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### The smoking chain: friendship networks, education, social background and adolescent smoking behavior in the Netherlands

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## 6

# The Role of Norm-Enforcing Social Capital for the Smoking Behavior of Dutch Secondary School Students

### 6.1 Introduction and Research Problem

The previous chapter showed that secondary school friendship networks mediate school type effects on smoking behavior. These findings confirm previous research suggesting that friends are significant for adolescent smoking behavior (Cotterell, 2007; Ennett & Bauman, 1993, 1994). However, the development of young people's smoking habits also depends on the social context of the family (Avenevoli & Merikangas, 2003; Engels, 1998). The smoking habits of parents and parents' attitudes toward the smoking behavior of their children constitute the normative model for children. It is unclear, however, how the role of these parental characteristics and secondary school friendship networks relate to each other in terms of the smoking behavior of students in The Netherlands. In other words, does it matter what friends' parents do and think regarding adolescent smoking behavior? This question relates to the discussion in the social network literature on, for example, the number of steps between persons in the network reached by social contagion. In their famous book *Connected* (2009) and various articles in leading scientific journals, Christakis and Fowler argue that there are three degrees of social influence for traits such as obesity and smoking. However, these authors have been fiercely criticized for using flawed methods (Lyons, 2011). The most important limitation of their methods is that they treat the focal actor (ego) as independent of other actors, although the core of social influence bears upon the idea of dependence among actors. This

chapter will argue that there is, at least, social influence over social distance two (two degrees) concerning smoking behavior.

This chapter uses Coleman and Hoffer's (1987) insights on functional communities to examine the role of the relationship between parents and secondary school friendship networks for adolescent smoking in The Netherlands. In their study on academic achievement in U.S. Catholic secondary schools, these authors show that norm-enforcing social capital plays an important role in school performance. The networks of parents and fellow students, the norms within these networks, and the redundancy (multiplicity) of network ties (i.e., that all network ties foster the same norms) are crucial for good school performance. This approach is potentially relevant to understand why there are differences in smoking behavior between children across different school types in The Netherlands. Therefore, the questions of this chapter are as follows: How do parents' smoking behavior and attitudes towards smoking affect Dutch adolescents' smoking behavior? *How do the smoking behavior and attitudes toward smoking of friends' parents affect the smoking behavior of Dutch adolescents?*

## 6.2 Theory and Hypothesis

### 6.2.1 Norm-Enforcing Social Capital and Functional Communities

Coleman and Hoffer's description of the role of norm-enforcing social capital within functional communities for the development of adolescents considers four different relationships. First, there are the relationships between children and parents at home. In the case of smoking, parents establish normative behavior through their own smoking behaviors and attitudes toward smoking (Avenevoli & Merikangas, 2003; Engels, 1998). Second, there are the relationships parents have with other parents. These relationships make it possible for shared norms to exist within the community (Van de Werfhorst, 2005). Third, there are the relationships children have with other children's parents within the community (Dijkstra, et al., 2004). These relationships confirm the norms that children are exposed to at home via other channels. Fourth, there are relationships among children at school. Because fellow students are part of the same network, they reconfirm norms that are dominant within the community. Taken together, a community is functional when a child's network connections within the community provide similar information with respect to healthy conduct and attitude and reconfirm this information through redundant ties. Coleman and Hoffer argue that

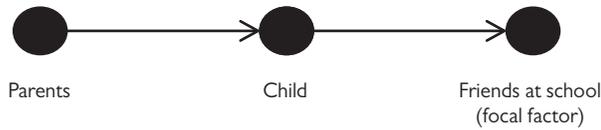
the communities around Catholic schools in the U.S. consist of networks with redundant ties between parents and children, which they call intergenerational closure<sup>1</sup>, that facilitate norms that promote school performance. Conversely, they argue that the absence of intergenerational closure in the communities around public schools result in poorer school performance and higher dropout rates.

### **6.2.2 Friends' Parents, Secondary Friendship Networks, and Adolescent Smoking**

Based on Coleman and Hoffer's insights, this chapter examines the role of friends' parents in the smoking of the focal actor. In other words, is there a social influence effect on smoking behavior over social distance two (see Figure 6.1)? Parents set a normative example for their children through their own smoking behavior and attitudes toward their children's smoking behavior. Social learning theory (Bandura, 1977a, 1977b) states that children learn behavior by observing, imitating, and confirming behavior. If parents do not smoke and disapprove of smoking, it is more likely that their children will not smoke and will find smoking objectionable. These mores of disapproval of smoking becomes second nature, which students take with them into their school network. In the school setting, students influence their friends with these mores, decreasing the likelihood that their friends will start smoking. Thus, the normative example set by friends' parents is likely to be relevant for the smoking behavior of the focal actor. Conversely, if the parents of a focal child's friends smoke and have a positive attitude toward smoking, this has a positive effect on their children's smoking behavior and, in turn, a positive effect on the focal actor's smoking behavior.

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<sup>1</sup> The term closure is misleading because the network is not completely "closed off." In contemporary social network analysis jargon, closure has a different meaning because it refers to a state of the network in which everyone knows everyone else (i.e., a network with a density measure of 1). In contrast, Coleman's definition refers to a dense network with ties that are redundant, which does not, by default, imply a network with a density measure of 1.

Figure 6.1 *Social influence at distance two*

Parents at home affect their child's behavior. In turn, children affect the behavior of their friends in school.

As tables 6.1 and 6.2 show, the dominant norm in The Netherlands is that parents reject smoking behavior among their children. According to Coleman and Hoffer, the relationships parents have with other parents are relevant for the enforcement of norms in the school setting. If the relationships between parents in the school setting improve, this will re-enforce the shared norms that reject smoking among parents in the school setting.

Although the friends' influence thesis is convincing because it reflects the only the mediating factor for the effect of parents' smoking behavior and attitudes, since the late 1970s, authors have suggested that similarity in behavior among friends may also be due to friendship selection (Cohen, 1977; Kandel, 1978). Various recent studies on adolescent smoking point out that both friends' influence and friendship selection contribute to the relevance of controlling for the latter (Mercken, Snijders, Steglich, & de Vries, 2009; Mercken, Snijders, et al., 2010a, 2010b; Mercken, Snijders, Steglich, & Vries, 2009). Two people can select one another as friends on the basis of the same key characteristics, such as lifestyle, behavior, and taste preferences (McPherson, et al., 2001). According to social exchange theory (Homans, 1961), it is easier to interact with like-minded people than with people who differ greatly. Interaction with a smoker can be a nuisance for someone who does not like smoking, decreasing the likelihood that a smoker and nonsmoker will become friends. For this reason, it is important to control for friendship selection based on similar smoking habits. Hence, the hypothesis of this chapter is as follows: Friends' parents' smoking behavior, their negative attitudes toward their child's smoking, and the relationships among parents in the school setting affect the smoking behavior of Dutch adolescents, even after controlling for friendship selection.

Table 6.1 *Parents' attitudes toward smoking: Parents think it is acceptable for their child to smoke occasionally. Source: DNSSU 2007, Trimbos Institute*

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Totally unacceptable	1494	36.3	36.9	36.9
Not acceptable	1696	41.2	41.8	78.7
A little acceptable	749	18.2	18.5	97.2
Acceptable	110	2.7	2.7	99.9
Very acceptable	5	0.1	0.1	100.0
Total	4054	98.4	100.0	

Table 6.2 *Parents' attitudes toward smoking: Parents say it is acceptable if their child smokes on a daily basis. Source: DNSSU 2007, Trimbos Institute*

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Totally unacceptable	2918	70.8	71.9	71.9
Not acceptable	993	24.1	24.5	96.4
A little acceptable	117	2.8	2.9	99.2
Acceptable	24	0.6	0.6	99.8
Very acceptable	7	0.2	0.2	100.0
Total	4059	98.5	100.0	

## 6.3 Methods

### 6.3.1 Operationalisation

The LNDA data described in section 2.2.2 are used to test the hypotheses.

#### *Main Variables*

The first dependent variable is *smoking*, which exists in a quantity-frequency interaction, as described in detail in Chapter Five. The second dependent variable is *friendship*, which is described in more detail in the previous chapter. *The percentage of smokers among friends* variable is computed for the random intercept models, indicating the percentage of friends with reciprocal ties who smoke on a daily basis.

*Norm-enforcing social capital* is operationalized with three individual-level variables and three ego-network variables: The variable for *parents' attitude toward their child's smoking* consists of two dummy

variables: *I do not know if I am allowed to smoke by my parents* and *I am not allowed to smoke by my parents*. *I am allowed to smoke by my parents* is the reference category. For the *parental smoking behavior* variable, the students were asked whether their father and mother smoke. These two questions were transformed into an ordinal variable, indicating whether the parents do not smoke at all (0), one of the two parents smokes (1) or both of the parents smoke (2). For the *parent-parent contact* variable, the students were asked how many of their schoolmates' parents are in contact with their parents. For the random intercept models, the *friends' parents' average smoking behavior* variable was computed to indicate the average parental smoking behavior of friends with reciprocal ties. For example, when a student has four reciprocal friendships and all of these friends score two on the parental smoking scale, the average smoking behavior of friends is  $((4 \times 2)/4) = 2$ . The *friends' parents' attitudes toward their child's smoking* indicator consists of one variable that represents the proportion of friends in the category *I don't know if I am allowed to smoke* and one variable that represents the proportion of friends in the category *I am not allowed to smoke*. Based on the variable of *parent-parent contact*, the average parent-parent contact for friends with reciprocal ties was computed to create the variable indicating *friends' parents contact with other parents*.

#### *Control Variables*

The *gender* variable was added because, especially in the lower grades, secondary school friendship networks tend to be gender segregated (McPherson, et al., 2001). The *school type* variable consists of two dummy variables for preparatory vocational education (VMBO) and intermediate general education (HAVO). Academic preparatory education (VWO) is the reference category.

Table 6.3 provides an overview of the descriptive statistics of the attribute variables used for the analyses in this chapter.

Table 6.3 *Descriptive statistics of attribute variables*

Variables	Obs.	Mean	Std. Dev.	Min	Max
Smoking behavior at Wave One	694	0.637	1.531	0	9
Smoking behavior at Wave Two	694	1.056	1.979	0	9
Percentage of daily smoking friends at Wave Two	694	8.313	18.210	0	100
Intermediate general education	694	0.166	0.372	0	1
Preparatory vocational education	694	0.572	0.495	0	1
Parents' smoking behavior	694	0.487	0.681	0	2
Age	694	13.452	0.608	11	16
Gender: male=1, female=2	694	1.513	0.500	1	2
Average smoking behavior of parents' friends at Wave Two	694	0.483	0.395	0	2
Not allowed to smoke	694	0.624	0.485	0	1
Do not know if allowed to smoke	694	0.199	0.399	0	1
Proportion of friends that are not allowed to smoke	694	0.622	0.252	0	1
Proportion of friends who do not know if they are allowed to smoke	694	0.195	0.213	0	1
Friends' parent-parent contact	694	3.729	1.381	0	7
Parent-parent contact	694	3.630	2.527	0	9

### 6.3.2 Data Analytic Strategy

The data analytic strategy of this chapter is similar to that of Chapter Five. First, the hypotheses are tested using random intercept models, which can take account of the nested structure of the data (students nested within classes), and in addition, they are tested with stochastic actor-based models and the software SIENA. The reason for this approach is that random intercept models, as pointed out in Chapter Two, are more easy to interpret for people not acquainted with the more complex SIENA models that are designed to take into account the problems of network dependency and unobserved network and behavior changes, as discussed in Chapter Two. The advantage of SIENA models over random intercept models is that instead of ego-network data, the model can analyze complete network data and account for potential friendship choices and the effect of indirect friendship ties. The dynamic character of the LNDA is well suited for SIENA modeling. Chapter Two provides an elaborate explanation of stochastic actor-based models and what they can do. The next paragraph briefly explains the SIENA effects relevant to answer the question of this chapter.

Chapter Five showed that parental educational level has no effect on smoking. Specifying both the random intercept models and the SIENA models with parental educational level in this chapter also shows no sig-

nificant effects on the other parameters in the models. For this reason, parental educational level is excluded from the final analyses presented in this chapter.

### 6.3.3 SIENA Model Specifications

#### *Behavior Influence Part of the Model*

In the behavior influence part of the model, it is possible to test how friends' smoking behavior influences the smoking behavior of the focal student. Therefore, the *average alter effect* is specified. A positive coefficient of this effect indicates that students tend to take on the smoking behavior of their friends. To examine the effect of friends' parents' attitudes toward smoking and their smoking behavior, the *alter's covariate average effects* are specified. Positive parameter values of these effects indicate that an increase in the average score positively affects the smoking behavior of the focal student. Furthermore, the variables for the direct effects of attitudes toward smoking and *smoking behavior of parents, gender, age, and school type* are modeled.

#### *Friendship Selection Part of the Model*

The main independent variable in the friendship selection part of the model is the variable that measures the extent to which students select their friends based on similar smoking behavior. This variable is called the *smoking similarity effect*. A positive smoking similarity effect indicates that students tend to make friends with other students who have similar smoking behaviors. Furthermore, smokers tend to be more sociable and make more friends (Engels, Scholte, van Lieshout, de Kemp, & Overbeek, 2006; Maggs & Hurrelmann, 1998). To control for these two characteristics, the *smoking alter effect* and the *smoking ego effect* are specified in the model. A positive smoking ego effect indicates that smokers are more likely to nominate others as friends compared to nonsmokers. A positive smoking alter effect indicates that smokers are more popular and more frequently mentioned as friends.

The control variables for the network evolution part of the model are *outdegree, reciprocity, transitivity, and gender similarity*. The first three effects are included by default in SIENA models (Ripley, et al., 2011). The outdegree parameter indicates the tendency of students to select fellow students as friends. This parameter is usually negative because students have a tendency not to nominate random other students as friends (Snijders, et al., 2010). The reciprocity parameter indicates the tendency of students to reciprocate friendships. This parameter is usually positive, which means that students prefer reciprocal friendships. The transitivity

parameter indicates the tendency to become a friend of a friend. A positive effect parameter indicates that a student nominates a friend of a friend rather than another arbitrary student.

## 6.4 Results

### 6.4.1 Results of the Random Intercept Models

Tables 6.4 a and b show the results of six random intercept models. The dependent variable is smoking at Wave Two. Model one shows that older students smoke more and that students in the preparatory vocational (at the  $p < 0.10$  significance level) and academic preparatory (at the  $p < 0.05$  significance level) school types smoke more compared to students in the academic preparatory school type.

Model two shows that parental smoking behavior has a positive effect on their children and that parents' attitudes toward their children's smoking behavior has a negative effect on that behavior. Contact between parents has no significant effect on smoking behavior. In comparison to model one, the effect of school type decreases slightly, indicating that a proportion of the school type effect is mediated by parents' smoking behavior and attitudes.

The outcomes of model three show that in addition to the effect of parents, friends' parents' smoking behavior and attitudes are relevant. The contact of friends' parents with other parents has no effect. Compared to model two, the parameter values for the two school type dummies decrease slightly. The parameter value for intermediate general education even becomes non-significant. This suggests that the school type effect is partially mediated by the behavior and attitudes of friends' parents.

In model four, the smoking behavior of friends is added. As a result, compared to model three, the parameter value of the preparatory vocational dummy decreases but is significant at the  $p < 0.01$  significance level, and the parameter value of the intermediate general vocational dummy also decreases and stays non-significant. Taken together, these outcomes are in line with the findings of the previous chapter suggesting that friendship networks mediate school type effects. The effects of parental smoking behavior become non-significant, but, despite a decrease in effect size, the effect of parents' attitudes toward smoking behavior remains significant. Furthermore, the effects of friends' parents' smoking habits and attitudes become non-significant, indicating that friendship network effects mediate this effect. Even when control-

ling for smoking behavior at Wave One, the effect of friends' smoking behavior remains significant.

The findings of these six random intercept models provide support for the idea that in addition to attitudes toward smoking behavior and the smoking behavior of parents, the attitudes and behaviors of friends' parents are highly relevant for youth smoking behavior. However, it remains unclear whether the association identified between smoking behavior and the smoking of friends is due to selection or influence. To disentangle these two possible mechanisms, the next paragraph discusses the outcomes of the SIENA analyses.

Table 6.4 *Random intercept models of smoking habits at wave two on parental smoking behavior and attitudes, parent-parent contact, school type and daily smoking of friends*

Model	0		1		2	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Constant	<b>1.116</b>	<b>0.000</b>	<b>-3.756</b>	<b>0.027</b>	-1.898	0.259
Age			<b>0.291</b>	<b>0.021</b>	0.220	0.071
Gender 1=boy, 2=girl			0.247	0.095	0.232	0.102
<b>School type</b>						
Preparatory vocational education			0.628	0.059	0.563	0.055
Intermediate general education			<b>0.746</b>	<b>0.003</b>	<b>0.567</b>	<b>0.011</b>
Academic preparatory education (reference category)						
Parents' smoking behavior					<b>0.372</b>	<b>0.001</b>
Not allowed to smoke by parents					<b>-1.065</b>	<b>0.000</b>
Do not know if allowed to smoke by parents					<b>-1.276</b>	<b>0.000</b>
Allowed to smoke by parents (reference category)						
Parent-parent contact					-0.007	0.798
Average smoking behavior friends' parents						
Proportion of friends who are not allowed to smoke						
Proportion of friends who do not know if they are allowed to smoke						
Friends' parents contacts with other parents						
Percentage of smoking friends at Wave Two						
Smoking behavior at Wave One						
Between class variance	<b>0.421</b>	<b>0.012</b>	0.202	0.140	0.130	0.224
Within class between student variance	<b>3.595</b>	<b>0.000</b>	<b>3.586</b>	<b>0.000</b>	<b>3.335</b>	<b>0.000</b>
Log likelihood	-1434		-1425		-1397	
Total variance	3.99		3.77		3.46	
Variance partition component	0.10		0.05		0.04	
Observations	694		694		694	
Number of groups	44		44		44	

**P < 0.05 in bold.** *p < 0.10 in italics*

Table 6.4 continued *Random intercept models of smoking habits at Wave two on parental smoking behavior and attitudes, parent-parent contact, school type and daily smoking of friends*

Model	3		4		5	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Constant	-0.965	0.564	-1.767	0.237	-0.874	0.444
Age	0.205	0.085	0.170	0.112	0.086	0.294
Gender 1=boy, 2=girl	<b>0.303</b>	<b>0.032</b>	0.217	0.088	0.145	0.134
<b>School type</b>						
Preparatory vocational education	0.473	0.091	<b>0.421</b>	<b>0.033</b>	0.234	0.121
Intermediate general education	0.300	0.177	0.164	0.320	0.053	0.675
Academic preparatory education (reference category)						
Parents' smoking behavior	<b>0.365</b>	<b>0.001</b>	<b>0.196</b>	<b>0.043</b>	0.051	0.498
Not allowed to smoke by parents	<b>-1.047</b>	<b>0.000</b>	<b>-0.840</b>	<b>0.000</b>	<b>-0.349</b>	<b>0.010</b>
Do not know if allowed to smoke by parents	<b>-1.219</b>	<b>0.000</b>	<b>-0.954</b>	<b>0.000</b>	-0.269	0.095
Allowed to smoke by parents (reference category)						
Parent-parent contact	0.000	0.99	0.011	0.662	-0.004	0.824
Average smoking behavior friends' parents	<b>0.673</b>	<b>0.000</b>	0.235	0.182	0.049	0.714
Proportion of friends who are not allowed to smoke	<b>-1.172</b>	<b>0.001</b>	-0.020	0.950	-0.103	0.672
Proportion of friends who do not know if they are allowed to smoke	<b>-1.572</b>	<b>0.000</b>	-0.145	0.700	-0.231	0.423
Friends' parents contacts with other parents	-0.005	0.928	0.036	0.440	0.033	0.354
Percentage of smoking friends at Wave Two			<b>0.050</b>	<b>0.000</b>	<b>0.025</b>	<b>0.000</b>
Smoking behavior at Wave One					<b>0.791</b>	<b>0.000</b>
Between class variance	0.106	0.221	0.000	0.882	0.000	0.887
Within class between student variance	<b>3.190</b>	<b>0.000</b>	<b>2.677</b>	<b>0.000</b>	<b>1.568</b>	<b>0.000</b>
Log likelihood	-1380		-1311		-1128	
Total variance	3.29		2.65		1.55	
Variance partition component	0.03		0.00		0.00	
Observations	694		694		694	
Number of groups	44		44		44	

P < 0.05 in bold, p < 0.10 in italics

### 6.4.2 Results of SIENA Estimations

#### *Friendship Selection Part of the Model*

All parameter values in the selection part of all models displayed in Table 6.5 are significant. The results show that when controlling for the structural network effects of outdegree, transitivity, and reciprocity, friends select each other on similar smoking habits. In addition to selection based on smoking behavior, gender similarity is an important trait for friendship nomination preferences. It appears that smokers are indeed more sociable because as they are more likely to be nominated by others as friends and are more likely to nominate others as friends.

*Behavior Influence Part of the Model*

Table 6.5 displays the results of four SIENA models. In all models, the parameters for the negative and significant tendency to smoke show that students generally find smoking unattractive. The positive and significant tendency to smoke squared parameters in all models show that smokers increase and incidental smokers decrease their smoking over time (polarization). In contrast with the outcomes of the random intercept models, none of the models shows a difference in smoking between boys and girls or age differences at the  $p < 0.05$  significance level. Model one shows that intermediate general students smoke more compared to academic preparatory students, indicating that school organization is important for non-cognitive outcomes. When controlling for the social capital indicators of smoking attitudes and behaviors of parents and contact with other parents at the individual level, the parameter value of the intermediate general dummy becomes non-significant, implying that this variable does not add an extra effect to the effect of the individual social capital indicator of parents' attitudes toward smoking. However, the parameter value of preparatory vocational education is significant, implying that, in addition to the individual social capital effects, school type is relevant for adolescent smoking. Thus, in addition to what a student's parents think, school type placement affects smoking behavior. When the effects of friends' parents' smoking habits and attitudes and contact with other parents are added in model three, the effects of school type become non-significant at the  $p < 0.05$  level, indicating that school type functions as a mediator for the effects of parental characteristics. Model three shows that if friends' parents disapprove of smoking, the smoking behavior of the focal actor is more negatively affected compared to the reference category of friends who are allowed to smoke; thus, friends' parents are relevant to smoking. In addition to the relevance of what parents think and do, the attitudes of friends' parents are also important, providing evidence for Coleman's idea of the relevance of norm-enforcing social capital. When controlling for the smoking behavior of friends in model four, however, which has a positive and significant effect, the effect of friends' parents' attitudes on smoking becomes non-significant. In other words, friends channel the effect of their parents' attitudes toward smoking on the smoking behavior of the focal actor. In model three the effect of friends' parents smoking is negative and significant at the  $p < 0.10$  significance level. In model four, when controlling for the smoking behavior of friends, the effect of smoking of friends' parents remains negative and significant. This finding is in contrast with the expectations of this chapter. Apparently, the

smoking behavior of friends' parents lessens the change of the focal actor to smoke.

Taken together, these findings provide partial evidence for the formulated hypothesis. No clear evidence was found for the role of the smoking behavior of friends' parents and the relationships between parents seem to have no effect. A clear effect was found of friends' parents' attitudes on the smoking behavior of the focal actor, which seems to be mediated by the friendship network, supporting Coleman's idea of the relevance of norm-enforcing social capital for the behavior of adolescents.

Table 6.5 *Results of SIENA analyses (five schools) for friendship relations, smoking behavior, parental smoking behavior and attitudes, and parent-parent contact*

Model	1		2		3		4	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
<i>Selection part of the model</i>								
Basic rate parameter friendship	<b>17.987</b>	<b>0.000</b>	<b>17.976</b>	<b>0.000</b>	<b>17.978</b>	<b>0.000</b>	<b>18.002</b>	<b>0.000</b>
Outdegree (density)	<b>-2.514</b>	<b>0.000</b>	<b>-2.514</b>	<b>0.000</b>	<b>-2.513</b>	<b>0.000</b>	<b>-2.513</b>	<b>0.000</b>
Reciprocity	<b>17.635</b>	<b>0.000</b>	<b>1.763</b>	<b>0.000</b>	<b>1.765</b>	<b>0.000</b>	<b>1.762</b>	<b>0.000</b>
Transitive triplets	<b>0.2026</b>	<b>0.000</b>	<b>0.203</b>	<b>0.000</b>	<b>0.203</b>	<b>0.000</b>	<b>0.203</b>	<b>0.000</b>
Gender similarity	<b>0.4217</b>	<b>0.000</b>	<b>0.422</b>	<b>0.000</b>	<b>0.421</b>	<b>0.000</b>	<b>0.421</b>	<b>0.000</b>
Smoking alter	<b>0.0453</b>	<b>0.000</b>	<b>0.045</b>	<b>0.000</b>	<b>0.045</b>	<b>0.000</b>	<b>0.045</b>	<b>0.000</b>
Smoking ego	<b>0.0678</b>	<b>0.000</b>	<b>0.067</b>	<b>0.000</b>	<b>0.068</b>	<b>0.000</b>	<b>0.068</b>	<b>0.000</b>
Smoking similarity	<b>0.6741</b>	<b>0.000</b>	<b>0.671</b>	<b>0.000</b>	<b>0.676</b>	<b>0.000</b>	<b>0.674</b>	<b>0.000</b>
<i>Influence part of the model</i>								
Rate smoking period 1	<b>30.599</b>	<b>0.000</b>	<b>3.015</b>	<b>0.000</b>	<b>2.930</b>	<b>0.000</b>	<b>2.999</b>	<b>0.000</b>
Tendency to smoke	<b>-0.787</b>	<b>0.000</b>	<b>-0.785</b>	<b>0.000</b>	<b>-0.844</b>	<b>0.000</b>	<b>-0.873</b>	<b>0.000</b>
Tendency to smoke squared	<b>0.1783</b>	<b>0.000</b>	<b>0.176</b>	<b>0.000</b>	<b>0.180</b>	<b>0.000</b>	<b>0.164</b>	<b>0.000</b>
Gender	<i>0.1574</i>	<i>0.091</i>	0.163	0.120	0.160	0.127	0.163	0.148
Age	<i>0.1498</i>	<i>0.073</i>	<i>0.143</i>	<i>0.101</i>	<i>0.150</i>	<i>0.083</i>	0.141	0.130
School type								
Preparatory vocational education	<i>0.2306</i>	<i>0.067</i>	<b>0.332</b>	<b>0.037</b>	<i>0.289</i>	<i>0.092</i>	0.222	0.182
Intermediate general education	<b>0.3172</b>	<b>0.043</b>	0.202	0.143	<i>0.293</i>	<i>0.093</i>	0.245	0.161
Academic preparatory education (reference category)								
Smoking behavior parents			0.064	0.351	0.107	0.168	0.099	0.219
Does not know if allowed to smoke by parents			0.021	0.887	0.043	0.788	0.062	0.713
Not allowed to smoke by parents			<i>-0.239</i>	<i>0.083</i>	<i>-0.231</i>	<i>0.094</i>	<i>-0.240</i>	<i>0.094</i>
Allowed to smoke (reference category)								
Parent-parent contact			<i>-0.010</i>	0.659	<i>-0.012</i>	0.605	<i>-0.013</i>	0.589
Friends do not know if allowed to smoke (influence via friends)					<b>-2.804</b>	<b>0.001</b>	<i>-2.325</i>	<i>0.055</i>
Friends not allowed to smoke (influence via friends)					<b>-1.269</b>	<b>0.013</b>	<i>-1.041</i>	0.163
Friends allowed to smoke (reference category) (influence via friends)								
Smoking of friends' parents (influence via friends)					<i>-0.586</i>	<i>0.070</i>	<i>-0.784</i>	<i>0.053</i>
Friends' parent-parent contact (influence via friends)					0.015	0.881	0.013	0.884
Friends' smoking (influence via friends)							<b>0.232</b>	<b>0.050</b>

**P < 0.05 in bold.** *p < 0.10 in italics*

## 6.5 Conclusion and Discussion

This chapter examined the role of parental smoking behavior and attitudes, relations among parents, and secondary school friendship networks for the smoking behavior of Dutch adolescents. To explain the difference in smoking habits between students across different school types, insights by Coleman and Hoffer on functional communities were

used. The focus was on the relations between parents and children, among parents, and among children within the school friendship network and how these relate to each other. Connecting to a recent discussion in the social network literature on social contamination (Christakis & Fowler, 2007, 2008; Cohen-Cole & Fletcher, 2008; Lyons, 2011), we asked over how many steps social influence occurs. Specifically, this chapter examined whether friends' parents are relevant to the smoking behavior of Dutch adolescents.

This chapter shows that friendship networks within schools are important for the transmission of parents' influence outside the school. Parents' attitude toward smoking and smoking behavior is not only relevant for the smoking behavior of their own children but also for their children's school friends. What parents think tends to be relevant for the norms present in the school friendship network. School types seem to have no effect independently but function as a mediating factor for parental effects.

In conclusion, both the relations with parents at home and the networks of friends within a school are important for the transmission of norms that influence adolescent smoking. School type plays a mediating role and, in contrast to Elstad's (2010) argument, has no effect independently. By examining the relationship between parental characteristics and friendship networks, it becomes clear how the different contexts in which young people find themselves relate to each other and contribute to smoking behavior. The frequently identified association between the smoking habits of the focal actor and that of his or her friends partly depends on the attitudes towards smoking of their friends' parents. For the discussion of the number of steps social influence reaches within a network, the findings of this chapter indicate that when accounting for ego dependency on alters, there is social influence at two steps from the ego.

There are several limitations to the findings in this chapter. As described in Chapter One, social capital consists of four factors: the network of the school setting, which consists of four types of relations; the information channeled by the network (in this case, norms); ego embeddedness in the network; and redundancy. In this chapter, only three of the four types of network relations described by Coleman and Hoffer were empirically examined. When examining the fourth type, the relationships between children and other children's parents within the community, different results may emerge. According to Coleman and Hoffer, a community is functional when parents correct each other's children. In this case, the effect of norm-enforcing social capital may be stronger

than indicated by the findings of this chapter. Another theoretical possibility not accounted for in this chapter is how parents influence each other's smoking behavior and attitudes toward smoking and how this relates to secondary school friendship networks. For example, if the parents of a focal actor only know other parents who smoke and condone smoking, this may affect the focal actor's parents' attitudes, which, in turn, may have a positive effect on the smoking behavior of the focal actor. This relates to another limitation of the data on parents' networks. This chapter uses a proxy variable for parental networks by asking children about their parents' relationships. Future research should collect network data among parents in the school setting. Furthermore, not controlling for friendship and parental networks outside of the school setting might bias the effects found in this chapter. For instance, Morgan and Sørensen (1999) argue that the effect of norm-enforcing social capital on educational achievement depends on the kind of norms that are fostered within the parental network and suggest that a different type social capital, norm-enforcing social capital, may have a different effect on educational achievement. This argument could also be applied to the effect of social capital on adolescent smoking behavior. The next chapter will address this issue.