Association of Attention-Deficit/Hyperactivity Disorder Symptoms With Levels of Cigarette Smoking in a Community Sample of Adolescents

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ABSTRACT

Objective: Research on the association of attention-deficit/hyperactivity disorder (ADHD) with cigarette smoking has primarily occurred within samples of clinically referred youths. This paper reports the association of ADHD symptoms with smoking practices in a community sample of adolescents. **Method:** Confidential self-report surveys were completed by 1,066 tenth-grade students enrolled in five public high schools who were taking part in a longitudinal study of biobehavioral predictors of adolescent smoking adoption. A well-standardized measure of ADHD inattention and hyperactivity-impulsivity symptoms, as well as demographic and social risk factors, were examined in relation to three levels of cigarette smoking: (1) never having smoked, (2) ever having smoked, and (3) current smoking (having smoked a cigarette within the past 30 days). **Results:** Regarding lifetime cigarette use, approximately 43% of students had ever smoked. Among those who had ever smoked, approximately 31% of students were current smokers. Ever having smoked was associated with family (odds ratio [OR] = 2.49, confidence interval [CI] = 1.85, 3.36) and peer smoking (OR = 4.05, CI = 3.07, 5.33) and clinically significant ADHD inattention symptoms (OR = 3.39, CI = 1.53, 7.54). Current smoking was also associated with peer smoking (OR = 2.99, CI = 1.72, 5.20) and clinically significant ADHD inattention symptoms (OR = 2.80, CI = 1.20, 6.56). **Conclusion:** Clinically significant ADHD symptoms should be taken into account when identifying adolescents at risk to smoke, since those with problematic inattention may be more likely to experiment with smoking and to become regular tobacco users. *J. Am. Acad. Child Adolesc. Psychiatry*, 2002, 41(7):799–805. **Key Words:** attention-deficit/hyperactivity disorder, cigarette smoking, comorbidity.

Attention-deficit/hyperactivity disorder (ADHD) is a heterogeneous neurobehavioral syndrome that begins in childhood and is applied to individuals who display developmentally inappropriate levels of attention problems or hyperactivity-impulsivity, along with impairments in functioning at home, school, or in social settings (American Psychiatric Association, 1994). ADHD continues into adolescence for approximately 70% of those who displayed it in childhood (Barkley et al., 1990) and persists into young adulthood for about 30% to 60% (Weiss and Hechtman, 1993). Moreover, ADHD and other forms of childhood psychiatric disturbance are associated with a number of comorbidities, including cigarette smoking (Barkley et al., 1990; Tercyak et al., 2002a,b). This trend is dangerous, as cigarette smoking is often considered to be a gateway to more advanced forms of drug use (Torabi et al., 1993) and leads to a host of negative health consequences (U.S. Department of Health and Human Services, 1994).

In a study of the developmental history of tobacco use among ADHD-affected youths and unaffected controls, Lambert and Hartsough (1998) found that by age 17, 46% of research participants with ADHD reported daily cigarette smoking, and this was significantly higher than the rate of smoking among controls (24%). These patterns also persisted into adulthood: ADHD-affected current

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smokers and those dependent on nicotine outnumbered unaffected current smokers and those dependent on nicotine by nearly 2:1. On the basis of a definition of smoking expressed as any amount of smoking on a daily basis for a month, Milberger et al. (1997) found that 19% of 140 adolescents with ADHD versus 10% of those without ADHD were smokers. Adolescents with ADHD were also found to begin smoking at an earlier age (15.5 years versus 17.4 years) than controls. Others investigating the relationship between ADHD and nicotine dependence have also shown ADHD to be associated with an earlier onset of regular smoking (Riggs et al., 1999) and a higher than normal risk for cigarette smoking (Barkley et al., 1990).

Exactly what happens to the smoking habits of adolescents with ADHD as they mature is not yet known. One study conducted with 71 ADHD-affected male and female adults showed that among men, 42% were current smokers, 13% were former smokers, and 45% had never smoked. Among women, these estimates were 38%, 31%, and 31%, respectively. Compared with the general population, rates of smoking among ADHD-affected adults were considerably higher, and the rates of quitting among men were considerably lower (Pomerleau et al., 1995).

Why ADHD is strongly associated with cigarette smoking remains an open question. One possible explanation is that nicotine remediates ADHD symptoms. Nicotine is a known central nervous system stimulant. Stimulation derived from nicotine may help some smokers with ADHD compensate for their low levels of attention, arousal, and concentration (Conners et al., 1996). Nicotine has been shown to enhance sustained attention in animal models (Mirza and Stolerman, 1998). In humans, several studies also suggest nicotine's usefulness in reducing symptoms of adult ADHD, such as attentional impairment (Ernst et al., 2001; Levin et al., 1996, 1998, 2001; Levin and Rezvani, 2000). Limited evidence is available to suggest that adolescents with ADHD turn to drugs to self-medicate more than do adolescents without ADHD (Horner and Scheibe, 1997), though whether adolescents knowingly smoke cigarettes to achieve this purpose remains unanswered. The self-medication hypothesis is also supported by recent data from an adult nonclinical population showing that smokers with ADHD inattention symptoms are more likely to smoke to increase arousal and for stimulation purposes (Lerman et al., 2001).

Despite the well-documented association of ADHD with youth smoking in clinical settings, the relationship of clinically significant ADHD symptoms to levels of smoking (e.g., never, ever, and current smoking) in the community has not been studied. This information is important because screening for symptoms of inattention and hyperactivity-impulsivity might be useful in targeting tobacco control efforts toward high-risk youths, which could help to arrest their smoking at an earlier stage.

The current study set out to investigate the extent to which clinically significant ADHD inattention and hyperactive-impulsive symptoms are related to smoking in a community sample of adolescents. We hypothesized that the proportion of smokers would be greater among those adolescents with clinically significant ADHD symptoms, and that these symptoms would positively identify adolescents' ever smoking (i.e., lifetime cigarette use) and current smoking (i.e., current cigarette use) practices. We also predicted that clinically significant ADHD symptoms would remain strongly associated with both lifetime and current cigarette use, even after controlling for the presence of other demographic and social factors known to influence adolescent smoking practices. Demographic influences include gender and race, and social influences include environmental smoking exposure by family members and peers, which has been shown to affect the adoption of smoking in adolescents (Choi et al., 1997; Conrad et al., 1992). Finally, we set out to determine whether the probability of smoking was higher when clinically significant inattention and hyperactivity-impulsivity symptoms were present together than when either were present alone, by exploring their interacting effects on lifetime and current smoking.

METHOD

Sample

Longitudinal Cohort. The research cohort comprised 1,136 tenth-grade students (52% male, 48% female) enrolled in five public high schools in northern Virginia who were being followed for 4 years (9th–12th grade) to evaluate social, psychological, and genetic predictors of adolescent smoking adoption. Students were ineligible to participate if they had a special classroom placement (i.e., severe learning disability and/or English as a second language) that might preclude valid survey administration.

Eligible participants were initially identified through class rosters at the beginning of ninth grade. Based on the above exclusionary criteria, 89% (2,120/2,393) of students were eligible to participate in grade 9. After determining eligibility, recruitment efforts were initiated by mail. Seventy-two percent (1,533/2,120) of the parents/guardians approached provided a definitive written response regarding permission for their adolescent to participate. A total of 54% (1,151/2,120) of parents of eligible students affirmed their consent, and 18% (382/2,120) declined. The most frequently reported reason parents gave for declining consent was lack of interest; among white parents,

those with education beyond the high school level were >2 times more likely to provide consent than those with a high school education or less (Audrain et al., 2002). Study enrollment required both active parental consent and adolescent assent (administrative approval of the study protocol was granted by the university's institutional review board). Of the 1,151 students with parental permission to participate, 15 declined (1%) and 13 (1%) were unavailable during baseline survey administration days due to school absence.

Cross-Section. As this is a longitudinal cohort study, members of the cohort are reassessed at least once in each year of high school. At the beginning of grade 10, surveys were self-administered during health and physical education classes, with oversight by project staff. The follow-up rate from baseline (spring semester of grade 9) to the fall semester of grade 10 was >95%. Because the primary variables of interest were ADHD symptoms (assessed in grade 10 only) and smoking practices, cases selected for data analysis were necessarily limited to the 1,066 students (98% of total) with complete information on both of these variables.

Control Variables

Demographics. Demographic factors assessed included student gender and race.

Environmental Smoking Exposure. Exposure to family and peer smoking has been shown to influence smoking adoption in adolescents (Choi et al., 1997; Conrad et al., 1992). As in past work (Choi et al., 1997), adolescents were asked how many of their family members (e.g., mother, father, siblings) smoke. Participants who responded that none (0) of their family members were smokers were classified as not exposed, and those who gave an answer of ≥1 were classified as exposed to family smoking. For peer smoking exposure, adolescents were asked how many of their four best male and four best female friends smoke. Participants who replied none (0) on both these items were classified as not exposed to peer smoking, and those who replied ≥1 to either item were classified as exposed to peer smoking.

Attention-Deficit/Hyperactivity Disorder Symptoms. The Current Symptoms Scale-Self Report Form is a well-standardized, 18-item self-report measure used to assess symptoms of ADHD from *DSM-IV* (Barkley and Murphy, 1998). Individuals rate their behavior over the past 6 months on a 4-point Likert scale (0 = never or rarely; 3 = very often) regarding how often they experience symptoms of inattention (9 items) and hyperactivity-impulsivity (9 items). The inattention and hyperactivity-impulsivity items are summed separately to produce continuous summary scores on each subscale. The internal consistency of the inattention and hyperactivity-impulsivity symptoms' subscales was adequate (Cronbach coefficient α values = .84 and .78, respectively). In our study, a strong correlation ($r = 0.70$, $p < .0001$) was observed between the continuous summary scores on these subscales, indicating the co-occurrence of some symptom patterns. The overall sample's subscale averages fell within normal limits (inattention mean = 5.9, SD = 4.5; hyperactivity-impulsivity mean = 6.6, SD = 4.4) (Barkley and Murphy, 1998).

Because study participants were drawn from a community population of high school students, we applied typical diagnostic criteria (endorsement of at least moderate severity on ≥6 symptoms on either the inattention or hyperactivity-impulsivity subscale) to determine the likely presence or absence of clinically significant ADHD symptoms. This scoring algorithm is also outlined in Barkley and Murphy (1998) and has been used successfully with other community samples (Barkley and Murphy, 1998).

Outcome Variable

Cigarette Smoking. Adolescent smoking practices were assessed with standard epidemiological items about self-reported experimentation with, and current use of, cigarettes (Kann et al., 1998). These included the questions "Have you ever tried or experimented with cigarette smoking, even a few puffs?" "Have you ever smoked a whole cigarette at one time?" and "When was the last time you smoked a cigarette?"

From this information, it was possible to create two variables that represented levels of adolescent smoking: lifetime cigarette use and current cigarette use. Positive lifetime cigarette use was defined as ever having smoked at least a partial cigarette (ever smokers), and this was contrasted to never having smoked this amount (never smokers) (Kann et al., 1998). Similarly, positive current cigarette use was defined as having smoked a cigarette within the past 30 days (current smokers), which was contrasted to having smoked a cigarette more than 30 days ago (noncurrent smokers) (Kann et al., 1998).

Statistical Analysis

Frequencies were generated to describe the study population in terms of demographics, smoking practices, exposure to environmental smoking influences, and clinically significant ADHD symptoms. The bivariate associations of subject variables with lifetime and current cigarette smoking were tested by using χ^2 tests of association. Multivariate logistic regression models for lifetime (never versus ever smoking) and current (noncurrent versus current smoking) cigarette use were then generated, including all relevant covariates (race, family smoking, and peer smoking) and ADHD symptoms.

RESULTS

Characteristics of Study Participants

The characteristics of the study sample are shown in Table 1. Fifty-two percent were female, and 65% were white. Regarding smoking, 43% ($n = 457$) were ever smokers; among those who had ever tried smoking, 31% ($n = 140$) were current smokers. In terms of exposure to others who smoke, 28% were exposed through family members, and 52% were exposed through peers. Consistent with epidemiological prevalence data, clinically significant inattention symptoms only (2%, $n = 21$), hyperactivity-impulsivity symptoms only (2%, $n = 25$), or both inattention and hyperactivity-impulsivity symptoms (2%, $n = 22$) were observed in approximately 6% ($n = 68$) of adolescents (corresponding to *DSM-IV* predominantly inattentive, predominantly hyperactive-impulsive, and combined types, respectively) (Barkley and Murphy, 1998).

Bivariate Associations With Smoking

Regarding lifetime cigarette use, youths from other racial and ethnic backgrounds were more likely than white youths to be ever smokers than never smokers ($\chi^2 = 3.95$, $p = .05$). Adolescents exposed to family or peer smoking also had a greater likelihood of being ever smokers than never smok-

TABLE 1
Characteristics of Study Population

Variable	All	Lifetime Use: Never Smokers	Lifetime Use: Ever Smokers	Current Use: Noncurrent Smokers	Current Use: Current Smokers
	1,066 (100.0)	609 (57.1)	457 (42.9)	317 (69.4)	140 (30.6)
Gender					
Male	510 (48.2)	282 (46.7)	228 (50.3)	157 (50.0)	71 (51.1)
Female	547 (51.8)	322 (53.3)	225 (49.7)	157 (50.0)	68 (48.9)
Race[a]					
White	684 (65.2)	409 (67.7)	275 (61.8)	192 (61.7)	83 (61.9)
Other	365 (34.8)	195 (32.3)	170 (38.2)	119 (38.3)	51 (38.1)
Family smoking[ab]					
0	754 (72.0)	484 (80.9)	270 (60.1)	197 (62.9)	73 (53.7)
≥1	293 (28.0)	114 (19.1)	179 (39.9)	116 (37.1)	63 (46.3)
Peer smoking[ab]					
0	501 (47.7)	484 (80.9)	270 (60.1)	103 (32.9)	20 (14.7)
≥1	550 (52.3)	114 (19.1)	179 (39.9)	210 (67.1)	116 (85.3)
Inattention[ab]					
<6	1,019 (47.7)	597 (98.0)	422 (92.3)	300 (94.6)	122 (87.1)
≥6	47 (4.4)	12 (2.0)	35 (7.7)	17 (5.4)	18 (12.9)
Hyperactivity-impulsivity					
<6	1,023 (96.0)	594 (97.5)	429 (93.9)	300 (94.6)	129 (92.1)
≥6	43 (4.0)	15 (2.5)	28 (6.1)	17 (5.4)	11 (7.9)

Note: Values represent *n* (%).
[a] Indicates significant ($p < .10$) difference between never and ever smokers.
[b] Indicates significant ($p < .10$) difference between noncurrent and current smokers.

ers (family, $\chi^2 = 55.07$, $p < .0001$; peers, $\chi^2 = 129.17$, $p < .0001$) than did adolescents who were not exposed to these influences. Finally, compared with adolescents without clinically significant inattention or hyperactivity-impulsivity, those who had these features were more likely to be ever smokers than never smokers (inattention, $\chi^2 = 20.04$, $p < .0001$; hyperactivity-impulsivity, $\chi^2 = 9.05$, $p = .003$).

In terms of current cigarette use, exposure to family members who smoked and exposure to peer smoking were more strongly related to current smoking than noncurrent smoking (family, $\chi^2 = 3.39$, $p = .07$; peers, $\chi^2 = 15.79$, $p < .0001$); adolescents with significant inattention symptoms were also more likely to be current smokers than noncurrent smokers ($\chi^2 = 7.71$, $p = .006$).

Multivariate Analyses of Smoking Outcomes

Two multivariate logistic regression analyses were conducted to determine the adjusted likelihood of ADHD symptoms' association with lifetime and current smoking. Variables with bivariate relationships significant at $p < .10$ with either or both of the outcomes of interest were entered into the models. As shown in Table 2, adolescents with family members who smoked were more than 2 times as likely to have ever smoked, and those exposed to peers who smoked were 4 times more likely to have ever smoked. Regarding ADHD symptoms, adolescents with clinically significant inattention were 3 times more likely to have ever smoked. This latter finding was true regardless of the order of entry of the two ADHD variables. The interaction between inattention and hyperactivity-impulsivity was tested but was not significant.

The second logistic regression model focused on current smoking (Table 3). It showed that adolescents exposed to peer smoking were almost 3 times more likely to be current smokers, and adolescents with clinically significant inattention symptoms were almost 3 times more likely to be current smokers. As in the previous model, the order of entry of the two ADHD variables and hyperactivity-impulsivity symptoms were unrelated to the outcome, and the interaction between inattention and hyperactivity-impulsivity was nonsignificant.

DISCUSSION

ADHD has been associated with smoking among clinically referred youths (Lambert and Hartsough, 1998). However, the association of ADHD symptoms with smoking in adolescent community populations is less well under-

TABLE 2
Logistic Regression Predicting Lifetime Cigarette Use

Independent Variables	OR (95% CI)	*p* Value
Race		
White	1.0	
Other	1.12 (0.84, 1.49)	.44
Family smoking		
No	1.0	
Yes	2.49 (1.85, 3.36)	<.0001
Peer smoking		
No	1.0	
Yes	4.05 (3.07, 5.33)	<.0001
Inattention		
No	1.0	
Yes	3.39 (1.53, 7.54)	.003
Hyperactivity-impulsivity		
No	1.0	
Yes	1.36 (0.62, 2.97)	.45

Note: OR = odds ratio; CI = confidence interval.

TABLE 3
Logistic Regression Predicting Current Cigarette Use

Independent Variables	OR (95% CI)	*p* Value
Race		
White	1.0	
Other	0.84 (0.54, 1.30)	.43
Family smoking		
No	1.0	
Yes	1.38 (0.90, 2.12)	.14
Peer smoking		
No	1.0	
Yes	2.99 (1.72, 5.20)	<.0001
Inattention		
No	1.0	
Yes	2.80 (1.20, 6.56)	.02
Hyperactivity-impulsivity		
No	1.0	
Yes	0.73 (0.28, 1.94)	.53

Note: OR = odds ratio; CI = confidence interval.

stood. To better identify the influence of ADHD symptoms on adolescent smoking practices, we examined clinically significant inattention and hyperactivity-impulsivity in a community sample. Of 1,066 high school sophomores surveyed, 21 (2%) met *DSM-IV* criteria on a validated self-report measure (Barkley and Murphy, 1998) of inattention symptoms, 25 (2%) met criteria for hyperactivity-impulsivity symptoms, and 22 (2%) met both criteria. As predicted, adolescents with inattention problems were significantly more likely to smoke. Specifically, adolescents who endorsed ≥6 moderately severe symptoms of inattention were well over 3 times as likely as those who did not meet this threshold to be ever smokers, and were almost 3 times as likely to be current smokers.

As noted by Murphy and Barkley (1996), there are a number of limitations to applying cutoffs typically used with children to determine the presence of clinically significant symptoms in adolescents and adults, especially in light of the fact that other diagnostic criteria for ADHD were not used. In our study, this procedure provided a rough estimate of ADHD prevalence, and it was primarily used to examine the relationship of clinically significant symptoms to adolescent smoking practices. When we examined the association of continuous scores on the 2 ADHD subscales with lifetime and current smoking in exploratory analyses, no significant effects of ADHD symptoms emerged after demographic and social influences were controlled for. This strongly suggested to us that it was the clinical significance of these symptoms that mattered most, and that clinical cutoffs should be used.

Similar to prior findings, exposure to environmental cigarette smoking was also significantly associated with both lifetime and current smoking (Choi et al., 1997; Conrad et al., 1992). In the multivariate models, adolescents exposed to family smoking were 2.5 times as likely to have ever smoked a cigarette than were adolescents whose family members did not smoke. In terms of exposure to peer smoking, exposed adolescents were 4 times as likely to be ever smokers and almost 3 times as likely to be current smokers than were unexposed adolescents. Gender and race were unrelated to adolescent smoking practices.

We examined the possibility that adolescents with ADHD combined type symptoms might experience poorer outcomes. Specifically, we predicted that adolescents with both elevated inattention and hyperactive-impulsive symptoms might be more likely to smoke. However, this possibility was not supported. The inattention × hyperactivity-impulsivity interaction terms were not significant in the models of lifetime or current cigarette use. More importantly, regardless of the order of entry of the two ADHD subscales into these models, only the main effect of clinically significant inattention symptoms was related to smoking. This suggests that these 2 aspects of ADHD do not contribute equally as risk factors for adolescent smoking, and that inattention is more strongly associated with both lifetime and current cigarette use.

It remains unclear why inattention, but not hyperactivity-impulsivity, should be positively associated with smoking. One possibility is that, developmentally, children with ADHD are less likely to continue to exhibit symptoms of hyperactivity-impulsivity as they mature,

whereas symptoms of inattention usually persist. Thus, one might expect the more predominant symptom profile during adolescence (i.e., inattention) to be associated with youth smoking practices. However, the relatively even distribution of inattention and hyperactive-impulsive symptoms in our sample makes this explanation less plausible.

Another possibility is that the rewarding properties of smoking act primarily on more cognitively mediated systems, such as attention, and less so on the control of hyperactive-impulsive behavior. Support for this possibility comes from a number of studies that have demonstrated the beneficial effects of nicotine on attention (Ernst et al., 2001; Levin et al., 1996, 1998, 2001; Levin and Rezvani, 2000). Recently, a study of adult smokers found that smoking for stimulation purposes and to minimize withdrawal symptoms were strongly associated with ADHD inattention symptoms, but not hyperactive-impulsive symptoms (Lerman et al., 2001). Consistent with the notion of self-medication, these results suggest that individuals with more pronounced inattention problems (but not necessarily hyperactivity-impulsivity) may use nicotine as a stimulant drug to manage these symptoms. In light of the physiological effects of nicotine on attention, and the role of biology in determining smoking and ADHD, additional research into this possibility is necessary (Tercyak et al., 2002b).

Limitations

Regarding the limitations of this work, it is important to keep in mind that the Current Symptoms Scale-Self Report Form alone cannot be used to diagnose ADHD, and adolescents' self-ratings of their ADHD symptoms were not confirmed by other means (e.g., by historical records and current information collected from parents and teachers, or other well-validated adolescent self-report measures of ADHD), which would have clarified their scores (Barkley and Murphy, 1998). As such, the true extent of their ADHD or other comorbid psychiatric diagnoses cannot be known. Though roughly 6% of our sample had one or more combinations of scores above the suggested clinical cutoffs on the Current Symptoms Scale-Self Report Form's subscales, the sample's means were within normal limits. Nevertheless, given the size of our sample, it is likely that the expected prevalence of other forms of psychiatric disturbance would be found.

Another important limitation was the study's consent rate (54%), which limits the overall generalizability of these findings. However, our active consent rate is consistent with those of other school-based adolescent health studies (Dent et al., 1997), and our sample was demographically representative of the sample from which it was drawn. The cross-sectional nature of this work also limited our ability to draw conclusions about the directional nature of the relationships observed. For example, in this study we are unable to determine whether inattention contributes to the adoption of smoking, or vice versa. On the basis of the developmental trajectories of ADHD and cigarette use, it is likely that inattention precedes smoking. In the future, prospective follow-ups should be able to answer this question more fully. And finally, this study did not assess other potentially important factors that may mediate or moderate the ADHD-smoking relationship, such as the presence of other disruptive behavior disorders.

Clinical Implications

The findings from this study have implications for both the prevention and treatment of adolescent cigarette smoking. There are numerous ways to tailor the process and content of tobacco control programs to meet the needs of adolescents with attention problems. For example, these adolescents might respond better to one-on-one interventions (versus group interventions) and more engaging tobacco education materials that take advantage of multimedia technology (versus standard print materials). Also, as their smoking may be linked to self-medication for ADHD symptoms, identifying and treating their ADHD earlier may prevent the onset of smoking altogether.

Self-management interventions (e.g., self-monitoring and self-reinforcement), which have been shown to be effective in treating students with ADHD (Pfiffner and Barkley, 1998; Pliszka et al., 1999), can also be applied. This might include having adolescents set goals such as remaining tobacco free, practicing ways to resist peer pressure to smoke, encouraging family members and friends who smoke to quit, identifying healthier sources of stimulation and reward (e.g., participating in sports), and becoming more aware of internal (e.g., low levels of stimulation) and external (e.g., tobacco advertising) cues that promote smoking. Adolescents may also be responsive to setting up self-rewards contingent on achieving their goals. In light of clinically significant symptoms among some adolescent smokers, it is also possible that pharmacotherapeutic agents (e.g., bupropion, nicotine replacement therapy) that dually target smoking and ADHD outcomes might be effective

in promoting cessation as well. Levin and Kleber (1995) further point out that given the impulsive nature of individuals with ADHD, incorporating extensive substance relapse prevention is also critical.

In short, the potential benefits of tailoring tobacco control programs to meet the needs of adolescents with attention difficulties are high. Research collaborations on the most effective ways to combine behavioral and pharmacological interventions to make these interventions more relevant to this subpopulation are needed. Along with exposure to others who smoke, ADHD symptoms appear to be another useful indicator of adolescents at risk to smoke, as those with inattention problems were found to be more likely to experiment with cigarette smoking and to become regular tobacco users.

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