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Short Communication

Early smoking experience in adolescents

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ABSTRACT

Initial smoking experience is a potential predictor of later smoking. Our study has a twofold aim: (1) to provide further support for construct validity of retrospective measurement of an early smoking experience questionnaire (ESE) in a representative sample of adolescents; and (2) to examine the association of initial smoking experience with sensation-seeking, current smoking and nicotine dependence.

Participants were ninth-grade high-school students who had tried smoking, even if only a puff. Data from 1599 students (62% of the total sample) were analyzed, including tobacco use history, symptoms of early smoking experience (ESE), and sensation-seeking.

Both exploratory and confirmatory factor analysis supported the two-factorial structure of ESE including pleasant and unpleasant experiences. A CFA analysis with covariates revealed that sensation-seeking, age and gender are significantly associated with pleasant experience, whereas gender is associated significantly only with unpleasant experience. A multinomial regression analysis revealed that pleasant experience positively and unpleasant experience negatively predicts intermittent and regular smoking compared with experimenters. Both pleasant and unpleasant experiences predict the nicotine dependence among intermittent and daily smokers.

Our study supports the construct validity of the early smoking experience questionnaire in a large sample of adolescents.

1. Introduction

Early subjective experience with smoking is suggested to be a potential predictor of further progression to smoking behavior and nicotine dependence (Pomerleau, Collins, Shiffman, & Pomerleau, 1993; DiFranza et al., 2004). Initial experimentation with smoking can yield both adverse experience, including coughing, dizziness, burning throat, nausea, lightheadedness, and positive experience, including relaxation, rush or buzz (Hirschman, Leventhal, & Glynn, 1984; Pomerleau, Pomerleau, & Namenek, 1998). Although both of these effects may be important in determining the likelihood of continued smoking (Eissenberg & Balster, 2000), the positive and pleasant effects have stronger association with later smoking behavior.

Despite the difficulties of quantification of initial smoking experience, different approaches are used to measure the individual differences in initial smoking experience. DiFranza, Savageau, Fletcher, Ockene, Rigotti, and McNeill (2004) applied descriptions of four experiences, namely irritation, nausea, dizziness and relaxation. Perkins, Gerlach, Broge, Grobe, and Wilson (2000) used a visual analog scale with items such as "head rush," "relaxed," "pleasant," and "jittery". Pomerleau, Pomerleau and Namenek (1998) constructed an early smoking experience questionnaire (ESE) with seven items referring to both pleasant and unpleasant experiences. Rodriguez and Audrain-McGovern (2004) applied the modified version of ESE to a sample of adolescents and supported the two-factorial structure of initial smoking experience. They excluded an item measuring dizziness because it is loaded on both pleasant and unpleasant factors in earlier exploratory analyses, and added a new item referring to the difficulty of inhaling. They also provided evidence for convergent and discriminant validity of the adolescent version of ESE. The pleasant experience positively correlated with nicotine dependence. Moreover, the pleasant experience also correlated with smoking status, but the unpleasant experience did not correlate with smoking status.

Since ESE is a retrospective self-reported measure, its validity is questionable for several reasons (Perkins, Lerman, Coddington, & Karelitz, 2008). On the one hand, it is not clear that adolescents with limited smoking experience are necessarily recalling their first experiences or they report some salient effects of smoking the first few cigarettes (Perkins et al., 2008). On the other hand, ESE is prone to memory bias and distortion, given that current smoking status may lead to biased recall or reporting of early smoking experience. In their research, Perkins et al. performed a validity study with young non-smoking adults, and presented evidence that two items from ESE, namely pleasurable buzz and dizziness, correlate with the subjective rating of the effect of experimental nicotine administration. Despite the several limitations of this study, it is the first research to present evidence of the validity of at least two items of this scale. Laboratory study with nicotine administration, however, cannot be performed

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with adolescents for important ethical reasons, and therefore ESE is still a valuable tool for measuring the first experiences of smoking in an adolescent population.

The early subjective experience with smoking might reflect the nicotine sensitivity of inexperienced users, but comparatively little research has examined how personality factors are associated with early smoking experience. Studying personality correlates of nicotine sensitivity, Perkins et al. (2000) demonstrated in an experimental situation that sensation-seeking correlates with more intense subjective experience in non-smokers owing to nicotine exposure, but not in smokers. In this latter group, the development of tolerance of both adverse and pleasant effects of smoking may hinder the detection of the association.

The present study had several goals. First, we wanted to extend earlier work on the construct validity of an adolescent version of the early smoking experience questionnaire and to confirm the two-factor structure in a large sample of Hungarian adolescents. Based on the sensitivity theory, we also proposed that pleasant and unpleasant experiences are associated with smoking and nicotine dependence. Finally we also expect that sensation-seeking predicts early smoking experience based on the earlier experimental research.

2. Method

2.1. Participants and data collection

The sample consisted of a subsample of 2565 ninth-grade high-school students participating in a prospective cohort study, which is called Budapest Adolescent Smoking Study, on smoking initiation and predictors of smoking behavior. The cluster sampling involved 70 high schools in Budapest including general high schools and vocational schools. Only those students who reported that they had tried smoking, even if it was only a few puffs, were included in this analysis. Therefore 1599 students (736 boys and 863 girls, mean age 15.32, SD = 0.59) participated. This data collection was the first phase of the study and was performed between October and November 2008. The participants were asked to complete the questionnaire in their classrooms within one class session, and therefore the sample characteristics reflect the composition of the participating classes. Subjects were informed both orally and in writing that participation in the study was voluntary. The present study was approved by the Institution Review Board of Eötvös Loránd University.

2.2. Measures

2.2.1. The early smoking experience questionnaire

The Hungarian version of ESE includes eight items that measure initial experience with smoking. Seven items were taken from Rodriguez and Audrain-McGovern (2004) and translated into Hungarian and back-translated into English. The seven items measure pleasant and unpleasant experience, nausea, relaxation, pleasurable rush or buzz, coughing, and difficulty inhaling. An additional item assessing dizziness was also included in our version since a current study emphasizes the relative importance of this item compared with other items (Perkins et al., 2008).

2.2.2. Smoking

Self-reported smoking behavior was assessed by several questions including: (1) have you ever tried a cigarette even if for only a few puffs? and (2) how many per day did you smoke (at least one cigarette) in the past 30 days? These questions made it possible to categorize the respondents into four groups: never tried (they were excluded from the present analysis), experimenter (tried it but did not smoke during the past 30 days), intermittent smokers (did not smoke every day during the past 30 days), and regular or established smokers (smoked every day during the past 30 days).

2.2.3. Nicotine dependence

Nicotine dependence was measured by two scales including Hooked on Nicotine Checklist and Fagerström Test of Nicotine Dependence.

Hooked on Nicotine Checklist (HONC, DiFranza et al., 2004) contains ten items asking about the symptoms of diminished autonomy and smoking. We applied this measure with continuous scoring, and therefore the response options were never, rarely, sometimes, and very often. This scale was applied only when participants reported smoking in the past 30 days. Internal consistency of the scale in the present sample was excellent ($\alpha = 0.93$).

Modified version of Fagertsröm Tolerance Questionnaire (mFTQ, Prokhorov, Pallonen, Fava, Ding, & Niaura, 1996) contains 7 items measuring nicotine dependence adapted to adolescent smokers. The internal consistency of this scale in the present sample was satisfactory ($\alpha = 0.64$).

2.2.4. Sensation-seeking

Sensation-seeking was assessed with an eight-item version of a sensation-seeking scale yielding one sensation-seeking score (Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002, $\alpha = 0.71$).

2.3. Statistical analysis

In order to test the construct validity of the Hungarian version of the ESE questionnaire, both exploratory and confirmatory factor analyses were performed with maximum likelihood parameter estimates with standard errors and chi square test statistics robust to non-normality and non-independence of observation owed to clustering (Muthén & Muthén, 1998–2007, p. 484). Satisfactory degree of fit requires the comparative fit index (CFI) to be larger than 0.95; the second fit index applied in these models was root mean square error approximation (RMSEA). RMSEA below 0.05 indicates excellent fit, a value around 0.08 indicates adequate fit, and a value above 0.10 signifies poor fit. The third fit index was the standardized root mean square residual (SRMR), for which a value below 0.08 is considered a good fit.

We also conducted a confirmatory factor analysis with ESE scales as latent variables and sensation-seeking, age and gender as "causal" variables, this type of analysis is also referred as multiple indicator multiple cause (MIMIC) model. MIMIC models can estimate effect of indicators on latent variables at the same time when direct effects of grouping variables or other continuous variables on the latent variables are also included.

In another model, we also applied a usual structural equation modeling to predict nicotine dependence with ESE scales.

In order to test the concurrent predictive validity of ESE scales, the multinomial logistic regression was applied with SPSS 17.0 to predict smoking status with three categories (experimenters, intermittent and daily smokers).

3. Results

3.1. Smoking behaviors

The prevalence of lifetime smoking was 62.3% in the total sample. According to our coding schema, 37.7% of participants ($N = 966$) had not tried cigarettes, 31.1% of participants ($N = 798$) were experimenters, 19.7% of participants ($N = 506$) were intermittent smokers, and finally 11.5% of participants ($N = 295$) were regular daily smokers. The current report focuses on early smoking experience, and therefore responses from participants reporting lifetime smoking were analyzed.