Smoking in European adolescents: Relation between media influences, family affluence, and migration background

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HIGHLIGHTS

- Seeing smoking depictions in movies has been identified as a determinant of smoking.
- It is not clear whether such influences vary within social subgroups.
- Affluent students had fewer risk factors for smoking but higher exposure to movies.
- No evidence that social subgroups differed in their response to seeing movie smoking

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ABSTRACT

Seeing smoking depictions in movies has been identified as a determinant of smoking in adolescents. Little is known about how such media influences interact with other social risk factors. Differences in smoking rates in different socio-economic status groups might be explainable by differences in media exposure. There might also be differences in the average response to movie smoking exposure. We tested this hypothesis within a cross-national study conducted in six European countries. A total of 16,551 pupils from Germany, Iceland, Italy, Netherlands, Poland, and Scotland with a mean age of 13.4 years (SD = 1.18) were recruited from 114 state funded schools. Using previously validated methods, exposure to smoking depictions in movies was estimated for each student and related to ever smoking. The analysis was stratified by level of family affluence (low, medium, high) and migration history of parents (yes vs. no), controlling for a number of covariates like age, gender, school performance, television screen time, sensation seeking and rebelliousness and smoking within the social environment (peers, parents, siblings). We found a significant association for each category of family affluence and ethnicity between ever smoking and movie smoking exposure, also significant adjusted odds ratios for age, school performance, sensation seeking, peer smoking, mother smoking, and sibling smoking. This relationship between movie smoking and adolescent smoking was not moderated by family affluence or ethnicity. Although we used a very broad measure of economic status and migration history, the results suggest that the effects of exposure to movie smoking can be generalized to the population of youths across European countries.

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1. Introduction

Smoking remains the single greatest preventable cause of mortality worldwide, being a major risk factor for a number of life-threatening diseases, including various cancers, cardio-vascular diseases and lung diseases (Ezzati & Lopez, 2003; Lopez, Mathers, Ezzati, Jamison, & Murray, 2006). Smoking is a learned behaviour, and the learning process usually starts during adolescence (Chassin, Prochaska, Rose, & Sherman, 1996). The likelihood of starting to smoke is affected by a range of individual, social and political factors (Conrad, Flay, & Hill, 1992). It is not comprehensively explained why broader environments (e.g., countries) differ so much in their smoking rates, but there is empirical evidence for a number of factors that are predictive for smoking: Family income and educational level (Richter et al., 2009; Ringlever, Otten, de Leeuw, & Engels, 2011), tobacco control policies like taxes, smoking bans, and advertising bans (Kostova, Ross, Blecher, & Markowitz, 2011; Lantz et al., 2000; Quentin, Neubauer, Leidl, & Konig, 2007; Ross & Chaloupka, 2003; Wakefield et al., 2000), personal characteristics like sensation seeking,

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gender, and ethnicity (Harrell, Bangdiwala, Deng, Webb, & Bradley, 1998; Mermelstein, 1999; Sargent, Tanski, Stoolmiller, & Hanewinkel, 2010), parenting practices (Andersen, Leroux, Bricker, Rajan, & Peterson, 2004; Chassin et al., 2005; Dalton et al., 2006), and smoking rates in the immediate social environment (de Leeuw, Scholte, Sargent, Vermulst, & Engels, 2010; de Vries, Engels, Kremers, Wetzels, & Mudde, 2003; Leonardi-Bee, Jere, & Britton, 2011). Another well-established environmental risk factor is media exposure. A number of cross-sectional (Hanewinkel & Sargent, 2007; Sargent et al., 2001, 2005), longitudinal (Dalton et al., 2003; Hanewinkel & Sargent, 2008; Jackson, Brown, & L'Engle, 2007; Tanski, Stoolmiller, Gerrard, & Sargent, 2012), and experimental studies (Gibson & Maurer, 2000; Hanewinkel, 2009; Hines, Saris, & Throckmorton-Belzer, 2000; Lochbuehler, Kleinjan, & Engels, 2013; Pechmann & Shih, 1999) have found an association between seeing smoking imagery in movies and own smoking among adolescents. The evidence for this seems strong enough that a US National Cancer Institute (NCI) report (National Cancer Institute, 2008) as well as a report from the World Health Organization (2009) suggest a causal association. The NCI report concluded that youth smoking onset would be reduced by 38% if smoking in movies was eliminated as a risk factor (National Cancer Institute, 2008).

It is by far less studied how the above mentioned different risk factors for smoking are related to each other, e.g., if they can be seen as independent risk factors or rather have to be seen as marker variables. For example, some population sub-groups might have a greater risk for smoking, because they have higher average exposure to movie smoking. This would indicate a mediating relationship. Another possibility is a moderating relation between risk factors. Some population sub-groups might have a greater risk for smoking because they have a stronger average response to movie smoking. And indeed, there are studies that have shown such moderating effects. For example, there is empirical evidence that adolescents with higher estimates on other risk factors for smoking (e.g., high sensation seeking, high rate of smoking in their social environment) have a lower responsiveness to movie smoking exposure. Also, three U.S. studies showed the differential impact of movie smoking dependent on race, with black adolescents being less affected by movie smoking than white adolescents (Jackson et al., 2007; Soneji, Lewis, Tanski, & Sargent, 2012; Tanski et al., 2012). One of these studies found additional evidence that in the group of white adolescents those with lower socio-economic status (SES) had a lower response to movie smoking (Soneji et al., 2012). However, a recent study conducted in six European countries, which is also the database for the present analysis, showed a consistent association between exposure to movie smoking and adolescent smoking in all countries, indicating that the movie smoking effect occurred independently of the cultural environment (Morgenstern et al., 2011). But a significant movie smoking effect in all countries does not preclude moderating effects on individual level variables. There has been no formal test of moderation effects in this study up to now.

The aim of the present paper therefore is to further investigate the association between exposure to movie smoking and adolescent smoking in different sample sub-groups. The analysis focuses on the indicators of family affluence and migration background, as these have been shown to be potential moderators in the past and are also of high relevance from a practical perspective. The two main research questions are: (1) Is there a difference in SES and migration background groups in movie smoking exposure, and (2) is the association between movie smoking and adolescent smoking moderated by SES and migration background?

2. Materials and methods

2.1. Study sample and procedure

The research was conducted by study centres in six European countries, in Germany (Kiel), Iceland (Reykjavik), Italy (Turin and Novara), Poland (Poznan), The Netherlands (Nijmegen), and the United Kingdom (Glasgow). The study samples were all recruited from state-funded schools (see Appendix A for sample details). Overall, a total of 19,268 students from 114 schools and 865 classes were examined for eligibility. One thousand fifty nine students (5.5%) could not be included in the study due to missing parental consent, 1559 students (8.1%) were absent on the day of assessment and could not be reached by mail, 99 students (0.5%) refused to participate, resulting in a final overall sample of 16,551 students (85.9% response rate). The mean age of the sample was 13.4 years (SD = 1.18, range = 10–19 years) with 51% being male.

2.2. Survey

In each country, data were collected through self-completion questionnaires, administered by trained research staff. Each completed questionnaire was placed in an envelope and sealed in front of the class. Students were assured that their individual data would not be seen by parents or school administrators. Study implementation was approved in all six study centres by the respective ethical boards and data protection agencies.

2.3. Measures

2.3.1. Family affluence

Family affluence was assessed with the Health Behaviour in School-Aged Children Family Affluence Scale (FAS) (Currie et al., 2008). This is a four-item measure that assesses *car ownership* ("Does your family own a car, van or truck?", response categories: 0 = "no", 1 = "yes, one", 2 = "yes, two or more"), *bedroom ownership* ("Do you have your own bedroom?", response categories: 0 = "no", 1 = "yes"), *family holidays* ("During the past 12 months, how many times did you travel away on holiday with your family?", response categories: 0 = "not at all", 1 = "once", 2 = "twice", 3 = "more than twice"), and *family computer ownership* ("How many computers does your family own?", response categories: 0 = "none", 1 = "one", 2 = "two", 3 = "more than two"). For the creation of the sum score, the last two categories of family holidays and family computers are combined, which results in the total range of the sum score of 0–7. Values between 0 to 3 are categorized as "low", values 4 and 5 as "medium", and values 6 and 7 as "high" family affluence. Validation studies of this scale found high parent–child agreements for the FAS items and a high correlation on country-levels with the Gross Domestic Product of a country (Andresen et al., 2008; Boyce, Torsheim, Currie, & Zambon, 2006).

2.3.2. Migration background

We asked the students to report the country of birth of their respective mothers and fathers ("Where was your mother born?", "Where was your father born?"). Response categories for both questions were "In Germany/Iceland/Italy/Poland/The Netherlands/UK" (depending on the study centre) vs. "In another country" vs. "I don't know". The two items were combined into the categories "no", "one parent", and "both parents" with migration background. "I don't know" responses were classified as "no".

2.3.3. Lifetime smoking

Lifetime smoking frequency was assessed with "How many cigarettes have you smoked in your life?". Response categories were 0 = "none", 1 = "just a few puffs", 2 = "1–19 cigarettes", 3 = "20–100 cigarettes", and 4 = "more than 100 cigarettes". Students who reported "none" were classified as "never smokers", and all the others as "ever smokers" (US Department of Health and Human Services, 1994).

2.3.4. Exposure to movie smoking

Exposure to smoking in movies was assessed using a variable data survey method developed by researchers of Dartmouth Medical School, which relies on the recall of seeing movies presented to respondents as a list of titles (Sargent, Worth, Beach, Gerrard, & Heatherton, 2008). Students in each country received a random selection of 50 movies out of a