Association between personality and adolescent smoking

Zeena Harakeh\textsuperscript{a,\textasteriskcentered}, Ron H.J. Scholte\textsuperscript{a}, Hein de Vries\textsuperscript{b}, Rutger C.M.E. Engels\textsuperscript{a}

\textsuperscript{a}Institute of Family and Child Care Studies, Radboud University Nijmegen, PO Box 9104, The Netherlands
\textsuperscript{b}Department of Health Education, Maastricht University, The Netherlands

Abstract

The present study examined the association between adolescents’ personality traits and smoking, and tested whether this association was moderated by birth order or gender. Participants were 832 Dutch siblings aged 13 to 17 years participating at baseline assessment (T1) and at follow-up 12 months later (T2). Personality was assessed by applying a variable-centered approach including five personality dimensions (Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Openness to Experience), and a person-oriented approach using three personality types (i.e., Resilients, Overcontrollers and Undercontrollers). Cross-sectional findings indicated that Extraversion (at T1 and T2), Agreeableness (at T2), Conscientiousness (at T2), and Emotional Stability (at T2) were related to adolescent smoking. Longitudinal findings indicated that only Extraversion and Emotional Stability were related to onset of adolescent smoking. Using a person-oriented approach, Overcontrollers and Undercontrollers did not differ from Resilients on smoking onset. No indication was found for a moderating effect of birth order on the association between personality and smoking. Additional findings showed that gender moderated the effect of Agreeableness on adolescents’ smoking onset. Implications for prevention are also addressed.

© 2005 Elsevier Ltd. All rights reserved.

Keywords: Personality types; Personality dimensions; Adolescent smoking; Smoking onset; Birth order

Smoking is addictive and harmful, causing health problems and death (e.g., de Vries, Engels, Kremers, Wetzels, & Mudde, 2003); therefore, there is a need to understand which factors contribute to smoking onset. Because experimentation with cigarette smoking often starts during adolescence, the present study explores whether personality plays a role in smoking initiation among adolescents.
Each person is characterized by a unique combination of personality traits which largely determine who they are and how they behave (e.g., Robins, John, Caspi, Moffitt & Stouthamer-Loeber, 1996), and these traits may have important consequences for a broad range of behavioral outcomes (e.g., Robins et al., 1996) including smoking (e.g., Terraciano & Costa, 2004). Because personality traits are enduring dispositions (McCrae & Costa, 2003) it is important to establish whether certain traits increase the risk for cigarette smoking among adolescents. If smoking occurs in adolescents with distinctive personality characteristics, such information may help to design more effective intervention and prevention programs, to formulate specific public policies, and perhaps to apply a more personalized treatment to discourage or prevent adolescent smoking (Wijatkowski, Forgays, Wrzesniewski, & Gorski, 1990).

There is general consensus that personality can be described in terms of five factors (the Big Five) (see Goldberg, 1990, 1992) both in childhood and in adolescence (e.g., Graziano & Ward, 1992; Halverson, Kohnstamm, & Martin, 1994; John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994; van Lieshout & Haselager, 1994). These factors include: Extraversion, Agreeableness, Conscientiousness, Neuroticism (also measured as the opposite of Emotional Stability) and Openness to new experiences. An increasing number of studies have used these five dimensions (e.g., Block, 1995; Digman, 1990; Goldberg, 1990; John, 1990; McCrae, 2001a; McCrae & John, 1992) which are reported to be heritable (e.g., Jang, McCrae, Angleitner, Riemann, & Livesley, 1998) and generalizable across cultures (McCrae, 2001b; McCrae & Costa, 1997; Paunonen, Zeidner, Engvik, Oosterveld & Maliphant, 2000; Terraciano, 2003). Studies on the association between personality and smoking have used different assessments of personality. Some assessed the higher-order factors such as the five dimensions of the Big Five (e.g., Terraciano & Costa, 2004), others used the Eysenck Personality scales (consisting of Extraversion, Neuroticism), and a few studies also used Psychoticism (e.g., Forgays, Bonaiuto, Wrzesniewski, & Forgays, 1993a; Forgays, Forgays, Wrzesniewski, & Bonaiuto, 1993b; Wijatkowski et al., 1990).

Most studies on personality and smoking have examined smoking in adulthood but not in adolescence. Moreover, adult samples do not provide insight into the role of personality in the process of smoking initiation, and the studies that did focus on adolescents mainly explored only two dimensions (i.e., Extraversion and Neuroticism) of the high-order traits rather than all five (e.g., Forgays et al., 1993a, 1993b; Wijatkowski et al., 1990). One exception, however, is the study of Otten, Engels and van den Eijnden (submitted for publication) which investigated all five dimensions of the Big Five (Goldberg, 1992). Their cross-sectional study showed that adolescents scoring high on Extraversion and low on Conscientiousness, Agreeableness and Emotional Stability (that is high on Neuroticism) are more likely to have a higher intention to smoke and are more likely to be a regular smoker. Wijatkowski et al. (1990) showed that persistent smokers, (girls and boys), scored significantly higher on the two dimensions Extraversion and Neuroticism. A longitudinal study by Cherry and Kiernan (1976) in young adults (aged 20 to 25 years) reported similar findings; i.e. smokers tended to be more Neurotic and more Extraverted than non-smokers. A possible explanation for this is that individuals scoring high on Extraversion may smoke because they seek stimulation (Eysenck, 1980), and those scoring high on Neuroticism may smoke to reduce tension and anxiety (Eysenck, 1980; for more details on nicotine and the nervous systems see also Pritchard, 1991; Fowler et al., 1996). Thus, to our knowledge, very few studies have examined the role of the Big Five personality dimensions in the process of smoking initiation.

Furthermore, most studies on personality have employed a variable-centered approach utilizing the Big Five personality dimensions to focus on differences between individuals on each of the five dimensions. Recent studies, however, concentrated on identifying how constellations of traits within
individuals are organized by applying a more person-oriented approach (Bergman & Magnusson, 1997). In the person-oriented approach, three personality types have been consistently identified across different (western) cultures, ages and ethnic groups: i.e. Resilients, Undercontrollers, and Overcontrollers (e.g., Caspi & Silva, 1995; Robins, John, & Caspi, 1998; Scholte, van Lieshout, de Wit, & van Aken, in press). These three types have been constructed and characterized in terms of Block and Block’s (1980) constructs of ego resiliency and ego control mentioned in their theory of personality functioning, and in terms of the Big Five personality dimensions (e.g., Asendorpf, Borkenau, Ostendorpf, & van Aken, 2001; Asendorpf & van Aken, 1999; Dubas, Gerris, Janssens, & Vermut, 2002; Hart, Hofmann, Edelstein, & Keller, 1997; van Lieshout, van Aken, & Scholte, 1998). Resilients have been characterized as being high on all the Big Five dimensions. Undercontrollers have been identified as being high on Extraversion, moderate to low on Emotional Stability, and low on the remaining dimensions. Overcontrollers score high on Agreeableness and moderate to high on Conscientiousness, moderate to low on Openness to new experiences, and low on Extraversion and Emotional Stability (see also Robins et al., 1998; van Aken, van Lieshout, Scholte, & Haselager, 2003; Akse, Hale, Engels, Raaijmakers, & Meeus, 2004; Dubas et al., 2002). The relation between these three personality types and adolescent smoking has not yet been investigated. However, some studies have investigated the association between these three personality types and drug use, but the findings were inconsistent. For example, van Lieshout et al. (1998) reported that Undercontrollers were more likely to use drugs, but Dubas et al. (2002) did not corroborate this finding. Shedler and Block (1990) reported that compared to experimenters frequent marihuana users are Undercontrolled, whereas compared to experimenters abstainers are Overcontrolled. Thus, use of a person-oriented approach to personality traits may provide insight into the ways constellations of traits are associated with smoking in adolescents. Moreover, prevention programs employing the person-oriented approach need only to focus on three groups and might be easier to implement compared with a variable-centered approach.

Most studies on the etiology of adolescent smoking examine differences between families rather than within families. Because older siblings tend to act as surrogate parents towards their younger sibling they may differ in personality from their younger siblings by, for example, being more responsible (Sulloway, 1995). A meta-analytic review by Sulloway (1995) implied that firstborns are more neurotic, less agreeable, more conscientious, and less open to new experiences compared to later borns. In the present study, we were particularly interested in whether birth order is related to differences in personality and smoking behavior, and whether birth order has a moderating effect on the association between adolescent’s personality and their smoking. Because older and younger siblings differ in smoking behavior (e.g., Bard & Rodgers, 2003), we assume that birth order is associated with adolescent smoking, i.e. that younger siblings are less likely to smoke than older siblings. Thus, since siblings often differ in scores on personality traits, the effects of personality on smoking may differ between siblings.

The present study investigates the association between adolescent’s personality on the one hand, and adolescent’s smoking and smoking onset on the other. This study offers a unique overall picture by applying both the person-oriented and the variable-centered approach. Data from two waves of a longitudinal study among 428 families are used in the analysis. A variable-centered approach is used to investigate the impact of the five personality dimensions on adolescent smoking cross-sectionally and longitudinally. Longitudinal analyses are used to test whether personality affects the initiation of smoking in adolescents. In addition, a person-oriented approach is employed to investigate the impact of the three personality types on adolescent smoking. Finally, we investigate whether birth order (older versus younger child) moderates the association between personality and adolescent smoking.
1. Method

1.1. Participants

A total of 428 Dutch families participated; each family consisted of a mother, father, and two adolescent siblings aged 13 to 17 years (for more details on this study see Harakeh, Scholte, de Vries, & Engels, 2005; van der Vorst, Engels, Meeus, & Dekovic, in press). All participating families fulfilled the following inclusion criteria: the children were biologically related to each other, and the mother and father were the biological parents of these children; parents were living together or were married; and the two siblings in each family were neither twins nor mentally or physically disabled. The families were approached for the baseline assessment between November 2002 and April 2003 (T1), and at follow-up 12 months later between November 2003 and April 2004 (T2). Of the 428 families, 12 families dropped out from the study and did not participate at T2. Thus, 416 families participated in the second wave.

The data of the 416 families were analyzed. The older siblings (53.1% male) were aged 14 to 17 years ($M=15.22$, $SD=.60$) and the younger siblings (47.6% male) were aged 13 to 15 years ($M=13.35$, $SD=.50$). The low, middle and high educational levels were equally represented among older siblings’ (30.1%, 29.9%, and 40%, respectively) and younger siblings’ (35.6%, 37.3%, and 27.1%, respectively). Compared to the educational level of the older children, there was a slight overrepresentation of younger children in the middle educational level group and underrepresentation in the high educational level group. This is because some Dutch schools do not differentiate between the middle and high educational level in the first two years of secondary school; the children in these particular schools were therefore assigned to the middle educational level in the present study.

1.2. Procedure

The addresses of families with a mother, a father and two 13- to 17-year old children were obtained from the registers of 22 municipalities. The families received a letter (and reply form) inviting them to participate in a longitudinal study with three waves, with a one-year interval between each wave. A total of 885 families returned the reply form and gave informed consent. These families were approached by telephone to check whether they fulfilled the inclusion criteria. Of the 765 families fulfilling the inclusion criteria, a selection was made to provide for an equal distribution of the children’s educational level and an equal number of all four possible sibling dyads. Finally, 428 families were selected to participate in this study. Interviewers visited the families at their homes; during these visits each family member filled in the questionnaire individually and separately, which took about 1.5 h. At each measurement wave, each family received 30 euros when all four family members had completed the questionnaires.

1.3. Instruments

1.3.1. Personality

In both waves, personality was assessed using both the variable-centered approach and the person-oriented approach. In the variable-centered approach, we measured the Big Five dimensions Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience.
These dimensions were assessed with the Quick Big Five (Vermulst & Gerris, 2005); this questionnaire consisted of 30 adjectives, and the respondents were asked to rate on a 7-point scale (ranging from 1 ‘completely untrue’ to 7 ‘completely true’) to what extent each adjective applied to them. Each dimension was assessed with 6 items. The dimension Extraversion was operationalized by adjectives such as talkative, quiet (recoded) and withdrawn (recoded) (at wave 1 Cronbach’s alpha was .81 and at wave 2 Cronbach’s alpha was .84). Agreeableness was measured by adjectives such as sympathetic, kind, likeable and cooperative, with alphas of .77 (T1) and .81 (T2). Conscientiousness was indicated by adjectives such as systematic, organized, orderly and efficient, with alphas of .85 (T1) and .87 (T2). Emotional Stability was assessed with adjectives such as nervousness, fearfulness and sensitivity, and all items were recoded: alphas were .75 (T1) and .77 (T2). Openness was measured with items such as creative, artistic and versatile: alphas were .67 (T1) and .68 (T2).

Applying a person-oriented approach, three personality types were identified. The k-means clustering procedure with a forced three-cluster solution was used to construct three personality types of the Big Five dimensions (see also Akse et al., 2004; Dubas et al., 2002). The means of the clusters on the Big Five characteristics are presented in Fig. 1. Resilients scored high on all five dimensions. Overcontrollers were identified as scoring low on Extraversion and Emotional Stability, while Undercontrollers were identified as scoring high to moderate on Extraversion, and moderate to low on Emotional Stability. We assessed the variable personality types at T1 and T2.

Adolescents’ smoking behavior. To assess their smoking behavior, adolescents were asked to report which stage of smoking applied to them (de Vries et al., 2003). On a 9-point scale responses ranged from 1=’I have never smoked, not even one puff’ to 9=’I smoke at least once a day’. In the cross-sectional analyses at wave 1 and wave 2 we recoded the responses into 1=’never smoked’ (not even one puff), and 2=’smoked once or more’. In the longitudinal analyses adolescent smoking onset was the outcome variable. We selected the non-smokers at wave 1 (adolescents who had never smoked, not even one puff)
and examined whether they had started to smoke at wave 2 (see Harakeh, Scholte, Vermulst, de Vries, & Engels, 2004).

1.4. Data analyses

First, descriptive statistics (paired t-tests and cross-tabulations) were used to examine whether the adolescents’ self-reports on personality dimensions and types were different for older and younger siblings. Next, multivariate logistic regression analyses were used to examine whether adolescents’ personality was related to adolescent smoking and smoking initiation, cross-sectionally as well as longitudinally. We tested the variable-centered and the person-oriented approaches separately. Logistic regression analyses were used because the outcome variable (i.e., adolescents’ smoking) was dichotomous. To control for sociodemographic variables, gender and educational level were included in the analyses. The variable educational level of the adolescent consisted of three categories (low, middle and high); low educational level was the reference group in the analyses. When investigating the person-oriented approach, Resilients were the reference group in the analyses.

The third step was to examine whether there was a moderating effect of birth order. This was tested separately for the variable-centered and person-oriented approaches. To test the variable-centered approach, we included interaction terms between the five personality dimensions and birth order in the analyses, while in the person-oriented approach the interaction terms between the personality types and birth order were included in the analyses.1

Additional logistic regressions were conducted to test whether gender moderated the association between personality and adolescent smoking. To test this, we included interaction terms between personality and gender in the analyses.

2. Results

2.1. Descriptive statistics

At wave 1, 52.2% of the older siblings and 64.6% of the younger siblings had never smoked, while 47.8% of the older siblings and 35.4% of the younger siblings had smoked at least once. One year later (wave 2), the smoking behavior was as follows: 48.3% of the older siblings and 57.6% of the younger siblings had never smoked while 51.7% of the older siblings and 42.4% of the younger siblings had smoked once or more. Thus, 7.7% of the older siblings and 11.2% of the younger siblings had started smoking between the two waves.

At both waves, the older siblings scored higher on the personality dimensions Conscientiousness and Agreeableness than the younger siblings (see Table 1). \( \chi^2 \) tests showed that there were no significant differences in personality types (wave 1) between older and younger siblings (\( \chi^2 (4,416)=5.43, p=.25 \)): i.e. 28.1%, of the older and the younger siblings were Resilients; 33.2% of the older and 39.9% of the younger siblings were Overcontrollers; and 38.7% of the older and 32.0% of the younger siblings were

---

1 In the logistic regression analyses the interaction terms were centered to avoid multicollinearity with the independent variable.
Undercontrollers. At wave 2, 33.4% of the older and 32.7% of the younger siblings were Resilients; 34.4% of the older and 34.9% of the younger siblings were Overcontrollers; and 32.2% of the older and 32.5% of the younger siblings were Undercontrollers. Again, there were no significant differences between the older and younger siblings, \((\chi^2 (4,410)= 4.27, p = .37))

### 2.2. Personality and adolescent smoking: variable-centered approach

We conducted cross-sectional analyses to test whether the Big Five factors were associated with adolescent smoking at wave 1. The variables entered in the cross-sectional multivariate analyses at T1 explained 12% \((\text{Nagelkerke } R^2)\) of the variance in adolescents’ smoking (Table 2). The Big Five personality factors accounted for 4.3% of the explained variance. Birth order, educational level and Extraversion were significantly associated with adolescent smoking. Younger siblings were less likely to smoke than older siblings. Adolescents with a lower educational level had a higher risk to smoke than adolescents with a high educational level. Adolescents who scored high on Extraversion had a higher risk to smoke than adolescents who scored low on Extraversion.

The variables entered in the cross-sectional analyses at T2 explained 10.7% of the variance in adolescents’ smoking (Table 2). The Big Five personality factors accounted for 6.2% of the explained variance. Birth order, educational level, Extraversion, Agreeableness, Conscientiousness, and Emotional Stability were significantly associated with adolescent smoking. Adolescents who scored high on Extraversion had a higher risk to smoke than adolescents who scored lower on Extraversion. Adolescents who scored low on Agreeableness, Conscientiousness, or Emotional Stability were less likely to smoke than adolescents who scored higher on these Big Five factors.

### 2.3. Personality and adolescent smoking: person-oriented approach

At T1 the personality types contributed 1.3% to the explained variance in smoking. Adolescents who were Overcontrollers were less likely to smoke than Resilients. At T2, this explained variance was 2.2%,
and adolescents who were Undercontrollers were more likely to smoke than Resilients. Longitudinal analysis showed that the personality types were not associated with smoking onset (Table 3).

2.4. Birth order as a moderator

We tested whether birth order moderated the association between adolescent’s personality and smoking behavior. We tested this separately for the variable-centered approach and the person-oriented approach. No indication was found for a moderating effect of birth order.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Logistic regression analyses of personality dimensions on adolescent smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cross-sectional wave 1</td>
</tr>
<tr>
<td></td>
<td>N=820</td>
</tr>
<tr>
<td></td>
<td>OR</td>
</tr>
<tr>
<td>Gender adolescent</td>
<td>1.03</td>
</tr>
<tr>
<td>Education level adolescent:</td>
<td></td>
</tr>
<tr>
<td>High (reference group)</td>
<td>1.00</td>
</tr>
<tr>
<td>Low</td>
<td>2.43***</td>
</tr>
<tr>
<td>Middle</td>
<td>0.88</td>
</tr>
<tr>
<td>Birth order</td>
<td>0.51***</td>
</tr>
<tr>
<td>Extraversion</td>
<td>1.44***</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>0.85</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>0.88</td>
</tr>
<tr>
<td>Emotional stability</td>
<td>0.88</td>
</tr>
<tr>
<td>Openness</td>
<td>1.07</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Logistic regression analyses of personality types on adolescent smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cross-sectional wave 1</td>
</tr>
<tr>
<td></td>
<td>N=820</td>
</tr>
<tr>
<td></td>
<td>OR</td>
</tr>
<tr>
<td>Education level adolescent:</td>
<td></td>
</tr>
<tr>
<td>High (reference group)</td>
<td>1.00</td>
</tr>
<tr>
<td>Low</td>
<td>2.49***</td>
</tr>
<tr>
<td>Middle</td>
<td>0.92</td>
</tr>
<tr>
<td>Birth order</td>
<td>0.58***</td>
</tr>
<tr>
<td>Personality types:</td>
<td></td>
</tr>
<tr>
<td>Resilients (reference group)</td>
<td>1.00</td>
</tr>
<tr>
<td>Undercontrollers</td>
<td>1.08</td>
</tr>
<tr>
<td>Overcontrollers</td>
<td>0.67*</td>
</tr>
</tbody>
</table>

OR=odds ratio. 95% CI=95% confidence intervals. *p<.05, **p<.01, ***p<.001.
2.5. Additional results

Additional cross-sectional and longitudinal analyses were conducted to test whether the association between adolescent’s personality and adolescent smoking was moderated by gender. Again, this was tested separately for the variable-centered approach and the person-oriented approach. The longitudinal results of the variable-centered approach indicated that gender only moderated the association between Agreeableness and adolescent’s smoking onset (OR = 0.41, \( p < .047, 95\% \text{ CI} = 0.17–0.99\)). Girls who scored low on Agreeableness started to smoke more often than boys who scored low on Agreeableness. Girls who scored high on Agreeableness less often started smoking than boys who scored high on Agreeableness\(^2\).

3. Discussion

This study examined the association between personality and adolescent smoking. To test this relation, we used a variable-centered approach (including the Big Five dimensions Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to new experience), and a person-oriented approach (including the three personality types Resilients, Overcontrollers, and Undercontrollers).

With the variable-centered approach, the cross-sectional findings of wave 1 and wave 2 indicated that adolescents scoring high on Extraversion were more likely to smoke. This concurs with other studies that investigated personality dimensions and adolescent smoking (Cherry & Kiernan, 1976; Otten et al., submitted for publication; Wijatkowski et al., 1990). Further, at wave 2, high scores on Agreeableness, Conscientiousness and Emotional Stability (i.e., low on Neuroticism) were indicative of lower involvement in smoking. The findings on Emotional Stability concur with other studies which reported that Neuroticism is a risk factor for smoking (e.g., Cherry & Kiernan, 1976; Wijatkowski et al., 1990). Moreover, Otten et al. (submitted for publication) reported similar findings for Extraversion, Agreeableness, Conscientiousness, and Emotional Stability, also suggesting that the latter three dimensions are protective factors and Extraversion is a risk factor. Longitudinal findings indicated that adolescents scoring high on Extraversion and low on Emotional Stability are more likely to initiate smoking one year later (for similar findings see Cherry & Kiernan, 1976).

It is important to stress that longitudinal analyses also allows to examine the direction of effects. In the longitudinal analyses, however, we primarily tested whether personality was a precursor of adolescent smoking. However, recent studies indicated that the relationship between Neuroticism and Extraversion on the one hand and smoking on the other may be bi-directional, suggesting that, e.g. high scores on neuroticism could be both a cause and an effect of smoking (e.g., Fowler et al., 1996; Pritchard, 1991). For example, Fowler et al. (1996) suggested that smoking cigarettes may affect mood (Extraversion, and Neuroticism) because smoking inhibits monoamine oxidase which breaks down the neurotransmitters involved in mood regulation. Future studies could examine the effects of smoking initiation on

\(^2\) Birth order moderated the effect on the association between Emotional Stability and adolescent smoking onset. However, because this result was significant in the multivariate analysis but not in the univariate analysis, this interaction effect is not reported in this paper.
personality traits; the current data, with only a small sample of regular smokers, do not allow this type of analysis.

Further, although Extraversion proved to be a major predictor, the other four personality dimensions may be of minor importance in explaining adolescent smoking and smoking initiation. The relatively low percentages of explained variance suggest that other factors may be important in explaining smoking initiation, e.g., peer pressure (e.g., Engels, Knibbe & Drop, 1999), smoking-specific cognitions (de Vries, Backbier, Kok, & Dijkstra, 1995), and parental behavior (Jackson & Henriksen, 1996).

Regarding the person-oriented approach, we should stress that the constellation of the three personality types in the current study closely resembled those found in other studies (e.g., Akse et al., 2004; Dubas et al., 2002; Scholte et al., in press). Moreover, the cross-sectional findings of our study indicated that in wave 1 Overcontrollers were less likely to smoke than Resilients. One year later, Undercontrollers were more likely to smoke than Resilients. The latter finding is in line with other reports on the association between personality types and adolescent substance use (van Lieshout et al., 1998; Shedler and Block, 1990). However, our longitudinal findings in adolescents indicated that personality types do not predict adolescent’s smoking onset. In summary, we can conclude that the main effects of personality types to predict adolescent smoking are not consistent over the two waves, but are in the suggested direction. A possible explanation is that because the person-oriented approach does not result in a group consisting mainly of adolescents scoring high on Extraversion and low on Emotional Stability (the strongest personality traits affecting smoking onset), we could not detect differences between the three groups. A statistical explanation is that because the power is limited and the effects of personality types are not very strong, no significant differences emerged.

With respect to whether birth order moderated the association between personality traits and adolescent smoking, older siblings proved to be more conscientious and agreeable than younger siblings, but no difference was found between older and younger adolescent siblings with regard to personality types. A review by Sulloway (1995), showed similar findings for Conscientiousness, but not for Agreeableness. A possible explanation for our findings is that because older siblings tend to act as surrogate parents towards their younger siblings they may identify more strongly with their parents and authority (e.g., Kagan, 1971, p.148; Sulloway, 1995). This may result in older siblings being more agreeable and conscientious than their younger siblings who tend to be more rebellious (Rohde et al., 2003). Secondly, we found that younger siblings were less likely to smoke than older siblings. However, we found no indication for a moderating effect of birth order on the association between personality and adolescent smoking, suggesting that the relation between personality and adolescent smoking is similar for both older and younger siblings.

4. Limitations

Some limitations of this study should be addressed. First, underreporting of smoking among adolescents may have occurred because they filled out the questionnaire in the presence of their parents. However, to help diminish this problem our interviewers were present when the four family members filled out the questionnaire. Second, birth order is strongly related to age, and age in turn is strongly related to adolescent smoking; therefore, the meaning and interpretation of birth order deserves some attention. In our study there was some overlap in age between the two siblings: the older siblings were aged 14 to 17 years old and the younger siblings 13 to 15 years. To disentangle birth order and age
effects, long-term longitudinal data are needed to establish whether some results are due to birth order or age. We can state, however, that the effects of birth order (or age) in the present study were minimal. Third, although we measured birth order, we can only differentiate between the older and younger sibling; i.e. this does not mean that the older sibling is the firstborn and the younger sibling is the youngest in the family. In this study, the older sibling may be the firstborn or the middle born, and the younger sibling may be the middle born or the youngest sibling. To obtain a total picture, future studies on birth order need to include longitudinal data of children passing through various stages of the family life cycle, whole or completed families, socioeconomic status, siblingship size, and the age difference between the siblings.

Fourth, we only looked at the main effects of personality on adolescent smoking; however, personality may also play a role in the interaction with environmental influences (e.g., O’Connor & Dvorak, 2001; Stein, Newcomb, & Bentler, 1996). In some environments certain personality characteristics might serve as a protective function, and in other environments the same characteristics might increase vulnerability (e.g., O’Connor & Dvorak, 2001). For instance, the effects of extraversion might be strongest when adolescents experience implicit or explicit social pressure to start smoking by peers or parents. Furthermore, the impact of parents’ efforts to prevent their children from smoking, (e.g. by enforcing non-smoking rules at home, or frequently communicating about smoking matters with children) might be most profound if children score high on Agreeableness. Additional studies are needed to investigate personality-environment interactions to provide information for the development of effective prevention programs. Finally, longitudinal studies also should investigates the long-term effects of personality on smoking onset.

5. Conclusions and implications

The present study shows that some personality traits do affect smoking in adolescents. The question arises whether personality really is such an important factor in developing addictive behavior in adolescents? Our findings are not straightforward. Although our results consistently indicate that adolescents scoring high on Extraversion are more likely to smoke, no clear picture emerged for the other personality traits. The explained variance of personality in predicting adolescent smoking is rather limited (see also Otten et al., submitted for publication), the explained variance of the three personality types was even lower than the five personality dimensions. Moreover, the person-oriented approach had no predictive value on long-term effects. Thus, we conclude that prevention programs should employ a more variable-centered approach rather than a person-oriented approach. These programs should also aim at addressing the personality dimensions Extraversion and Emotional Stability because these proved to have a long-term effect on adolescent smoking. Further, it is assumed that these two dimensions are also related to the self-efficacy of an adolescent. Self-efficacy is a component often used in prevention programs aiming to enhance the self-efficacy of adolescents in order to resist smoking. For optimal effects, such self-efficacy prevention programs should differ for adolescents who are high on Extraversion and low on Emotional Stability. For instance, adolescents scoring high on Extraversion are more likely to encounter hazardous/risky situations and meet people with risky behaviors, and might therefore benefit more from self-efficacy enhancing information. Whereas adolescents low in Emotional Stability will benefit more of stress self-efficacy enhancing information. Future studies on personality-environment interactions need to establish whether certain
personality characteristics in adolescents serve as a protective factor or a risk factor in certain environments. Studies to date indicated that adolescents with a more outgoing interpersonal nature are at higher risk for smoking. Thus, public health campaigns and/or personalized treatment to prevent smoking should be aimed at this high-risk group.

Acknowledgements

This study was funded by a grant from the Netherlands Organization for Scientific Research (NWO).

References


