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Attention-Deficit/Hyperactivity Disorder Subtype Differentially Predicts Smoking Expectancies in Adolescents

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Abstract

Purpose—Attention deficit hyperactivity disorder (ADHD) is an established risk factor for smoking; however, no studies have considered whether precursors to smoking behavior differ among adolescents with ADHD. Smoking expectancies are beliefs about the potential consequences of smoking, and they develop before smoking initiation. ADHD characteristics may contribute to the formation of expectancies and eventual smoking behavior. We evaluated whether clinical levels of ADHD subtypes differentially predicted smoking expectancies.

Methods—Adolescents ($n = 221$; age mean = 12.67 years) completed the Smoking Expectancy Scale for Adolescents, answered standardized questions about their smoking behavior, and provided expired breath samples to verify never-smoking status. Parents completed the Conners' Parent Rating Scale for ADHD symptoms of inattention and hyperactivity/impulsivity.

Results—Adolescents with clinical levels of inattention were significantly less likely to endorse negative consequences, including Expected Costs (odds ratio [OR] = .16), Appearance–Presentation Costs (OR = .29), Social Costs (OR = .19), Health Costs (OR = .21), and Addiction Costs (OR = .39). Inattentive female adolescents were significantly more likely to endorse Weight Control as a consequence. Adolescents with clinical levels of hyperactivity/impulsivity were more likely to endorse positive consequences, including Expected Benefits (OR = 5.31), Affect Control (OR = 2.60), and Boredom Reduction (OR = 3.14); they were less likely to endorse Social Costs (OR = .27).

Conclusions—ADHD subtype differentially predicted smoking expectancies. Adolescents with ADHD may be more vulnerable to developing pro-smoking expectancies due to subtype-related deficits in neurocognitive processing. These findings have potential implications for developing targeted smoking prevention programs.

Keywords

Tobacco; Smoking; Nicotine; Expectancies; ADHD; Inattention; Hyperactivity; Impulsivity; Adolescence; Prevention

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In 2010, 14%–17% of adolescents aged 15 years and older were classified as current smokers [1,2]. The extant literature suggests that attention deficit hyperactivity disorder (ADHD) is a risk factor for smoking in youth. Adolescents with ADHD have prevalence rates of smoking almost double that of non-ADHD control subjects (46% vs. 24%; 19% vs. 10%) [3,4]. Smoking is also initiated at a younger age. By age 8 years, 8% of children with ADHD had started smoking, versus 2% without ADHD [3]. By age 15 years, the rates increase to 25%, versus 9% [4]. Onset of daily smoking—defined as smoking at least one cigarette per day for the previous month [5]—also occurs at a younger age (15 vs. 17 years) and continues to track into adulthood when young adults with ADHD continue to smoke more than age-matched control subjects (42% vs. 26%) [3]. Although adolescents with ADHD differ from non-ADHD adolescents in terms of smoking behavior, it is also very likely that they display different characteristics even before smoking initiation.

Outcome expectancies are cognitions about the potential benefits or costs of a particular behavior [6]. Originally described in the addiction and substance use literature, expectancies consistently precede intentions to use a substance, which in turn lead to initiation of behavior [7–10]. Thus, expectancies are one of the first factors involved in the pathway to substance use. Expectancies are conceptualized as cognitive intervening variables (e.g., thought, belief, schema) between exposure (e.g., observing others drinking) and initiation (e.g., taking a drink) [9]. These intervening cognitions refer to one's anticipation of a systematic relationship between the event and expected outcome [10]. According to the widely accepted Expectancy Mediation Hypothesis, expectancies may be a proximal cause of behavior and may mediate distal effects [11]. Some experimental evidence supports a causal role, as laboratory manipulation of expectancies has led to behavior change [12]. Moreover, expectancies are one of the most consistent predictors of eventual smoking behavior [13]. Those who expect more beneficial outcomes (negative affect reduction, weight control, pleasure, boredom reduction) and fewer costs (health risks) are more likely to initiate, smoke more cigarettes, and continue to smoke, compared with those expecting fewer benefits and greater costs [6,14,15]. Characteristics specific to ADHD may contribute to the formation of expectancies and eventual smoking behavior.

ADHD diagnostic classification includes frequent and severe inattention and/or hyperactivity/impulsivity, inconsistent with developmental level, that is maladaptive and interferes with social or academic functioning [16]. According to the Diagnostic and Statistical Manual of Mental Disorders, fourth edition, text revision [16], there are three subtypes of ADHD: predominantly inattentive, predominantly hyperactive/impulsive, and combined. Adolescents with ADHD are classified into one of three subtypes based on diagnostic criteria characterized by specific cognitive and behavioral deficits. Given that the cognitive impairments associated with ADHD are salient to decision-making models of adolescent smoking behavior [7], it is plausible that the inattentive and hyperactive/impulsive subtypes differentially affect formation of smoking expectancies.

Problems associated with the inattentive subtype largely include executive and mnemonic function difficulties, such as impaired levels of concentration, distractibility, sustained and divided attention, verbal and nonverbal working memory, encoding and retrieval difficulties, complex information processing, and conceptual abilities [17,18]. According to the

Broadbent model of selective attention [19], information in the environment is filtered by attentional resources, encoded into short-term memory, and then consolidated and stored in long-term memory. Adolescents with the ADHD inattentive subtype may not adequately filter and remember the information that pertains to the negative consequences of smoking. Adolescents are typically exposed to information about the harmful consequences of smoking through prevention programs in schools and media campaigns [20]. Hence, those with inattention may be less likely to form expectancies related to the disadvantages of smoking. Compared with non-ADHD adolescents who do not display attention impairment, it is plausible to suspect that those with the inattentive subtype would be less likely to pay attention to and remember messages about the costs of smoking.

On the other hand, the hyperactive/impulsive subtype is largely characterized by poor inhibitory control, motor restlessness and behavioral stimulation, novelty seeking, and deficient rule-governed behavior [17,21]. Importantly, adolescents with ADHD display impaired social and emotional functioning because they have marked difficulty regulating their emotions and expressing feelings of anger and aggression in an adaptive fashion [22]. Such externalizing behaviors may significantly compromise relationship quality with family members and friends [17]. Because of the nature of their social and emotional deficits, adolescents with the hyperactive/impulsive subtype may form beliefs about smoking whereby they expect that using cigarettes will help them to better control their ADHD symptoms. In other words, it is possible that adolescents with the hyperactive/impulsive subtype are more likely to believe that smoking cigarettes will provide them with more pleasant affect, sensory stimulation, boredom reduction, and enhanced social experiences [23].

The current state of knowledge convincingly demonstrates that inattention and hyperactivity/impulsivity subtypes of ADHD are both independent predictors of adolescent smoking initiation and intensity [24,25]. Further, there is evidence of a dose-response gradient for ADHD symptoms and urge to smoke [26]. Additionally, impaired sustained attention and impulse control may predispose individuals who smoke to maintain their habit [27]. The question remains whether adolescents with ADHD are more likely to develop different expectancies of smoking before initiation. Further, it is unknown whether never-smoking adolescents with ADHD are more vulnerable to developing specific patterns of pro-smoking expectancies consistent with their specific ADHD subtype. Thus, it remains to be tested empirically whether adolescents with greater hyperactivity/impulsivity symptoms may be more likely to expect that smoking reduces boredom and controls negative affect, whereas those with greater inattention symptoms expect fewer negative repercussions from smoking.

The goal of the current study was to address these gaps in scientific knowledge by comparing smoking expectancies (costs of smoking, benefits of smoking) among never-smoking adolescents with and without clinical symptoms of inattention and hyperactivity/impulsivity. It was hypothesized that adolescents with clinical levels of inattention would be less likely to expect costs (social, appearance, health, addiction), whereas adolescents with clinical levels of hyperactivity/impulsivity would be more likely to expect benefits (social, affect control, boredom reduction, weight control).

Methods

Participants

Participants were recruited as part of the larger Healthy Heart Project, a longitudinal study examining early risk factors and precursors to cardiovascular disease conducted by the Pediatric Public Health Psychology Laboratory at Concordia University. Participants were recruited within the Montreal community using convenience sampling by posting flyers throughout neighborhoods and distributing bookmarks in classrooms approved by the local school boards. Adolescents with severe psychopathology or medical conditions were excluded from the study.

Measures

Conners' ADHD Rating Scale—Parents completed the Revised Conners' Parent Rating Scale, short version (hereafter referred to as Conners'), a commonly used diagnostic tool and standardized measure for ADHD symptom severity [28]. The Conners' includes 27 items to assess cognitive problems/inattention (e.g., "Inattentive, easily distracted") and hyperactivity/impulsivity (e.g., "Is always 'on the go,' or acts as if driven by a motor") in children and adolescents. Parents were asked to rate the items using a 4-point Likert scale (0 = *not true at all* to 3 = *very much true*). The clinical range was defined as scores equal to or above the 90th percentile on each subscale (i.e., inattention, hyperactivity/impulsivity). This cutoff score falls within the "possible significant problem" range [28]. The Conners' has good psychometric properties, including internal consistency (Cronbach α s > .85) and test–retest reliability ($r = .62$ – $.85$) [22], and is deemed an effective screener to identify children and adolescents meeting ADHD diagnostic criteria.

Smoking Expectancy Scale for Adolescents—The Smoking Expectancy Scale for Adolescents (SESA) is a 27-item questionnaire measuring beliefs about the consequences of smoking cigarettes [29], including potential benefits and costs of smoking. Using a 10-point Likert scale (0 = *not at all likely* to 9 = *very likely*), children rated the likelihood that each benefit (e.g., "Feel calm," "Look cool") and cost (e.g., "Smell bad," "Get lung cancer") would occur to them if they were to smoke cigarettes. Two higher-order factors are "Expected Costs" and "Expected Benefits." Expected Costs includes four factors (Appearance–Presentation Costs, Social Costs, Health Costs, Addiction Costs). Expected Benefits includes four other factors (Affect Control, Social Benefits, Boredom Reduction, Weight Control). These eight factors have demonstrated good internal consistency (Cronbach α s = .68–.87) and concurrent validity [29].

Smoking status—Smoking status was ascertained using two standardized questions: "Have you ever tried cigarette smoking, even just a few puffs?" and "Have you ever smoked a whole cigarette?" These questions were developed as part of a Health Canada initiative to establish standardized questions for monitoring tobacco use [5]. These questions have been used extensively in population-based surveys throughout Canada (e.g., 2009 Youth Smoking Survey, 2010 Canadian Tobacco Use Monitoring Survey). Ever-smoking was defined as smoking more than one whole cigarette in one's lifetime. Never-smoking was defined as smoking less than one whole cigarette in one's lifetime. Puffing was defined as inhaling a

few puffs of smoke, but less than one whole cigarette. As a validity check, children exhaled into a carbon monoxide breath monitor (Bedfont, Scientific-USA, Medford, NJ); all never-smoking children's expired breath sample had carbon monoxide values (mean [SD] = 1.22 [2.36] ppm) within the nonsmoking range (defined cutoff: 11 ppm).

Procedure

Parents and their children were informed about the study and provided their consent (or assent) before their participation. To maximize independence in responding, parents and children completed questionnaires in separate rooms. Trained research assistants were present and available to answer questions. Participants were debriefed and compensated. The study was approved by the Concordia University Ethics Review Board (#UH2005-077-4). Data were double entered, verified, and analyzed with SPSS 16.0 software (SPSS, Inc., Chicago, IL).

Results

Participant characteristics

Adolescents ($n = 234$, mean [SD] age = 12.67 [2.04] years; 50.5% male) and their parents participated (Table 1). The sample was diverse in terms of ethnic background (72.5% English speaking, 57.7% Caucasian). Rates of clinical inattention (11%) and clinical hyperactivity/impulsivity (8.5%) were consistent with prevalence rates typically observed in school-aged youth [30]. There were no differences across the control group or ADHD subtype groups for demographic variables, except age. Adolescents with clinical hyperactivity were significantly older than the control ($t = 2.79$, $p = .006$) and clinical inattention ($t = 2.04$, $p = .047$) groups. Parental ratings on the Conners' for both clinical inattention ($t = 13.86$, $p < .001$) and clinical hyperactivity ($t = 13.00$, $p < .001$) were significantly different from the control group. Five adolescents were prescribed ADHD medications (Ritalin [Novartis, Quebec, Canada], Concerta [Janssen, Ontario, Canada], Strattera [Eli Lilly, Ontario, Canada], Adderall [Shire, Quebec, Canada]). Smoking behavior and expectancy characteristics are presented in Table 2. Of the never-smokers ($n = 221$), there were 23 puffers (few puffs of smoke, but less than one whole cigarette) and 198 adolescents who had never smoked a cigarette, not even a few puffs. The rates of endorsing a smoking expectancy as likely were comparable with previously reported rates using the SESA within Quebec, Canada [31].

Hypothesis testing: ADHD subtype and likelihood of smoking expectancies

Binary logistic regression was used to test hypotheses. Data were checked for assumptions of linearity, multicollinearity, and independence of errors. Chi-square tests ($p < .05$) and -2 log likelihood were used to establish goodness of fit. Wald statistics and odds ratios (ORs) were calculated to ascertain the likelihood of the ADHD subtype group endorsing the smoking expectancy. ADHD subtype (clinical inattention vs. control group; clinical hyperactivity vs. control group) was modeled for each smoking expectancy (eight SESA factors, two higher-order factors). Smoking expectancy factors were coded as "0" (unlikely) or "1" (likely) based on participants' SESA rating. These models were also tested including age and ADHD medication use as covariates; results did not differ, and none significantly

contributed to the models (results not depicted). Smokers ($n = 13$) were excluded from analyses.

Consistent with our first hypothesis, adolescents with clinical levels of inattention were less likely to endorse Expected Costs ($OR = .16$), Appearance–Presentation Costs ($OR = .29$), Social Costs ($OR = .19$), Health Costs ($OR = .21$), and Addiction Costs ($OR = .39$), but more likely to endorse Weight Control ($OR = 2.60$), compared with the control group. In follow-up analyses, the findings for Weight Control were attributable to sex differences. Inattentive girls were significantly more likely (67%) to endorse Weight Control as a likely consequence of smoking, compared with inattentive boys (20%; $p = .02$). All of these models evidenced satisfactory goodness of fit ($\chi^2 p_{avg} < .01$; $-2 \log likelihood_{avg} < 227$). Consistent with our second hypothesis, adolescents with clinical levels of hyperactivity/impulsivity were significantly more likely to endorse Expected Benefits ($OR = 5.31$), Affect Control ($OR = 2.60$), and Boredom Reduction ($OR = 3.14$), compared with the control group. Further, those with clinical levels of hyperactivity/impulsivity were less likely to endorse Social Costs ($OR = .27$). All of these models evidenced satisfactory goodness of fit ($\chi^2 p_{avg} < .02$; $-2 \log likelihood_{avg} < 232$). Logistic regression models are presented in Table 3.

Discussion

Adolescents with ADHD start smoking earlier, progress more rapidly to daily smoking, and smoke more cigarettes per day compared with those without ADHD. The goal of the current study was to evaluate whether adolescents with ADHD were more likely to endorse smoking expectancies—which are robust precursors to smoking behavior—before smoking initiation. Due to the neurocognitive impairments associated with each subtype of ADHD that may shape the formation of cognitive expectancies regarding future behavior, it was hypothesized that clinical levels of inattention and hyperactivity/impulsivity would differentially predict patterns of expected costs and benefits. Findings were consistent with the hypotheses. Adolescents with clinical levels of inattention were less likely to endorse costs associated with smoking, compared with the control group. Specifically, they indicated that possible consequences of smoking, including smelling bad, bad breath, becoming less popular, losing respect of friends, getting lung cancer, seriously damaging health, becoming addicted to cigarettes, or becoming dependent on nicotine, were unlikely. Inattentive female adolescents also believed smoking would prevent them from overeating and help them to control their appetite. Alternatively, adolescents with clinical levels of hyperactivity/impulsivity were more likely to endorse benefits associated with smoking. Namely, they indicated that possible smoking consequences such as feeling relaxed, feeling less stressed, making life less dull, and helping reduce boredom were more likely. Further, they endorsed that becoming less popular and losing respect of friends were unlikely consequences of smoking.

These findings contribute new knowledge to the extant literature. They provide evidence that adolescents with ADHD have precursors to smoking initiation that can be distinguished from the control group. Of particular interest is the finding that the patterns of expected costs and benefits differed by ADHD subtype. Perhaps those with clinical levels of inattention do not accurately attend to prevention messages about the costs of smoking. That is, they may

develop different expectancies about smoking because they do not pay attention to information due to distractibility and limited concentration, the information is inaccurately encoded and processed, or they are not able to retrieve the information due to working memory deficits. This is consistent with other deficits observed in adolescents with ADHD inattentive subtype, who exhibit difficulty sustaining attention, do not seem to listen when spoken to directly, are often easily distracted by extraneous stimuli, fail to give close attention to details, and are often forgetful in daily activities. In contrast, those with clinical levels of hyperactivity/impulsivity may focus on the personal advantages of smoking due to cognitive and executive impairments. They may develop positive expectancies about smoking because they overattend to information about smoking leading to them feeling less stressed, being something to do to reduce their boredom, providing stimulation, and serving as a tangible distraction, regardless of the perception of their peers. This parallels symptoms of ADHD hyperactivity subtype, including often fidgeting with hands, feelings of restlessness, having difficulty engaging in leisure activities quietly, poor impulse control, and seeking novelty. Taken together, adolescents with ADHD may be more vulnerable to developing pro-smoking expectancies (more benefits, fewer costs) due to deficits in neurocognitive processing. This may have potential implications for developing effective prevention programs.

Three limitations merit consideration. First, ADHD status was not clinician diagnosed. Instead, clinical cutoffs were established using parental ratings on the Conners', which is the most frequently used instrument by clinicians when conducting assessment for ADHD diagnosis. Further, the prevalence rates observed in our community representative sample were comparable with those typically observed in the population. Nevertheless, future research should aim to replicate this finding with a clinical group with confirmed ADHD diagnosis. Second, our small sample size may have contributed to overestimated ORs [32]. Bootstrapping has been suggested as a corrective strategy to correct for biased ORs [33], although the complexity of bias correction may not always be effective [34]. Future research should replicate the present findings with a larger clinical sample. Third, the cross-sectional nature of the study limits inferences regarding causality. The mechanisms linking ADHD status and pro-smoking expectancies are unknown. It is unclear whether neurocognitive deficits associated with ADHD shape the formation of smoking expectancies. For example, future research should examine whether adolescents with ADHD similarly encode and retrieve public health prevention messages compared with control subjects, or whether the issue is more related to executive functioning, and how they act on this information. Importantly, the processing of information may differ by ADHD status. Relatedly, without temporal data, we cannot establish that smoking expectancies in ADHD adolescents will necessarily lead to smoking initiation. However, smoking expectancies are considered a robust predictor of eventual smoking behavior [11,13]. Future research should use a longitudinal design to examine dynamic trajectories of ADHD symptoms, smoking precursors (i.e., expectancies), and early smoking behavior milestones (i.e., puff, inhalation, whole cigarette [35]). Given that adolescents with ADHD are also more likely to consume other psychoactive drugs, such as alcohol and marijuana [36], and that the outcome expectancy model is not specific to tobacco smoking [8–10], future research should aim to replicate these findings with other substances.

Although adolescents with ADHD may differ in their beliefs about eventual smoking, there are pharmacologic reasons why smoking rates may be higher in those with ADHD. The Self-Medication Hypothesis posits that individuals smoke to self-regulate, thereby increasing their concentration levels, improving mood stability, and diminishing symptoms of impulsivity and inattention [37]. In fact, adolescents with ADHD report that they use cigarettes to self-regulate and are motivated by the ability of nicotine to decrease negative affect and control mood, as well as to help fall and stay asleep [38]. Nicotine has been found to have a calming effect by decreasing overactivity and distractibility while also increasing alertness in those suffering from ADHD [39]. Experimental evidence shows that nicotine was as effective as stimulant medication in improving both concentration and attention in adult ADHD smokers [40].

Results of the present study have potential implications for public health prevention. Targeted smoking prevention programs may be more effective for high-risk ADHD audiences. Further, the type of prevention message may need to be specific to ADHD subgroup. Because individuals with inattention attend to the costs of smoking at lower rates compared with non-ADHD individuals, and have problems maintaining attention and concentration, interactive programs and media messages may need to be tailored to better convey information. Likewise, programs tailored to individuals with hyperactivity may be more effective if they emphasize negative consequences and aim to dispel the benefits of smoking, while also providing adaptive strategies to cope with boredom and negative affect. Regularly scheduled follow-up visits with the primary care physician or pediatrician could provide an avenue for targeted communication to adolescents with ADHD to emphasize the importance of smoking abstinence. Furthermore, targeting inaccurate cognitions among this at-risk population in the school setting through teachers, special educators, and nurses may also offer a resource-efficient delivery of a tailored public health prevention message.

In conclusion, ADHD subtype differentially predicted smoking expectancies in never-smoking adolescents. Adolescents with inattention did not accurately attend to the costs of smoking, believing that appearance, social, health, and addiction costs were unlikely to occur if they were to smoke; inattentive girls expected smoking to help prevent weight gain. In contrast, adolescents with hyperactivity expected affect control and boredom reduction to be likely consequences of smoking, whereas they considered becoming less popular or losing respect of their friends would be unlikely consequences. Such erroneous expectancies should be identified and targeted before the development of pro-smoking intentions as a potential preventive measure to reduce smoking behavior in adolescents with ADHD.

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IMPLICATIONS AND CONTRIBUTION

Never-smoking adolescents with ADHD had greater pro-smoking expectancies about the consequences of smoking, compared with those without ADHD. Endorsed smoking expectancies—which are robust precursors to smoking behavior—differed by ADHD subtype. Targeted prevention programs may be more effective for high-risk ADHD youth when tailored to ADHD subtype.

Table 1

Participant characteristics by ADHD subtype

Characteristic	Control group (n = 188)	Clinical inattention (n = 24)	Clinical hyperactivity ^a (n = 19)
	n (%)	n (%)	n (%)
Age (mean, SD)	12.6 years (2.1)	12.8 years (2.2)	14.0 years (1.9) ^b
Sex (male)	95 (50.5%)	15 (62.5%)	10 (52.6%)
Ethnicity			
Caucasian	108 (57.4%)	12 (50.0%)	10 (52.6%)
Asian	17 (9.0%)	3 (12.5%)	2 (10.5%)
African American	10 (5.3%)	2 (8.3%)	2 (10.5%)
Latino	6 (3.2%)	0 (.0%)	1 (5.3%)
Other	47 (25.0%)	7 (29.2%)	4 (21.1%)
Conners' ADHD parent ratings			
Inattentive (mean percentile, SD)	41.4%ile (19.2)	95.9%ile (2.9) ^b	76.9%ile (26.7)
Hyperactivity (mean percentile, SD)	44.5%ile (17.2)	67.7%ile (28.1)	96.0%ile (3.3) ^b

ADHD = attention-deficit/hyperactivity disorder; SD = standard deviation.

^a Clinical hyperactivity includes hyperactivity/impulsivity.^b Value significantly different from control group ($p < .05$).

Table 2

Smoking behavior and expectancy characteristics by ADHD subtype

Variable	Control group (n = 188)	Clinical inattention (n = 24)	Clinical hyperactivity ^a (n = 19)
	n (%)	n (%)	n (%)
Never smokers			
Puffer (n = 23)	9.04% (17)	12.5% (3)	26.32% (5)
Never smoked cigarette (n = 198)	90.96% (171)	87.5% (21)	73.68% (14)
Smoking Expectancy Scale for Adolescents ^b			
Expected Costs	91.0% (171)	62.5% (15) ^c	84.2% (16)
Appearance–Presentation Costs	86.7% (163)	66.7% (16) ^c	89.5% (17)
Social Costs	59.0% (111)	20.8% (5) ^c	26.3% (5) ^c
Health Costs	93.1% (175)	75.0% (18) ^c	94.7% (18)
Addiction Costs	60.1% (113)	37.5% (9) ^c	52.6% (10)
Expected Benefits	10.1% (19)	25.0% (6)	36.8% (7) ^c
Affect Control	25.5% (48)	37.5% (8)	47.4% (9) ^c
Social Benefits	6.4% (12)	12.5% (3)	10.5% (2)
Boredom Reduction	19.1% (36)	25.0% (6)	42.1% (8) ^c
Weight Control	18.6% (35)	37.5% (9) ^c	31.6% (6)

^aClinical hyperactivity includes hyperactivity/impulsivity.^bFor Smoking Expectancy Scale for Adolescents, percentages indicate the proportion of each group that endorsed “likely” for each respective expectancy.^cValue significantly different from control group ($p < .05$).

Table 3

Smoking expectancies for ADHD inattention and hyperactivity subtypes versus control group

Expectancy	B	SE	Wald	OR (95% CI)
ADHD clinical inattention versus control group				
Expected Costs	−1.85	.49	14.12	.16^a (.06–.41)
Appearance–Presentation Costs	−1.24	.48	6.54	.29^b (.11–.75)
Social Costs	−1.67	.52	10.24	.19^a (.07–.52)
Health Costs	−1.55	.55	7.90	.21^a (.07–.63)
Addiction Costs	−.93	.45	4.38	.39^b (.16–.94)
Expected Benefits	1.03	.53	3.83	2.79 (.99–7.82)
Affect Control	.52	.45	1.30	1.67 (.69–4.05)
Social Benefits	.79	.69	1.33	2.20 (.58–8.44)
Boredom Reduction	.27	.50	.29	1.31 (.49–3.51)
Weight Control	.95	.46	4.31	2.60^b (1.05–6.38)
ADHD clinical hyperactivity versus control group				
Expected Costs	−.38	.67	.32	.69 (.19–2.53)
Appearance–Presentation Costs	.43	.77	.31	1.54 (.34–7.01)
Social Costs	−1.31	.54	5.87	.27^b (.09–.78)
Health Costs	.57	1.06	.29	1.76 (.22–13.97)
Addiction Costs	−.24	.48	.24	.79 (.31–2.03)
Expected Benefits	1.67	.53	9.89	5.31^a (1.88–15.02)
Affect Control	.95	.49	3.84	2.60^b (1.00–6.74)
Social Benefits	.54	.80	.45	1.71 (.36–8.22)
Boredom Reduction	1.14	.50	5.27	3.14^b (1.18–8.34)
Weight Control	.63	.52	1.42	1.87 (.67–5.22)

OR – odds ratio; CI – confidence interval; SE – standard error; B – unstandardized regression coefficient. Bold ORs are significant.

^a $p < .01$.^b $p < .05$.