Parental Factors in Association with Adolescent Smoking Relapse

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Introduction

Whereas onset, escalation and continuation of smoking have been the primary focus of adolescent smoking research for years, over the past decade there has been a shift in attention to adolescent smoking cessation. Such a shift has proven critical as adolescents seem largely unable to quit smoking [1], while the prevalence of regular smoking in youths remains high. Having difficulty to quit smoking particularly applies to adolescents who smoke daily and have been shown to have successful unaided smoking cessation rates ranging from no more than 5.3 [2] to 12.3% [3]. Success rates are somewhat higher among adolescents who have received some kind of intervention, such as 17% in a teen school-based clinic cessation program [4], and between 6.5 and 17.7% with nicotine replacement aids [5]. Although smoking cessation rates vary across countries and age groups and are contingent on both the specific outcome measure used and duration of follow-up [6], cessation rates among youths are discouragingly low, demanding more intensive research on determinants of relapse among adolescents.

Since the area of research on smoking relapse among adolescents is almost completely uncovered, it may be effective to relate smoking cessation to factors that have been established as significant determinants in earlier adolescent smoking trajectories. In research on adoles-
cent smoking, parental influences have extensively been examined and have consistently been found to play a significant role in the development of adolescent smoking. Several aspects of parenting, such as emotional support and anti-smoking socialization, as well as parents' own smoking behavior, have been shown to be related to both the acquisition and continuation of adolescent smoking [7–19], but their relation with smoking cessation and relapse among adolescents has hardly received any attention so far. In the present study, the associations between parental factors and smoking relapse among adolescents were examined.

Regarding parental factors in adolescent smoking, the smoking behavior of parents themselves has received ample attention. Numerous studies demonstrate that parental smoking predicts adolescents' acquisition and continuation of smoking, with exposure, availability and role-modeling being the most often proposed explanatory mechanisms [7–13]. Having established the adverse effects of parental smoking, one might expect that parental smoking discourages children to undertake attempts to quit, or to frustrate success in smoking cessation. Although two studies support this notion and say something about the likelihood that adolescents have quit at some point in the past when parents were supportive [20, 21], they were not informative about whether parental smoking can actually determine the success of adolescents' attempts to quit smoking or that it can prevent relapse.

In addition to parents' own smoking behavior, their parenting skills and attitudes, such as parental support (both general and smoking-specific support) and parental disapproval of the norm against smoking, appear to be relevant to the onset and escalation of adolescent smoking as well [16–22]. However, these processes are distinctively different from smoking cessation and relapse. Again, there have been few studies that explored parenting practices such as support and anti-smoking norms in the context of smoking cessation and relapse among adolescents. One exception is a study by Chassin et al. [22], who found that adolescents who had quit smoking reported higher levels of parental support than did continuing smokers, although this only counted for younger adolescents. We posit that adolescents may be more prone to try to maintain abstinence during an attempt to quit when they are aware of their parents' norm that they should quit smoking. In addition, parents' engagement in smoking cessation-specific parenting skills (such as exertion of pressure to quit, communicating the advantages of smoking cessation, and limiting the opportunities to smoke around the house [23]) might make adolescents feel more prepared to start their quit attempt, thereby also decreasing the odds of relapse.

In the present study, 135 adolescents, aged 15–20 years and who smoked daily, participated in an ecological momentary assessment study in which they embarked on a serious attempt to quit smoking. Participants answered questions 3 times/day about their quitting experiences over a period of 4 weeks. We hypothesized that parental smoking would predict time to the first lapse, and relapse into smoking as observed during the 3 weeks after the attempt to quit and at the 2-month follow-up. Parental support, a parental norm in favor of smoking cessation, and the engagement in smoking cessation-specific parenting was hypothesized to decrease the odds of a first lapse and relapse.

**Method**

**Participants**

The present sample consists of 135 adolescents aged 15–20 years who smoked daily. Being between 15 and 19 years of age and smoking at least 1 cigarette/day were the main selection criteria. Exclusion criteria were participation in a smoking cessation program and use of antidepressants. Two participants who had turned 20 in the month prior to the study were allowed to participate. The sample originally comprised 176 adolescents who were enrolled in the study. This number was narrowed down to 149 by excluding 17 individuals who withdrew prior to the target quit day, 9 who had too many missing values to establish whether they had achieved 24-hour abstinence or not, and 1 participant who failed to reach 24-hour abstinence at least once during the study. Fourteen of those 149 participants did not successfully return their baseline questionnaire and were therefore excluded from the present analyses. The final sample thus consisted of 135 adolescents. Of these 135 participants, 120 (88.9%) completed the 2-month follow-up [for attrition analyses on the same data see 24].

The final sample of 135 adolescents consisted of 86 girls (63.7%) and 49 boys. Ages were distributed as follows: 15 (2.2%), 16 (31.1%), 17 (29.6%), 18 (16.3%), 19 (17.8%), and 2 persons had just turned 20 (1.5%); mean = 17.21, SD = 1.18. Participants resided across all four regions of the Netherlands, and all levels of educational attainment were represented: lower vocational training (53.9%), higher vocational training (14.6%), pre-university education (13.8%), and college (17.7%). Most respondents lived at home with their parents (89.5%), whereas 7.6% lived in student housing, with his/her grandparents (0.7%), or with a romantic partner (2.2%). The average number of years that participants had been smoking daily was 2.95 (SD 1.61). At the time of enrollment in the study, the smoking rate was distributed as follows: 1–5 cigarettes/day (11.9%), 6–10 cigarettes/day (34.3%), 11–20 cigarettes/day (47.0%), 21–30 cigarettes/day (5.7%), and 31 or more cigarettes/day (3.0%). The smoking rates for fathers and mothers were as follows: not smoking (61.7 and 64.9% for fathers and mothers, respectively);
was operationalized as ‘My father/mother thinks I should quit. You expect from your father/mother?’ The two items were averaged through the question ‘How much support in your quit attempt do you get from your father/mother?’ and ‘How much did your father/mother help you in your quit attempt?’

Parenting and Adolescent Smoking

Relapse

Procedure

Participants were asked to complete a baseline questionnaire 1 week prior to entering the study in which they were monitored daily for a total of 4 weeks (diary period). The first day of monitoring was always a Monday. Participants started the monitoring period with 7 days of baseline monitoring during which they were instructed to smoke ad libitum. The 8th day was the assigned quit day for each participant. A quit attempt was considered as such when participants were abstinent for at least 24 consecutive hours, as was evidenced by 3 consecutive reports of non-smoking. Following the quit day, subjects were monitored for an additional 3 weeks. On each day of monitoring, participants were asked to complete the same internet-based questionnaire three times – in the morning (to be completed between 10 a.m. and noon), the afternoon (3–5 p.m.), and evening (8–10 p.m.). Each questionnaire was identical and asked participants questions on smoking since the previous questionnaire, motivation, self-efficacy, withdrawal symptoms, and situational stimuli (e.g., alcohol/coffee consumption, seeing others smoke). The questionnaires were in Dutch (participants spoke Dutch) and took approximately 3 min to complete. Questionnaires were automatically time-stamped with the time that they were completed. Participants who failed to complete a questionnaire within the designated sampling window where sent a text message to remind them. If a participant did not have access to the internet during the sampling window, they were asked to complete a paper version of the questionnaire and to submit the paper version online as soon as they had access to internet again. Participants received 40 euros if they completed the full 4 weeks of the diary period, and 10 additional euros upon completion of the 2-month follow-up. All data were collected between October 2006 and March 2007. This study was approved by the Committee on Research Involving Human Subjects.

Measures

Parental Smoking. Standard items were used to measure fathers’ and mothers’ smoking status. Response choices were: (1) no, my father/mother does not smoke; (2) yes, but <1 cigarette/day; (3) yes, 1–5 cigarettes/day; (4) yes, 6–10 cigarettes/day; (5) yes, 11–20 cigarettes/day; (6) yes, 21–30 cigarettes/day; (7) yes, ≥31 cigarettes/day. Scores on maternal and paternal smoking had been dichotomized into non-smokers (response choice 1) and smokers (response choices 2–7) and were combined to form a measure of parental smoking, with 1 being indicative of two non-smoking parents, 2 indicating one non-smoking and one smoking parent, and 3 indicating two smoking parents. Previous research showed that adolescents are highly accurate in their reports on parental smoking, with 1 being indicative of two non-smoking parents, 2 indicating one non-smoking and one smoking parent, and 3 indicating two smoking parents. Previous research showed that adolescents are highly accurate in their reports on parental smoking [25].

Parental Support. Expected parental support was measured through the question ‘How much support do you expect from your father/mother?’ The two items were averaged into one score reflecting expected parental support. Item anchors ranged from 1 (no support at all) to 5 (a lot of support).

Parental Norm regarding Smoking Cessation. Parental norm was operationalized as ‘My father/mother thinks I should quit smoking’. Participants rated the extent to which they agreed with this statement on a scale from 1 (absolutely not true) to 4 (very true). A high score indicated that parents strongly held the norm that their child should quit smoking. The mean of the items for fathers and for mothers was used as a measure of parental norm towards their child’s smoking cessation.

Smoking Cessation-Specific Parenting. Smoking cessation-specific parenting refers to parenting practices aimed at motivating and pressuring adolescents to quit smoking, through rule setting, communication, and exertion of pressure specifically attuned to adolescent smoking cessation [23]. This instrument has been shown to have good reliability in a large sample of frequently smoking adolescents [23]. Examples of the 8 items pertaining to the smoking cessation-specific parenting scale are: ‘my parents do not allow me to smoke at home’, ‘my parents talk to me about the benefits of smoking cessation’, and ‘my parents exert pressure on me to quit smoking’. Item anchors ranged from 1 (absolutely not true) to 5 (very true). Cronbach’s α was 0.83.

Outcome Variables

For the purposes of the analyses presented here, we were interested in five outcomes: first lapse, mild and heavy relapse within 3 weeks after the quit attempt, and smoking status at the 2-month follow-up. A participant’s first lapse day was defined by any report of smoking (even if only a puff) after having accomplished 24 h of abstinence. The literature on adolescent smoking does not provide standard definitions of relapse that are specifically suitable for adolescents. Common definitions of relapse as applied to adult smokers might be too stringent in adolescent samples (e.g., smoking at least 5 cigarettes for 3 consecutive days [26]) given that adolescents have shorter histories of smoking. For the purposes of the present analyses, we defined relapse in two ways: (1) smoking at least 1 cigarette/day for 3 consecutive days (mild relapse), and (2) smoking at least 5 cigarettes/day for 3 consecutive days (heavy relapse). Smoking status at the 2-month follow-up was measured through the question ‘Have you maintained abstinence since the end of the diary period?’ Response choices were: (1) yes, I am still a non-smoker; (2) no, I am smoking again, but I smoke less now than before I entered the study; (3) no, I am smoking again at the same level as when I entered the study. Scores were dichotomized into non-smokers (response choice 1) and smokers (response choices 2–3). All outcome variables were dichotomous with score 1 representing non-smoking, and 2 indicating the occurrence of smoking (first lapse, relapse, and current smoking at follow-up).

Strategy for Analyses

First, we calculated the relative occurrence of the relapse variables and computed correlations among independent variables. Next, we examined the associations between the baseline parenting variables and the various outcome variables by means of survival analyses, using a Cox proportional hazards regression model. Survival analysis is used to study the time between the entry to a study and a subsequent event (such as death, or in the present case, relapse). A Cox regression model provides an estimate of the hazard (or risk) of the event for individuals on the basis of their individual characteristics (such as cognitions), thereby taking into account when the event occurred [27]. Since the follow-up was measured at a fixed time point (2 months after the end of the diary period), we used logistic regressions instead of survival analysis to test effects on abstinence at follow-up. The survival...
analyses and logistic regression analysis all multivariately test the relative value of predictor variables. Lastly, sex, age and educational attainment did not significantly predict any of the outcome variables and were therefore not included in the model as possible confounding variables.

**Results**

The majority (70.4%, 95/135) of the participants experienced at least one lapse during monitoring, and 58.5% (79/135) also reported a second lapse. Mild relapse, defined as any smoking on 3 consecutive days, occurred for 46/135 participants (34.1%). Heavy relapse, defined as smoking at least 5 cigarettes on 3 consecutive days, occurred for 27/135 participants (20.0%). At follow-up, 29.6% of the initial sample of 135 adolescents were still abstinent, and 59.3% were smoking again (11.1% of the subjects did not participate in the follow-up).

Pearson and Spearman correlations were computed to examine the associations between all model variables (table 1). Parents who were smokers themselves were less likely to engage in smoking cessation-specific parenting and held a less strict norm regarding their child’s quitting than parents who did not smoke. Both fathers’ and mothers’ smoking status were not related to the amount of support their children expected them to provide. Smoking cessation-specific parenting was strongly positively related to parental norm, indicating that parents who were more strongly applying smoking cessation-specific parenting were also the ones who held the norm that their child should quit smoking. Smoking cessation-specific parenting was not associated with expected parental support, whereas parents who held a pro-quitting norm were expected to provide more parental support.

The findings of the survival analyses show that paternal and maternal smoking, smoking cessation-specific parenting, expected parental support and norm on smoking cessation were not related to any of the lapse and relapse measures (table 2). We found a trend effect of smoking by fathers on abstinence at the 2-month follow-up (table 3). Smoking by fathers seemed to function as a protective factor in that smoking by fathers was related to lower odds of adolescents’ smoking at follow-up.

**Discussion**

The present study examined the impact of parental smoking, smoking cessation-specific parenting, parental norms towards quitting, and parental support on adolescent smoking relapse after cessation. Although a trend was found for paternal smoking predicting successful quitting at follow-up, we mostly found no effects of the parent variables on relapse.

We can propose several explanations for the lack of a substantial effect of parental smoking on adolescent relapse outcomes. Firstly, Darling and Cumsille [28] suggested that when focusing on proximal processes that operate at transitional points (undertaking a quit attempt), stable characteristics (such as parental smoking) can predict change only in the presence of a triggering event (such as the offer of a cigarette by a peer). If adolescents are constantly exposed to smoking at home while they attempt to quit, they are likely to be challenged more severely to maintain their abstinence. However, it may not directly be the exposure to their parents’ smoking that causes them to relapse, but the exposure is likely to weaken their resistance towards smoking-related cues or tempting situations, which in turn makes relapse more likely.

Alternatively, the influence of parental smoking may be contingent on individual characteristics of the adolescent, such as adolescents’ self-efficacy during and after the quit attempt. It is conceivable that parental smoking is only significant in further (re)lapping when in conjunction with adolescents’ low self-efficacy to resist smoking. However, information about whether parents who were smokers also smoked in the company of their children who attempted to quit smoking or not, and how often participants were around their smoking parents during the study was not included in the daily questionnaire.

<table>
<thead>
<tr>
<th>Measures</th>
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<th>3</th>
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<tbody>
<tr>
<td>Smoking father</td>
<td>–</td>
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<tr>
<td>Smoking mother</td>
<td>–</td>
<td>0.27**</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking cessation-specific parenting</td>
<td>–0.31***</td>
<td>–0.34***</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental norm about quitting</td>
<td>–0.29**</td>
<td>–0.24**</td>
<td>0.45**</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Expected parental support</td>
<td>–0.07</td>
<td>0.02</td>
<td>0.08</td>
<td>0.18*</td>
<td>–</td>
</tr>
</tbody>
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* p < 0.05; ** p < 0.01; *** p < 0.001.
while this may make a difference for the self-efficacy and vulnerability of adolescents in cessation. We also do not know whether parents adjusted their smoking behavior during their child’s quit attempt or not, for example, by smoking outside the house instead of inside or even by quitting smoking themselves. Adolescents might be accustomed to their parents’ smoking and as such might be less influenced by it. However, it may be the change in parents’ smoking behavior rather than their baseline smoking status that affects adolescents who attempt to quit smoking. This might explain why smoking by fathers appeared to be a protective factor for smoking at follow-up; these fathers may have made an extra effort regarding their own smoking.

Perceived parental support at baseline did not predict any of the outcomes. It is possible that strong temptations to smoke (when drinking alcohol at a party or in a pub for example) and the experience of heavy withdrawal symptoms may cause relapse regardless of the amount of support parents may provide [29]. It must also be noted that we used a measure of expected parental support. Although adolescents are likely to be capable of forecasting their parents’ behavior, for example based on their experiences from the past, their expectations may not entirely be met. It is possible that those who received less support than they had expected were additionally prone to relapse, compared to those who received the expected amount of support or even more. This, again, points to the need of examining the development of and change in parents’ attitudes and behaviors when their child is in the midst of the quitting process. To conclude, there is hardly any literature available on which factors predict relapse among adolescents, and as such there is little empirical knowledge about what parents could focus on when they want to help their child in preventing relapse. One prior study showed that day-to-day variations in self-efficacy predict the first lapse and relapse into smoking among daily smoking adolescents who have achieved abstinence [30], and parents should be advised to monitor and help strengthen their child’s daily self-efficacy after quitting.

In the above, we have mainly proposed alternative explanations of why parental smoking and parenting practices may still be relevant despite the present findings. It is, however, of course possible that the influence of parents reaches only so far and may be more important in guiding and facilitating the processes that precipitate actual quit attempts rather than determining the outcome of the trials. This might also explain why smoking cessation-specific parenting and parental norms about quitting did not predict the outcome of the quit attempts. It is conceivable that once an adolescent starts with his or her quit attempt, only individual characteristics remain critical to the outcome. Parents who exert pressure on their child to quit and who have a strong pro-quitting norm may be effective in stimulating their child to consider and undertake a quit attempt in the first place [23], but those particular efforts do not seem to facilitate progress in successful cessation.

### Table 2. Survival analyses for outcome variables during the diary period

<table>
<thead>
<tr>
<th></th>
<th>1st lapse</th>
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<th>Mild relapse</th>
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<th>Heavy relapse</th>
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<tbody>
<tr>
<td></td>
<td>OR 95% CI</td>
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<td>OR 95% CI</td>
<td>OR 95% CI</td>
<td>OR 95% CI</td>
<td>OR 95% CI</td>
</tr>
<tr>
<td>Smoking father</td>
<td>0.64 0.39–1.06</td>
<td>0.75 0.36–1.56</td>
<td>0.66 0.25–1.77</td>
<td></td>
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<tr>
<td>Smoking mother</td>
<td>1.19 0.72–1.98</td>
<td>0.72 0.35–1.52</td>
<td>0.61 0.21–1.73</td>
<td></td>
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<tr>
<td>Smoking cessation-specific parenting</td>
<td>1.11 0.81–1.51</td>
<td>1.13 0.75–1.71</td>
<td>1.30 0.79–2.14</td>
<td></td>
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</tr>
<tr>
<td>Parental norm about quitting</td>
<td>1.04 0.72–1.50</td>
<td>1.03 0.59–1.81</td>
<td>1.02 0.47–2.21</td>
<td></td>
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<tr>
<td>Expected parental support</td>
<td>0.88 0.73–1.06</td>
<td>0.96 0.75–1.23</td>
<td>0.92 0.68–1.26</td>
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### Table 3. Logistic regression analyses for relapse at the 2-month follow-up

<table>
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<th>Relapse at follow-up (n = 119)</th>
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<tr>
<td></td>
<td>OR 95% CI</td>
<td></td>
</tr>
<tr>
<td>Smoking father</td>
<td>0.47* 0.21–1.02</td>
<td></td>
</tr>
<tr>
<td>Smoking mother</td>
<td>1.08 0.48–2.42</td>
<td></td>
</tr>
<tr>
<td>Smoking cessation-specific parenting</td>
<td>0.92 0.59–1.44</td>
<td></td>
</tr>
<tr>
<td>Parental norm about quitting</td>
<td>1.28 0.76–2.15</td>
<td></td>
</tr>
<tr>
<td>Expected parental support</td>
<td>1.08 0.78–1.50</td>
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</table>

* p = 0.056.
Important strengths of the present study are that it is the first prospective study on parent variables in relation to adolescent smoking relapse, and that day-to-day reports of smoking have allowed for the first lapse and mild and heavy relapse to be distinguished from one another, and the time to event to be known. However, the study has some limitations. The sample size may have prevented relations to emerge as statistically significant. However, the sample size is quite normative for a study using ecological momentary assessment data in which adolescents are monitored so intensively. Further, we had sufficient statistical power to show effects of baseline cognitive factors in another paper based on these data [31]. Second, reports by proxy were used to measure parents’ behavior and one could argue that such reports do not reflect the actual behavior of parents. However, not only do adolescents seem to be quite accurate in estimating parents’ substance use [24], the perception rather than actual (smoking) behavior of others seems more relevant to adolescents’ behavior regarding both parents [32]. Lastly, we did not use biochemical verification to ensure that participants had achieved 24-hour abstinence. However, with the participants it was emphasized that failure to reach abstinence would not be condemned as we were interested in the natural process of adolescent smoking cessation. The observation that 27.5% of the participants did not show 24-hour abstinence on the target quit day suggests that participants did not feel obliged to falsify their actual quit day in case of initial ‘failure’. Moreover, several studies among adolescents have indicated that self-reports of smoking and quitting behavior are valid and reliable [33].

Future Research

Since the present study is the first to examine the direct parental influence on adolescents’ smoking cessation attempts and relapse, more research is needed before we can draw definite conclusions. We conducted this pilot study to test whether baseline measurements of parental behaviors affect lapse, relapse and short-term prolonged cessation. We recommend that future studies on this topic include day-to-day information on the behaviors of parents during the period in which their adolescent offspring make an effort to quit smoking. As noted, we did not collect these data in the current study. As the process of quitting is a highly dynamic one [34], the interaction with parents automatically is so as well. Ecological momentary assessment studies in which adolescents embark on a serious quit attempt, and which include daily reports of both parenting variables and possible moderators, would simultaneously meet the demand for more dynamic formulations of smoking cessation [34], as well as the need for placing familial influences in a context that interacts with the individual characteristics of parents and children [35].

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References

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29 Trotter L, Wakefield M, Borland R: Socially cued smoking in bars, nightclubs, and gambling venues: a case for introducing smoke-free policies. Tob Control 2002;11:300–304.


