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Adolescents Report both Positive and Negative Consequences of Experimentation with Cigarette Use

Sonya S. Brady, Ph.D.,

University of California, San Francisco, Department of Psychiatry

Anna V. Song, Ph.D., and

University of California, San Francisco, Center for Tobacco Control Research and Education

Bonnie L. Halpern-Felsher, Ph.D.

University of California, San Francisco, Department of Pediatrics

Abstract

Objective—To examine the physiological and social consequences that 9th and 10th grade adolescents experience as a result of experimenting with cigarette use, and whether consequences vary by level of experimentation and gender.

Method—Data were collected between 2001 and 2004 from 395 adolescents attending two northern California public high schools. Analyses are limited to 155 adolescents who reported puffing on cigarettes or smoking whole cigarettes at any of four time points during the study.

Results—The percentage of adolescents reporting consequences of smoking were as follows: any positive consequence (56%), felt relaxed (46%), looked cool (31%), looked grown-up (27%), became popular (17%), any negative consequence (56%), friends were upset (35%), trouble catching breath (29%), bad cough (26%), got into trouble (23%). Ten percent of adolescents reported only experiencing negative consequences, 11% reported only positive consequences, 45% reported both negative and positive consequences, and 34% reported no consequences. Greater levels of experimentation were associated with greater likelihood of reporting positive or negative consequences. Few gender differences emerged.

Conclusion—Adolescents experience both positive and negative consequences of experimentation with cigarette use. Prevention and intervention efforts should acknowledge that positive consequences of smoking may occur and address how these consequences can be achieved through other behaviors.

Keywords

tobacco use; cigarettes; smoking; decision-making; benefits; costs; consequences; risk behavior; experimentation; adolescence

Requests for reprints and correspondence may be addressed to Sonya S. Brady, Ph.D., Division of Epidemiology & Community Health, School of Public Health, University of Minnesota, 1300 South Second Street, Suite 300, Minneapolis, MN 55454-1015, e-mail: ssbrady@umn.edu or to Bonnie L. Halpern-Felsher, Ph.D., Division of Adolescent Medicine, Department of Pediatrics, UCSF, 3333 California St., Ste. 245, Box 0503, San Francisco, CA 94118, e-mail: bonnie.halpernfelsher@ucsf.edu.

Précis

The 155 adolescents in this study were more likely to report both positive and negative consequences of experimenting with cigarette use at greater levels of experimentation.

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Introduction

In the United States, roughly 4,000 adolescents try their first cigarette each day, and over one quarter will progress to daily smoking (SAMHSA, 2005). Half of adolescents have tried smoking by the end of 10th grade, including those who report having had one or two puffs (CDC, 2006). The consequences that adolescents experience in relation to experimentation with cigarette use are of theoretical importance in understanding why they continue to smoke or discontinue smoking (Bonnie, 2001). However, most research has focused on adolescents' perceptions of potential outcomes or motivations for smoking (e.g., Bottorff et al., 2004; Epstein et al., 2000; Johnson et al., 2003; Nichter et al., 1997; Nichter et al., 2007; Parsons et al., 1997; Urberg and Robbins, 1981; also see Halpern-Felsher et al., 2007, for a review). To our knowledge, no research has examined the percentage of adolescents who report specific consequences subsequent to experimenting with cigarette use.

Perceptions of risk are a key element of most theories explaining why individuals engage in risky behavior, including cigarette use (Ajzen, 1985; Bandura, 1994; Fishbein and Ajzen, 1975; Gerrard et al., 1996; Gerrard et al., 2003; Kanfer, 1970; Rosenstock, 1974; Triandis, 1977). In general, adolescents understand that there are risks associated with smoking (Leventhal et al., 1987; Jamieson and Romer, 2001; Arnett, 2000), but most adolescents who smoke believe they can avoid becoming addicted and experiencing negative physical health outcomes (Arnett, 2000; Leventhal et al., 1987; Slovic, 1998; Slovic, 2001). More recently, research has examined other factors hypothesized to be of importance in maintaining risk behavior. First, perceived benefits have been recognized as being of equal or greater importance than perceived risks in understanding risky behavior, including cigarette use (Benthin et al., 1993; Goldberg et al., 2002; Halpern-Felsher et al., 2004; Parsons et al., 1997; Prochaska et al., 1992; Prochaska and Velicer, 1992). Second, research has examined adolescents' perceptions of short-term outcomes of smoking (Gritz et al., 2003; Halpern-Felsher et al., 2004; Prokhorov et al., 2002), which may be of greater importance in determining behavior than potential long-term outcomes (Halpern-Felsher et al., 2007). Third, researchers have recognized the importance of both physiological processes (e.g., pleasurable rush or buzz, relaxation; Eissenberg and Balster, 2000; Pomerleau et al., 1998) and social processes (e.g., looking cool, having more friends; Epstein et al., 2000; Nichter et al., 2007; Rugkasa et al., 2001) in determining smoking behavior.

Existing literature has examined perceptions of benefits and costs among adolescents with varying degrees of smoking experience. Perceived social benefits to smoking are associated with increases in smoking involvement over time (Epstein et al., 2000). In one study, perceived benefits of risk taking, including cigarette smoking, were associated with increases in risk taking over a 3-month period, while perceived costs were not associated with changes in risk taking over time (Parsons et al., 1997). Adolescents who have tried smoking view potential costs (e.g., friends don't like smokers) as less important than adolescents who have never tried smoking, while potential benefits (e.g., feeling grown-up) are viewed as equally important by each group (Urberg and Robbins, 1981). In addition, some research suggests that girls are more likely than boys to rate benefits (e.g., smoking shows that you do what you want) and costs (e.g., smoking makes your parents mad) as important in considering whether or not to smoke (Urberg and Robbins, 1981). In an earlier study of the present sample, adolescents who had tried smoking by the fall of 9th grade were more likely to perceive benefits of smoking and less likely to perceive costs of smoking in comparison to adolescents who had never smoked (Halpern-Felsher et al., 2004). In addition, adolescents with greater experience puffing on cigarettes were more likely to perceive benefits and less likely to perceive costs of smoking. Collectively, the above studies suggest that perceived benefits may prompt adolescents to experiment with cigarette use, while perceived costs may be discounted. The studies also

suggest that gender and level of smoking experience may influence perceived consequences of cigarette use.

What is notably missing from the literature on adolescent experimentation with cigarette use is whether perceived benefits and costs of smoking are actually experienced by adolescents who have smoked. The present study examines the short-term positive and negative physiological and social consequences that 9th and 10th grade adolescents report subsequent to experimenting with cigarette use.

In this study, we address the following research questions: (1) What physiological and social consequences do 9th and 10th grade adolescents experience as a result of experimenting with cigarette use? (2) Do positive and negative consequences vary by level of experimentation? (3) Do positive and negative consequences vary by adolescent gender?

Methods

Participants

This study is part of a larger longitudinal investigation on adolescents' tobacco beliefs and smoking behavior. The cross-sectional analyses of the present study were limited to the consequences of cigarette use that adolescents reported at the first time point they indicated having any experience with cigarette use. Participants were 155 adolescents who reported puffing on cigarettes or smoking whole cigarettes at any of the four time points during the study.

Procedure

The University Institutional Review Board approved the study. Participants were recruited from two northern California public high schools (schools A and B), 1 year apart. Data were collected every 6 months during the ninth and tenth grades, between late 2001 and early 2003 (school A), and late 2002 and early 2004 (school B). Researchers introduced the study to students in classrooms during the school day and invited all ninth grade students to participate. Students were asked to share study materials with their parents. Interested participants signed an assent form and parents signed a consent form. Of the 790 students who received consent packets (302 from school A and 488 from school B), 418 (53%) returned completed consent forms (79.5% and 36.5% of eligible students from schools A and B, respectively). Of these 418 students, 395 (95.2%) completed the survey for an overall response rate of 50% (75.5% response rate from school A and 34.2% from school B). Participants completed self-administered questionnaires during a regular class period at their school. Participants in school A received a movie gift certificate, while the administrators and teachers in school B received school supply money to compensate for their efforts in the study. There were no significant differences in the pattern of results between the two schools, and thus, results are reported for the total sample, collapsed across school.

Sample Attrition

Of the 395 adolescents who completed surveys during the fall of 9th grade (Time 1), 90% completed surveys in the spring of 9th grade (Time 2), 85% completed surveys during the fall of 10th grade (Time 3), and 84% completed surveys during the spring of 10th grade (Time 4). Adolescents who completed fewer than all four surveys were more likely to report puffing on cigarettes or smoking whole cigarettes at Time 1 and to be multiethnic. They did not differ from adolescents who completed all four surveys in terms of gender and parental education.

Sample Characteristics

Analyses in the present study were limited to the 155 adolescents (39% of 395) who reported puffing on cigarettes or smoking whole cigarettes at any of the four time points during the study. In the fall of 9th grade, the mean age of participants was 14 (SD=0.4) and 54% of adolescents were male. Participants reported diverse ethnic backgrounds: White/non-Hispanic (51%), Hispanic/Latino (10%), Asian/Asian American (8%), Pacific Islander (3%), Black/African American (1%), multiethnic (19%), other ethnicity (8%). Participants' report of the highest level of education achieved by any parent also varied: less than a high school degree (1.5%), high school degree (10%), some college (10%), 2-year degree (8%), 4-year degree (14%), some education post-bachelors (9%), professional or graduate degree (27.5%), unknown (20%).

Measures

At each time point, adolescents reported whether they had puffed on cigarettes and smoked whole cigarettes. Adolescents were asked their level of smoking experience for each type of smoking (1 time, 2–5 times, 6–10 times, more than 10 times). Adolescents were also asked the number of times they had experienced each of 8 consequences as a result of smoking (see Table 2). Items were developed to mirror commonly assessed perceived benefits and costs to smoking (e.g., Urberg and Robbins, 1981). Consequences are examined as dichotomous (no/yes) outcomes. In addition to examining individual consequences of smoking, two dichotomous composite outcomes were created: any experienced positive consequence and any experienced negative consequence.

Results

Table 1 shows smoking characteristics of adolescents at the first time point they reported smoking. Sixty-five percent of adolescents reported smoking at Time 1. Among this subgroup, the mean age that adolescents first puffed on or smoked a whole cigarette was 11.6 years (SD=2.0 years, minimum=6 years, maximum=14 years; not shown in table). The time point at which adolescents first reported smoking (Time 1 versus later) was not associated with study outcomes, and thus, this variable is not discussed further. Of the entire sample of adolescents who reported smoking at some time point during the study, 47% initially reported only puffing on cigarettes while 53% initially reported having progressed to smoking whole cigarettes. Table 1 also shows the number of times adolescents reported puffing on or smoking whole cigarettes. Within the group of adolescents who reported puffing on cigarettes, 71% reported puffing once, while only 8% reported puffing beyond 5 times. Within the group of adolescents who reported having smoked whole cigarettes, sizable percentages reported smoking whole cigarettes 1 time, 2–5 times, and more than 10 times. In contrast, only 14% reported smoking whole cigarettes 6–10 times.

Table 2 shows the percentage of adolescents reporting positive and negative consequences at the first time point they reported smoking. Percentages are shown within the total sample of adolescents and separately by gender and smoking group. Ten percent of adolescents reported only experiencing negative consequences, 11% reported only positive consequences, 45% reported both negative and positive consequences, and 34% reported no consequences (not shown in table). Table 2 shows logistic regressions of consequences on gender and smoking group. Only one gender difference emerged: male adolescents were more likely than female adolescents to report getting into trouble as a result of cigarette use. Many differences in reported consequences emerged between adolescents who smoked whole cigarettes versus puffed on cigarettes. Adolescents who smoked whole cigarettes were more likely to report any positive consequences of smoking, including feeling relaxed, feeling that they looked cool, and feeling that they looked grown-up. They were also more likely to report any negative

consequences of smoking, including having trouble catching their breath, getting into trouble, and having their friends become upset with them. No interactions between gender and smoking group emerged in predicting consequences of cigarette use.

Table 3 shows logistic regressions of consequences of smoking on gender and level of smoking experience, within smoking group. Smoking experience had four levels: 1 time, 2–5 times, 6–10 times, and more than 10 times. With each increment in puffing experience, adolescents who reported only puffing on cigarettes were 2.5 times more likely to experience any positive consequence of smoking, including feeling relaxed, feeling that they looked grown-up, and becoming popular. With each increment in puffing experience, they were also 2.5 times more likely to report having a bad cough and 4.4 times more likely to report having trouble catching their breath. With each increment in experience of smoking whole cigarettes, adolescents who reported smoking whole cigarettes were 1.8 times more likely to experience positive consequences of smoking, including feeling relaxed, and 3.0 times more likely to experience negative consequences of smoking, including having trouble catching their breath and having their friends become upset with them. Gender and experience with smoking whole cigarettes interacted, such that only female adolescents were more likely to report looking cool (OR=2.5) and looking grown-up (OR=4.0) with each increment in smoking experience. Only one main effect of gender emerged in analyses: male adolescents who smoked whole cigarettes were 5.5 times more likely than female adolescents to report getting into trouble as a result of cigarette use.

Discussion

To our knowledge, previous research has not examined the percentage of adolescents reporting specific consequences subsequent to experimenting with cigarette use. Our findings complement literature on perceptions and motivations related to cigarette use. Over half of the adolescents in this study reported negative consequences of experimentation, such as a bad cough, trouble catching one's breath, getting into trouble, and friends becoming upset. However, over half of adolescents reported positive consequences, such as feeling relaxed, looking cool or grown-up, and becoming popular. Forty-five percent of adolescents reported both positive and negative consequences of experimentation, in comparison to a third who reported no consequences and smaller groups of roughly 10% who reported only positive or only negative consequences, respectively.

As one might expect, greater levels of smoking experience were associated with greater likelihood of experiencing negative consequences. In comparison to adolescents who reported only puffing on cigarettes, adolescents who reported smoking whole cigarettes were more likely to report any negative consequence of smoking, including having trouble catching their breath, getting into trouble, and having their friends become upset with them. Each increment in puffing or smoking experience was associated with greater likelihood of reporting negative consequences. This pattern was also observed with respect to adolescents' experience of positive consequences. In comparison to adolescents who reported only puffing on cigarettes, adolescents who reported smoking whole cigarettes were more likely to report any positive consequence of smoking, including feeling relaxed, looking cool, and looking grown-up. Each increment in puffing or smoking experience was associated with greater likelihood of reporting positive consequences. We do not know when adolescents first experienced the consequences of smoking that they reported and whether they were still experiencing these consequences at the time they completed the survey. It may be that each increment in level of experimentation with smoking conferred a greater likelihood of experiencing positive consequences. Alternatively, those adolescents who experienced initial positive consequences of smoking may have been more likely to progress to greater levels of use. This latter interpretation is consistent with research showing that perceived benefits of smoking are associated with

increases in smoking over time (Epstein et al., 2000). Positive consequences of smoking may thus reinforce smoking behavior.

It is possible that experiencing positive consequences is more salient to adolescents than experiencing negative consequences, and that negative consequences may not be enough of a deterrent from smoking when positive consequences also occur (Slovic et al., 2004; Slovic, 2003). This interpretation of data is consistent with research showing that perceived costs are not associated with changes in risk taking over time (Parsons et al., 1997; Tucker et al., 2003) and that smokers view potential costs of smoking as less important than do nonsmokers (Urberg and Robbins, 1981). Future studies should examine whether positive consequences of smoking indeed explain why adolescents incrementally increase their level of experimentation with cigarette use, and whether adolescents who experience positive consequences disregard concurrently experienced negative consequences.

In the present study, each increment in puffing or smoking experience was associated with greater likelihood of experiencing both positive consequences (i.e., benefits) and negative consequences (i.e., costs) of smoking. We can compare this finding with prior research from our laboratory that focused on perceptions of benefits and costs among adolescents. At the first assessment during the fall of 9th grade, each increment in puffing experience among adolescents who had tried smoking was associated with greater likelihood of perceiving benefits and *lower* likelihood of perceiving costs of smoking (Halpern-Felsher et al., 2004). The distinction between *perceptions* of benefits and costs and *actual experience* of benefits and costs is thus important with respect to understanding adolescent experimentation with cigarette use. There may be a disconnect between perceptions and actual experience of costs among adolescents who are experimenting with cigarette use, such that adolescents acknowledge they experience costs but do not always adjust their general perceptions of the costs associated with cigarette use. Future research should examine whether there is a disconnect between perceptions and experience, and whether this apparent disconnect promotes continued experimentation with cigarette use and eventual habitual patterns of use.

The few observed gender differences in the present study suggest that consequences of experimentation may sometimes reinforce girls' smoking behavior and punish boys' smoking behavior. Among those adolescents who initially reported smoking whole cigarettes, each increment in smoking experience was associated with greater likelihood that girls, but not boys, reported looking cool and grown-up. Independent of smoking group (only puffed versus smoked whole cigarettes) or incremental level of smoking whole cigarettes, boys were more likely than girls to report getting into trouble as a result of smoking.

Study limitations

One limitation of this study is that our first assessment occurred when 53% of adolescents had already progressed to smoking whole cigarettes. In addition, we do not know whether consequences of smoking occurred after each incremental increase in level of experimentation, or whether those adolescents who experienced specific consequences increased their level of experimentation. Ecological momentary assessment techniques may aid in determining whether increasing levels of experimentation consistently yield additional consequences. Another limitation is that we did not assess all of the consequences that are relevant to adolescents' decision making about cigarette smoking (e.g., hedonic effects such as a pleasurable rush or buzz). Finally, we did not have the sample size or number of data collection waves to test whether early consequences were associated with subsequent intention to smoke and actual smoking behavior.

Conclusions

Positive social and physiological consequences appear to be of critical importance in understanding why adolescents incrementally increase their level of experimentation with cigarette smoking. Although adolescents do experience negative consequences of experimentation, these consequences are usually reported along with positive consequences. Prevention and intervention efforts should acknowledge that positive consequences of smoking may occur and address how these consequences can be achieved through other behaviors. Health promotion efforts should also emphasize that disregarding negative consequences may lead adolescents to experiment with cigarette use and become vulnerable to addiction. Further research should examine whether initial positive and negative consequences of experimentation with cigarette use predict long-term patterns of smoking.

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Table 1
 Characteristics of adolescents at the first time point they reported smoking.¹

	Number	Percentage
Gender		
Female	72	46%
Male	83	54%
Time point at which smoking was first reported		
Time 1 (Fall, 9 th grade)	101	65%
Time 2 (Spring, 9 th grade)	22	14%
Time 3 (Fall, 10 th grade)	21	14%
Time 4 (Spring, 10 th grade)	11	7%
Smoking group when smoking was first reported		
Puffed on cigarettes	73	47%
Have smoked a whole cigarette	82	53%
Level of smoking experience within group		
Puffed on cigarettes		
1 time	52	71%
2–5 times	15	21%
6–10 times	5	7%
More than 10 times	1	1%
Have smoked a whole cigarette		
1 time	22	27%
2–5 times	30	37%
6–10 times	12	14%
More than 10 times	18	22%

¹Data were collected from two northern California public high schools in the United States between 2001 and 2004.

Table 2
Positive and negative consequences of smoking, by gender and smoking group.

	Total Sample	Gender		Smoking Group		Puffs	Results of Logistic Regressions ²	
		Male	Female	Whole Cigarette	OR (95% CI) for Male Gender		OR (95% CI) for Whole Cigarette	
Any positive consequence of smoking	56%	53%	59%	74%	36%	1.28 (0.64,2.56)	5.24 (2.63,10.46)	***
Felt relaxed	46%	44%	46%	62%	27%	1.05 (0.54,2.07)	4.27 (2.16,8.45)	***
Felt that I looked cool	31%	28%	34%	40%	20%	1.30 (0.65,2.64)	2.59 (1.26,5.33)	*
Felt that I looked grown-up	27%	22%	30%	36%	16%	1.49 (0.71,3.15)	2.88 (1.33,6.23)	**
Became more popular	17%	14%	20%	21%	12%	1.46 (0.61,3.48)	1.90 (0.79,4.60)	***
Any negative consequence of smoking	56%	54%	57%	71%	38%	1.07 (0.55,2.10)	3.88 (1.98,7.58)	***
Had a bad cough	26%	25%	26%	32%	19%	1.06 (0.51,2.21)	1.95 (0.93,4.12)	***
Had trouble catching my breath	29%	31%	28%	42%	15%	0.85 (0.41,1.76)	4.10 (1.88,8.94)	***
Got into trouble	23%	11%	34%	31%	15%	4.27 (1.77,10.29)	2.62 (1.15,5.99)	**
My friends were upset with me	35%	36%	35%	45%	25%	0.92 (0.47,1.81)	2.52 (1.27,5.01)	**

¹ Data were collected from two northern California public high schools in the United States between 2001 and 2004. OR="odds ratio" CI="confidence interval"

² Main effects are shown for male adolescents and adolescents who have smoked a whole cigarette. No interactions between gender and smoking group emerged in predicting initial consequences of cigarette use.

* $p < .05$,

** $p < .01$,

*** $p < .001$

Logistic regressions of consequences on gender and incremental level of smoking experience, within smoking group.¹

Table 3

	Puffed on cigarettes		Have smoked a whole cigarette	
	OR (95% CI) for Male Gender	OR (95% CI) for Each Increment in Puffs	OR (95% CI) for Male Gender	OR (95% CI) for Each Increment in Cigarettes
Any positive consequence of smoking	0.90 (0.33,2.47)	2.52 (1.17,5.44)*	1.95 (0.69,5.50)	1.81 (1.06,3.10)*
Felt relaxed	0.90 (0.30,2.70)	2.80 (1.29,6.10)**	1.20 (0.46,3.08)	1.93 (1.19,3.12)**
Felt that I looked cool	1.07 (0.33,3.43)	1.96 (0.92,4.16) ²	1.46 (0.59,3.59)	1.26 (0.84,1.89) ³
Felt that I looked grown-up	0.58 (0.16,2.12)	2.23 (1.00,4.96)*	2.53 (0.96,6.71) ⁴	1.40 (0.91,2.17) ⁴
Became more popular	1.13 (0.25,5.02)	3.15 (1.30,7.62)*	1.56 (0.50,4.85)	1.50 (0.91,2.48)**
Any negative consequence of smoking	0.70 (0.27,1.82)	1.70 (0.84,3.43)	1.82 (0.63,5.26)	2.98 (1.57,5.65)**
Had a bad cough	0.60 (0.18,2.07)	2.52 (1.15,5.52)*	1.48 (0.57,3.83)	1.08 (0.70,1.65)
Had trouble catching my breath	0.64 (0.15,2.76)	4.36 (1.75,10.91)**	0.86 (0.34,2.13)	1.53 (1.00,2.33)*
Got into trouble	2.94 (0.69,12.49)	2.06 (0.90,4.71)	5.48 (1.76,17.14)**	1.56 (0.98,2.49)*
My friends were upset with me	0.66 (0.22,1.97)	1.82 (0.87,3.78)	1.11 (0.45,2.74)	1.54 (1.02,2.34)*

¹Data were collected from two northern California public high schools in the United States between 2001 and 2004. Main effects are shown for male adolescents and adolescents with greater smoking experience, within smoking experience group. OR="odds ratio" CI="confidence interval"

²Gender and experience with puffing cigarettes interacted to predict "feeling that I looked cool", but simple effect tests were non-significant (OR=2.35, 95% CI=0.65,8.52 for girls; OR=0.18, 95% CI=0.02,1.58 for boys).

³Gender and experience with smoking whole cigarettes interacted to predict "feeling that I looked cool" (OR=2.50, 95% CI=1.16,5.37, $p<.05$, for girls; OR=0.86, 95% CI=0.51,1.45, ns , for boys).

⁴Gender and experience with smoking whole cigarettes interacted to predict "feeling that I looked grown-up" (OR=4.03, 95% CI=1.47,11.01, $p<.01$, for girls; OR=0.90, 95% CI=0.53,1.54, ns , for boys).

* $p<.05$,

** $p<.01$,

*** $p<.001$