavior, and yet demonstrate very little influence of this understanding on the actual behavior of smoking?

Recent research on gestalt and feature-intensive (G/FI) processing (Sharps & Martin, 2002; Sharps & Nunes, 2002; Sharps, 2003) has addressed similar issues, and may provide a way of addressing cigarette smoking from a productive cognitive perspective. The crux of the G/FI theory is that a crucial factor in the functional or experiential nature of information lies in the degree to which that information is subjected to processing which is more *gestalt* or more *feature-intensive* (FI) in nature. Purely gestalt processing deals with information in large "chunks," providing for relatively rapid processing but for relatively little incisive analysis. Purely feature-intensive processing tends to ignore the overall or configurational nature of information in favor of comparatively minute analyses of elements of that information, providing for relatively comprehensive analysis but for relatively slow, cumbersome processing. Neither of these types of processing occurs in isolation, of course; information processing in any given instance lies on a continuum between these extremes, with the functional or experiential nature of a given processing event depending to a great degree on the relative involvement of gestalt and feature-intensive processing activity (Sharps, 2003).

The G/FI perspective has been supported by the results of specific experiments in a number of cognitive realms, including the diminution of specific cognitive processes with age (e.g., Sharps, 1998), spatial memory (Sharps & Gollin, 1987a, 1988; Sharps, 1991; Sharps & Martin, 1998; Sharps et al., 1999), mental rotation (Sharps, 1990; Sharps & Gollin, 1987b; Sharps & Nunes, 2002), nonspatial memory (Gollin & Sharps, 1988; Sharps, 1997; Sharps & Antonelli, 1997; Sharps et al., 1999; Sharps & Price, 1992; Sharps & Tindall, 1992; Sharps, Wilson-Leff, & Price, 1995) in both the visual

and auditory realms (e.g., Sharps, 1998; Sharps, Price, & Bence, 1996; Sharps & Pollitt, 1998), and the types of errors of memory frequently made by eyewitnesses in their testimony before courts (e.g., Sharps et al., 2003). Results of particular importance for the present work have derived from the study of G/FI processing in addictive processes (Sharps et al., 2005a; Sharps et al., 2005b), in which it was shown that feature-intensive processing of the risks involved in substance abuse tends to insulate individuals against such abuse. More gestalt processing, frequently exacerbated by tendencies toward cognitive aspects of attention deficit, tended to mask risks and to be associated with higher tendencies toward substance abuse. Additional research has shown that across decision situations, including situations of considerable risk, the provision of feature-intensive information in the immediate context of the given decision tends to result in far better understanding and processing of decisional consequences (Sharps & Martin, 2002).

Therefore, it is something of a puzzle why well-informed individuals, including and perhaps especially college students, continue to smoke at all. As discussed above, there is clearly sufficient feature-intensive information available about the dangers of smoking. This information is clearly sufficiently available to provide the sorts of contextual effects, based on feature-intensive analysis, observed in our earlier work (e.g., Sharps & Martin, 2002). In short, there should be plenty of information for feature-intensive analysis to result in diminished smoking behavior in college students. And yet, such effects are minimal or nonexistent. What is going on?

Most of the work on G/FI up to the present time has concentrated on the feature-intensive end of the spectrum, and the benefits for human reasoning, including the potential for risk avoidance, that derive from an appropriate feature-intensive analysis of any given complex decision situation. However, one might ask whether *gestalt* processing might, under some specific circumstances, have power to reduce the tendency to decide in favor of risky situations such as smoking. There is clearly an abundance of feature-intensive information available on the subject of smoking, which appears to have little effect on smoking behavior in the college population. But feature-intensive analysis might, in this instance, prove to be a two-edged sword. In the case of cigarette smoking, feature-intensive analysis may provide the individual with an understanding of the dangers to health involved in the activity. However, it also provides one with the opportunity to gauge positive effects of smoking as well: relaxation effects, the perception of being "cool" especially in young people, etc. Given this, it might be the case that in cigarette smoking, for which there is a superabundance of FI information to be considered, the most effective deterrent to smoking may lie in a relatively gestalt rejection of smoking behavior under all circumstances. In other words, the person who is "safest" from smoking might be the individual who dogmatically rejects smoking in gestalt terms, and for whom there is no FI consideration of possible positive gains weighed against negative consequences.

The present study formed a preliminary test of this hypothesis in a college-student population. Additional exploratory measures were included to provide an appropriate context against which to evaluate the results of this test.

METHOD

Participants

An initial pool of 186 respondents was recruited from the Psychology Department Subject Pool at the California State University in Fresno. All respondents participated in the procedures delineated below. Thirty-six individuals (14 males, mean age = 20.50 years, $SD = 1.83$, and 21 females, mean age 21.09 years, $SD = 3.70$) identified themselves as smokers. From the remaining non-smoking sample of 150 students, 36 individuals were drawn at random as a matching sample (11 males, mean age = 21.91 years, $SD = 5.87$, and 25, mean age = 19.60 years, $SD = 5.87$). Direct comparison measures were performed on the 72 member matched sample. Some exploratory measures, as reported below, derived from the full sample of 186 individuals.

Procedures

The primary technique used in this research is a modification of the decision-efficacy rating procedure developed by Sharps & Martin (2002). This procedure presents participants with descriptions of real-world decisions which have led to negative or catastrophic outcomes. The outcomes, however, are not described. Participants are asked to rate the decisions for efficacy (e.g., "did the individual make a good decision?") on either a yes-no basis or a 7-point Likert scale, depending upon the question of interest. This procedure makes it possible to determine the degree to which the respondents actually understand the potential for negative consequences present in the decisions themselves.

In the present experiment, respondents were exposed to 12 real-world decision scenarios concerning cigarette smoking. These included a range of levels for which smoking might be justified, with relatively low-justification scenarios involving social factors such as "fitting in" and "being cool," and relatively high-justification scenarios involving such elements as attempts to reduce narcotics use through substitution of smoking, and attempts to aid in weight loss in potentially life-threatening situations of obesity. (The full set of scenarios may be requested from the first author by interested researchers). Given that these scenarios addressed smoking behavior in others, rather than in the self, they provided an index of the degree to which a given individual respondent tended to take mitigating circumstances into account in a feature-intensive manner, as opposed to the degree to which such circumstances tended not to be considered, resulting in the rejection of smoking under all circumstances in a gestalt manner. Respondents were asked to read these at their own pace, and to rate on a 1-to-7 Likert scale, in each case, the justification for smoking.

In addition, a questionnaire was administered to all respondents, requesting information about the presence and intensity of cigarette smoking and other tobacco-related habits, and about the illicit use of drugs other than tobacco. The Dissociative Experiences Scale (Carlson & Putnam, 1993) was also administered, in order to provide a

preliminary exploration of the idea that cigarette use might reflect a tendency to dissociate away from negative information about smoking.

RESULTS

Multivariate analysis of variance (MANOVA) yielded results consistent with the hypothesis advanced above. Cigarette smokers regarded the individuals depicted in the scenarios to be more justified in smoking than did nonsmokers, $F(1, 69) = 14.75, p < .001$. There was also a significant effect of scenario, $F(1, 11) = 31.96, p < .001$, and the interaction of smoking with scenario was significant, $F(1, 11) = 2.95, p = .001$. Smokers yielded a mean rating score across scenarios of 3.13 ($SD = 1.02$), with nonsmokers yielding a significantly lower mean of 2.24 ($SD = 0.99$). Interestingly, this effect did not vary significantly among cigarette smokers as a function of the amount smoked.

Univariate tests after MANOVA ($p < .05$) were conducted to evaluate the significant multivariate interaction. The results of this analysis are given in Table 1. With two exceptions to be discussed below, it was shown that cigarette smokers, in general, found an individual to be justified in smoking under serious health, mental health, or professional/employment situations in which smoking might be perceived to have salutary effects. However, in purely social situations or situations involving minors, there was no significant difference between the attitudes of smokers and nonsmokers. This is the pattern of results that would be expected from more feature-intensive processing of the scenarios on the part of smokers, and from more gestalt processing on the part of nonsmokers, in that the circumstances surrounding a given case of smoking, which would

TABLE 1
Effects of Cigarette Smoking on Smoking Justification by Scenario

Type of Individual and Reason	Significance (S) or Nonsignificance (N) of Smoker/ Nonsmoker Rating Difference ($p < .05$)
1. Teenager, social reasons	N
2. Adult, weight control, cosmetic	N
3. Adult, social reasons	N
4. Military technician, job efficiency	S
5. Adult, serious clinical depression	S
6. Adult, weight control, clinical necessity	N
7. Adult, need to smoke with boss for professional advancement	S
8. Adult, Strong situational depression from job reversals	S
9. Adult, alleviation of pain while quitting narcotics	S
10. Unspecified individual, "just feels like" cigarette	S
11. Unspecified minor, social reasons	N
12. Adult, social reasons	N

necessitate a feature-intensive analysis on the part of the respondent, tended to influence smokers' opinions but not those of nonsmokers.

Additional analyses yielded several results which should be the subject of future investigation. Smokers were more likely to report experience with illicit drugs than were nonsmokers, $F(1,65) = 5.79, p = .019$. (Five respondents did not give usable data on this issue.) Within the smoker sample, however, the *amount* smoked did not further predict drug experience. This does not, of course, speak to directionality of effect, but this result may indicate that a willingness to smoke may be related to a willingness to try other drugs as well. Further research will of course be necessary in this complex and potentially controversial area.

Dissociation as measured by the DES was not significantly predicted by cigarette smoking, although this relationship approached significance with this sample size, $F(1,68) = 3.02, p = .087$ (smoker mean score = 15.69, $SD = 11.65$, nonsmoker mean score = 11.66, $SD = 7.40$). This finding, especially in view of the relatively large absolute difference in means between smokers and nonsmokers, may warrant additional investigation. Additional findings on dissociation, dealing with pipe and cigar smoking, provided too few cases for statistical analysis. Interesting aspects of these findings, however, are discussed below.

DISCUSSION

Although much is known about many aspects of the psychology of smoking, little is known about the actual processes involved in the personal decision to smoke. There has been very little application of cognitive principles to the critical area of smoking decisions.

The present research addressed this issue from the perspective of the G/FI theory discussed above. To summarize issues fully explicated in the introductory remarks, feature-intensive processing has been shown to be important in the reduction of positive attitudes about substance abuse. What is strange about cigarette smoking, however, is that the amount of feature-intensive negative information on the subject appears to be virtually at the saturation point for young adults. Practically all young people in the Western world are in possession of sufficient negative information on cigarette smoking for full feature-intensive analysis of the problems involved. Yet young people are still smoking. What, cognitively, separates the smokers from the nonsmokers?

The present research suggests that a crucial protective factor here lies not in FI processing, but on the other end of the G/FI continuum, in a gestalt, non-feature-intensive, effectively dogmatic rejection of smoking under all circumstances. Successful nonsmokers may simply never allow themselves to consider smoking at all, except as a gestalt negative to be avoided. The results obtained here are consistent with this view. Nonsmokers, as shown in Table 1, do not differ from smokers in their negative attitudes toward smoking for trivial reasons. However, smokers are more likely to be accepting of smoking for nontrivial reasons, such as the idiosyncratic control of serious clinical depression or relief from the withdrawal consequences of an attempt to escape a narcotics addiction. In other words, the smokers are doing a feature-intensive analysis of

mitigating circumstances, whereas the nonsmokers are not. One might suggest, of course, that the smokers are focusing on the wrong features, the potentially salutary uses of cigarette smoking, to the exclusion of the potentially catastrophic consequences to health that also derive from the habit. This may reflect differences in the ways in which heuristics are driving the FI analyses in question (Sharps et al., 2005b); if so, additional research should address the question of how to train smokers to alter the relevant heuristics in more health-conscious directions.

Two rather odd exceptions to the trends discussed above derived from these data. In one serious situation, the use of cigarettes to aid in the control of life-threatening obesity, smokers did not find mitigating value in smoking; their ratings were not significantly different from those of nonsmokers. We would suggest that this may derive from a general societal negativity toward obesity and the obese, a rather powerful learned set of attitudes (e.g., Sharps, Price-Sharps, & Hanson, 2001) which may result in a tendency to see obesity as a personal failure rather than as a serious medical problem.

Also, in a trivial situation, in which an individual "just feels like" a cigarette, smokers found this justification oddly powerful, significantly differing from nonsmokers in their ratings. We suggest that this probably derives from a general defensiveness which smokers may subjectively adopt to deal with the powerful cultural onslaught against smoking currently in vogue in mainstream society. These suggestions, of course, are conjectural at this time. What we can say with certainty, however, is that these two anomalies indicate the complexity with which a cognitive approach to addictive behaviors must contend. Issues of social context, and of gestalt and feature-intensive analysis of such context in any given domain-specific issue (see Sharps & Wertheimer, 2000) may prove to be of paramount importance both in the understanding and the implementation of cognitive approaches to such behaviors as cigarette smoking.

Issues of individual differences in clinically-relevant domains may also be crucial. As discussed briefly in the Results section above, cigarette smokers did not yield significantly higher scores on the Dissociative Experiences Scale than did nonsmokers, although the difference approached significance. However, examination of dissociation in the overall data set of 186 initial participants was perhaps of greater interest for future study. Although there were too few pipe and cigar smokers in this college-aged sample for statistical analysis, these respondents yielded potentially important trends. Dissociation scores for 176 non-pipe smokers (who provided usable data on this issue) in the overall sample averaged 12.97 ($SD = 10.08$), but for the seven pipe smokers in the sample, the average was double that of non-pipe smokers, 28.77 ($SD = 25.70$). A large discrepancy in DES scores was also observed between the 22 cigar smokers and the 161 (usable) non-cigar smokers of the overall sample, with cigar smokers yielding a mean of 19.40 ($SD = 18.98$) as compared with non-cigar smokers' mean of 12.78 ($SD = 9.69$). The large differences in sample sizes for these issues naturally renders any form of statistical analysis meaningless. However, the mean score differences, and the very large relative standard deviations, are suggestive of issues which should be further explored. It may be, for example, that the eccentricity of cigar and pipe smoking in college students may appeal to more disaffected individuals. Pipes or cigars might also be subjectively suggestive, to their college-aged smokers, of a lifestyle which more dissociated

individuals may choose to affect or adopt. These ideas are, of course, offered as speculative possibilities for further research, rather than as conclusions.

These and related issues must await further empirical study. For the present, what we can say is that the cognitive aspects of cigarette smoking appear to differ somewhat from those governing some other addictive behaviors. Protection from smoking is less to be found in a close, feature-intensive analysis of its attributes than it is to be found in a general, gestalt rejection of tobacco use across domains. These findings may have consequences for the way in which smoking cessation and prevention programs might be constructed. We would suggest, for example, a test of the hypothesis that smoking prevention programs, for students and others naive to smoking, might focus most effectively on the inculcation of a gestalt rejection of tobacco use under any circumstances. Smoking cessation programs for experienced smokers trying to quit, however, may have to refocus the nature of extant FI analyses; smokers may need to make a more intensive analysis of the extremely negative consequences of smoking, for example, relative to the modest positive gains which smokers may be more likely to focus on in day-to-day life.

These suggestions should be the focus of future applied research. For the present, the findings presented here demonstrate a productive cognitive approach to the decision-making aspects of cigarette smoking, in which smokers were shown to use FI processing in a manner different from that of their nonsmoking counterparts, a manner more conducive to smoking behavior and to the ultimate negative consequences to which that behavior must lead. This work further represents an additional application and test of the predictions of gestalt/feature-intensive processing theory, and further demonstrates the importance of a cognitive perspective on addictive processes in general.

NOTES

Amy Villegas is now at Alliant University.

Address for correspondence: Matthew J. Sharps, Department of Psychology, MS PH-11, California State University, Fresno, CA 93740-8019. E-mail: matthew_sharps@csufresno.edu.

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