Published in final edited form as:
Addict Behav. 2012 March ; 37(3): 331–334. doi:10.1016/j.addbeh.2011.11.005.

The acquired preparedness risk model applied to smoking in 5th grade children

Jessica L. Combs[a], **Nichea S. Spillane**[b], **Leann Caudill**[a], **Brittany Stark**[a], and **Gregory T. Smith**[a,*]

Jessica L. Combs: combs.jess@gmail.com; Nichea S. Spillane: Nichea_Spillane@Brown.edu; Leann Caudill: Leann.Caudill@gmail.com; Brittany Stark: Brittany.stark@comcast.net; Gregory T. Smith: gsmith@email.uky.edu

[a]115 Kastle Hall, Department of Psychology, University of Kentucky, KY, 40506, United States

[b]Box G-S 1121–4, Department of Community Health, Center for Alcohol and Addiction Studies, Brown University, United States

Abstract

The very early onset of smoking predicts numerous health problems. The authors conducted the first test of one risk model for elementary school age smoking, known as the acquired preparedness (AP) model of risk, in a cross-sectional sample of 309 5th grade children. The model posits that (a) impulsivity-related personality traits contribute to risk for a variety of risky, maladaptive behaviors; (b) smoking expectancies confer risk only for smoking; and (c) the personality traits contribute to the formation of high risk expectancies for reinforcement from smoking, which in turn increases the likelihood of early onset smoking. The model was supported: the high-risk personality traits distinguished children engaging in any risky, maladaptive behavior from other children, and the smoking expectancies differentiated smokers from all other children. The relationship between personality tendencies to act rashly when experiencing intense positive or negative emotions and smoker status was partially mediated by expectancies for reinforcement from smoking. This model should be investigated longitudinally.

Keywords

Smoking; Personality; Risk; Children

1. Introduction

Little is known about smoking in the elementary school years, though there is evidence that many children begin smoking prior to age 13 (Andrews, Tildesley, Hops, Duncan, & Severson, 2003; deBry & Tiffany, 2008). There is a need to better understand the risk process that leads to early initiation of smoking (Costello, Erkanli, Federman, & Angold, 1999). The current paper has two aims: (1) To investigate rates of smoking behavior prior to

*Corresponding author. Tel.: +1 859 257 6454.

Contributors

Authors Combs and Smith designed the study and wrote the protocol. Authors Caudill and Stark helped to conduct the statistical analysis. Author Spillane assisted in literature searches and providing summaries of previous research studies, as well as providing assistance in conducting the statistical analysis. Author Combs wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

Conflict of Interest

All authors declare that they have no conflicts of interest.

middle school entry and (2) To begin the process of testing an acquired preparedness risk model for elementary school smoking.

2. Personality traits related to impulsivity and smoking behavior

Research has identified at least three different personality traits that appear to contribute to impulsive, risky behavior: sensation seeking, low conscientiousness, and urgency (Cyders & Smith, 2007, 2008; Whiteside & Lynam, 2001). Sensation seeking refers to the tendency to seek out new or thrilling experiences, low conscientiousness refers to lack of persistence and the tendency to act without planning ahead, and urgency refers to the tendency to act rashly while in intense mood states, whether positive or negative. Among the impulsivity-related traits, sensation seeking and urgency have been particularly important in explaining aspects of smoking behavior among adults and adolescents (Billieux, Van der Linden, & Ceschi, 2007; Spillane et al., 2010). Because recently developed measures of these traits appear valid for elementary school children (Zapolski, Stairs, Settles, Combs, & Smith, 2010), it is now possible to study the traits' roles in the smoking behavior of children this young. This study is the first to do so.

3. Expectancy theory

Smoking expectancies are learned associations indicating the expected consequences of smoking behavior. To the extent that an individual has learned that smoking will alleviate negative affect or that it will enhance social experience, that individual will hold stronger expectancies for these forms of reinforcement from smoking. The expectancies, in turn, lead to an increased likelihood of initiating smoking (Bauman & Chenoweth, 1984; Brandon & Baker, 1991). There is also evidence that expectancies moderate the impact of impulsivity on smoking (Brandon, Wetter, & Baker, 1996; Spillane, Smith, & Kahler, 2010).

4. Integrating personality and learning

The general Acquired Preparedness (AP) theory specifies a process by which some individuals are at increased risk for engaging in a number of different risky or addictive behaviors. The theory relies on evidence that personality can shape the learning process (Smith, Williams, Cyders, & Kelley, 2006) by differentially preparing individuals to acquire high risk expectancies which lead to higher risk for externalizing behaviors. In this application of the AP model to smoking, we considered the three different personality dispositions to rash or impulsive action we described above (urgency, sensation seeking, and low conscientiousness) for inclusion in the model.

We tested these hypotheses: (1) urgency, sensation seeking, and low conscientiousness would differentiate those 5th graders who had already smoked from those who had not, but would not differentiate the smokers from other 5th graders who had engaged in other forms of risky behavior; (2) expectancies for reinforcement from smoking would differentiate the smokers from other 5th graders, including those who had engaged in other forms of risky behavior; and (3) smoking expectancies would mediate the relationship between the high risk personality traits and smoking behaviors.

5. Method

5.1. Subjects

Participants in the study (n=1843) consisted of 5th grade girls and boys from public school systems in the Southeast. The mean age was 10.9 years, with an almost exact split between male and female. The sample was 61.6% Caucasian, 17.0% African-American, 6.9% Hispanic, 3.0% Asian, and 11.5% Other.

5.2. Measures

5.2.1. The UPPS-P-child version—(Whiteside & Lynam, 2001; Zapolski et al., 2010) was used to measure the three personality dispositions to rash action. In the current sample, the lower order traits of positive and negative urgency were correlated at about .70 and played identical roles when they were considered separately; we therefore used the overall urgency trait. Low conscientiousness has two facets: lack of planning and low perseverance. Internal consistency reliability estimates in the current sample were: (1) urgency, α=.91; (2) sensation seeking, α=.79; (3) lack of planning, α=.79; (4) lack of perseverance, α=.65.

5.2.2. Adolescent smoking consequences questionnaire (ASCQ; Lewis-Esquerre, Rodrigue, & Kahler, 2005)—The ASCQ was used to measure outcome expectancies for smoking among adolescents. We measured a global expectancy for reinforcement from smoking. The internal consistency reliability estimate for the ASCQ in the current sample was α=.91.

5.2.3. Smoking behavior checklist—This measure consisted of two questions about the incidence and frequency of smoking.

5.2.4. Eating disorder examination- questionnaire (EDE-Q; Fairburn & Beglin, 1994)—The EDE-Q is designed to assess the full range of disordered eating behaviors during the preceding 4 weeks. The EDE-Q has been shown to have good reliability and validity (Luce & Crowther, 1999; Mond, Hay, Rodgers, Owen, & Beumont, 2004).

5.2.5. The drinking styles questionnaire (DSQ: Smith et al., 1995)—The DSQ was used to measure self-reported drinking. For this young sample, we measured drinker status dichotomously.

5.2.6. The pubertal development scale (PDS: Petersen, Crockett, Richards, & Boxer, 1988)—This scale measures pubertal status, with different questions for boys and for girls. As is common (e.g., Culbert, Burt, McGue, Iacono, & Klump, 2009), we used a dichotomous classification for the pubertal stage in the current study.

5.3. Procedures

5.3.1. Questionnaire administration—The questionnaires were administered in 23 public elementary schools during school hours. Out of 1,988 5th graders in the participating schools, 1,843 participated in the study (92.7%). This procedure was approved by the University's IRB and by the participating school systems.

6. Results

6.1. The impact of school membership and the frequency of risky behaviors in 5th grade children

Initially, we tested whether school membership accounted for significant variance in any of the study variables. It did not. We then tested for the frequency of different risky behaviors in the population. 427 of 1843 children engaged in binge eating, purging, drinking, and/ or smoking. As anticipated, the base rate of smoking in the fifth grade population was low: 103 out of 1843 students reported having smoked a full cigarette (5.6%). Of those who reported having done so, 79.6% reported having smoked 1–4 times ever, 2.9% reported smoking 3–4 times per year, 5.8% reported smoking once per month, 6.8% reported smoking once or twice per week, and 4.9% reported smoking daily.

6.2. Correlations among traits, expectancies, and smoker status

Correlations among all study variables can be found in Table 1. Because the base rate of smoking was extremely low in this 5th grade sample, we created a subsample with 309 participants. First, we included the 103 children who reported a history of smoking in the past six months. Second, we included 103 children who did not smoke but who did report another maladaptive behavior, because those children should share personality-based risk but not smoking expectancy-based risk with the smoker sample. Third, we included 103 children who neither smoked nor participated in any of the other maladaptive behaviors. The two non-smoking subsamples were matched to the 103 smokers on pubertal status, sex, and school. Tests of our three hypotheses were run using this subsample of 309 (although results were unchanged when we ran them on the full sample).

6.3. Hypothesis one: Impulsivity-related personality traits contribute to risk for a variety of risky, maladaptive behaviors

In order to test this hypothesis, we performed a series of planned contrasts in analysis of variance (ANOVA). These contrasts were significant: urgency: $t(306)=7.91$, $p<.001$; lack of planning $t(306)=5.62$, $p<.001$; lack of perseverance $t(306)=2.61$, $p<.01$; urgency, lack of planning, and lack of perseverance were significantly higher in children who were engaging in *any* of the behaviors than in the comparison children. We also tested contrasts between the smoker group and the "other risky behavior" group, and found that those two groups did not differ on any of the personality traits.

6.4. Hypothesis two: Smoking expectancies concurrently predict smoker status

We then performed an ANOVA contrast to show that smoking expectancies would be significantly higher in those children who reported smoking than in all other children (whether or not they were engaging in other, non-smoking risky or maladaptive behaviors). This contrast was significant ($t(306)=5.35$, $p<.001$), with smoking expectancies being significantly higher in children who reported smoking than in all other children. The two non-smoking groups did not differ in smoking expectancies.

6.5. Hypothesis three: The acquired preparedness (AP) model

To test the AP model of risk, we proceeded in a series of steps. The personality variables were initially entered without being corrected for expectancies; urgency and lack of planning were significant at the $p<.01$ level as predictors for smoking behavior. When the smoking expectancy was entered, it was significant at the $p<.001$ level with an odds ratio of 1.82. Thus, personality and expectancies had additive effects in accounting for smoker status.

To test the mediation of expectancies on personality traits, we again used the n=309 subsample and created a structural equation model which included 5 variables: urgency, lack of planning, and lack of perseverance; smoking expectancies; and smoker status. The model is depicted in Fig. 1. Our model fit the data very well, with a WRMR fit index of 0.00. Smoking expectancies significantly mediated the relationship between urgency and smoking behavior (indirect effect=.08; z=2.79; p<0.005; 90% CI=0.02–0.14).

7. Discussion

Almost 6% of our 5th grade sample reported having already smoked a full cigarette. There is indeed a need to better understand the risk processes leading to this experimentation. Our further analyses show that membership in the smoking group can be concurrently predicted by our theorized model of risk.

The personality traits of urgency, lack of planning, and lack of perseverance differentiated 5th graders who were engaging in some form of risky, maladaptive behavior (smoking, drinking, binge eating, purging) from 5th graders not involved in risky behavior. In contrast, expectancies for reinforcement from smoking, which are thought to be a product of individuals' learning history, differentiated 5th grade smokers from other 5th graders, including those engaging in other forms of risky, maladaptive behavior.

Our predictions from the AP model were largely supported. If the current findings are confirmed longitudinally, there will be further support for the following theory. Personality dispositions to engage in rash or impulsive behavior increase the likelihood of late elementary school-aged children initiating smoking behavior by leading to the formation of expectancies that smoking is reinforcing. This risk process involves a focus on short-term rewards over long-term consequences.

Interestingly, sensation seeking did not emerge as a concurrent predictor of 5th grade smoking, despite its apparent importance with respect to adolescent and adult smoking. Our data do not provide information to explain this unanticipated finding.

It is important to note that each of these risk models describes causal processes, but the current data are both correlational and cross-sectional. Because the current findings were consistent with the underlying theory, there is merit to investigating the theory further with longitudinal data. The cross-sectional design is the most significant limitation of the study, but there are other limitations to be noted as well. We assessed smoking behavior using a very brief measure, though such measures have strong reliability and validity (Robins, Hendin, & Trzesniewski, 2001; Smith et al., in press). Another limitation is our reliance on questionnaire assessment; however, children at this age may have been reluctant to admit smoking behavior, or even smoking expectancies, when asked to discuss them with an adult.

The findings of this study support the views that (a) risk processes involving individual differences in personality and psychosocial learning may begin earlier than once thought; (b) there are general, dispositional characteristics to risk processes across different categories of risky, maladaptive behaviors; and (c) learning processes, measured here by expectancies, influence the specific form of risky behavior engaged in by someone high in dispositional risk.

Acknowledgments

Role of Funding Sources

Funding for this study was provided by NIAAA grant RO1AA016166 to G. T. S. and NIDA grant K08 DA029094-01 to N. S. S. Neither NIAAA nor NIDA had any role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

This work was supported by the National Institutes of Health (NIAAA grant RO1AA016166 to G. T. S. and NIDA grant K08 DA029094-01 to N. S. S.).

References

Andrews JA, Tildesley E, Hops Hyman, Duncan SC, Severson HH. Elementary school age children's future intentions and use of substances. Journal of Clinical Child and Adolescent Psychology. 2003; 32:556–567. [PubMed: 14710464]

Bauman KE, Chenoweth RL. The relationship between the consequences adolescents expect from smoking and their behavior: A factor analysis with panel data. Journal of Applied Social Psychology. 1984; 14:28–41.10.1111/j.1559-1816.1984.tb02218.x

Billieux J, Van der Linden M, Ceschi G. Which dimensions of impulsivity are related to cigarette craving? Addictive Behaviors. 2007; 32(6):1189–1199.10.1016/j.addbeh.2006.08.007 [PubMed: 16997490]

Brandon TH, Baker TB. The Smoking Consequences Questionnaire: The subjective expected utility of smoking in college students. Psychological Assessment: A Journal of Consulting and Clinical Psychology. 1991; 3:484–491. Retrieved from http://www.deepdyve.com/browse/journals/psychological-assessment-a-journal-of-consulting-and-clinical-psychology.

Brandon TH, Wetter DW, Baker TB. Affect, expectancies, urges, and smoking: Do they conform to models of drug motivation and relapse? Experimental and Clinical Psychopharmacology. 1996; 4:29–36.10.1037/1064-1297.4.1.29

Costello EJ, Erkanli A, Federman E, Angold A. Development of psychiatric comorbidity with substance abuse in adolescents: Effects of timing and sex. Journal of Clinical Child Psychology. 1999; 28:298–311. Retrieved from www.jccap.net/. [PubMed: 10446679]

Culbert KM, Burt SA, McGue M, Iacono WG, Klump KL. Puberty and the genetic diathesis of disordered eating attitudes and behaviors. Journal of Abnormal Psychology. 2009; 118:788–796.10.1037/a0017207 [PubMed: 19899848]

Cyders MA, Smith GT. Mood-based rash action and its components: Positive and negative urgency. Personality and Individual Differences. 2007; 43(4):839–850.10.1016/j.paid.2007.02.008

Cyders MA, Smith GT. Emotion-based dispositions to rash action: Positive and negative urgency. Psychological Bulletin. 2008; 134(6):807–828.10.1037/a0013341 [PubMed: 18954158]

de Bry SC, Tiffany ST. Tobacco-induced neurotoxicity of adolescent cognitive development (TINACD): A proposed model for the development of impulsivity in nicotine dependence. Nicotine & Tobacco Research. 2008; 10:11–25.10.1080/14622200701767811 [PubMed: 18188741]

Fairburn CG, Beglin SJ. Assessment of eating disorders: Interview or self-report questionnaire? International Journal of Eating Disorders. 1994; 16:363–370. [PubMed: 7866415]

Lewis-Esquerre JM, Rodrigue JR, Kahler CW. Development and validation of an adolescent smoking consequences questionnaire. Nicotine & Tobacco Research. 2005; 7:81–90.10.1080/14622200412331328475 [PubMed: 15804680]

Luce KH, Crowther JH. The reliability of the eating disorder examination-self-report questionnaire version (EDE-Q). International Journal of Eating Disorders. 1999; 25:349–351. [PubMed: 10192002]

Mond JM, Hay PJ, Rodgers B, Owen C, Beumont PJV. Temporal stability of the eating disorder examination questionnaire. International Journal of Eating Disorders. 2004; 36:195–203. [PubMed: 15282689]

Petersen AC, Crockett L, Richards M, Boxer A. A self-report measure of pubertal status: Reliability, validity, and initial norms. Journal of Youth and Adolescence. 1988; 17:117. http://www.springer.com/psychology/child+&+school+psychology/journal/10964 Retrieved from.

Robins RW, Hendin HM, Trzesniewski KH. Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-Esteem Scale. Personality and Social Psychology Bulletin. 2001; 27(2):151–161.10.1177/0146167201272002

Smith, GT.; Combs, JL.; Pearson, CM. Brief instruments and short forms. In: Cooper, H., editor. The Handbook of Research Methods in Psychology. Washington, D.C: American Psychological Association; in press

Smith GT, Williams SF, Cyders MA, Kelley S. Reactive person-environment transactions and adult developmental trajectories. Developmental Psychology. 2006; 42:877–887.10.1037/0012-1649.42.5.877 [PubMed: 16953693]

Spillane NS, Kahler CW, Smith GT. Positive urgency, positive reinforcement expectancies, and level of nicotine dependence in college students. 2010 Manuscript submitted for publication.

Spillane NS, Smith GT, Kahler CW. Impulsivity-like traits and smoking behavior in college students. Addictive Behaviors. 2010; 35:700–705.10.1016/j.addbeh.2010.03.008 [PubMed: 20381971]

Whiteside SP, Lynam DR. The Five Factor Model and impulsivity: Using a structural model of personality to understand impulsivity. Personality and Individual Differences. 2001; 30(4):669–689.10.1016/S0191-8869(00)00064-7

Zapolski TC, Stairs AM, Settles RF, Combs JL, Smith GT. The measurement of dispositions to rash action in children. Assessment. 2010; 17:116–125.10.1177/1073191109351372 [PubMed: 19955108]

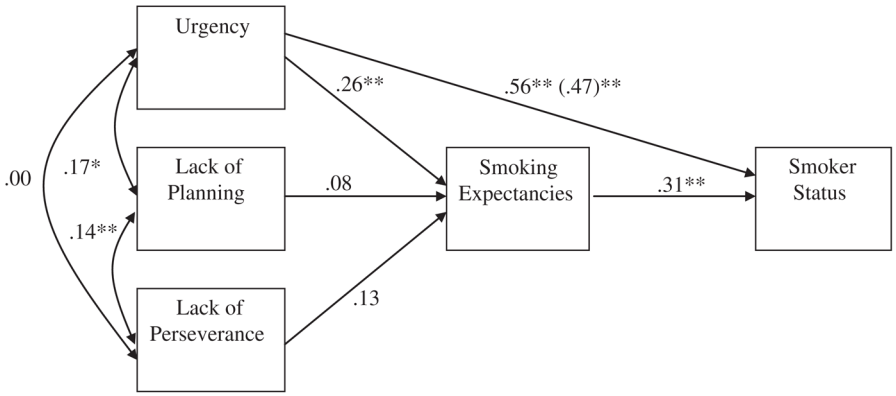

Fig. 1.

Depiction of the partial mediation structural equation model tested. Mediation statistics are provided in the results section. The first coefficient for the path between urgency and smoking is the uncorrected, bivariate correlation. The second coefficient, in parentheses, reflects the remaining association between urgency and smoking once the influence of smoking expectancies is removed. $^{**}p<.01$; $^{*}p<.05$.

Table 1

Correlations between puberty, traits, expectancies and smoker status.

	Puberty	Urgency	SS	Lack of Pers	Lack of Plan	Expectancy	e
Puberty	–						
Urgency	.12*						
SS	.07	.32*	–				
Lack of pers	−.01	−.04	−.29*	–			
Lack of plan	.06	.36*	.12*	.47*	–		
Expectancy	.09*	.24*	.08*	.07	.16*	–	
Smoke	.16*	.24*	.07	.13*	.19*	.25*	

Note. N = 1843. SS = Sensation Seeking; Lack of Pers = Lack of Perseverance; Lack of Plan = Lack of Planning; Smoke = Smoker Status.

*$p<.001$.

Addict Behav. Author manuscript; available in PMC 2013 July 15.