



Individual and contextual determinants of perceived peer smoking prevalence among adolescents in six European cities



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ABSTRACT

Background. Young people perceiving a high peer smoking prevalence are more likely to initiate smoking. It is unclear which factors contribute to perceived peer smoking prevalence and if these factors vary according to education. This study aimed to assess the determinants of perceived smoking prevalence and assessed its variation at school and country-level.

Methods. Data of 10,283 14–17-year-old students in 50 secondary schools in six European cities were derived from the 2013 SILNE survey. The outcome was the perceived smoking prevalence score among peers at school (0–10 scale, 10 represented 100% smoking prevalence). Multilevel linear regression models estimated the associations of factors with perceived prevalence score and variance at school and country-levels. Analyses were also stratified by academic achievement of the adolescent and parental education.

Results. Determinants of a higher perceived prevalence score were female sex, ever smoking, having friends who smoke, low academic achievement, low parental educational level, and higher actual prevalence of smoking in the school. The perceived prevalence score was not associated with school policies or with the availability of cigarettes near the school. Determinants were very similar across levels of academic achievement and parental education. Perceived prevalence scores substantially varied between schools and countries: 10% and 11% of total variance was related to schools and countries respectively.

Conclusion. Across educational levels, perceptions of peer smoking are strongly determined by both individual characteristics and school and national contexts. Future studies should assess why perceived smoking prevalence varies between schools and countries and identify modifiable factors.

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1. Introduction

Adolescent smoking rates in Europe have declined over the recent years, but not all European countries show a downward trend (de Looze et al., 2013; Hibell et al., 2012). The majority of smokers initiated smoking before 18 years of age, and 39% smoked their first cigarette before they were 16 (Lifestyle statistics team, 2014). Earlier smoking onset leads to more severe nicotine dependence and earlier manifestation of chronic smoking-related illness (US Department of Health Human Services, 2012, 2014). Prevention of smoking initiation in adolescence

is essential to reduce the smoking-related disease burden in Europe in the future.

Initiation of smoking in adolescents is typically influenced by the social context, including family, peers and schools (Alexander et al., 2001; Hoffman et al., 2006; Kobus, 2003). According to social learning theory, behaviours are learned through the observation of others and the subsequent modelling of behaviour (Bandura and McClelland, 1977). Social learning theory is highly applicable to smoking uptake in adolescents (Hoffman et al., 2006; Kobus, 2003) and the school is one of the primary contexts in which smoking uptake occurs (Kobus, 2003).

Previous research indicates that smoking uptake is more determined by the perception of the prevalence of peer smoking rather than the actual smoking prevalence rates (Ellickson et al., 2003). Higher perceived smoking prevalence is a strong risk factor of smoking (Edwards et al.,

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2008; Ellickson et al., 2003; Lai et al., 2004; Nichols et al., 2006; Otten et al., 2009; Thrull et al., 2013; Wang et al., 2011; Wiium et al., 2006; Zaleski and Aloise-Young, 2013; Zehe et al., 2013), with some studies estimating an 80% higher likelihood of having initiated smoking after two years in those who overestimated smoking prevalence at baseline (Edwards et al., 2008; Wang et al., 2011). Depending on the setting and the definition of overestimation, previous studies found that 25 to 90% of adolescents overestimated the smoking prevalence (Conley Thomson et al., 2005; Edwards et al., 2008; Lai et al., 2004; Otten et al., 2009; Wang et al., 2011) and that perceived smoking prevalence was more than twice as high as the actual smoking prevalence (Elsev et al., 2015; Pedersen et al., 2013; Unger and Rohrbach, 2002). In order to prevent smoking in young people, it is important to influence smoking prevalence perceptions towards lower, more realistic levels.

Within the same school, the perceived smoking prevalence can vary to a large extent between groups of students (Brown et al., 2010; Conley Thomson et al., 2005; Javier et al., 2013; Pedersen et al., 2013; Unger and Rohrbach, 2002). For example, perceived smoking prevalence rates have been found to be higher in adolescents of lower socioeconomic position (SEP) than in their high SEP counterparts (Doku et al., 2010; Pfortner et al., 2014; Richter and Leppin, 2007), in females than in males (Javier et al., 2013; Pedersen et al., 2013; Unger and Rohrbach, 2002) and in adolescents who have more friends who are smokers (Conley Thomson et al., 2005; Unger and Rohrbach, 2002). However, subgroup variations have hitherto only been studied in the USA, and not in the European context.

Perceptions of the school-level smoking prevalence have previously been found to strongly vary between schools, indicating that the school context may play an important role (Wiium et al., 2006). Schools differ in their physical environment which may be related to the availability of cigarettes around the school. The extent to which smoking is actively controlled with smoking policies also varies between schools (Galanti et al., 2013). However, to our knowledge, no study to date assessed which school characteristics, independent of the characteristics of individual students, may influence the perception of peer smoking prevalence.

Evidence on individual-level and school-level determinants of perceived smoking prevalence may inform policies or interventions aimed to alter false perceptions among adolescents. Also, since perceived smoking prevalence is an aspect of descriptive social norm (Lapinski and Rimal, 2005), altering false perceptions might help denormalise smoking. This would be particularly helpful within the group of lower SEP adolescents, among whom smoking rates are higher than among those of high SEP (de Looze et al., 2013). Unfortunately there is little evidence that specific policies to prevent smoking are more effective in adolescents with low SEP than among those with high SEP (Brown et al., 2015; Hiscock et al., 2012).

The aims of this study were to assess the determinants of the perceived smoking prevalence and to assess its variation at the school and country-level. We additionally explored if determinants differed between adolescents of low SEP and those with high SEP. By analysing information of six cities in Europe, we aimed to derive conclusions that may be applicable to the wider European context.

2. Methods

2.1. Study population

Data were derived from the SILNE (Smoking Inequalities: Learning from Natural Experiments) secondary school survey, which was conducted between January and November 2013. Secondary schools were invited in six European cities: Namur (Belgium), Hannover (Germany), Tampere (Finland), Latina (Italy), Amersfoort (the Netherlands) and Coimbra (Portugal). Ethical approval was obtained in all countries where approval was required. Questionnaires were self-administered and were completed in classrooms, under the

surveillance of a research fellow and/or a teacher. More details on the survey were published elsewhere (Lorant et al., 2015).

In the 50 participating schools 13,870 students were invited of whom 11,015 (79.4%) completed the student questionnaire. For this analysis we excluded students aged 12, 13, 18 or 19 years ($N = 424$), those with missing information on age ($N = 81$), and students with missing information on perceived smoking prevalence ($N = 227$). The total study population consisted of 10,283 individuals. Furthermore, individuals with missing values on academic achievement ($N = 223$) and parental educational level ($N = 1246$) were excluded in the stratified analysis.

School-level information was derived from self-administered questionnaires completed by 276 individuals of the school staff.

3. Measures

3.1. Outcome

The perceived smoking prevalence score was measured with the following question: 'In your opinion, what percentage of people of your age in your school smoke cigarettes?'. Answers were provided on a discrete scale of 0 to 10, with 0 defined as perceiving 0% smokers in the school and 10 defined as perceiving 100% smokers.

3.2. Individual determinants

Demographics included were age (in years), gender (male vs. female), and foreign background (foreign background vs. native background). Respondents with one or two parents born in a country other than the country of residence were defined as having a foreign background. We used the country of birth of the parents to determine students' foreign background, because patterns of upbringing may largely vary according to the foreign background of the parents (Yaman et al., 2010).

Academic achievement was measured on a country specific scale using the grading system of each country and was categorised into 'insufficient', 'low', 'average', 'good', or 'high'. In the analysis 'insufficient' and 'low' were combined due to low numbers in the 'insufficient' category. In the stratified analysis academic achievement was dichotomised into low (insufficient, low or average) and high (good or high). Educational level of parents was measured using country-specific categories and was standardised into 'low', 'middle', and 'high'. In most countries 'low' corresponded to primary school and/or a lower level of secondary school, 'middle' corresponded to completed secondary school and/or lower level college, and 'high' corresponded to college or university degree. For each respondent the information of the parent with the highest educational level was used. Parental educational level was dichotomised for the stratified analysis, into 'low' (low or middle educational level) and 'high' (high educational level). Students who did not report at least one parent's educational level were excluded from the stratified analysis.

The smoking behaviour of the student was measured in six categories: 'never-smoker', 'ever tried smoking once', 'experimenter' (have smoked once or twice during the past 30 days), 'regular smoker' (at least weekly, but not daily smoking), 'daily smoker', and 'ex-smoker' (did smoke, but not in the past 30 days).

Three variables captured the smoking environment. Smoking behaviour of best friends was measured in four categories: 'none of them smoke', 'some of them smoke', 'most of them smoke', and 'all of them smoke'. Smoking behaviour of (step)parents was divided into 'no smoking (step)parents', 'one smoking (step)parent', and 'two or more smoking (step)parents'. Smoking rules at home were measured in three categories: 'smoking is not permitted in the home', 'smoking is only permitted in certain areas', 'smoking is permitted everywhere in the home'.

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