Tampere University

HANNA AHO

Social Involvement and Adolescent Smoking

Associations and Students' Views of Smoking in a Vocational School Setting

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ACADEMIC DISSERTATION
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Miehelleni Jarille; lapsilleni Onnille ja Oivalle; ja äidilleni, jonka apu perheelle on ollut korvaamatonta.

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ABSTRACT

The aim of this dissertation was to investigate the association between smoking behaviour and social involvement with the family, school connectedness and peer relations in a vocational school setting. In addition, in an attempt to gain a deeper insight into adolescent smoking-related perceptions, practical nurse students' own views on their smoking behaviour were examined in focus groups.

The study used two types of datasets: 1) the first phase of the study utilized the Health Promotion study (2013), a quantitative nationally representative sample (n=34, 776) collected by the National Institute for Health and Welfare and 2) the second phase used qualitative focus group interviews (N=29). First, the association between adolescent smoking and social involvement was evaluated using statistical methods such as multinomial regression analyses. Second, discourse analysis was applied to clarify the data emerging from qualitative focus group interviews.

The quantitative results indicated that higher scores of parental involvement were reflected in a reduced likelihood of an adolescent individual smoking when adjusted with socioeconomic factors, parental smoking, and respondent's age. The likelihood of smoking was reduced in young people living with both parents in a nuclear family or in a dual-residence on alternate weeks. Those adolescents whose parents smoked were more likely to smoke than their peers with non-smoking parents. Daily smoking by a mother was clearly associated with her daughter's smoking, but paternal smoking was equally related to smoking in both genders of offspring. Students who smoked daily perceived that they were receiving less support from teachers. Furthermore, these teenage smokers liked school less and were truant more often than those who did not smoke. Moreover, having a close friend/friends, a school staff member smoking on the school's premises as well as the presence of bullying increased the likelihood that an individual would be a smoker. Qualitative results revealed that practical nurse students looked on smoking as a normal activity, felt that they smoked responsibly, thought that their smoking was under control and considered that smoking was a part of their identity.

The information emerging from this study may make parents more aware of why it is so important that they are actively involved in their teenager's life. Vocational training schools should undertake the following actions; increasing student

connectedness, decreasing bullying and prohibiting smoking in the surroundings of the school in accordance with the law of tobacco (2016). In guidance and programs aiming at cigarette cessation, more emphasis should be placed on peer attachment and smoking as a part of a teenager's identity.

TIIVISTELMÄ

Tämän väitöskirjatutkimuksen tarkoituksena oli selvittää ammattikoululaisten tupakoinnin ja perheen osallisuuden, kouluun kiinnittymisen ja ystävyyssuhteiden välisiä yhteyksiä. Lisäksi tutkittiin ryhmäkeskustelujen avulla lähihoitajaopiskelijoiden omia näkemyksiä tupakoinnistaan.

Kahta erilaista aineistoa käytettiin: 1) ensimmäisessä vaiheessa aineistona hyödynnettiin Terveyden ja Hyvinvoinnin Laitoksen (THL) keräämää kansallisesti edustavaa kouluterveyskyselyä (n=34 776) ammattikoululaisten osalta vuodelta 2013. 2) toisessa vaiheessa kerättiin laadullinen fokus-ryhmähaastatteluaineisto (N=29). Tutkimuksen ensimmäisen vaiheen aineisto analysoitiin multinomiaalisella regressioanalyysilla. Toisen vaiheen aineisto kerättiin kahdesta ammattioppilaitoksesta ja ryhmien keskustelut analysoitiin diskurssianalyysin avulla.

Tulosten mukaan yli kolmannes (36 %) ammattikoululaisista tupakoi päivittäin. Nuoret tupakoivat sitä todennäköisemmin mitä vähemmän vanhemmat osallistuivat nuoren elämään. Tupakoinnin todennäköisyyttä vähensi nuoren asuminen molempien vanhempien kanssa joko ydinperheessä tai vuoroviikoin vanhempien luona. Tupakoivien vanhempien lapset tupakoivat todennäköisemmin kuin tupakoimattomien vanhempien lapset ja tämä yhteys säilyi, vaikka vanhemmat olisivat lopettaneet tupakoinnin. Äitien päivittäinen tupakointi liittyi eri tavalla tyttöjen tupakointiin, mutta isien tupakointi oli yhteydessä samansuuntaisesti sekä tyttöjen että poikien tupakointiin. Päivittäin tupakoivat opiskelijat kokivat saaneensa vähemmän opettajien tukea, pitivät koulusta vähemmän ja lintsasivat enemmän kuin tupakoimattomat oppilaat. Myös se, että opiskelijalla oli läheinen ystävä/ystäviä, koulun henkilökunnan tupakointi sekä kiusaaminen olivat yhteydessä tupakointiin. Tupakoivat lähihoitajat normalisoivat tupakointia, kokivat olevansa vastuullisia tupakoitsijoita, ajattelivat tupakointinsa olevan hallinnassa ja kokivat tupakoinnin olevan osa identiteettiään.

Tutkimuksen tuottaman tiedon avulla voidaan vanhempia tukea osallistumaan teini-ikäisen elämään ja ymmärtämään oman tupakointinsa yhteys nuoren tupakointiin. Opiskelijoiden kouluun kiinnittymisen lisääminen ja tupakointikiellot saattavat edistää tupakoimattomuutta. Tupakonnin lopettamiseen liittyvässä ohjeistuksessa tulisi huomioida sosiaaliset suhteet ja tupakointiin liittyvä identiteetti.

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α	Cronbach alpha coefficient
CHINAL	The Cumulative Index to Nursng and Allied Health
CI	Confidence interval
EHD	Ecology of Human Development
ERIC	Education Resources Information Center
Md	Median
Medline	Medical Literature Analysis and Retrieval System Online
MeSH	Medical Subject Headings
N	Sample size
OR	Odds ratio
p	Statistical significance
PBT	Problem Behavior Theory
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PsycINFO	Psychological database
RYO	Roll-your-own tobacco
SHP	School Health Promotion study
Scopus	Multidisciplinary Abstract and Citation Database
SD	Standard deviation
SES	Socioeconomical Status
SLT	Social Learning Theory
SPSS	Statistical Package for the Social Science
THL	National Institute of Health and Wellfare
TM	Tailor Made cigaettes
TPB	Theory of Planned Behavior
TTI	Theory of Triadic Influence
WHO	World Health Organization
$\chi 2$	Chi Square

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ORIGINAL PUBLICATIONS

The summary is based on the original articles based on the four sub-studies listed below. The summary contains both published articles and unpublished data.

I Aho H, Koivisto A-M, Paavilainen E, Joronen K. 2018. Parental involvement and adolescent smoking in vocational setting in Finland. *Health Promotion International* 33(5), 846-857.

II Aho H, Konu A, Koivisto A-M, Joronen K. 2019. Relationship among School Connectedness, Smoking Policy, and Smoking Behavior in Finnish Vocational Schools. *Health Behavior and Policy Review.* 6(1), 57-71.

III Aho H, Koivisto A-M, Joronen K. 2019. The relationship between peer relations, self-rated health, and smoking behavior in secondary vocational schools. *Nursing Open,* Accepted for publication.

IV Aho H, Pietilä I, Joronen K. 2019. Practical nursing students' discursive practices on smoking in Finland. *International Journal of Qualitative Studies in Health and Well-being.* Submitted.

1 INTRODUCTION

According to the World Health Organization (2016), there are one billion smokers worldwide. Nearly 4000 adolescents try their first cigarette yearly in the United States with one in four of these adolescents transitioning to daily smoking (U.S. Department of Health and Human Services., 2012). By comparison, some 15% of young Australians aged 15–24 reported being a smoker in 2010 (World Health Organization., 2015) and in Finland, of the adolescents aged 14–17 approximately 12% smoke daily (Kinnunen et al., 2016). However, adolescent smoking polarizes in Finnish society. In the year 2013, the proportion of daily smokers among Finnish high school was 8%, compared with 36% among vocational school students (National Institute for Health and Welfare, 2016). This huge difference of smoking rates is similar internationally and vocational school students' smoking is comparable to unemployed youth (Bonevski, Guillaumier, Paul, & Walsh, 2013; Huisman, van de Werfhorst, & Monshouwer, 2012; Loukas, Murphy, & Gottlieb, 2008). Also, in Finland, there is longitudinal evidence that adolescents and young adults with lower levels of academic achievement seem to be more likely to smoke cigarettes (Latvala et al., 2014).

Cigarette smoking is usually initiated before the age of 18 and experimenting with cigarettes often develops into regular smoking later in adolescence and in life (American Lung Association., 2016; Sargent, Gabrielli, Budney, Soneji, & Wills, 2017). According to the longitudinal study this association remains regardless of the level of experimentation, or whether the adolescent subsequently rejected early smoking (Saddleson et al., 2016).

Research has shown that smoking is associated with other health risk behavior including alcohol and other substance use (Dierker, Braymiller, Rose, Goodwin, & Selya, 2018; Feemster, Proctor, & Hoffmann, 2016; O'Loughlin, Dugas, O'Loughlin, Karp, & Sylvestre, 2014) and a low level of physical activity (Lebron et al., 2017; Veliz, McCabe, McCabe, & Boyd, 2017). Associations have also been established with school-related factors such as lower academic achievement (Gaete, Ortuzar, Zitko, Montgomery, & Araya, 2016; Kuipers et al., 2016), bullying (Jochman, Cheadle, & Goosby, 2017), and truancy (Barreto et al., 2012; Pengpid & Peltzer, 2017; M. Vaughn, Maynard, Salas-Wright, Perron, & Abdon, 2013). In addition,

there is evidence of those behaviors are often cumulative and occur simultaneously (Blake, Malik, Mo, & Pisano, 2011) leading to fatal diseases later in adulthood (World Health Organization, 2015). Nonetheless, health inequality of smokers has been found to emerge already in teens. First and second-year vocational school students who smoke perceive their health significantly poorer than their non-smoking peers. This appears to be evident also with occasional smoking girls. (Aho, Koivisto & Joronen, 2019)

Adolescent smoking has been studied in many ways to find and accumulate associations and to make recommendations to curb adolescent smoking. Identifying and understanding the reasons why adolescents smoke remains paramount to reducing tobacco use in adolescence. (Roditis, Lee, & Halpern-Felsher, 2016).

Social involvement with parents, school connectedness and social relations with peers influences to various health-related behaviors such as smoking (Andersen et al., 2015; Tzelepis et al., 2015). Family bonding, strong parent-child relationship (de Araujo, Loukas, & Gottlieb, 2011; Hong, Lee, Grogan-Kaylor, & Huang, 2011), and parents' negative reactions toward smoking have an important role in reducing the onset of daily smoking in adolescence (Barreto et al., 2012; Mahabee-Gittens, Xiao, Gordon, & Khoury, 2012).

School connectedness refers to social bonding, belonging, engagement and attachment (Chung-Do, Goebert, Chang, & Hamagani, 2015). The common denominators of school connectedness are school relationships as well as the student's perception of teacher support (Centers for Disease Control and Prevention (CDC), 2010; Chung-D et al., 2013; Chung-Do et al., 2015). Students perception of their teachers caring about them personally and about their learning are more likely to be engaged in school, to do better academically, and to have fewer health-risk behaviors (McNeely & Falci, 2004).

Peer relationships and perceptions of social belonging have been found to mitigate the effects of risk factors linked to smoking (Forster, Grigsby, Bunyan, Unger, & Valente, 2015; Tang & Loke, 2012). However, the number of smoking peers (Almutairi, 2014; Cengelli, O'Loughlin, Lauzon, & Cornuz, 2012; Seo & Huang, 2012; Talip, Murang, Kifli, & Naing, 2016; Wellman et al., 2016) and attachment to smoking peers (Almutairi, 2014; Cengelli et al., 2012; Choi & Smith, 2013; Hong et al., 2011; Seo & Huang, 2012; Talip et al., 2016) increases non-smoking adolescent to smoke or to take up smoking over time (Simons-Morton & Farhat, 2010).

In the social environment, adolescents are inevitably aware of the stigmatizing effects of their smoking (Tombor, Herbec, Neale, Michie, & West, 2015). The stigma

of smoking is related to negative feelings like guilt, shame, and embarrassment (Antin, Annechino, Hunt, & Lipperman-Kreda., 2017; Evans-Polce, Castaldelli-Maia, Schomerus, & Evans-Lacko, 2015) causing anger and frustration toward nonsmokers who openly disagree with smoking (Evans-Polce et al., 2015). The discomfort at smoking-related stigma is countered with different coping strategies, such as making a distinction between oneself and a "typical" smoker, getting defensive, or continuing to smoke because of the experienced stigma and general anger and frustration with the restrictive policies around smoking (Evans-Polce et al., 2015). According to research evidence, smoker identity can cause this—which refers to how we see ourselves and our behaviour—and seeing oneself as a person who smokes. Smokers with strong smoker identity have been shown to resist quitting attempts and have more negative responses to smoking bans (Hefler & Chapman, 2015; Silla, Beard, & Shahab, 2014; Tombor et al., 2015). In group identity, the adolescent feels as if he or she belongs to a group that smokes (Meijer, Gebhardt, Dijkstra, Willemsen, & Van Laar, 2015).

The first legislation to regulate smoking came into force in 1977, since then tobacco act have been moderated four times. The current tobacco act (2016) in Finland forbids smoking in public buildings and outside areas around schools where mainly underage (i.e., under 18) people study. Therefore, vocational schools, hospitals, and other health care environments are smoke-free areas by law (Finlex, 2016). However, the prevalence of nurses who smoke ranges from 4% to 47% being less popular in North America as compared to Europe (Duaso, Bakhshi, Mujika, Purssell, & While, 2017) whereas practical nurses are significantly more often likely to smoke than doctors or nurses (Sarna, Bialous, Karabi, Antonio, & Yang, 2014).

Many questions remain regarding social involvement for adolescent daily smoking, occasional smoking, and former smoking. The aim of this dissertation study is to investigate aspects of vocational school students smoking and its association with social involvement with parents, school, and peers in their own environment. The effectiveness of smoking policies within vocational institutions has also gone unexamined, therefore policies regarding smoking during school hours at school premises will be investigated. Moreover, practical students view of their smoking as future health care workers are researched analysing their discursive practices based on interview material from focus groups.

2 REVIEW OF PREVIOUS RESEARCH

2.1 Theories describing smoking and substance use in adolescence

There are numerous theories in the association of social environment and adolescent behaviour in social context. I will shortly introduce five approaches to understanding adolescent smoking uptake: social learning theory (Bandura, 1977), the Theory of Planned Behavior (Ajzen and Fishbein, 1980), Problem Behavior Theory (Jessor & Jessor, 1977), and the Ecology of Human Development (Bronfenbrenner, 1977) and Theory of Triadic Influence (Flay & Petraitis, 1994).

All the social theories mentioned here have been used as a theoretical background in adolescent smoking research over the years. Some social learning and social context theories and those that concentrate of intrapersonal views have been integrated together because differences across theories may affect their relative abilities to predict all smoking behaviour, such as smoking uptake versus frequent smoking (Collins & Ellickson, 2004). The social learning theories highlight the importance of the social learning process with significant people such as parents and peers. Because of positive learning, adolescents are typically protected from health-compromising behaviour such as smoking providing that the significant people in an adolescent's life discourage smoking and cigarettes are less accessible.

2.1.1 Four theories of behaviour in adolescence

Social Learning Theory

Bandura's (1977) the social learning theory (SLT) has been used as theoretical background for several studies of adolescent smoking (Collins & Ellickson, 2004; Grindal & Nieri, 2016; Lochbuehler, Schuck, Otten, Ringlever, & Hiemstra, 2016). SLT suggests that repeated observation of family, friends and others such as teachers

and neighbours smoking behaviour will lead to a representation of smoking and, consequently, an increased likelihood that the smoking behaviour will eventually be successfully performed as observed (modelling)(Akers & Lee, 1996). Furthermore, the observer will receive vicarious reinforcement for smoking by enjoying smoking or projecting this desired image of a smoker (Cowdery & Trucks, 1994; Kauranen, 2013; X. Wen et al., 2008). There is evidence of tailored smoking cessation programs which are based on changing the model for smoking (Mason, Gilbert, & Sutton, 2012).

Social development theory by Vygotsky (1962) looks beyond the observation and modelling of an adolescent. According to Vygotsky family and friends (influential agents) affect the quality and content of the adolescent's socialisation with others (Wertsch, 1985). The quality of parent-child communication, closeness and parental monitoring, and knowledge of adolescents' life is essential for learning (Gottman, Katz, & Hooven, 1996; Nikken & Schols, 2015).

Theory of Planned Behavior

The Theory of Planned Behavior (TPB) was constructed based on the Reasoned Action Model for understanding, predicting, and changing individual's social behaviour. Basically, the roots of experimental substance use are found in adolescents' beliefs about substances and the likely outcomes that will follow of this behavior. Attitudes toward smoking, subjective norm, and perception of behavioural control lead to the formation of a smoking intention. The more favourable the attitude and subjective norm, and the greater the perceived control, the stronger the person's intention to start smoking. Intention precedes a behaviour and people carry out their intentions when the opportunity arises. In addition to intention, perceived behavioural control may contribute to smoking behaviour (Ajzen, 2012).

Consequently, the key to preventing smoking initiation is through persuasive messages that target substance-specific beliefs. First, persuasive messages should decrease adolescents' expectations regarding the positive consequences of smoking (e.g., comprehensive talk of health dangers) and potential benefits of smoking (e.g., social approval or coping with stress). Second, messages should alter adolescents' evaluations of the apparent costs and benefits of smoking (e.g., health risks). Third, messages should challenge adolescents' perceptions concerning the normative nature of smoking (smoking prevalence among peers). Finally, messages should provide adolescents with information and skills that directly promote feelings of refusal and self-efficacy (Collins & Ellickson, 2004)

Problem Behavior Theory

Problem-Behavior Theory (PBT) is a framework which helps to explain the nature and development of alcohol abuse, drug misuse and other problem behaviours such as smoking among adolescents. Behaviours are viewed as a part of a set of psychosocial variables that influence one another. 1) Objective social environment includes factors such as family background and the opportunity to have access to cigarettes. 2) The perceived environment includes parental and friend approval of smoking (normative beliefs), friends' behaviour, and the relative importance of to whom adolescent can confide (parents vs. friends). The proneness to adolescent problem behaviour includes low parental disapproval of problem behaviour, low parental control, support, and low parent influence. Additionally, high peer approval and model of problem behaviours, low peer controls, and high peer influence. (3) Personality factors such as low value of academic achievement, a low self-esteem, and positive attitudes toward youth resistance to adult authority. Further, problem behaviour proneness includes personality factors such as higher value on independence and greater social criticism. The balance between the three systems of variables and the instigations and controls of the systems reflects the proneness of problem behaviour of each adolescent (Collins & Ellickson, 2004; Donovan, 2005; Jessor, ; Jessor & Jessor, 1977; Jessor, 1987)

Ecology of Human Development (EHD)

Bronfenbrenner's ecology of human development (Bronfenbrenner 1977) theorizes that human development takes place within a set of nested and changing environments and that multifaceted interactions within and between those environments shape behaviors. Previous research on smoking that has used Bronfenbrenner's theoretical model for theoretical background of their study (Ennett et al., 2010; Hong et al., 2011; Joronen & Åstedt-Kurki, 2005; L. Vaughn & Jacquez, 2011) are intrigued over the different social systems children and adolescents are influenced indirectly. The social context close to the adolescent, the proximal and major settings in which youth development takes place are so-called *microsystems* of adolescents (family, peer, and school context). *Exosystems* are more distal social environments such as neighbourhoods, cultural values, and traditions. Microsystems are situated in each exosystem and it has primacy over exosystems in influencing development. Interrelations and interdependency among microsystems (family, friends, school context) are called *mesosystems*. Bronfenbrenner suggests that exosystems tend to impinge on microsystems and mesosystems in a unidirectional

way and interactions between exosystem and microsystems are not suggested (Ennett et al., 2010; Joronen & Åstedt-Kurki, 2005). The chronosystem consists of consistency or change of the individual and the environment over time such as historical events or changes in family structure (Hong et al., 2011). The strength of various social influences depend on proximity & frequency of contact, where the closest circles of influences include the people with whom adolescents associate most of the time (family and peers) and whose influence on smoking, is likely to be the greatest (Simons-Morton & Farhat, 2010).

2.1.2 Theory of triadic influence: Theoretical framework of influences on tobacco use in adolescence

Understanding and preventing adolescent smoking is better understood with a multifaceted approach where several theories are integrated instead of explained with any of the theories alone (Collins & Ellickson, 2004; Talip et al., 2016; X. Wen et al., 2008). The theoretical background of this study is the theory of triadic influence (TTI).

Theory of triadic influence by Pertraitis, Flay, and Miller (1995) is based on response to the problem of multiple theories and multiple ways of explaining the same phenomenon. Pertraitis et al. (1995) reviewed 41 of the most prominent theories (including those explained in the previous section) of experimental substance use and subsequently identified overlaps and gaps. Two main dimensions were found; levels of causation and streams of influence. The analysis produced a framework for understanding adolescent substance use. With the theory, it is possible to reflect on what influences smoking among young people and why. (Petraitis, Flay, & Miller, 1995).

Levels of causation

The theory of triadic influence predicts adolescent behavior by three *levels of causation.* All three levels influence behavior differently. a) The ultimate causes are relatively stable causes that adolescent cannot much influence. These ultimate causes include such cultural environment that include for example the availability of good schools and recreational activities, parental values (warmth, support, supervision), but also the sociodemographic background, politics, and age. Furthermore, ultimate-level causes include personality traits that cannot be easily changed, such as impulse control, temperament, sociability (Flay & Petraitis, 1994)

b) Distal-level causations are variables affecting behavior that adolescents have some control over. The first level includes self-control, bonding to parents or rebellious role models (the social-personal nexus) that mirror the quality and quantity of social interactions between adolescents and social and cultural surroundings. A distal-level influence includes values, expectations, and evaluations that contact with social surroundings brings about. For example, expectations of success at school and, at the same time, of relationships with friends who attach great importance to academic achievement (Snyder & Flay, 2012)

c) Proximal-level causations are highly predictive of a specific behavior including individuals' decisions, normative perceptions, intentions, and experiences that have a direct effect on behavior. These include others to encourage of experiment with substance, adolescent holding positive attitudes towards substance use and feeling capable of using particular substance. Although, proximal level predictors are under the control of an adolescent, after all, behaviors are influenced by the distal and ultimate causes described above (Flay & Petraitis, 1994; Flay, Petraitis, & Hu, 1999; Snyder & Flay, 2012)

Streams of influence

The causes of behavior are also categorized into three influencing streams, which vary within the levels of causal relationships explained in the previous paragraph. (1) An intrapersonal stream begins at the ultimate level that is difficult to influence by an adolescent, such as personality traits such as openness to experience or extraversion. These ultimate level intrapersonal causes are directly affected by social-personal nexus (social skills, self-determination, and will to behave in a certain way and skills to succeed in behavior). This entity forms self-efficacy for a particular behavior, such as performing homework after school. (Flay & Petraitis, 1994; Flay et al., 1999; Snyder & Flay, 2012)

(2) Social influences also begin with the ultimate causes social surroundings that are out of adolescents control (e.g., quality of the school, parenting practices or family functioning). The social influences continue through social/personal nexus which includes the strength of bonding with influential people around the adolescent, such as parents, peers, and teachers, and the behaviors of those people that act as role models (weak attachment to family members but strong relations to friends and strong desire to please them). The stream then continues through motivation to comply with various role models. The social influences end with

normative beliefs of smoking and perceptions of social pressures to engage in smoking (Flay & Petraitis, 1994; Snyder & Flay, 2012)

(3) The cultural-environmental or also called cultural-attitudinal stream begins with cultural elements that are relatively stable and out of adolescents' control, e.g., political, religious, economic (poor employment prospects), influences in mass media, and policies (public policy towards substance use). Then the cultural environment stream flows into distal levels of causation including the interaction's individuals have with political institutions and the information and values they absorb from their culture. The cultural-environmental stream continues to the expectations from behaviour, and how one evaluates various consequences of this behaviour, and commitment to conventional values and to parents. Together all these influences produce adolescent's attitudes toward a specific behaviour, such as attitudes and expectations of experimenting with substances (Flay & Petraitis, 1994; Snyder & Flay, 2012)

Each stream ends in affective/cognitive factors(self-efficacy, social normative beliefs, attitudes) that influence an individual's intentions. The streams influence in other streams and are often mediated by or curb influences in other streams (Snyder & Flay, 2012)

Table 1. Rationale for Theoretical Foundations of the Study

Theoretical foundation	Origin	Purpose
Social learning theory (SLT)	Bandura (1977, 1986) Akers 1977	Social interactions and repeated observation with parents, peers and schoolmates smoking will lead to an increased chance of adolescent smoking behaviour
Theory of planned behavior (TPB)	Ajzen and Fishbein, 1980	Attitude toward smoking, adolescents' norms, and perceived control of the behaviours together shape adolescent intentions and future behaviours i.e., behaviour is determined by behavioural intentions.
Problem behavior theory	Jessor and Jessor, 1977	Surrounding conditions, personality, and the behaviour serve either lead to problem behaviour or reduce participation in problem behaviour.
Ecology of human development	Bronfenbrenner (1977)	Smoking and alcohol use of an adolescent is influenced or inhibited by the interrelations of interactions between social interaction and micro-, meso-, exo-, macro-, and chrono systems
Theory of triadic influence (TTI)	Flay & Petraitis (1994)	Integrating 41 theories to understand the multifaceted problem of adolescent tobacco onset. TTI is organized to dimensions three levels of causation and three streams of influence. With model, it is possible to reflect on what influences smoking among young people and why

2.2 Previous research on adolescent social context and smoking

Overview of reviews are designed to compile and summarize data from systematic reviews, and reviews to provide relevant evidence for cumulating knowledge and for decision-making (Pollock, Fernandes, Becker, Featherstone, & Hartling, 2016).

Adolescent smoking and its association to family, school, and peer context were overviewed from reviews as primary outcomes. As a secondary outcome personality trait and psychological characteristics that were associated with smoking habit were introduced shortly. Review of reviews and systematic reviews were used for literature search for being able to review more high-quality literature than in conventional methods.

Theory of Triadic Influence (TTI) that was introduced in detail in the previous section (3.2) provides a theoretical framework for this review of reviews. First, the outcomes that could relate to the degree of interaction with family, school, and peers are presented in separate sections. Finally, all these findings will be presented as levels of causation and streams of influences.

2.2.1 Search strategy and results

A systematic literature search was carried out on September 12, 2018, from the following databases: Medline (Ovid), CINAHL, ERIC, and PsycINFO. The search Medical Subject Hedings (MeSH terms) for Medline and specific controlled vocabulary for databases for publication types covered smoking ("cigarette", "tobacco", "tobacco smoking", "cigar smoking", "cigarette smoking") and adolescent or young adult ("adolescen*", "young adult*", "teenage*", "student*"). Social involvement with family school and peers was searched with ("social involvement", "social influence", "social interaction", "school*", schools or community colleges", "teacher*", "bullying", "friend* or peer*", "peer group", "social networks", "famil*", "mother*, father* or parent*"). Additionally, these search terms were used for database Scopus but limited to cover the title only.

Search was limited to cover journals written in English and published between years 2008-2018. Option for selecting previewed journals was used with CINAHL database. Review, systematic review, evidence synthesis* meta-analysis*, meta-synthesis* was additionally searched form titles and summaries.

Inclusion criteria were: data from 2008, focus on adolescent or young adult smoking, and family involvement, family interaction, school context, and peer relations. There were overlapping age ranges for child and adolescent in different databases. In this study, an adolescent was defined as a person 10-18 year of age and young adult 19-24 years of age.

Exclusion criteria were studies that examined other than smoking cigarette (e.g., vaping, shisha smoking, snuff), intervention and cessation programs, other than English and availability in full-text. The exclusion criteria were based on the 2013 school health promotion study. The total number of systematic reviews and reviews was 291. There were 115 duplicates removed. Total of 176 systematic reviews and reviews were included in the literature search and screened systematically with exclusion and inclusion criteria. Limitation of this data extraction was that it was not done with two or more researchers.

Total of 18 systematic reviews and reviews were included for analysis. Accepted studies are shown in table 2. The selection process is described as in PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart in figure 2.

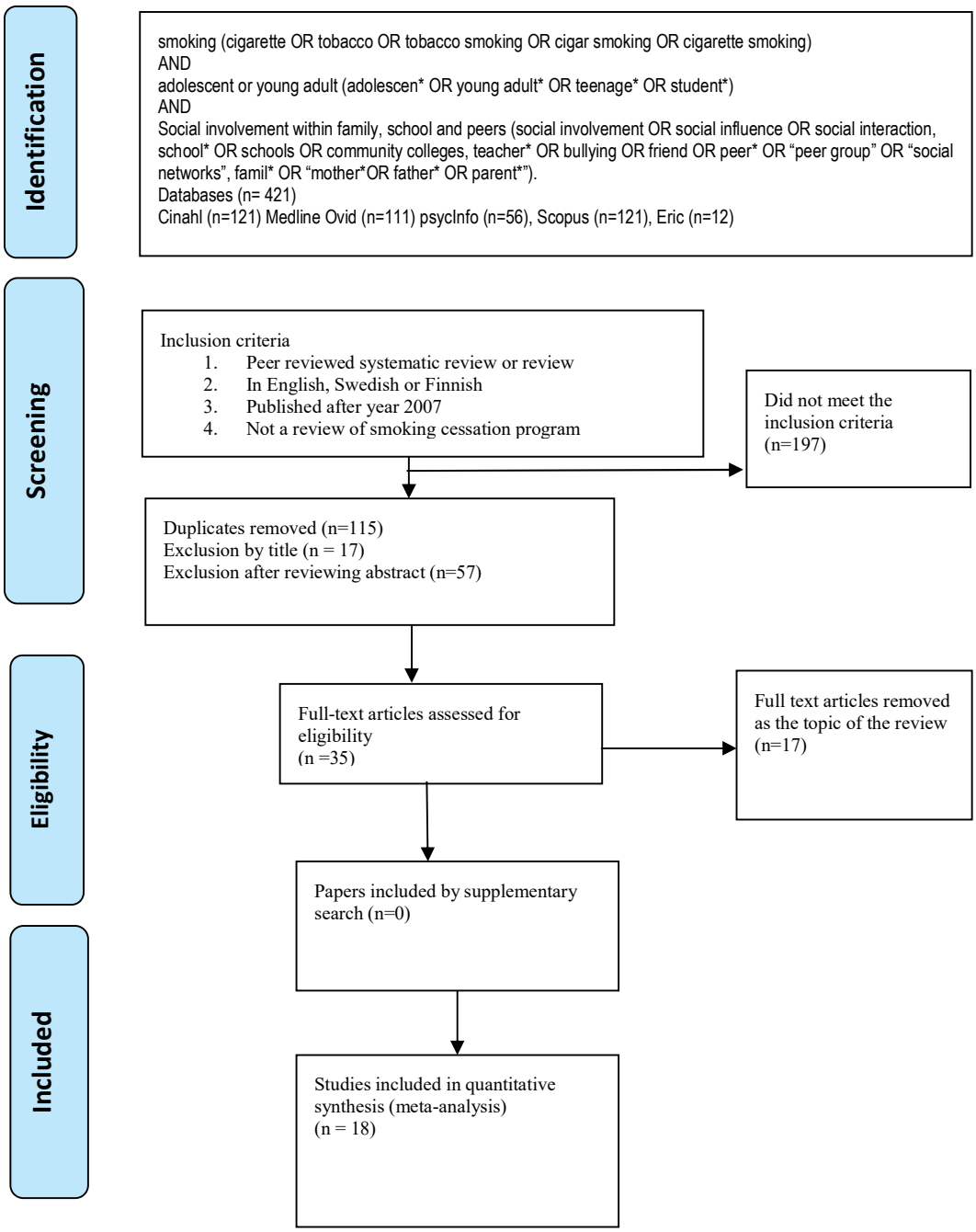

Figure 1. Flowchart of the review selection process (Prisma 2009)

The 18 reviews and systematic reviews that were selected for this review of reviews are listed in table 2. Additionally, the main results for selected reviews and systematic reviews are presented in appendix 1. The original reviews were of an international nature covering all continents except Africa.

Potential predictors for smoking uptake were arranged into four broad contexts based on the research results. These contexts were family context, school context, peer context, and personality features. This review of reviews focuses on the main effects of adolescent smoking uptake; findings of interactions and prevention programs are not assessed in this review.

Although the reviews examined individuals with different ethnic backgrounds, similar explanations were found in all these countries which suggests that the results can be generalized to many cultures. Several predictors and associations for smoking onset and regular smoking in adolescence were detected in the reviews and systematic reviews. There is a general consensus about several of the factors that contribute to smoking onset in adolescence as the research results have accumulated over decades.

However, there were some limitations. It was difficult to make direct comparisons and a synthesis of the data from the 16 reviews as they varied in their research methods, sample populations, ages of the respondents, and the measure used to assess smoking behavior. Although this review of reviews was restricted to articles that had been published during the last ten years, some of the original trials discussed by these authors originated from the 1980s or 90s and furthermore, some only reviewed longitudinal studies, but some included cross-sectional samples alongside longitudinal trials. Some reviews were truly international, others were only concerned with trials conducted in one nation. Finally, some reviews had a narrow study focus whereas other explored wider study objectives.

Table 2. Characteristics of the Original Systematic Reviews and Reviews

Reference (year)	Type of review	Number of included studies	Year range of included studies	Age range of study participants	Sample size of included studies
Wellman et al. (2016)	Systematic review of longitudinal studies	53	1984-2015	>18	Information not included
Talip et al. (2016)	Systematic review	20	2005-2015	10-19	131 729
Okoli et al. (2013)	Systematic review	12	1980-2010	8-19	10 831
Skeer et al. (2013)	Systematic review	18(/7 of tobacco)	2000-2012	10-18	186 731
Filho et al. (2012)	Systematic review	59	< 2011	10-19	130 720
Freedman et al. (2012)	Systematic review	27	1998-2010	18-25	Information not included
Gengelli et al (2012)	Systematic review	176	1984-2010	10-29	5182
Hong et al. (2011)	Review	Information not included	1980-2010	10-24	Information not included
Sullivan et al. (2011)	Systematic literature review of cross-sectional and longitudinal studies	57	1989-2009	12-19	281 820
Leonardi-Bee et al. (2011)	Systematic Review	58	2000-2009	2-12 and 13-19	23000
Emory et al. (2010)	Review of cross-sectional and longitudinal studies	19	1990-2010	11-18	106 255
Ansari-Moghaddam et al.(2016)	Systematic Review	58	2000-2014	14-19	80 588
Almutairi (2014)	Review	12	1999-2013	12-19	12009
Choi et al. (2013)	Systematic review	8	1994-2010	Up to 18	5067
Simons-Morton et al. (2010)	Review of longitudinal studies	13	1999-2010	12-18	62172
Seo et al (2013)	Systematic review of cross-sectional and longitudinal studies	10	2018-2010	13-18	28,263

2.2.2 Family context and adolescent smoking

The onset of smoking uptake by adolescents and then its progression to regular smoking have been associated with multiple factors in the family context. Certain sociodemographic features, such as lower family income (Ansari-Moghaddam et al., 2016), lower parents' education (Ansari-Moghaddam et al., 2016; Wellman et al., 2016), family unemployment (Hong et al., 2011; Talip et al., 2016; Wellman et al., 2016), type of family residence (Ansari-Moghaddam et al., 2016; Talip et al., 2016), and family type other than nuclear family (Cengelli et al., 2012; Sullivan, Bottorff, & Reid, 2011; Talip et al., 2016; Wellman et al., 2016) have all been linked with smoking onset in adolescence. Mother's smoking while pregnant or after giving birth has been found to influence smoking by their daughters more than their sons (Sullivan et al., 2011) and lack of partaking of family meals seems to associate with smoking onset in girls more than in boys(M. Skeer & Ballard, 2013).

One significant predictor of adolescent smoking uptake identified all around the world is smoking by either a parent or sibling (Almutairi, 2014; Ansari-Moghaddam et al., 2016; Cengelli et al., 2012; Emory, Saquib, Gilpin, & Pierce, 2010; Filho, Campos, & Lopes, 2012; Freedman, Nelson, & Feldman, 2012; Hong et al., 2011; Leonardi-Bee, Jere, & Britton, 2011; Talip et al., 2016; Wellman et al., 2016). According to one review, smoking by the mother is the strongest predictor of adolescent smoking but if both parents are smokers then the risk of adolescent smoking onset is nearly tripled. (Leonardi-Bee et al., 2011). Several explanations have been postulated why parental smoking is such a strong predictor of adolescent smoking, for example, modelling and imitation of a parent or siblings (Almutairi, 2014; Simons-Morton & Farhat, 2010) (see the Social Learning Theory introduced in the previous section). Children are exposed to second-hand smoke when either one or both parents smoke (Emory et al., 2010; Filho et al., 2012). Furthermore, smoking parents are more likely to have positive attitudes towards smoking, for example they may consider that smoking is a perfectly acceptable behavior. These parental attitudes may be transferred to their adolescent children since it is known that favorable personal beliefs and subjective norms towards cigarette smoking in adolescence significantly predict the intention to initiate smoking (Hong et al., 2011; Talip et al., 2016). Even if smoking parents claim to be bitterly opposed to adolescent smoking, the fact that the parents are smokers may undermine these parental values (Emory et al., 2010). Additionally, it is likely that cigarettes will be available in the home of smoking parents (Emory et al., 2010). There is also evidence that parents who smoke are less likely to be aware that their teenage children have started

smoking. There are also findings that smoking parents may tend to believe that adolescent smoking is influenced more by the mass media and their children's peers rather their own cigarette use (Hong et al., 2011). Additionally, adolescents who have started smoking at a young age, are more likely still smoke as adults (Cengelli et al., 2012; Emory et al., 2010; Freedman et al., 2012; Simons-Morton & Farhat, 2010). It has been found that if there is no second-hand smoke in the home then the initiation of smoking is delayed to a later age (Emory et al., 2010).

Family cohesion, family functioning and family ties have been found to display a significant association with adolescent smoking uptake (Emory et al., 2010; Filho et al., 2012; Hong et al., 2011; Simons-Morton & Farhat, 2010; M. Skeer & Ballard, 2013; Talip et al., 2016). Social norms about smoking and parents' expectations about non-smoking can be considered as one positive aspect of parenting and for fostering close parent-adolescent relationships (Simons-Morton & Farhat, 2010). Positive parent-child relations have both direct and indirect effects on adolescent tobacco use. Parents can discourage their teenage children's relationships with friends (who engage in smoking, give bad examples or who are negative influences) and indirectly prevent friendship formation with smoking peers, moderating the effects of friends' influences and reduce contacts with smoking peers (Hong et al., 2011; Simons-Morton & Farhat, 2010). Additionally, it has been found that non-smoking adolescents enjoy better relationships than smokers with their parents (Hong et al., 2011).

Frequent family meals create cohesion in families and have been found to exert a protective influence against tobacco use among teens. The results examining the relationship between family meals and tobacco are mixed and may be moderated by gender. (M. R. Skeer & Ballard, 2013) Studies included in Skeer & Ballard's (2013) review found that for girls, a one day per week increase in the frequency of family dinners was associated with a 0.6 percentage point reduction in smoking in the past 30 days. Additionally, compared to adolescents who reported eating zero to one dinner per week with their family, adolescents who ate five to seven family dinners per week were significantly less likely to smoke one or more cigarettes daily. Frequent family meals are one way of tightening the parent-teen bond as the dinner table is a good place where parents can learn about and discuss everyday aspects of their children's lives. Good relationships can make teenagers realize how important they are to their parents and how concerned their parents are in their ongoing life events. Simply chatting with their teenage children during an everyday meal can help parents to spot changes in certain patterns for example, in their children's clothing or friends;

these changes may be indicators that the child is adopting detrimental risk behaviors such as smoking (M. Skeer & Ballard, 2013).

Positive parenting practices, including monitoring and supervision of adolescents, are associated with lower susceptibility of the adolescent to engage in smoking (Ansari-Moghaddam et al., 2016; Simons-Morton & Farhat, 2010; Wellman et al., 2016). Parents should set expectations of non-smoking, support their teens in these choices and vocally and openly disapprove of cigarettes and smoking (Cengelli et al., 2012; Emory et al., 2010; Simons-Morton & Farhat, 2010). Strict, complete smoking restrictions (a smoke-free home) have been found much more beneficial than partial restrictions with respect to adolescent smoking uptake. Partial restrictions increase youth experimentation and the tendency to start to smoke compared to the situation in a smoke-free home (Emory et al., 2010). Home smoking rules should include talking and warning about the dangers of smoking, non-smoking expectations by the parents, as well as a knowledge of which, if any, of their children's friends are smoking. In addition, parents should not be afraid to monitor their children's behaviour and they should have confidence that their views can influence adolescent smoking behavior (Emory et al., 2010). Parental values about why smoking is unacceptable are difficult to pass on to teens if there are no restrictions on smoking within the family, even in homes where parents have never smoked. (Emory et al., 2010; Wellman et al., 2016). Indifferent attitudes toward smoking have been found to increase adolescent smoking uptake and influence the ability of youngsters to resist the temptation to start smoking (Hong et al., 2011; Simons-Morton & Farhat, 2010). According to several investigators, positive parenting practices that are maintained over time will reduce the number of smoking friends in an adolescent's social circles. Parental smoking-related negative norms and attitudes may also be valuable by encouraging the teenager to resist the pressure to smoke from his/her peers (Hong et al., 2011; Simons-Morton & Farhat, 2010; Talip et al., 2016).

Poor parenting, such as low parental responsiveness, low parental engagement or connectedness (Wellman et al., 2016) parental alcohol use (Filho et al., 2012; Hong et al., 2011; Talip et al., 2016), violence within the family, conflicts with family members (Talip et al., 2016), poor relationships with parents (Filho et al., 2012), separated parents, and other drug use by an adolescent (Ansari-Moghaddam et al., 2016; Filho et al., 2012) have been associated with smoking susceptibility. Stressful events in the lives of the parents such as unemployment may unintentionally affect the behavior of an adolescent because parents may lack the energy to monitor their children and maintain quality interactions within the family (Hong et al., 2011).

2.2.3 School context and adolescent smoking

In view of the time spent in school, the association of the school context with adolescent smoking has been under-researched in the systematic reviews. Academic stress (Almutairi, 2014; Hong et al., 2011) and also underachievement (Hong et al., 2011) as well as poor academic performance (Talip et al., 2016; Wellman et al., 2016) have been associated with adolescent smoking. Trouble in school (Wellman et al., 2016), problematic intrapersonal relationships in the classroom, feelings of being rejected and poor social status, and isolation from friends have all been positively related to smoking (Choi & Smith, 2013; Seo & Huang, 2012).

Positive associations were found also with respect to school-wide factors that relate to smoking such as a lack of anti-smoking policies, school acceptance of smoking and whether or not cessation programs are offered to the students (Wellman et al., 2016). There is a lack of convincing evidence that smoking cessation programs offered by schools are effective; that may be an indication of a paucity of good quality programs (Freedman et al., 2012). It is recognized that the more students who smoke in school and the more that smoking is tolerated, the greater the incidence of smoking uptake by the students. Attachment to school (Simons-Morton & Farhat, 2010; Wellman et al., 2016) and strict anti-smoking policies in school have been found to prevent both smoking uptake and regular smoking in adolescents (Wellman et al., 2016).

The reviews indicated that there is an increased risk of smoking uptake by a student if he/she has witnessed a teacher smoking (Almutairi, 2014; Ansari-Moghaddam et al., 2016; Hong et al., 2011; Talip et al., 2016; Wellman et al., 2016).

2.2.4 Peer relations and adolescent smoking

Researchers all over the world have acknowledged the association between the peer group and friends with future smoking by an adolescent (Almutairi, 2014; Ansari-Moghaddam et al., 2016; Cengelli et al., 2012; Choi & Smith, 2013; Freedman et al., 2012; Hong et al., 2011; Okoli, Greaues, & Fagyas, 2013; Seo & Huang, 2012; Simons-Morton & Farhat, 2010; Talip et al., 2016; Wellman et al., 2016); peer behaviour is known to influence smoking initiation, progression, and quitting (Seo & Huang, 2012; Simons-Morton & Farhat, 2010). As explained previously, parents have a direct and indirect influence on their children's selection of friends and other aspects of peer relationships (Hong et al., 2011). In fact, one review found that peer factors have been found to be a stronger predictor of adolescent smoking than

parenting factors (Hong et al., 2011). The number of smoking peers (Almutairi, 2014; Cengelli et al., 2012; Seo & Huang, 2012; Talip et al., 2016; Wellman et al., 2016), attachment to smoking peers (Almutairi, 2014; Cengelli et al., 2012; Choi & Smith, 2013; Hong et al., 2011; Seo & Huang, 2012; Talip et al., 2016), and susceptibility to peer influence (Freedman et al., 2012; Hong et al., 2011; Simons-Morton & Farhat, 2010; Talip et al., 2016) have been found to significantly associate with adolescent smoking uptake according to results recently reviewed.

To understand how smoking by peers is associated and mediated with adolescent smoking uptake, it is necessary to understand what is meant by the following terms, peer influence, peer socialization and peer selection. *Peer influence* refers to social influence, where some adolescents convince their peers to adopt their behaviour (Seo & Huang, 2012). The processes through which the influence of peers leads to homogeneity within a peer group are called peer socialization and peer selection (Simons-Morton & Farhat, 2010). *Socialization* occurs when the direction for attitudes and behaviour is influenced by the actual or perceived attitudes and behaviour (e.g., norms) of group membership. Peer socialization operates mainly through indirect peer pressure to conform to actual or perceived group norms (Cengelli et al., 2012; Simons-Morton & Farhat, 2010). *Peer selection,* on the other hand, appears when a person seeks out a friend or group with whom he/she shares common attitudes and behaviours. The selection process can also include *deselection*: when some members start experimenting with cigarettes or other substances, other members of the peer group can respond either by leaving the group or by accepting the new group norm. Peer socialisation and selection are likely to be interactive although there is no commonly accepted opinion among researchers on which is more important (Seo & Huang, 2012; Simons-Morton & Farhat, 2010). The so-called best friend appears to exert the greatest influence on adolescent smoking as compared to a group of friends although the influence of a group of close friends (peer group) may be mediated through a best friend (Simons-Morton & Farhat, 2010; Talip et al., 2016).

Network analysis has been used as a framework for understanding *Peer group structures* and trying to determine which adolescents are more likely to begin smoking within different peer groups (Choi & Smith, 2013; Seo & Huang, 2012). These interactions in a social system have been characterized into three major social positions. First, *a clique* is a group of people who share similar views, interests, or behavioural patterns. Second, *a liaison* is an individual, who interacts between at least two groups. Third, *isolates* are adolescents who do not actively take part in the activities of any groups of friends. Clique members have been reported to have lower

than average smoking rates whereas isolates have revealed higher than average smoking rates (Choi & Smith, 2013; Seo & Huang, 2012).

Given that peer selection and socialization have been demonstrated to be involved in the direct association between friendships and smoking, it is somewhat surprising that those adolescents who do not interact with any friends seem to smoke the most. It has been hypothesised that stress or loneliness are the factors promoting smoking. Another postulated explanation is that smoking contributes to smoking-induced isolation i.e. a smoker may no longer be welcome in a non-smoking peer group. It is also possible that smoking and social isolation from peers are both influenced by the same variable e.g. the presence of depression (Choi & Smith, 2013; Seo & Huang, 2012).

2.2.5 Personal features

Sex differences have been found with respect to the age of smoking initiation (Okoli et al., 2013). However, in this international sample, it seems that there is no consensus about which gender carries the greater risk for smoking uptake, instead cultural and regional variations seem to determine which gender is more likely to experiment with smoking and acquire a smoking habit (Ansari-Moghaddam et al., 2016; Cengelli et al., 2012; Freedman et al., 2012; Hong et al., 2011; Okoli et al., 2013; Simons-Morton & Farhat, 2010; Wellman et al., 2016). The source of the first cigarette, the person with whom and where the first cigarette was smoked**,** and reasons for smoking uptake have also been found be different in boys and girls (Okoli et al. 2013). It has been found that girls are more likely to obtain their first cigarette at home from parents or siblings and also their first smoking experience is more likely to take place at home whereas boys report being given their first cigarette from friends and to smoke with friends (Almutairi, 2014; Filho et al., 2012; Okoli et al., 2013). Smoking boys were found to engage with other substances more often than girls who smoked (Ansari-Moghaddam et al., 2016).

In several reviews, it is claimed that personal/psychological characteristics associate with smoking onset. There are many factors that increase the susceptibility of adolescents to smoke cigarettes e.g. sensation seeking or rebelliousness (Okoli et al., 2013; Wellman et al., 2016), low self-esteem, low self-efficacy (Talip et al., 2016; Wellman et al., 2016) receptivity to tobacco promotion efforts, having subjective norms towards smoking, exposure smoking in media (Talip et al., 2016; Wellman et

al., 2016), and believing that smoking is glamorous (Okoli et al., 2013; Talip et al., 2016; Wellman et al., 2016) .

Psychological problems, such as depression (Hong et al., 2011; Talip et al., 2016; Wellman et al., 2016), feelings of sadness, loneliness, insomnia, and having a suicidal ideation have been also associated with smoking onset (Filho et al., 2012). Early experimentation with cigarettes (Cengelli et al., 2012; Freedman et al., 2012), intention to smoke in the future (Cengelli et al., 2012; Talip et al., 2016; Wellman et al., 2016), and having positive attitudes towards smoking are factors that predict regular smoking in adulthood (Cengelli et al., 2012; Freedman et al., 2012).

Adolescents and young adults who have been asked about the reasons why they have started smoking, have given the following reasons: exposure to smokers in social relations (Almutairi, 2014; Freedman et al., 2012), boredom, stress (Freedman et al., 2012; Okoli et al., 2013; Talip et al., 2016), psychological factors such as relief from anxiety, curiosity and for fun (Almutairi, 2014; Wellman et al., 2016). In addition, tobacco normalization occurs when an adolescent has only a limited knowledge about the harmful effects of tobacco smoking e.g. believing it is safe or by listening to propaganda at tobacco-sponsored events (Freedman et al., 2012).

Table 3 describes the protective factors for tobacco imitation in adolescence. Personal, social, and environmental factors that influence smoking onset have been summarized in table 4.

Table 3. Protective factors of adolescent smoking onset

Non-smoking parents
Parental attitude towards tobacco use
Family cohesion family functioning and family ties
Parents' expectations of non-smoking and warnings about smoking that are maintained over time
Positive parent-child relationship
High parental monitoring/supervision and control
Parental knowledge about their teens smoking
Parental knowledge of their teenage children's friends who are smokers
Higher quality relationships with peers and teacher
Higher self-esteem
Deselection of smoking peers
Strict anti-smoking policy in school extending to staff, students, and visitors

Table 4. Personal, social, and environmental factors associating with smoking onset factors with respect to tobacco smoking initiation among adolescents (modified (Talip et al., 2016)

Personal factors	Social factors	Broader environmental factors
Psychological problems	Family context	Environmental context
Depression feelings of sadness, having suicidal ideation Loneliness, social alienation Insomnia	Lower socioeconomic status (SES) of family Family smoking status Family conflict Parental indifferent attitude towards smoking	Exposure to tobacco advertisements, media Smoking of adolescent's idol or role model
Personality traits	Peer relations	
Age, gender, race Low level of behavioral control Low self-efficacy Low self-esteem Risk-taking, sensation seeking, rebellious personality	Number of friends smoking Best friend smoking Friends' positive attitude to smoking Strong attachment to smoking friends	
Intention to smoke	School context	
Early experimentation with cigarettes Having positive beliefs and a subjective norm of smoking Receptivity to tobacco promotion efforts	Academic stress, underachievement, poor academic performance Trouble in school Poor relationships with classmates Isolation from social network Lack of anti-smoking policy/activities and school tolerance of smoking Teacher smoking	

2.3 Previous research on perceptions of cigarette smoking

2.3.1 The search strategy

The aims for this review of the literature were to examine adolescents' perceptions of their smoking habits. Systematic searches were collected mainly from investigations which had a qualitative design, but studies with well-designed cross-sectional and longitudinal studies were selected to complement the qualitative observations. The systematic searches conducted in this second literature review

aimed to identify how smoking adolescents view their smoking habit and how they deal with their smoking as well as examining quitting interventions.

The systematic review of the literature was conducted in 1.11.2018 from the following databases: Medline (Ovid), CINAHL, ERIC, AND PsycINFO. The search used different search combinations of MeSH terms in Medline and synonyms from titles and abstracts covering smoking ("cigarette", "tobacco", "tobacco smoking", "cigar smoking", "cigarette smoking") and adolescent or young adult ("adolescen*", "young adult*", "teenage*", "student*")and adolescent perceptions of their smoking ("opinion*", "belief*", "perception*", "view*", and "attitude*"). In addition, systematic searches with the above search terms were conducted using the SCOPUS database.

The search was limited to journals written in English and published between the years 2014-2018. The option for selecting review articles was adopted in the CINAHL database.

The total number of systematically screened articles was 1707. The identified literature was systematically examined by applying both inclusion and exclusion criteria. In addition to the publications found in the systematic search, one article was found manually. The search strategy and elimination and inclusion criteria are presented in the PRISMA-flowchart (Figure 2).

2.3.2 Materials and methods

Evidence revealing adolescents' perceptions and views of their smoking behaviour was systematically screened, and 66 articles were chosen for full-text screening. In these peer-reviewed articles, three main themes could be identified through a modified inductive content analysis. These themes were disadvantages and benefits of smoking, tobacco-related norms and social belonging, and smoker identity and its relation to smoking cessation.

The literature search focused on perceptions and views of adolescents about their smoking; in contrast, findings of interactions and prevention programs, predictors for smoking uptake of consequences of smoking were not assessed in this literature review. Adolescents all around the world seemed to have similar perceptions of their smoking behaviour as there was little variation between the different continents.

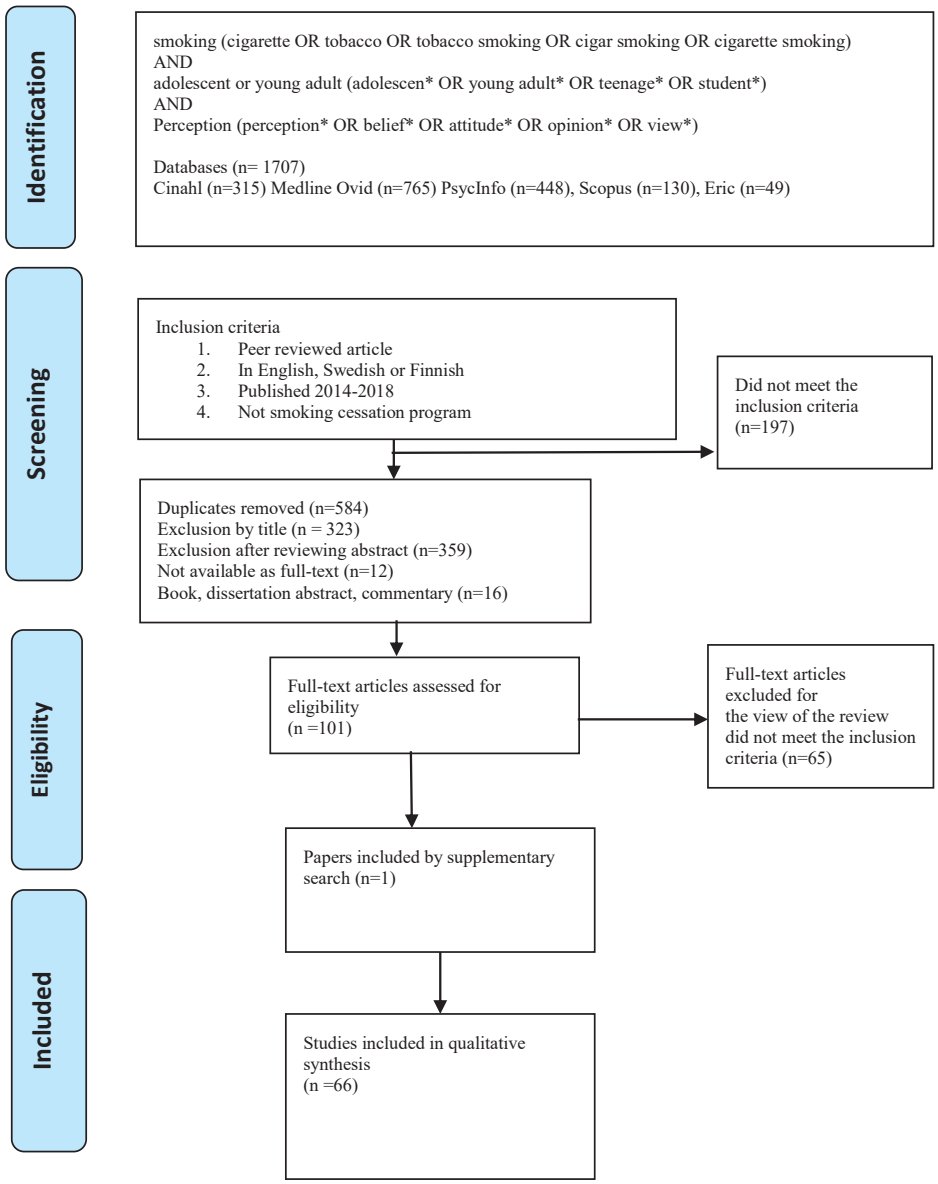

Figure 2. Flowchart of the systematic review selection process (Prisma 2009)

2.3.3 Adolescents perceptions of tobacco related disadvantages and benefits

According to research evidence, adolescents tend to attribute fewer negative outcomes to smoking behaviour compared to non-smokers (Lydon, Howard, Wilson, & Geier, 2016) and underestimate the health risk on smoking (Peña-Purcell, Rahn, & Atkinson, 2018). However, smoking adolescents perceive health consequences of cigarette smoking (Kasim, Al-Zalabani, El-Moneim, & El-Moneim, 2016; Silla et al., 2014) alongside of social stigma to be a serious disadvantage of smoking habit (Palmer et al., 2016; Silla et al., 2014). There is research evidence of smoking-related stigma could be internalized differently by different people, particularly those who experience stigmatization because of other socially ascribed makers of inequity (e.g. race, ethnicity, gender, sexuality). Multiple stigmas may intensify the social isolation and marginalization that some people already experience. (Antin et al., 2017) Smokers have found to have negative views of their smoking and state that they regret having started smoking mostly due to the addiction and the health dangers of smoking (Silla et al., 2014).

Non-smoking teenagers increasingly view smoking as unhealthy and uncool (Woodgate & Busolo, 2015) which may add the burden of stigma labelling of the public and the society (Trainer, Gall, Smith, & Terry, 2017). Smokers themselves associate smoking with negative images relating to appearance (e.g., smelling and having bad teeth), psychological traits (e.g., being desperate or anxious), and future desires (e.g., not being successful). According to research they fear and recognize that non-smokers might see them similarly, which raise shame and regret resulting in smokers not smoking publicly or by stopping smoking (Tombor et al., 2015).

According to adolescent smokers being addicted to smoking is a serious disadvantage of cigarette smoking. (Gifford et al., 2016; Palmer et al., 2016). According to young adults who smoke, addiction causes bad feelings that are out of individual's control and anxiety that can only be relieved by smoking (Roditis et al., 2016). By controlling when to smoke and how many cigarettes is being smoked creates a feeling of control, avoid being addicted, and being looked down on by others. Occasionally smoking college students have been found to portray negatively addicted smokers as they have lost control and have uncontrolled urges to smoke (Tombor et al., 2015). One way to convince oneself and others of being in control of their smoking habit is assuring an addiction to be a decision that individual makes, and that smoker can quit smoking if only wanted (Roditis et al., 2016).

Cost of cigarettes causes financial burden (Palmer et al., 2016). Roll-your-own (RYO) tobacco has in the past attracted negative generalizations of a lower-class way of smoking. In Germany, France and Netherlands people with low-income are still likely to consume only RYO tobacco than those with higher income (Brown et al., 2017). However, as the RYO is cheaper than tailor-made (TM) cigarettes the use of RYO has grown globally also among young people (Brown et al., 2017; Hoek, Ferguson, Court, & Gallopel-Morvan, 2016). Young adults manage the negative attributes by relating roll-your-own tobacco with superior features, emphasizing that rolling cigarettes require skills. Different color rolling papers also create individuality.(Hoek et al., 2016) Additionally, some smokers attribute TM cigarettes as being more harmful to health than more natural RYO tobacco (Brown et al., 2017; Hoek et al., 2016).

In addition to non-smokers looking down on smokers, they also object to second hand smoke in their vicinity. The smoker can usually overlook those who resent smoking and move slightly away without interrupting smoking (Byron, Cohen, Frattaroli, Gittelsohn, & Jernigan, 2016). The systematic review of qualitative studies found that smoke-free restrictions were not enforced, and regulations meant to limit supply or lessen access were overlooked, broken or simply had no significance to the everyday lives of the adolescent smokers. (Hefler & Chapman, 2015).

Despite several disadvantages and the physical risks assocated with smoking, adolescents continue to smoke because in their opinion there are more benefits for smoking compared to quitting smoking (Morrell, Lapsley, & Halpern-Felsher, 2016). According to smoking adolescents, smoking provides emotional benefits (Peña-Purcell et al., 2018). Adolescents have perceived that cigarette smoking has a pacifying effect (Byron et al., 2016), helps one to relax (Roditis et al., 2016), relieves stress (Byron et al., 2016; Hanson, 2018; Roditis et al., 2016) and calm nerves (Hanson, 2018). Moreover, smoking has been found to relieve boredom and provide inspiration (Byron et al., 2016).

Cigarette smoking appears to have also social benefits (Byron et al., 2016). According to previous research adolescents who smoke think that they are more attractive to the opposite sex as smokers (Kasim et al., 2016). A qualitative study among lesbian, gay, and bisexual (LGB) youths found that smoking is a way of fitting in despite having stress of identity formation (K. Bennett, Ricks, & Howell, 2014).Smoking is perceived to provide comfort in social gatherings, and smokers are thought to have more friends (Kasim et al., 2016). Furthermore, smoking eases conversation with friends and with the opposite sex (Byron et al., 2016). Smokers have been found to believe that smoking adds positive body image (Peña-Purcell et

al., 2018), reduces body weight (Kasim et al., 2016) and add masculinity in males (Byron et al., 2016). Moreover, young people have reported to smoke because it produces positive feelings and it is a way of letting the body have fun (Roditis et al., 2016).

2.3.4 Norms of smoking and social belonging

Norms of smoking are formed in childhood and smoking onset is often eased by smoking members of a family including older siblings. Adolescent smoking is according to research evidence approved by the parents who smoke in early adolescence even if initially challenged (Hefler & Chapman, 2015). Parental messages and strategies to prevent smoking initiation are predisposed by the quality relationships between parent and child and within-family discussions of tobacco-related harmful effects (Maggi et al., 2014). Parent smoking and positive attitudes towards smoking, however, adds the adolescent's intention to smoke in the future, particularly if the smoking parent is the mother (A. Johnson et al., 2018; Masood et al., 2015). If smoking is perceived as normal behavior in adolescents' social surroundings, curiosity towards smoking and wanting to try smoking increases. Norms are strengthened if smoking plays a prominent role in family and peer relations creating a social inclusion (Hefler & Chapman, 2015).

Smoking norms take in shape in close relationships to adolescent and smoking becomes a norm when it is taught to be a normal sign of growth and as a sign of entering adolescence (Ebrahimi, Sahebihagh, Ghofranipour, & Tabrizi, 2014; Gifford et al., 2016). When adolescents perceive that everybody around them smokes cigarettes, smoking imitation is considered a sign of entering the society and socialization (Byron et al., 2016; Ebrahimi et al., 2014). In general, along with parents and friends, teachers are also mentioned as a referent to smoking (Hanson, 2018).

According to one longitudinal twin study, there were more female smokers in a society in which smoking was popular and accepted compared to an environment in which female smoking was not popular indicating that social influence is more important on smoking habit rather than the susceptibility to smoke being inherited (Mezquita et al., 2018).

Younger adolescents compared to young adults may have their self-worth tied to smoking and feel accepted and more valued by others because of their smoking habit (Wong et al., 2014). Friends choose each other on alike smoking behavior whereas surprisingly influence of friends' smoking behavior is not significant for smoking

initiation (Huisman, 2014; Ragan, 2016). However, friends' beliefs about smoking affect young people's own opinions about smoking. Young people have been found to change their own opinions to reflect their friends' opinions (Ragan, 2016) There is evidence that if an adolescent identifies to a high-risk group, he has a higher risk of using cigarettes. Identification with multiple low-risk groups does not confer further protection against smoking but endorsing many high-risk groups add the risk of smoking more than those adolescents who endorse only one group with higher risk to smoke (Fuqua et al., 2012). The higher the number of smoking friends the stronger the intention to initiate smoking in the future. Moreover, the high number of classmates that smoke adds the likelihood to smoking initiation (A. Johnson et al., 2018; Masood et al., 2015)

Identification as a social smoker has been found to be protective against escalating smoking habit to regular smoking in some peer groups and to escalate to regular smoking in some peer groups (A. Johnson et al., 2018). Social smokers among college students smoke around friends and other smokers but may conceal their smoking identity when social context changes to professional or more private (i.g., being around employers or family members). They may also deny being a smoker altogether and identify themselves as a non-smoker who smoke cigarettes. This is justified by the claim of not being addicted or not to buy cigarettes but smoking only when offered (Rosa & Aloise-Young, 2015; Tombor et al., 2015).

2.3.5 Smoker identity and its association with smoking cessation

Increases in smoking behaviour have been found to consistently associate with the development of smoker identity which once established is seldom concisely questioned (Hertel & Mermelstein, 2016; Tombor et al., 2015). Smoking escalation and smoker identity development are associated with reduced coping mechanisms in both sexes (Hertel & Mermelstein, 2016; McConnell, Memetovic, & Richardson, 2014). Smoker identity is an informed choice of smoking because, in spite of education and increased knowledge of smoking-related health hazards, smokers continue to smoke (Gifford et al., 2016; Wong et al., 2014). Instead of fear of one's health, a smoker can associate smoking habit with a personal attribute of being a fun-loving person who prioritizes enjoyment over health consequences (Tombor et al., 2015).

Smoker identity influences individuals' intentions to attempt to quit smoking. Factors that can impair willingness to stop smoking have been found to include

having favourable feelings about their smoking habit, accepting risks as part of accepting one smoking identity and having only indefinite plans to stop smoking later in life (Tombor et al., 2015). Social smokers or perceiving an identity of a non-smoker despite smoking cigarettes feel less of a need to quit as they don't see it as relevant and continue smoking occasionally rather than quitting altogether (A. Johnson et al., 2018). Moreover, those who deny being a smoker have been found to underrate the risks of cigarettes and have greater feelings of self-efficacy (Song, Kim, & Kim, 2014).

Quitting smoking is as multifaceted as smoking initiation. The evidence of the effectiveness of different school policies that have been designed to prevent youth tobacco use is weak and inconclusive (Galanti, Coppo, Jonsson, Bremberg, & Faggiano, 2014). Failure of cessation programs is often associated with not having the interest to stop smoking, quitting resistance and if none of the other smokers in a cessation group succeed in stopping smoking (Kim et al., 2016; Peña-Purcell et al., 2018). Free quitlines in the U.S are negatively perceived by the adolescents as rehabilitation and are believed to be for desperate people (Waters et al., 2015). According to study evidence smokers feel that smoking is regretted mainly because of their unsuccessful ability to stop smoking, however, they feel that they are not prepared to quit at this point of their lives resulting low levels of the use of nicotine replacements. Although smokers have stated the intention to quit smoking are these intentions often vague and to occur later in the future (Silla et al., 2014).

Quitting is more likely to succeed with those whose self-esteem is not strongly tied to their smoking behaviors (Wong et al., 2014). It affects smoker identity and coping mechanisms that smoking is related to (Mantler, Irwin, Morrow, Hall, & Mandich, 2015). Targeting individual social identity and smoker identity need to be considered when developing smoking cessation messages (Moran & Sussman, 2014; O'Connor et al., 2016). Motives to quit could be generated by the discrepancy between other valued aspects of identity (e.g., getting pregnant, being a good mother) and smoker identity (Pledger, 2015; Polen et al., 2015; Tombor et al., 2015) or as a response to social stigma or fear of social rejection for being a smoker (Hefler & Chapman, 2015; Silla et al., 2014). Good results have been found to have in life coaching that aims to deal with forming again smokers' identity, adding personal competence and changing positive perceptions of smoking behaviors (Mantler et al., 2015).

2.4 Summary of the literature

The literature review was conducted in two phases. Through evidence synthesis first, family context, school context, peer context and personality features that are associated with adolescent smoking behavior and second, disadvantages and benefits, norms of smoking and smoker identities that related to adolescent perceptions and views were assessed. According to systematic literature reviews, adolescent smoking is a multifaceted behavior with a sum of many factors. Identity, which begins with social relations and social belonging escalates to smoker identity and cessation efforts should encounter of building re-identification.

The theoretical framework introduced at the beginning of this dissertation can be found to be embedded in the literature reviewed. Each of the introduced theories (SLT, TPB, PBT, EHD, TTI) shares the viewpoint that close relationships provide the most important social influence while culture and media provide important but secondary influences for smoking uptake. Understanding and preventing adolescent smoking might be better understood with a multifaceted approach where several theories are integrated instead of explained with any of the theories alone (Collins & Ellickson, 2004). As a summary, all the results of the systematic literature reviews are integrated to the conceptual model of Theory of Triadic Influence (TTI). This model encloses the personal, social, and environmental impacts on smoking behavior in adolescence dividing them into separate but interconnected streams. In addition, all four sub-studies of this dissertation study is based on this model.

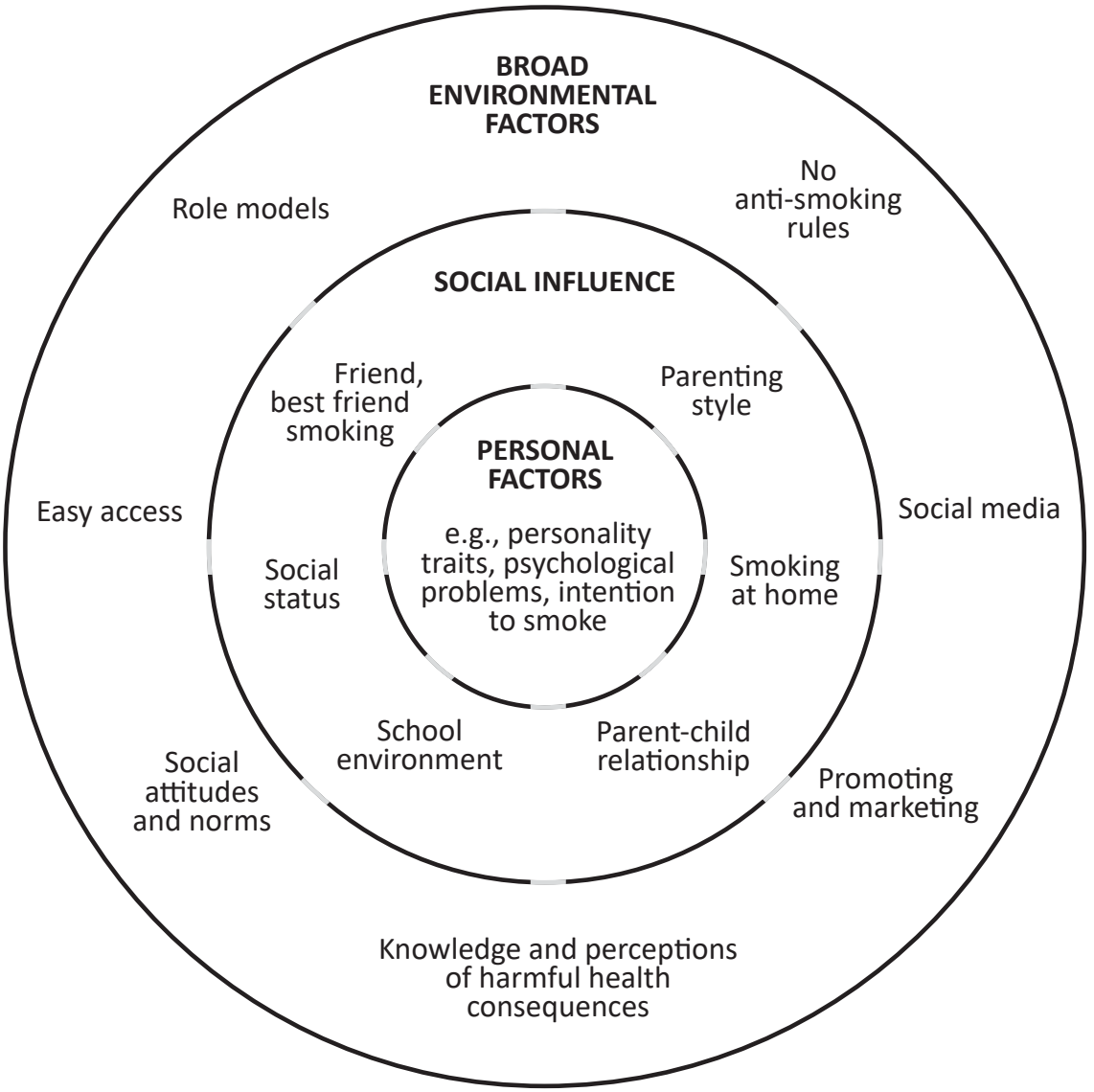

Figure 3. Three different levels that influence tobacco onset in adolescence (TTI). (Modified from the original concept of (Flay & Petraitis, 1994; Karimi et al., 2014)

3 AIMS OF THE STUDY

The aim of this study was to explore how social involvement and students' own perceptions of their smoking are associated with vocational students' smoking habits. The overall purpose was to increase understanding and knowledge of smoking behaviour in Finnish vocational students and to develop an overview of vocational students' smoking behaviour.

Specific objectives of the study are as follows:

1. to describe and explain the associations between family, school and peer involvement and smoking among students in a vocational school in a representative national setting (I, II, III)

   I to examine whether parental involvement in the lives of their adolescent children is associated with adolescent smoking? (I)

   II to determine whether teachers' support, school connectedness, and anti-smoking policies are related to adolescent smoking in a vocational school setting? (II)

   III to elucidate whether students' peer attachment and social belonging are associated with adolescent smoking? (III)

2. to describe practical nurse students' own perceptions and opinions emerging from discussions about their smoking (V)

3. to develop a synthesis explaining the background to smoking by vocational students

4 MATERIALS AND METODS

4.1 Design

This study was conducted in two study phases. In the first phase, cross-sectional data was used (I-III) whereas the second phase was based on an explorative qualitative design (IV). The quantitative phase of this study utilized the data of The School Health Promotion Study (SHP) conducted by the National Institute for Health and Welfare in Finland. SHP is a nationwide survey of adolescents' health and well-being and is conducted every other spring in students in upper comprehensive schools, upper secondary schools, and first and second-year students in vocational schools. The questionnaire used the year 2013 that can be found online at http://www.thl.fi/fi/web/thlfi-en/research-and-expertwork/population-studies/school-health promotion-study.

The second data set was gathered from focus group interviews and collected adolescents' own perceptions of the social factors that influence their decisions to smoke. The focus group interviews took place in November 2016. During the group interviews, social involvement and willingness to quit smoking in the future were the major themes of this exploratory qualitative study. Materials and methods of the phases are described further in the following sections.

An overview of data sources, study subjects, main measures and study methods used in sub-studies I-IV is shown in table 5.

Table 5. Overview of data sources, study subjects, main measures and study methods used in sub-studies I-IV.

Study	I	II	III	IV
Data source	SHP Year 2013	SHP Year 2013	SHP Year 2013	Focus group interview Year 2016
Study subjects	14-20 -year olds (Mean= 17.6, S.D. 0.90). n=34 776	14-20 -year olds (Mean= 17.6, S.D. 0.90). n=34 776	14-20 -year olds (Mean= 17.6, S.D. 0.90). n=34 776	16-25- year olds N= 29
Main measures	Family involvement in the adolescent's life	Teacher support, liking school, truancy, school policy on smoking	Having a close friend, difficulties with mates, bullying	Dealing with stigma of smoking and smoker identity
Study methods	Multinomial logistic regression analysis	Multinomial logistic regression analysis	Multinomial logistic regression analysis	Critical discourse analysis

4.2 Phase I: Social involvement and smoking in vocational setting (I, II, III)

4.2.1 Participants

The target group for phase I sub-studies included all 1st and 2nd-year students participating in the School Health Promotion study on March 2013. The study group consisted of 34,776 students from 419 vocational schools. The mean age of respondents was 17.6 ranging from 14 to 20 (S.D. 0.90). More than half (55.6%) were men (n = 19336) and 44.4% were women (n = 15440). To account for possible gender differences, separate analyses were conducted for girls and boys.

The original rate of response of SHP could not be reliably calculated because the total number of students was not requested from the participating vocational schools. The response rate had to be calculated from the statistics of all Finnish vocational students, but this did not take into account the fact that some students were out of school undertaking practical training, which influenced their possibility for participating in the research. In addition, vocational school students in their third year did not take part in this study. However, the missing values of this secondary analysis were low (1.3% -2.4%) with one exception: the missing values related to parents' education were slightly higher (mothers' education 3.6% and father's training 4.7%).

Sample statistics of selected variables (I; II; III) are shown in appendices one, two and three.

4.2.2 Measures (I, II, III)

Adolescent smoking (I, II,III)

Adolescent smoking was the dependent variable in phase I studies. Smoking was defined in this study as cigarette smoking. Use of e-cigarette and use of snuff were excluded in this study. Adolescent smoking was assessed by two questions in SHP: 1. How many cigarettes, pipefuls or cigars have you smoked altogether (none, only one, about 2-50 and over 50)? 2. Which of the following alternatives best describes your current smoking habits? (I smoke once a day or more often, I smoke once a

week or more often, but not every day, I smoke less often than once a week, I have quit smoking). For this study, these adolescent smoking variables were combined into one variable with response categories: daily smokers (I smoke once a day or more often), occasional smokers (I smoke once a week or less often), those who had quit smoking (I have quit smoking) and non-smokers (I have smoked altogether only once or never).

Sociodemographic status (I)

The socio-demographic background of families was assessed by requesting information about the family structure, parents' educational level, and unemployment or layoffs during the previous year. *The family structure* was evaluated by asking the respondents about the adults with whom they lived. We subsequently coded this variable into living in a nuclear family, living with a single parent, living in a stepfamily, living alternately with separated parents in two homes, and living in some other arrangement. *Parental education level* was evaluated by asking the participants to report their mother's and father's highest level of education. In this study, the variable was categorized into three levels: low level education (comprehensive or primary school), middle education (upper secondary school and/or vocational institution), and high education (university, university of applied sciences or other higher education institution). To assess *unemployment of a parent,* students were asked if their parents had been unemployed or laid off during the past year. The options were: neither of my parents, one of my parents and both of my parents.

Parental involvement (I)

Parental involvement was studied using five questions measuring the parent-child relationship, the connectedness of family, and parental monitoring. All these questions were dichotomized into two categories. The first category (coded as 1) referred to a high level of parental involvement and the second category (coded as 0) to a low level or no parental involvement. The dichotomized variables were then summed up to create an involvement indicator ranging from 0 to 5, with 0 referring to no or low parental involvement and 5 to parental involvement in all five items. Table 5 illustrates how the indicator of parental involvement was formed.

Table 6. The formulation of the family involvement indicator

Original question	Dichotomized variable
Parent- child relationship	
"If you have difficulties at school or with your school work, how often do you get help from your parents"	
Whenever I need	1
On most occasions	1
Rarely	0
Hardly ever	0
"Can you talk about things that concern you with your parents"	
Often	1
Fairly often	1
Every once and a while	1
Hardly ever	0
Connectedness of family	
"Which of the following alternatives best describes your family's eating habits in the afternoon or evening?"	
Family dinners with usually everyone sitting around the table	1
Have a meal but entire family does not eat at the same time	0
No proper meal, everyone grabs something to eat	0
Parental monitoring	
"Do your parents know most of your friends?"	
Both of them know	1
Only my father does	1
Only my mother does	1
Neither does	0
"Do your parents know where you spend your Friday and Saturday nights?"	
Yes, Always	1
Yes, Sometimes	1
Most of the time they don't know	0

Parental smoking (I)

Parental smoking status was measured by the responses to the question: During your lifetime, has your father/mother (separately) smoked? The response options were: never smoked, used to but has now quit, smokes nowadays and don't know. The responses were combined for this study into the categories of a daily smoker (smokes nowadays and don't know), quit smoking and a non-smoker.

Adolescent school connectedness (II)

Adolescent connectedness to vocational school was measured by questions concerning teacher support, liking school, and truancy. *Teacher support* was originally assessed with three Likert-style statements: 1) teachers encourage me to express my opinions in class, 2) teachers are interested in how I am doing and 3) teachers treat us fairly. The response options were "fully agree", "agree" "disagree" and "fully disagree". All responses were first dichotomized into two categories: the first category (coded as 1) referred to a high level of teacher support (fully agree/agree), and the second category (coded as 0) to a low level or no teacher support (disagree/fully disagree). The dichotomized variables were then summed to create a teacher support indicator with a value ranging from 0 to 3. The support indicator was then categorized into two groups, with value 1 indicating that the adolescent had received teacher support on at least two out of three measures, whereas value 0 meant that the adolescent had agreed with only one teacher support item or disagreed with all three teacher support items. If any of the three items were unanswered, the indicator was marked as a missing value. The internal consistency (Cronbach alpha) for the teacher support indicator was 0.72. The formulation of the teacher support indicator is shown in table 4.

Table 7. The formulation of teacher support indicator

Original question	Dichotomized variable
Teachers encourage me to express my opinions in class,	
Fully agree	1
Agree	1
Disagree	0
Fully disagree	0
teachers are interested in how I am doing	
Fully agree	1
Agree	1
Disagree	0
Fully disagree	0
Teachers treat us fairly.	
Fully agree	1
Agree	1
Disagree	0
Fully disagree	0

Secondly, adolescents' school connectedness was assessed with a question about *liking school*, with response options ranging from very much (1) to not at all (4). This

scale was dichotomized into "very much/rather much" and "rather little and not at all". Thirdly, school connectedness was measured with a question about *truancy* during the last 30 days. The response options were "none", "1 day", "2 to 3 days" and "more than 3 days". This measure was again dichotomized: skipping school for two days or more in the past 30 days and no school absences for truancy (none and 1 day).

School policy (II)

The vocational school's policy on smoking was assessed with three measures. Firstly, the respondents were asked whether smoking was allowed during a school day, with the following response options: 1) forbidden, 2) allowed in certain areas, and 3) allowed without restrictions. This measure was dichotomized into "forbidden" and "allowed" (allowed in certain areas/allowed without restrictions). Secondly, the students were asked how closely the smoking restrictions were monitored: "very closely", "fairly closely" or "hardly at all". These responses were dichotomized as "closely" (very closely and fairly closely) and "hardly at all". Thirdly, the adolescents were asked whether teachers or other personnel smoked at school or on school premises with response categories of: "yes, daily", "yes, sometimes", "no" and "I don't know". Teachers and other personnel who were reported to smoke daily or sometimes on school premises were considered as smokers and other teachers and school personnel as non-smokers.

Peer attachment (III)

Adolescent attachment to peers was measured by four measurements. Firstly, respondents were asked if they were experiencing *difficulties in getting along with their schoolmates* with 4-point scale response categories varying from (1) not at all to (4) very much. This scale was dichotomized into not at all/rather little and very much/rather much. Secondly, respondents were asked if they had a *close friend* with whom the respondent could talk confidentially about almost everything concerning herself/himself. Response categories were "I do not have any close friends", "I have one close friend", "I have two close friends" and "I have several close friends". This measure was dichotomized as "having at least one close friend" and "not having any close friends". Next, the respondent was asked of *how often they had been bullied* at school during this semester. The response category was: "several times a week", "about once a week" "rarely" and "not at all". Students who responded that they

had been bullied weekly (several times a week/about once a week) were considered as being bullied at school and the rest of the respondents as not bullied at school. The last question that measured students' peer attachment was: how often you have *participated in bullying* other pupils during this semester with response categories:" several times a week", "about once a week", "rarely" and "not at all". Respondents that bullied other pupils on a weekly basis were considered as bullies.

The association between bullying with adolescent smoking was explored by clarifying the bullying status. Measurements of being bullied and being a bully were combined to create a *bullying status* to clarify the complex nature of bullying with a new measurement with students divided into four categories: (1) bullied bully, (2) bully not bullied, (3) bullied not bully and (4) not bullied not bully.

Self-rated perceived health (III)

Respondents' health was evaluated by the question of how the students rated their health in general. Responses for this measurement were: "good", "rather good", "moderate" and "poor". Measurements were dichotomized as self-reported health as being "good" or "rather good" and "moderate or poor".

4.2.3 Statistical analysis of phase I sub-studies (I, II, III)

Percentages, cross-tabulation, and $\chi 2$ analyses were calculated for all categorical variables to examine the association between adolescent smoking status and parental involvement (I), teacher support (II), school connectedness, school smoking policy (II), and peer attachment (III).

The primary research questions evaluated the associations between vocational school student cigarette smoking and the factors described in the previous section. All the associations were studied using unadjusted and adjusted multinomial logistic regression. Analyses were conducted separately for boys and girls. In the unadjusted model, one variable was entered in the model separately and in the adjusted model, all the variables were examined at the same time. Adolescent smoking was set as the dependent variable and family-related, school-related and peer attachment related factors as independent variables. Daily smokers, occasional smokers, and those who had quit smoking were compared with non-smokers, who were used as a reference group. Adolescents' age (I, II, III) and family SES variables (II, III) (mother's and

father's educational level and family structure) were set as covariates in sub-studies two and three.

The statistical analyses were conducted using IBM (Armonk, NY) SPSS statistics 23. The results are presented as odds ratios (ORs) and their 95% confidence intervals. ORs were considered statistically significant only if the associated confidence intervals did not include the value 1.0. Statistical significance for all analyses was set at less than 0.1% level ($p<0.001$) due to the large sample size.

4.3 Phase II: Practical nurse students' discursive practices on smoking (IV)

4.3.1 Participants and data collection

A total of 29 volunteers aged from 16 to 25 were interviewed in five focus groups of five and one focus group of four participants in the fourth sub-study. All volunteers were female students. Interviews were conducted during school hours on school premises and sessions lasted between 45 and 60 minutes. No payment was made to the respondents.

Practical nurse students were recruited from two vocational schools in a city of southern Finland (approximately 200 000 inhabitants). All participating students were daily smokers. Limiting the research population was necessary to get a manageable entity. Practical nurse students were chosen as the target group for the fourth sub-study as qualified practical nurses (ie. care assistants) will be hired to work in smoke-free workplaces such as hospitals, care homes, and different outpatient and residential homes for the elderly. It was also essential for this study that the students should have similar interests, same ethical guidelines, and views of a future life such as working in an occupation in which smoking is undesirable behaviour. Additionally, it was necessary to Smoking during work hours in public buildings is also against the law (tobacco act 2016)(Finlex, 2016). Additionally, according to previous research, nurses who smoke might hinder health promotion practices and smoking cessation campaigns as they may unconsciously belittle the negative effects that smoking exerts on their clients'/patients' health (Agurtzane, Arantzamendi María, Lopez-Dicastillo Olga, & Angus, 2017).

Information sheets were handed out to all participants and consent forms that provided the permission to record conversations were collected from each

participant before the group interview. Students were told about the voluntariness of the interview and the possibility to leave a group interview at any time of the session without explanation. Students had the opportunity to ask questions before the interviews. Participants were given a questionnaire (Appendix 2) to gather some background characteristics. In all, 21 students out of the 29 returned the anonymous questionnaire, some students were in hurry to attend the next lesson or to go outside to smoke before the next lesson.

Each of the six focus group discussions was recorded, but also written notes about aspects that were important to remember or would clarify meanings of discussions were taken during the interviews. After each interview, the audio-discussions were transcribed. In addition, laughter and facial expressions and pauses were recorded into the transcripts. During the interviews, social involvement was a leading theme for the discussions. Parents' involvement, schools' involvement, health and beauty effects, positive and negative feelings of smoking, and possible smoking cessation in the future were all discussed. In addition, time and circumstances of smoking uptake were discussed by the groups. The topics were introduced to students who were able to freely discuss and share experiences on these broader topics without the investigator controlling the conversation. The discussion guide, which structured the interviews, is shown in appendix 3. Specific themes were subjected to some variation when the discussions were lively, and the investigator did not want to interrupt the flow. However, also clarifying questions were asked during the interview by the investigator.

4.3.2 Focus group method

The advantages of focus groups are that they allow an exploration of research themes, that participants might find threatening in a one-on-one interview such as if the interviewee does not represent a normative citizen (Schulze & Angermeyer, 2003). Additionally, vulnerable populations can be investigated via focus groups as their views might not be heard as well with other approaches (Carey & Asbury, 2016). Group discussions allow the exploration of sensitive issues and the ability to obtain more valuable data than could be gathered in individual interviews. The group interaction prompts a greater depth of revelation, and can lead to deeper insights into experiences (Carey & Asbury, 2016) as the group members with similar thoughts have the chance to hear other participant's views and they have the possibility to alter, process or broaden their own statements (Ritchie, Ritchie, & Lewis, 2003). In

the fourth sub-study, the transcribed extracts from the interviews were used but when reporting the findings, the participants' names were changed in order to protect their anonymity.

4.4 A critical discursive analysis on phase II sub-study (IV)

The phase II study uses the methodology of critical discourse analysis "CDA" (Fairclough, 2013) as discourse is how we make sense of our society, how we develop relationships with others and how we share meanings by conversation together with other people (De Chesnay, 2014). Discourse analysis has been widely applied for investigating multiple research topics such as health issues, sociological views, and health promotion. Discourse analysis has enabled researchers to develop new insights into adolescent smoking e.g. with respect to how schools' policies influence smoking and alcohol use (Leow, 2011), and smokers' views of their smoking (Gough, Fry, Grogan, & Conner, 2009).

Critical discursive analysis can be referred to as an analysis of language-based relations between discourse and components or moments as well as the inner relations of discourse (Fairclough, 2013). CDA does not focus on entities of individuals but on social relations within groups. *Internal* social relations relate to a complex set of connections of communication for example, between focus group members as well as with the moderator, but also with the physical world, persons, and power relations. Our social life consists of complex relationships: we create meanings and make meanings. *External* discourse includes different elements of a social process such as power relations within the group. Dialectical relations refer to relations in which group members are not fully separate in the sense that one excludes the other. The dimensions of discourse and the dimensions of discourse analysis are described in the form of a spiral in Figure 4 (inspired by Fairclough and (Bergh, Friberg, Persson, & Dahlborg-Lyckhage, 2015). The spiral illustrates both the interaction of the discourse process with the surrounding world and highlights that the discourse process does not proceed in a straightforward manner but is multifaceted and complicated to interpret.

For the purposes of the Phase II sub-study, we focused on how the focus group members dealt with the tensions between two contradictory discourses; one emphasizing the negative health effects and potential moral condemnation related to practical nurse students' smoking, and another describing the enjoyable elements and social acceptance of smoking widely prevalent in their social circles. The analysis

consisted of examining the dialectical nature of how these different discourses emerged in our interviewees' considerations of their own smoking, and the discursive practices that they adopted for both justifying their smoking and coping with potential accusations about their health-damaging and irresponsible behavior. We conducted the analysis by reading the transcripts and listening to the audio tapes of the interview repeatedly in order to acquire an initial understanding of the data. Discussions of similar contents were grouped together and thus formed themes. In the analysis, we found four different discursive practices that the students utilized for rationalizing their own smoking and minimizing potential moral accusations that their behaviour was irresponsible to modern society.

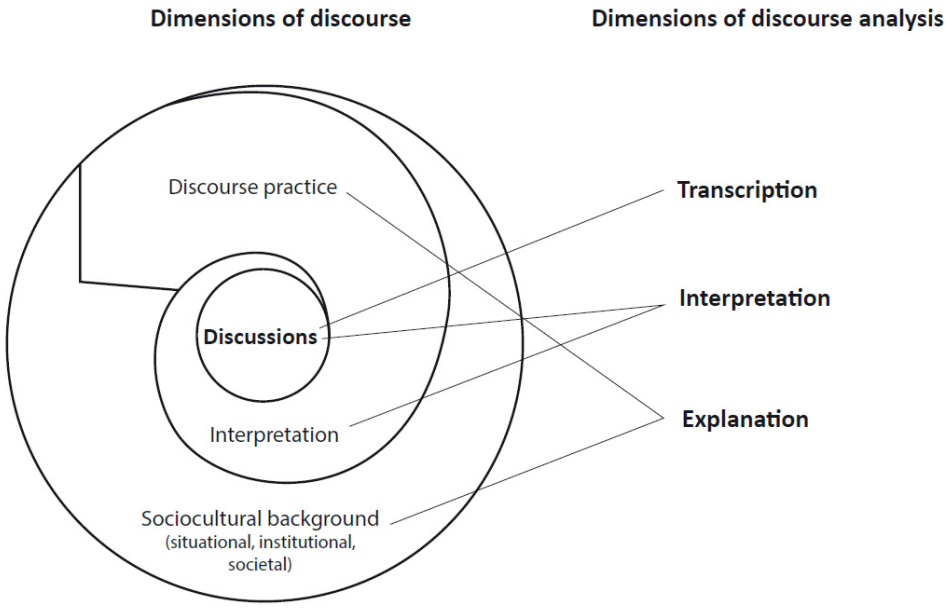

Figure 4. The dimensions of discourse and the dimensions of discourse analysis. Modified (Bergh et al., 2015; Fairclough, 2013)

5 RESULTS

5.1 Adolescent smoking behavior among vocational school

The results of phase I revealed that adolescent smoking behavior among vocational students was more common than non-smoking. Just over one-third (36%) of all vocational school students reported smoking on a daily basis. Only one in every three (33%) of the girls 33% and slightly more of the boys (38%) reported being non-smokers (smoked none or one cigarette in their lives)
Girls reported being daily smokers (37%) slightly more often than boys (36%). Girls were also occasional smokers (15%) slightly more often than boys (13%). In all, 15% of the girls and 14% of boys said they had quit smoking. Young adults were daily smokers statistically significantly more often than younger adolescents and therefore, this fact was adjusted for in the multivariate models.

5.2 Background characteristics

5.2.1 Sociodemographic factors: family type

According to the bivariate model, of those living in nuclear families, 29% of girls and 30% of boys were daily smokers. In adolescents who lived alternately with both biological parents in two separate homes, the proportion of daily smokers was 36% in both genders. Girls who lived in a single parent family reported being daily smokers slightly more often (42%) than boys (40%). A similar number (43% of girls and 41% of boys) were daily smokers if they lived in a family with one biological parent and one step-parent. Among boys and girls who lived in other living arrangements, even more of the adolescents were daily smokers (46% of girls and 49% of boys).

In the multivariate model, family type was statistically significantly associated with smoking by adolescents. In multinomial regression analysis, living arrangements other than living with a biological parent or parents increased daily and occasional

smoking in both boys and girls. Different living arrangements other than living with a biological parent/s were associated with being a former smoker in girls. In the multivariate analysis, there did not seem to be any association with smoking behavior if boys or girls lived with separated biological parents in two homes on alternate weeks.

5.2.2 Sociodemographic factors: parents' unemployment, education, and smoking behavior

In the univariate model, boys and girls who lived with parents who had been unemployed or laid off during the past year smoked daily more often than those adolescents who lived with employed parents. Mother's level of education showed no significant association with smoking behavior in the univariate model, but a low paternal education level was significantly associated with daily smoking in boys but not in girls. Sample statistics of selected SES variables are illustrated in table 8.

In the multivariate model, parent's unemployment no longer displayed a statistically significant association with smoking by either girls or boys. Girls were daily smokers significantly less often if their mother had a medium or low level of education when compared to their peers whose mothers had a degree from a university or university of applied sciences. Girls were also occasional smokers less often if their mother had a low educational level. In fact, girls reported being a daily smoker more frequently if their own level of education differed extensively from their mothers' education level.

The univariate model indicated that girls and boys whose parents smoked daily were more frequently daily smokers than their peers whose parents did not smoke. This association remained even if parents had quit smoking.

The multivariate model also highlighted these associations: mothers' smoking was associated with adolescent daily smoking in both genders. Having a mother who had quit smoking was linked with daily and occasional smoking in girls, and with having quit smoking. Paternal smoking was significantly associated with daily smoking in their adolescent children, as well as with having quit smoking. A father who had quit smoking was associated with daily and occasional smoking by his teenage children, as well as with boys who had quit smoking.

To discover whether boys' and girls' smoking was similarly associated with maternal and paternal smoking, two multivariate multinomial regression analyses with interactions were performed for the whole dataset. The first multivariate

analysis included the main effect of gender and an interaction term with gender and mother's smoking, and all other independent variables. The second multivariate analysis included the main effect of gender and an interaction term of gender and father's smoking. The analyses revealed that the interaction between gender and mother's smoking was statistically significant ($p<0.001$), but this was not the case for the interaction between gender and father's smoking ($p=0.023$). These results suggest that there are some gender differences in the association between maternal smoking and smoking in their male or female children, but that there is no association between paternal smoking and smoking in either girls or boys.

Table 8. Sample statistics of selected sociodemographic covariates

Variables	Girls		Boys		
	N	%	N	%	P*
Respondents age					<0.001
14	26	0.2	13	0.1	
15-16	3674	23.7	5217	27.1	
17-18	9750	63.4	12747	66.3	
19-20	1956	12.7	1240	6.5	
Family type					<0.001
Intact	6847	45.0	10359	55.2	
Co-parenting/dual residence	662	4.3	1491	7.9	
Single parent	2364	15.5	3127	16.7	
Step family	1437	9.4	1712	9.1	
Other type	3914	25.7	2080	11.1	
Mother's education level					<0.001
Comprehensive school or primary school or no education	2321	15.4	2655	14.4	
Upper secondary school or vocational education	6550	43.5	7617	41.2	
Occupational studies in addition to upper secondary school or vocational education	3166	21.0	3917	21.2	
University, university of applied sciences or other higher education	3028	20.1	4279	23.2	
Father's education level					<0.001
Comprehensive school or primary school or no education	3419	23.0	3761	20.6	
Upper secondary school or vocational education	6953	46.8	8151	44.6	
Occupational studies in addition to upper secondary school or vocational education	2248	15.1	2933	16.0	
University, university of applied sciences or other higher education	2243	15.1	3450	18.9	
Parental unemployment last year					0.016
Neither parent	9812	64.6	12319	65.7	
One parent	4643	30.5	5452	29.1	
Both parents	771	5.1	982	5.2	
Mother's smoking					<0.001
Mother never smoked	7587	49.5	9820	51.7	
Mother used to smoke but has now quit	3098	20.2	3968	20.9	
Mother smokes nowadays	4154	27.1	4302	22.6	
I don't know (mother)	486	3.2	915	4.8	
Father's smoking					<0.001
Father never smoked	5259	34.4	7013	36.9	
Father used to smoke but has now quit	4091	26.7	5132	27.0	
Father smokes nowadays	5035	32.9	5624	29.6	
I don't know (father)	921	6.0	1246	6.6	

**) = Chi Square*

5.3 Parental involvement and adolescent smoking behavior (I)

The formulation of a parental involvement indicator has been explained in detail previously in the methods section (5.2.3). In this study of the parent-child relationship, parental involvement consisted of the connectedness of the family and the intensity of parental monitoring. Lower scores in the parental involvement indicator reflected more frequent adolescent smoking. More than every second adolescent with no parental involvement, was a daily smoker. In contrast, less than one in three adolescents (30% of girls and 29% of boys) with the highest parental involvement smoked daily. Correspondingly, adolescents were statistically significantly more likely to be daily smokers with the exception of the group with the highest parental involvement scores. Anything other than the highest parental involvement score was reflected also in the likelihood of girls smoking occasionally. These associations remained in the adjusted multinomial regression model. Table 9 shows the multinomial regression model that controlled for sociodemographic factors, parental smoking, and the respondent's age. In this model the parents were not divided by smoking into smokers and nonsmokers.

Table 9. Adjusted odd ratios (and 95% confidence intervals) in the multinomial logistic regression of smoking on family involvement.

	GIRLS smokes daily			smokes occasionally			has quit smoking		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
Parental involvement									
No involvement	2.90	1.79-4.70	<0.001	2.90	1.62-5.19	<0.001	1.90	1.06-3.42	0.033
Very low involvement	2.04	1.61-2.59	<0.001	2.16	1.61-2.89	<0.001	1.22	0.90-1.67	0.206
Rather low involvement	1.70	1.45-1.99	<0.001	1.74	1.42-2.12	<0.001	1.19	0.97-1.45	0.095
Rather high involvement	1.75	1.54-1.98	<0.001	1.75	1.49-2.06	<0.001	1.39	1.19-1.60	<0.001
High involvement	1.49	1.33-1.67	<0.001	1.56	1.29-1.73	<0.001	1.24	1.08-1.43	0.002
Very high involvement	1			1			1		

	BOYS smokes daily			smokes occasionally			has quit smoking		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
Parental involvement									
No involvement	2.44	1.59-3.72	<0.001	1.5	0.82-2.87	0.176	1.99	1.16-3.41	0.012
Very low involvement	1.76	1.41-2.18	<0.001	1.38	1.01-1.87	0.040	1.48	1.12-1.96	0.006
Rather low involvement	1.47	1.28-1.69	<0.001	1.34	1.11-1.62	0.003	1.21	1.00-1.44	0.045
Rather high involvement	1.69	1.51-1.88	<0.001	1.44	1.24-1.68	<0.001	1.17	1.02-1.35	0.030
High involvement	1.36	1.23-1.51	<0.001	1.36	1.19-1.56	<0.001	1.14	1.00-1.29	0.050
Very high involvement	1			1			1		

The reference group for the dependent variable was “Non-Smoker” and smokers and those who have quit smoking were compared to non-smokers. Parental involvement indicator was an independent factor. In the adjusted model, all the variables were examined at the same time. Family SES variables, parental smoking and respondent’s age were adjusted.

5.4 The relationship between school connectedness, smoking policy, and adolescent smoking behaviour (II)

5.4.1 School connectedness

According to the bivariate analysis, lack of *teacher support* was statistically significantly associated with smoking behaviour: Those girls and boys who smoked daily, occasionally or had quit smoking did not perceive that they were receiving any teacher support; this was statistically significant. With respect to daily smoking girls, 43% reported not receiving teacher support whereas 35% reported obtaining support. There were no major differences in the extent of teacher support of girls who smoked occasionally or those who were former smokers. Of the nonsmoking girls, slightly over one in four (26%) did not consider that they were receiving teacher support while 35% reported that their teachers did support them. A significant minority (42%) of boys smoking daily reported not getting teacher support whereas 34% of daily smoking boys said that they did receive support from teachers. There was no difference in the perception of teacher support in the boys who were occasional smokers or former smokers. With regard to the nonsmoking boys, 31% reported not receiving support whereas slightly more (40%) stated that their teachers supported them.

The adjusted multivariate model revealed that lack of teacher support was statistically significantly associated with daily smoking among boys and girls, when adjusted for the following covariates: age of respondents, family socioeconomic variables (SES), family type, and all other independent variables within the model.

Bivariate analysis also revealed that not *liking school* was statistically significantly associated with smoking in both genders. A significant minority (45%) of the girls who smoked daily did not like school with fewer i.e. 35% reported liking school. Occasional smoker and former smoker girls liked school approximately as much. One out of every four (24%) nonsmoking girls did not like school whereas more (35%) of nonsmoking girls liked school. A similar pattern was found for boys: with respect to the daily smokers; 43% did not like school and 34% liked school. Similar to the situation in girls, boys who were occasional and former smokers displayed no major difference between not liking and liking school. In the male non-smokers, the situation was somewhat different; 28% did not like school but more, 40%, stated that they liked school.

The adjusted multinomial regression model (table 3) revealed that disliking school was associated with daily and occasional smoking in both genders when adjusted for the following covariates: age of respondents, family socioeconomic variables (SES), family type, and all other independent variables within the model.

5.4.2 Truancy

According to the cross-tabulation, truancy was statistically significantly associated with daily, occasional, and former smoking in both genders. Nearly 60% of daily smoking girls had been truant on at least two days during the previous 30 days; only one in three smokers (33%) had not been truant. There were no major differences in the truancy incidence in girls who were occasional smokers or former smokers. The non-smoking girls were much less likely to be truant; only 15% had been absent because of truancy during the previous month; more than double that value (37%) had not been truant in the preceding 30 days. This pattern was similar in the boys. Over half (55%) of daily smoking boys had played truant during the previous month with only slightly more than every third (36%) not being truant. The difference in the level of truancy was not significant in occasionally and formerly smoking boys. As observed in the girls, the non-smoking boys were more regular school attendees, only 18% had played truant in the last month 42% had not been absent.

The adjusted multivariate model showed that adolescents who were truant for two or more days a month were not only more likely to be daily smokers, but also occasional smokers and former smokers in comparison with those who were not truant for more than one day a month. The adjusted multinomial regression model was adjusted for the following covariates: age of respondents, family socioeconomic variables (SES), family type, and all other independent variables within the model.

5.4.3 Smoking policy

In the bivariate analysis, the extent of *smoking restrictions* was statistically significant only among smoking boys. Among boys who were daily smokers, 38% reported smoking was allowed with some restrictions whereas 32% of daily smoking boys reported that smoking was forbidden on the school premises. There were not many differences in their views of school tobacco restrictions in the occasional smokers and former smokers. Many non-smoking boys, (31%) reported some restrictions and 41% said that smoking was forbidden.

Tobacco policy monitoring was statistically significantly associated with smoking behavior in both genders. Daily smoking girls reported more often that tobacco policy was closely monitored. Occasional and former smokers and non-smoking girls slightly more often reported that smoking restrictions were hardly monitored at all. Boys showed a similar pattern: Daily smokers more often reported that there was close monitoring of tobacco policies in comparison with occasional smokers, former smokers, or nonsmokers.

Students' perceived *school staff smoking* was associated statistically significantly with smoking in both genders. Among daily smoking girls, 44% believed that some of the school staff were smoking in comparison with slightly over one third of daily smoking girls (34%) who did not report this observation Girls who reported that they smoked occasionally or had quit smoking stated slightly more often than their non-smoking peers that there were school teachers who were smokers. Slightly more than every third (34%) of non-smoking girls, considered that school staff did not smoke during school hours where every fourth (26%) said that their teachers did smoke. Boys exhibited a similar pattern: 43% of boys who were smoking daily reported staff smoking on school premises whereas 33% did not think that the staff smoked at school. Those boys who smoked occasionally or were former smokers reported the occurrence of staff smoking in much the same way. Many nonsmoking boys (32%) considered that staff members did smoke during school hours, 40% disagreed with this opinion.

The adjusted multinomial regression model showed that *perceived teachers' and other staff members' smoking* on school premises significantly increased the odds of adolescents' daily smoking, occasional smoking, as well as former smoking. However, close *monitoring of smoking restrictions* increased the odds of daily smoking in both genders. The adjusted odd ratios in the multinomial regression of sub-study II are illustrated in table 10.

Table 10. Adjusted odd ratios (and 95% confidence intervals) in the multinomial logistic regression of smoking on school related issues

	GIRLS								
	smokes daily			smokes occasionally			has quit smoking		
	OR	**95% CI**	**P**	**OR**	**95% CI**	**P**	**OR**	**95% CI**	**P**
Teachers' support									
Low level	1.38	1.25-1.53	**<0.001**	1.21	1.06-1.38	0.004	1.25	1.10-1.42	0.001
High level	1			1			1		
Likes school									
Rather little or not at all	1.37	1.22-1.54	**<0.001**	1.32	1.15-1.53	**<0.001**	1.29	1.12-1.49	0.001
Rather or very much	1			1			1		
Truancy last 30 days									
At least 2 days	3.60	3.16-4.10	**<0.001**	2.30	1.96-2.71	**<0.001**	1.85	1.57-2.19	**<0.001**
None	1			1			1		
Smoking is allowed									
Allowed in school	1.02	0.93-1.11	0.698	0.89	0.80-1.00	0.031	0.89	0.80-0.99	0.036
Forbidden in school	1			1			1		
Smoking restrictions are monitored									
Hardly at all	0.74	0.68-0.81	**<0.001**	0.92	0.83-1.03	0.149	1.04	0.93-1.15	0.534
Closely	1			1			1		
School personnel smoke on school premises?									
Yes	1.91	1.75-2.08	**<0.001**	1.49	1.34-1.67	**<0.001**	1.40	1.26-1.56	**<0.001**
No	1			1			1		

	BOYS								
	smokes daily			smokes occasionally			has quit smoking		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
Teachers' support									
Low level	1.35	1.22-1.49	**<0.001**	1.18	1.03-1.35	0.015	1.26	1.11-1.43	**<0.001**
High level	1			1			1		
Likes school									
Rather little or not at all	1.25	1.12-1.40	**<0.001**	1.29	1.12-1.50	**<0.001**	1.25	1.09-1.44	0.002
Rather or very much	1			1			1		
Truancy last 30 days									
At least 2 days	3.43	3.06-3.86	**<0.001**	2.43	2.09-2.83	**<0.001**	1.94	1.66-2.26	**<0.001**
None	1			1			1		
Smoking is allowed									
Allowed in school	1.20	1.11-1.30	**<0.001**	1.01	0.91-1.13	0.822	0.96	0.87-1.07	0.463
Forbidden in school	1			1			1		
Smoking restrictions are monitored									
Hardly at all	0.73	0.67-0.79	**<0.001**	0.87	0.78-0.97	0.008	0.87	0.79-0.97	0.008
Closely	1			1			1		
School personnel smoke on school premises?									
Yes	1.67	1.54-1.80	**<0.001**	1.44	1.29-1.59	**<0.001**	1.41	1.27-1.56	**<0.001**
No	1			1			1		

The reference group for dependent variable was "Non-Smoker" and smokers and those who have quit smoking are compared to non-smokers. School related factors were set as independent factors. In the adjusted model, all the variables were examined at the same time. Family SES variables, respondents' age and all the other independent variables were adjusted for in the model.

5.5 The relationship between peer relations and adolescent smoking behavior (III)

According to the sub-study crosstabulation (bivariate analysis), difficulties with schoolmates were not associated with smoking in either girls or boys. Instead, having

a close friend or friends was statistically significantly associated with smoking in both genders. Adolescents without a friend in whom they could confide were less frequently daily smokers and were more often non-smokers.

The multinomial regression model was adjusted for the age of the respondent, parent's education level family type and other dependent variables at the model. After adjustment difficulties with mates were not associated with smoking behaviour in either gender. However, having a close friend or friends added to the odds of girl's daily smoking and occasional smoking and to boys' daily and occasional smoking, and former smoking.

According to the bivariate analysis being a victim of bullying at school was statistically significantly associated with smoking in boys but not in girls. Participation in bullying was associated with smoking behaviour in both genders. Bullying status was significantly associated with smoking behaviour in both genders and bullies were more frequently daily smokers than their classmates who did not participate in bullying behaviour.

According to the adjusted multinomial regression model of bullying behaviour, bullying was not associated with smoking in girls. Boys who bullied others and were bullying victims themselves were statistically significantly more often daily smokers. In addition, bullies who were not themselves bullied were statistically significantly more often daily and occasional smokers. Being a victim that did not bully others was not associated with smoking behaviour.

Self-rated health was statistically significantly associated with smoking behaviour in girls and boys according to bivariate analysis. Adolescents who assessed their health as moderate or poor were more often daily smokers than their peers who rated their health as 'fairly good' or good. Adolescent smoking associations on peer relations are shown as the adjusted odd ration in the multinomial logistic regression model in table 11.

Table 11. Adjusted odd ratios (and 95% confidence intervals) in the multinomial logistic regression of smoking on peer relations

	GIRLS								
	smokes daily			smokes occasionally			has quit smoking		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
Difficulties with mates									
Has difficulties	0.89	0.77-1.02	0.081	0.98	0.82-1.16	0.785	0.95	0.79–1.13	0.532
No difficulties with mates	1			1			1		
Having a close friend									
Don't have friends	**0.44**	**0.36-0.53**	**<0.001**	**0.53**	**0.41-0.67**	**<0.001**	0.85	0.79-1.06	0.139
Has a friend or friends	1			1			1		
Bullying status									
bullied bully	2.41	1.26-4.64	0.008	0.69	0.23-2.14	0.525	0.81	0.29-2.30	0.695
bully	2.00	1.27-3.14	0.003	1.92	1.12.3.29	0.018	1.57	0.88-2.78	0.126
victim	0.98	0.76-1.25	0.852	0.72	0.50-1.02	0.066	0.99	0.72-1.36	0.934
not bullied not bully	1			1			1		
Perceived health									
Moderate or bad	**1.95**	**1.78-2.14**	**<0.001**	**1.28**	**1.13-1.44**	**<0.001**	1.06	0.94-1.21	0.326
Good or very good	1			1			1		

	BOYS								
	smokes daily			smokes occasionally			has quit smoking		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
Difficulties with mates									
Has difficulties	1.02	0.91-1.14	0.704	1.02	0.91-1.14	0.704	1.02	0.91-1.14	0.704
No difficulties with mates	1			1			1		
Having a close friend									
Don't have friends	**0.45**	**0.40-0.52**	**<0.001**	**0.45**	**0.40-0.52**	**<0.001**	**0.45**	**0.40-0.52**	**<0.001**
Has a friend or friends	1			1			1		

Bullying status									
bullied bully	**2.11**	**1.62-2.75**	**<0.001**	**2.11**	**1.62-2.75**	**<0.001**	**2.11**	**1.62-2.75**	**<0.001**
bully	**2.23**	**1.74-2.86**	**<0.001**	**2.23**	**1.74-2.86**	**<0.001**	**2.23**	**1.74-2.86**	**<0.001**
victim	1.03	0.84-1.27	0.778	1.03	0.84-1.27	0.778	1.03	0.84-1.27	0.778
not bullied not bully	1			1			1		
Perceived health									
Moderate or bad	**1.59**	**1.44-1.75**	**<0.001**	**1.59**	**1.44-1.75**	**<0.001**	**1.59**	**1.44-1.75**	**<0.001**
Good or very good	1			1			1		

The reference group for dependent variable was "Non-Smoker" and smokers and those who have quit smoking are compared to non-smokers. Measures of peer relation were used as independent factors. In the adjusted model, all of the variables were examined at the same time. There were adjustments for family SES variables and respondents' age.

5.6 Practical nurse students' discursive practices on smoking (IV)

5.6.1 Normalization

Normalization relates to social processes where ideas and actions become "natural" in everyday life and are accepted among peers (Hathaway, Comeau, & Erickson, 2011; Measham & Shiner, 2009). In the focus group interviews, to a large extent smoking was described as normal behavior, which was most often justified by the claim that most of the students' *family members and all of their close friends were smokers*. In other words, having smoking family members and friends lowered the individual's threshold to start smoking. Smoking was said to *go well with everything* one does during the day as if without cigarettes walking and eating would not be as pleasant. Smoking was stated to *allow the person to calm down* when experiencing anxiety. Some teachers were thought to be especially difficult to tolerate, evoking negative feelings that only smoking could relieve.

Adolescent discussions revealed that most smoking parents saw smoking as *a normal phase of development that adolescents passed through*. Some parents had compared smoking and other substance use by stating "there is nothing wrong with smoking just as long as you don't do drugs". In addition, smoking siblings considered smoking as normal behavior.

One reason for not giving up smoking was that *Quitting* smoking might also lead to *exclusion from the smoker group* and friends. When discussing the barriers to smoke cessation, fear of losing important relationships and fear of getting excluded from groups of friends was intense and caused unwillingness to quit smoking.

During the practical training, smoking tutors were rated as highly valuable, as tutoring around the ashtray created a special belonging that could not be obtained anywhere else. In other words, a smoking student would obtain better tutoring from a tutor who smoked. Patients were not thought to be affected by the smell of cigarettes as smoking had been more common previously, and according to the interviewees, *smoking is therefore, more "normal" to the elderly* than to present-day adults.

5.6.2 Smoking is under control

Female practical nurse students (n=29) did not place any importance on the negative stereotype of smokers being wrinkly-skinned, yellow-toothed and ill, as all the students were adolescents or young adults. In many discussions, smoking was viewed as a willingly chosen behavior that *I could quit if I wanted to*. Several excuses were given as to why cessation was not considered as favorable at this particular time. Smoking a cigarette was needed in order that the participant would be a better girlfriend, wife, even a mother or the student was not motivated while still in the school or did not think there was any need to quit. A feedback question was posed to the moderator; Why should someone give up smoking as smoking was pleasurable and they liked the taste of cigarettes? *Pregnancy in the future* was provided an example of an event that would give them the motivation to quit. It was common knowledge in the groups that quitting smoking while pregnant was easier as somehow the cravings ceased. After delivery, adolescents thought that they would not start smoking again, but those participants with children claimed that it was not so easy.

Smokers were relatively young, and most of the students had thought of *quitting before smoking leads to negative effects* on their beauty and health. A few students had set an age for cessation beforehand which might prevent them even thinking about quitting before that predetermined age. The students thought that they would quit

smoking in early adulthood as smoking in middle-age or later was considered disgusting.

5.6.3 Responsible smoking

In all of the focus group discussions, students claimed that they were responsible smokers who actively took *nonsmokers and children into consideration*. The discussions claimed that responsible smoking was acceptable and other people needed to be taken into consideration, as they all did. Students presented themselves as responsible smokers as they would never smoke in front of grandparents, other family members, or relatives who did not approve of smoking.

Smoking was to be avoided also if there were children present. Pregnant and nursing mothers were considered not responsible smokers and the students viewed them with feelings of disgust. Nonetheless, there were supporting comments about mothers who were unable to quit smoking even while pregnant, but the students stated that a responsible mother should not smoke in public as it makes others feel uncomfortable. During the discussions, it seemed that the reasons why one should not smoke while around children or while being pregnant were somewhat ambivalent: one reason was partly for the protection of the child's health, but another reason was more egoistic i.e. the smoker should avoid stares of disapproval from other people.

5.6.4 Smokers' identity

Smoking was considered not just a habit but as a part of themselves. Students made it clear that neither getting seriously ill themselves nor some serious illness in a close person could make them quit smoking as smoking was so much a part of their identity. Furthermore, students claimed to need cigarettes as they were a part of their personality. Justifications for smoking emerged in the group discussions as smoking was considered to (1) *bind a family and friends together* and (2) be *a medication for the blues* and to calm a temperamental personality. They also justified their smoking by underrating the cost of cigarettes, or minimizing the fact that smoking has serious health effects. Smoking was thought to bind family members and friends together, and new friends, even boyfriends, had been found by asking for a cigarette or a light for a cigarette. Some students even stated how frightening it would have been if they had not smoked, then they would never have met friends with whom they relate or

been a part of a smoker group where they strongly felt that there was social belonging. Conversely, they felt that if they had not smoked, they might well have made friends with the wrong kind of people. Social belonging to the smoker group was named when the discussions focused on why they were not willing to quit smoking as they had a fear of losing their status and social identity (Tajfel, 1981).

All the students explicitly described their smoking as a positive factor for promoting social connections bringing people with similar views together. Furthermore, students who were mothers stated that smoking was an opportunity to take a break from stressful domestic situations with children.

Participants discussed defending their smoking to a nonsmoking boyfriend. Being asked, even pleaded to quit made the interviewees angry, as their smoking was so much a part of their identity and not just a habit and it was difficult to relate to a non-smoker who did not understand that fact. Similarly, young mothers justified their smoking by its provision of a brief moment of their own time, a respite from domestic chores; therefore, they were not motivated to give up these precious moments of their own during the evenings.

Smoker identity was discussed as cigarettes were needed as medication for anxiety and depression and to calm their difficult personalities. Without cigarettes, they felt that their personality would change, and reality would be too much to handle. The students described themselves as being nicer, happier and better able to control their negative feelings because they smoked. It was claimed that their mothers would be worried about their daughters' behaviors if they were non-smokers. Likewise, because smoking made them have a calmer and nicer personality, they considered that it may even have made their mothers fonder of them rather than having a depressed and anxious non-smoking daughter.

5.7 Summary of the results

Smoking was more common than nonsmoking among adolescents studying in a vocational school. After controlling for the respondents' ages, family type, parental education level and parental smoking, the findings of first sub-study highlighted the significance of parental involvement as a powerful protective factor against smoking by vocational students and argued against parenting practices that provide an adolescent with a freedom that he/she is not ready to handle.

The second sub-study found that vocational students who were daily smokers felt that they received less teacher support, liked going to school less, and skipped school

more often than their nonsmoking classmates. At school, close monitoring of smoking was not associated with less smoking but surprisingly with an increased number of daily smokers. Furthermore, smoking by teachers and other school personnel during school hours increased the odds of daily, occasional, and former smoking in both genders of students. The respondents' age, family type, and parental education level were controlled for in the second and third sub-studies

The last sub-study in phase I found that among vocational school students' difficulties with classmates was not associated with adolescent smoking behaviour as such but instead, having a friend or friends increased the odds for smoking in both girls and boys either daily or occasionally as well as the odds of being an ex-smoker. In boys, being a bully increased the odds for smoking daily and occasionally but also being a victim of bullying increased the odds for daily smoking. This association was not evident in the girls. Additionally, our study confirmed that poorer self-rated health was associated with smoking behaviour in both girls and boys.

The phase II qualitative study involved focus group discussions in practical nurse students (n=29); it found that the negative aspects of smoking were not a concern to these students. The students utilized four different discursive practices for rationalizing their own smoking behaviour and minimizing potential moral disapproval of smoking when they had qualified in the future as practical nurses: First, smoking was normalized: smoking was considered a normal behaviour because family and friends smoked. Smoking was seen as an activity that one can do throughout the day. Exclusion from the smokers' group was a worry that stopped these students from quitting smoking. These reasons were given both at the time when smoking began and later as a factor preventing cessation. Second, smoking was claimed to be under control as smoking was a habit that could be quit whenever the individual wanted. Smoking was viewed as a temporary phase of a teenager's or young adult's life, as the students emphasized that smoking and future cessation would be under their control. Students claimed to have decided to quit smoking before a certain age when the adverse effects of smoking would begin to emerge and at least before getting pregnant.

Third, students considered themselves responsible smokers and they took pride in not smoking while children were present or in the company of non-smokers who disapproved of smoking. Fourth, smoking was clearly claimed to be a part of their students' identity. Smoking was not seen as a bad habit but simply as a part of who they were as individuals. Smoking was considered as medicine for "the blues" and a way of controlling their temperamental behavior. The results of all sub-studies are illustrated in figure 5.

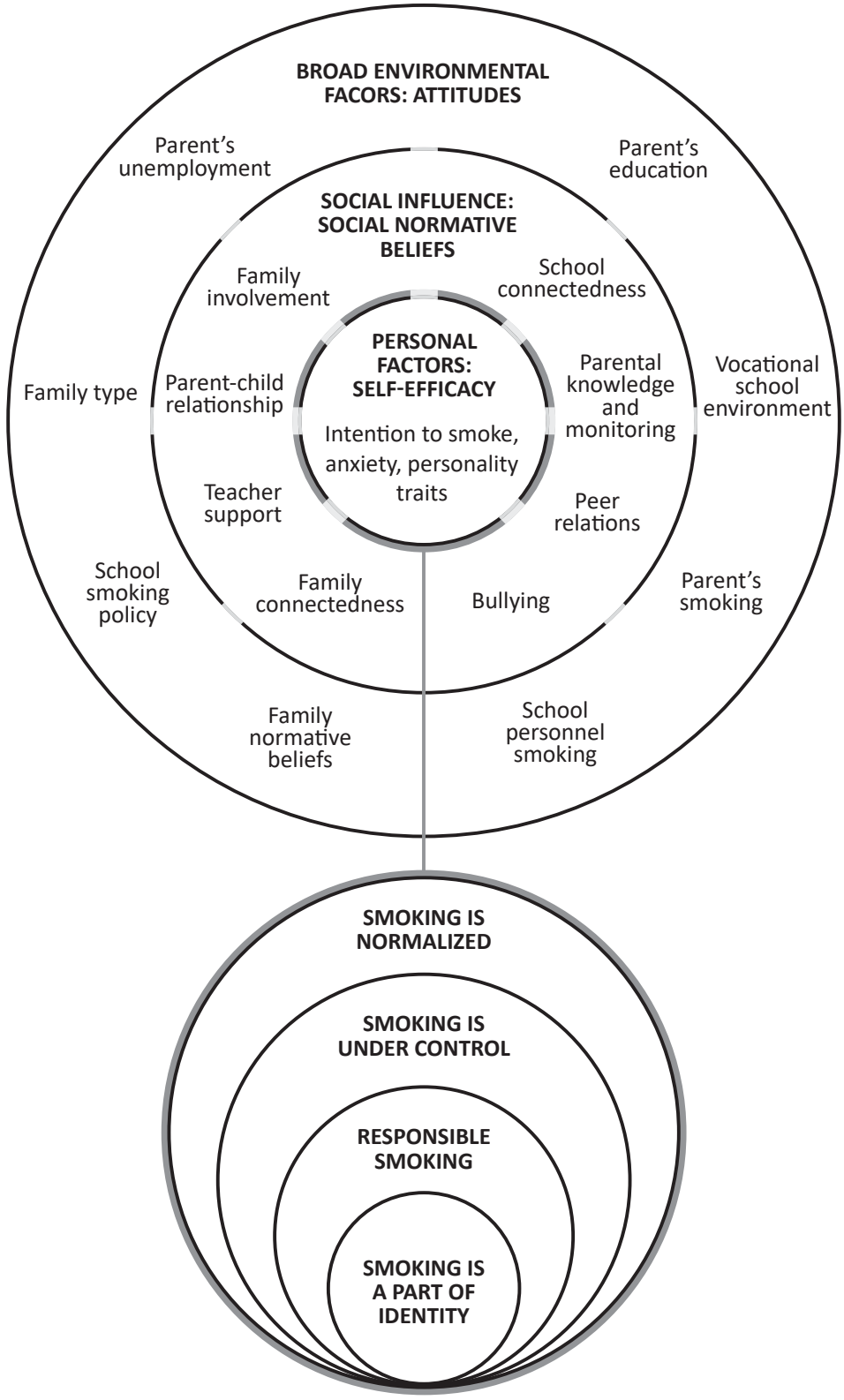

Figure 5. Summary of the results of this dissertation study (results of I-IV sub-studies)

6 DISCUSSION

6.1 Ethical aspects

During this entire research project, the ethical issues encountered can be considered as an ethical journey from start to finish (McKie, 2014). The overall object of this study was to gain knowledge of Finnish vocational students' smoking habits. Many dimensions of this topic have been under-researched; however, it has been estimated that vocational students are 4.5 times more likely to be daily smokers than upper secondary school students. It is also known that those who smoke in adolescence will be more likely to be smokers as adults (Saddleson et al., 2016; Sargent et al., 2017) and this is a major factor contributing to health and economic inequalities (World Health Organization, 2015).

The phase I primary study was conducted according to the Helsinki Declaration (World Medical Association., 2014) and was approved by the Institute for Health and Welfare Institutional Review Board in Finland. All respondents were given a detailed explanation of the study by the research team but written, informed consent was not needed to be obtained from participants according to local regulations. Students completed anonymously and voluntarily a classroom-administered questionnaire on their own under their teacher's supervision. Furthermore, students were informed of their right to withdraw at any time from filling in the questionnaire.

The research plan of this study was approved by the National Institute for Health and Welfare and the primary data was accessed for secondary use to increase the knowledge of smoking in a vocational school setting. Access to the data for research purposes was in accordance with the research plan and after use, the data was destroyed; the primary data is housed in the National Institute for Health and Welfare.

Before conducting the phase II sub-study, the City of Tampere approved the research plan. The permission for interviews and the practical arrangements such as time and place of the interviews were also approved by the Head of Vocational Education. Phase II sub-study participants, practical nurse students, can be considered as vulnerable interviewee's because they are constantly aware of the stigma linked with their smoking (Aho & Kylmä, 2012). Practical nurses will be

employed in smoke-free workplaces such as hospitals, primary care, and different out-patient and institutional units for the care of the elderly and children. Smoking during work hours in these places is against the law (Tobacco Act, 2016) and contravenes the rules set by many employers. Smoking may also affect their work as nurses who smoke might hinder health promotion practices i.e. they may unconsciously belittle the negative effects that smoking exerts on their clients'/patients' health (Agurtzane et al., 2017).

Information sheets and consent forms with permission to tape the discussions were handed out before the group interview. Students were informed about the voluntary nature of the interview, given the chance to ask questions prior to the interview and informed of the option of leaving the interview at any time. All six focus group discussions were audio-recorded. After every interview, the moderator transcribed the audio-recordings verbatim including the laughs, pauses, and expressions into the transcription. Focus group interviews were held on school premises during school hours, and no fee was paid to the participants.

The phase II audio-recorded group interviews, transcribed data with the forms for background information with the consent forms being kept in a locked cupboard as password protected files to ensure anonymity and confidentiality of the participants (McKie, 2014).

6.1.1 Phase I: Validity and reliability

Validity refers to whether the tests measured what they were designed to measure, aiming to make sure of the trustworthiness of the study (Roberts, Priest, & Traynor, 2006). The strengths and limitations of usage of secondary data for phase I studies were carefully evaluated. Despite the advantages of secondary data which were described in the previous section, if one only has access to secondary data sets, researchers are always limited to the original data collection. It is not possible to go back and ask more specific questions (Doolan et al., 2017). Nonetheless, this study conducted in all vocational schools in Finland was highly representative of all vocational school students.

The original questionnaire (http://www.thl.fi/fi/web/thlfi-en/research-and-expertwork/population-studies/school-health promotion-study) was stringently reviewed and the items in the questionnaire were found to represent the study aims and objectives. Each of the sub-studies was carefully planned, conducted, and written (Roberts, Priest, & Traynor, 2006).

The content validity was ensured with a series of literary reviews and with expert opinions. Factor analysis was used to ensure that the items used to form the indicators were relevant. One item was left out of the teacher support measure since two of the characteristics were related to each other (Fabrigar & Wegener, 2012). Furthermore, the input from a professional statistician has ensured the validity of the statistical analyses in the phase I sub-studies. All measures were conducted separately for girls and boys to take account of gender differences (Struik, O'Loughlin, Dugas, Bottorff, & O'Loughlin, 2014). Statistical models and the covariates in the multinomial model were selected with caution. The multinomial regression model was chosen as the method of analysis as this approach obtains the best explanation for relationships among a set of measures and it makes it possible to control for variables that may play a role in the interpretation and conclusions being drawn from the results (Taylor, 2013).

Generalization (external validity) of phase I studies and the ability to apply the setting and the findings with confidence to other people and other situations is possible as long as the time, context and study population are representative of those to whom the results are to apply (Taylor, 2013). The vocational training and education differ from country to country; this was taken into consideration when generalizing the study design or interpreting the findings. In fact, similar results of excessive smoking among vocational school students have been reported in different countries in the Western world. The secondary data set consisted of large sample sizes which increases the generalizability of the results (Doolan et al., 2017).

Reliability is basically concerned with the quality of the measurement. It is vital that measurement does not represent randomly fluctuating scores i.e. obtaining research findings that are not reliable nor systematic (Thompson, 2003). The phase I sub-studies were a set of secondary studies utilizing the data collected by the National Institute of Health and Welfare. While the large sample size contributes to reliability, it is possible that the students who were not in school on the survey day would have given somewhat different responses to the questionnaire. For example, if there were a large number of students who were playing truant, this might mean that the role of truancy has been underestimated in this data.

In sub-studies I-III, the large sample size (34 776) ensured reliability as such but the internal consistency of the indicators formed was ensured by estimating Cronbach's alpha coefficient. All the responses of the role of family involvement and the teachers' support indicators were randomly split into two sets and the average correlation between all the split halves was estimated (Cronbach, 1951). The internal consistency (Cronbach's alpha) was 0.46 for the family involvement

indicator; for teacher support, the indicator was 0.72. The indicator can be estimated as being internally consistent and that the indicator questions are measuring the appropriate issues when the Cronbach's α is >0.6, however, a smaller value of Cronbach's α does not mean that the original measurements should be invalid but caution is necessary in their interpretation (Kvantitatiivisten menetelmien tietovaranto, 2018; Reunamo, 2018).

6.1.2 Phase II: Trustworthiness and authenticity

Lincoln and Guba (1985) initially presented four criteria for evaluating the trustworthiness of a qualitative study. Trustworthiness is a term which refers to four aspects i.e. credibility, dependability, confirmability, and transferability. Authenticity was added later as the fifth criterion of trustworthiness (Guba & Lincoln, 1994).

Trustworthiness refers to the degree of confidence in qualitative data, its interpretation, and methodological soundness and the adequacy of the data to ensure the quality of the study (Polit & Beck, 2010). Basically, this concept refers to why it would be worthwhile paying attention to an inquiry (Lincoln & Guba, 1985). *Credibility (i.e. truth value)* as an important part of trustworthiness referring to the internal validity of the study (Lincoln & Guba, 1985). The fourth sub-study was conducted without the investigator interrupting or leading the discussion of the students, instead she listened and let them freely discuss smoking-related topics in their group. During the focus group sessions, students gave truthful interview data in their own context. The transcripts were checked against the audio recordings to ensure their validity i.e. what was really said and discussed. This was then shared with other members of the research group of sub-study IV to ensure that the findings were compatible with vocational students' perceptions (Holloway & Wheeler, 2013). According to Sandelowski (1986) and Lincoln & Guba (1985), a qualitative study can be considered to be credible if the descriptions of experiences are recognized by people that share the same experience. The fourth sub-study was not returned to the students to confirm the conclusions; these were discussed in student seminars, with the tutor of this thesis and with the co-writers to ensure the credibility of the study.

Lincoln and Guba (1985) used the term *transferability (i.e. applicability)* to describe the generalizability of the study and are a naturalist's equivalent for external validity. It is possible that a qualitative study can be somewhat transferable to a similar context or to similar participants. In the fourth sub-study, information was provided to the interviewees about the research context; this may help the reader to be able to

estimate whether the findings are adequate and transferable. However, the transferability is dependent on the study's aim and objects and can only be relevant if the researcher's intentions are capable of allowing generalizations of the topic or phenomenon (Sandelowski, 1986).

The consistency and the *dependability* of the phase II study findings (reliability) ensured the transparency of the study process. Readers of the fourth sub-study and other researchers that are interested in this study should be able to follow and evaluate the adequacy of the analysis, decision process, and conclusions made through the descriptions of the study context and the discussions included in the original article. A study can be called dependable if, through the researcher's process and descriptions, the study findings could be replicated with similar participants under similar circumstances (Lincoln & Guba, 1985).

Confirmability (objectivity) refers to the researcher's ability to indicate that the data represent the interviewee's thoughts and views and not the researcher's previous assumptions and preconceptions (Holloway & Wheeler, 2013). Confirmability in the study was ensured by describing how the conclusions and interpretations were created as well as describing how the findings were derived from the data. In the original article (4) many direct quotes are provided from the original discussions since these illustrated well each theme that emerged. Additionally, confirmability includes the researcher's intellectual honesty and transparency (Dahlberg, Drew, & Nystrom, 2001).

While trustworthiness is concerned with an adequate methodology, *authenticity* refers to the extent to which researchers have fairly and totally revealed a variety of different realities which realistically represent the participants' lives (Polit & Beck, 2010). There is no equivalent term in qualitative research but it refers to strategies that are appropriate for reporting the participants' views and to the ability and extent to which the researcher has been able to express the feelings and emotions of the participant's experiences in a credible manner (Guba & Lincoln, 1994). The trust and acceptance of students were gained by first discussing freely with them about their studies and the school. Secondly, it was important to emphasize to the students that the interview was not aiming to sermonize against smoking but that the researcher was truly interested in their views and experiences. Discussions were relaxed and there was a lot of laughter. Fairness towards the students was ensured and informed consent gathered from all the participants with permission granted to record the interviews. Students' backgrounds and their social context have been transcribed to allow readers to understand the world in which these students live. Extensive quotes

from their discussions were included in the findings to allow readers to grasp the essence of the experience, as recommended by Guba & Lincoln (1994).

6.1.3 Strengths and limitations

Advantages and challenges of secondary data analysis

Secondary data analysis means that the data have been already collected by other sources and are readily available. Large datasets that contain different health statistics are obtainable from a number of government agencies (e.g. National Health and Wellbeing and Finnish Social Science Data Archive). These under-used data sets can be accessed by primary researchers, since these voluntary and professional agencies typically collect more data than they can initially analyze (e.g. cancer society in Finland https://www.syopajarjestot.fi/julkaisut/raportit/syopayhdistyksen-vuosikertomus-2016/suomen-syoparekisteri/. Additionally, international datasets can be obtained e.g. data without boundaries (http://www.dwbproject.org/).

The advantages of the use of secondary data for research are that it is less expensive and requires less time as opposed to designing a new research protocol and then recruiting new subjects and collecting data. It is also timesaving, since the existing data set is readily available in a research-friendly format. Furthermore, secondary data sets often contain large sample sizes not only increasing the generalizability of findings but also providing opportunities for new insights (Doolan, Winters, & Nouredini, 2017; Dunn, Arslanian-Engoren, DeKoekkoek, Jadack, & Scott, 2015) The use of secondary data has the benefit of not subjecting subjects to any potential harms associated with research participation, as these individuals have already experienced the burdens associated with participating in the research (Abeysekera, 2014).

Despite the advantages of secondary analyses, there are several major areas of potential concern that should be considered. First, the researcher needs to have the knowledge and resources to identify, find and access suitable databases and to possess the ability to evaluate the quality of the data. Second, research planning must take place under the terms of the data, because when research is being planned, the data has already been collected and can no longer be changed. It is possible that there will be no data set available which can answer a particular research question, in which case the only way to answer that question would be to conduct a prospective study. Additionally, the existing data may not be adequate due to sample characteristics or size, variables may not have been measured appropriately, or data may be insufficient

due to missing data. Third, secondary data sets, especially those collected in the social sciences, may become outdated within a few years, especially if the primary data set is already a couple of years old. Last, secondary data analysis may be limited because of a lack of research funding to engage staff to assist with the research project or to obtain assistance from a statistician to help with reliable data analysis (Doolan et al., 2017; Dunn et al., 2015)

Further strengths and limitations

Despite the many strengths of the results in this dissertation, there are some limitations to be noted when evaluating these study findings. First, the usage of existing data set suffered from the limitations described above, especially the data collection limitations in the original data collection (Doolan et al., 2017; Dunn et al., 2015). The response rate of the primary data set could not be reliably calculated and could not be estimated retrospectively. However, the strength of the primary data collection was that it was obtained from all vocational institutes in Finland, including Åland Islands. While the large sample size ensures reliability, it is possible that some students would have been absent on the day of the data collection perhaps undertaking practical training but possibly playing truant, which might mean that the extent of truancy was underestimated in this data. Additionally, it is possible that we have underestimated the prevalence of bullying for the same reasons because bullying has been associated with truancy (Havik, Bru, & Ertesvåg, 2015). However, in this secondary analysis, the rate of missing values was low (between 0.3–4.7%) apart from responding to the questions enquiring about bullying (12.5%).

Second, there is variation in the ways in which adolescent smoking has been measured. (International Agency for Research on Cancer, World Health Organization). In the SHP survey, the "smoker" indicator has been available for several years, and this indicator can be compared from one data set to the next. A similar measurement has been used in other WHO collaborative studies such as HBSC (i.e., Health Behavior for School-aged Children)(Bogdanovica, Szatkowski, McNeill, Spanopoulos, & Britton, 2015; Dupuy, Godeau, Vignes, & Ahluwalia, 2011). Furthermore, the "teacher support" indicator may vary in different countries, but this measurement has been used to indicate teachers' emotional support when reporting the results of the original School Health Promotion study. The dichotomized variable was calculated to indicate whether or not a student perceived that he/she had obtained teacher support.

Third, this study measured only cigarette smoking. Since the data was collected, the use of smokeless tobacco and vaping electronic tobacco have become more popular among teens and young adults. There is evidence that dual users of tobacco products tend to minimize the health consequences of other tobacco products in comparison with cigarette smoking, and have more friends who use other forms of tobacco, compared to cigarette users and non-users of these products (Batanova, Loukas, Velazquez, & Brown, 2015). Use of E-cigarette or dual-use with cigarettes and vaping was not measured in the School Health Promotion study in 2013. Instead, the use of snuff was measured: total of 5.5% of vocational students used snuff. Proportion of girls who used snuff was under 1%. Couple years later the proportion of vaping and snuffing and their dual-use with cigarettes among adolescent smokers had rapidly become more popular, especially among boys but also among girls in vocational setting. Approximately, 10 % of boys reported using e-cigarette and little less of snuff but the smoking behavior was most reported being dual-use of either using snuff and some other nicotine product or dual-use of all nicotine products. (Puupponen, Ruokolainen, Ollila, & Seppänen, 2016)

Fourth, information was gathered by self-report and therefore the possibility of under- or over-reporting cannot be ignored (Brener, Billy, & Grady, 2003). Truthfulness and accuracy may always be compromised in self-reported responses concerning health-risk behaviors (Brener et al., 2003). Smoking was not validated by biological indicators because of the large sample sizes and furthermore, it would have been impossible to corroborate reports of having quit smoking. However, self-reports have been shown to be reliable when measurements have been conducted under optimized conditions, when the anonymity of the respondents is ensured (Brener et al., 2003; Caraballo, Giovino, & Pechacek, 2004). Causal inferences cannot be made from these cross-sectional survey data.

Fifth, it needs to bear in mind that there are several other associations with adolescent cigarette smoking apart from introduced in this dissertation. Such important associations include to smoke to control body weight (Cawley, Dragone, & Von Hinke, 2016), exposure to smoking in media and sporting events (Talip et al., 2016), academic stress or underachievement (Hong et al., 2011). There are differences in ethnicity and sexuality in smoking onset and daily smoking. (Jordan, McElroy, & Everett, 2014; Antin et al., 2017) Globally, Finland is of relatively homogenous ethnicity. In 2013, there were approximately 5 % of other than Finnish background studying in vocational schools. Of those almost 3% were from other countries in Europe. Unfortunately, sexual orientation in youths was not measured in the School Health Promotion study until year 2015 (National Institute for Health

and Welfare., 2017). Association of smoking among different ethnic background or sexual orientation has not yet been conducted among vocational students in Finland. The limitations of phase II are somewhat different from the phase I studies. The study participants were limited to practical nurse students, who were willing to share their experiences on smoking. These attitudes and beliefs cannot be generalized to all practical nurse students or to all adolescents and they may even differ from practical nursing students in other parts of Finland and other countries. The findings may also be different compared to nursing students studying in a university setting. The data was gathered with the first author who had a personal and academic background in this topic, but this means that her perspective may have defined and shaped the phenomena being studied. To enhance the trustworthiness and credibility of the study, all quotes from the students were translated by a professional Finnish-English translator.

Unquestionable strength of this dissertation study is the mixed methods approach which was aimed at supporting the integration of different parts of research process into a coherent whole (Plowright, 2011). This mixed methods investigation was conducted with two different data sets: a secondary logistic regression analysis of a nationally representative dataset about adolescent health and a discursive analysis of six focus groups of late adolescent practical nursing students. The results of the quantitative analysis inform the focus group questions and qualitative analysis. Both elements of study were given equal consideration without one element being privileged to another (Plowright, 2011). The mixed methods and results of different approaches were combined with a comprehensive framework of Theory of Triadic Influence and succeeded create a coherent whole.

6.2 Discussion of the results

Social background and smoking

This research demonstrated that girls smoked daily and occasionally more often than boys. Girls reported also smoking occasionally and having quit smoking more often than boys. According to a longitudinal study, young people who have reported having quit smoking however are statistically significantly more often likely to be smokers later in adolescence and as adults when compared to those who reported that they were nonsmokers (Saddleson et al., 2016). It is possible that those individuals who said that they had quit smoking had begun to use some other

tobacco products, or they still smoked occasionally, or that they had only recently quit smoking.

Previously the relationships between family socioeconomic background (SES) and adolescent smoking behavior have not been consistent. Some studies report only non-significant or no associations at all (Barreto et al., 2012; M. Wen, Van Duker, & Olson, 2009), others have found that a low socioeconomic status is significantly associated with more adolescent smoking (Bolte & Fromme, 2009; Fergusson, Horwood, Boden J., & Jenkin, 2007; Moor et al., 2015). Parents with a higher level of education and therefore a better family income may be protective against adolescent smoking, but these associations are not direct but instead are mediated by other factors (M. Wen et al., 2009); smoking in adolescents has been linked with higher parental smoking frequency (Fergusson et al., 2007), less often eating meals with family members together (Neumark-Sztainer, Wall, Fulkerson, & Larson, 2013) and a greater likelihood of living in a family type other than an intact family (Bolte & Fromme, 2009). Smoking in adolescents is more common in those whose families have a low SES in comparison with families with higher SES. In this study, the results of the adjusted multinomial regression, somewhat surprisingly, revealed that girls were more likely to be daily or occasional smokers if their mother had higher education than the girls themselves who are studying in a vocational school. It is possible that daughters with mothers who have a higher education need to show off and to try to show their independence by smoking. Therefore, it is possible that girls who have a lower level of education than their mothers may be at greater risk of starting to smoke.

Previous studies investigating the link between family structure and adolescent smoking are unanimous that adolescent smoking does differ across family structures (S. L. Brown & Rinelli, 2010; Razaz-Rahmati, Nourian, & Okoli, 2012). The present study's results did not run counter to expectations i.e. adolescents in cohabiting stepfamilies were most likely to smoke, while adolescents living in a nuclear family were least likely to smoke. The smoking behaviour of adolescents in married stepfamilies and single-parent families fell in between these family types. Those boys and girls living other than with their parents were most likely to smoke both daily and occasionally, but an association was also found with former smoking by girls. According to the results of the first sub-study, it is possible that girls living with a single parent seem to be less likely to smoke daily as compared to those living in a stepfamily.

It was observed that living for alternate weeks with both parents who had separated and now live in two homes, was not reflected in daily or occasional

smoking in either sex. This is an interesting result because co-parenting together though separated is a relatively new type of family structure. We could find no international or Finnish results investigating the association of dual parenting with smoking in adolescents. There are some previous reports where it has been noted that living alternately with both biological parents in two homes enhances an adolescent's wellbeing. Co-parenting has been found to be particularly crucial to the health and well-being of adolescents as those with strong bonds to both parents display fewer externalizing and internalizing problems, less acting out at school and receive higher grades as compared to their peers with weak ties to both parents (King & Sobolewski, 2006.)

There is an abundance of evidence that parental smoking is reflected in smoking by their adolescent children and it has been postulated that a mother's daily smoking is associated with a daughter's smoking and paternal smoking to smoking by male offspring (Barreto et al., 2012; A. C. Johnson, Mays, Hawkins, Denzel, & Tercyak, 2017; Masood et al., 2015). This study found that if both parents were smokers then this was associated with a higher frequency of adolescent smoking and that this association remained even when the parents had quit smoking. The results indicate that maternal daily smoking had a different impact on smoking in girls and boys, but the association of paternal smoking was similar in both sexes. There is also contradicting claims of adolescent smoking in families where parents have quit smoking. According to earlier evidence (Gilman et al., 2009), smoking is not more likely to be initiated if parents have quit smoking than if parents have never smoked. According to evidence emerging from the same study, intergenerational transmission is more likely before the age of 13. The respondents of this present study were several years older, and it was not possible to estimate when their parents had stopped smoking. In sub-study I, a mother who had given up smoking was linked only with her daughter's occasional smoking while if a father had quit smoking then this linked with occasional smoking in both genders.

Several factors mediate intergenerational transmission of smoking. Parents who smoke have been found to have more tolerant attitudes toward their teenage children's smoking, have less rules about smoking at home (Pennanen, Vartiainen, & Haukkala, 2012; Pennanen, Haukkala, de Vries, & Vartiainen, 2011) and have less discussions about smoking (L. Wang, Mamudu, Alamian, Anderson, & Brooks, 2014). Moreover, a lower level of parental control (M. Wen et al., 2009) and the availability of cigarettes in the home have been found to associate with adolescent smoking (Abar, Jackson, Colby, & Barnett, 2014; Rainio, 2009). Likewise, parents who smoke have difficulty maintaining anti-smoking practices as their children grow

older (Pennanen, Vartiainen, & Haukkala, 2012) and parents who smoke have been found to approve of smoking in their mid-teenage children even if initially voicing disapproval (Hefler & Chapman, 2015).

Social involvement and adolescent smoking

There is previous convincing evidence that family involvement i.e., family monitoring and family connectedness are linked with less risk-taking behaviours, such as smoking, in adolescents (Borawski, Ievers-Landis, Lovegreen, & Trapl, 2003). However, as children grow up, parents often adjust their parenting practice to allow their adolescents more freedom (Borawski et al., 2003; McGue, Elkins, Walden, & Iacono, 2005; Piko, Varga, & Wills, 2015; Shanahan, McHale, Crouter, & Osgood, 2007). The results of first sub-study of this dissertation highlighted that parents should maintain a solid family involvement not only with their young children but also as they grow to be young adults. It was found that family involvement significantly associated with daily and occasional smoking in vocational school students of both sexes when adjusted for age, socioeconomic factors, and parental smoking. In order to monitor parental involvement in this study, it was decided to create a parental involvement indicator. The indicator included measures of the parent-child relationship, parental monitoring, and family connectedness.

Previously a good parent-child relationship and good parent-child communication have been found to be associated with less adolescent smoking (Cheney, Oman, Vesely, Aspy, & Tolma, 2015; Distefan, Gilpin, Choi, & Pierce, 1998; B. Johnson, McBride, Hopkins, & Pepper, 2014). However, higher levels of parent-child communication can be linked with adolescent smoking if the teenagers believe that they are not so close to their parents and smoking is viewed as means of rebelling against parents (Harakeh, Scholte, Vermulst, de Vries, & Engels, 2010). It is plausible that a poor relationship and communication at only a shallow level or feelings that conversations are forced might act as a stressor for rebellious behavior in adolescents. There is previous evidence that higher levels of parental monitoring e.g. their knowledge of their teenager's friends and whereabouts correlate with lower levels of smoking behavior (B. Johnson et al., 2014; Mahabee-Gittens et al., 2012). A reasonable amount of parental monitoring has been previously proven to mediate peer influence and have a robust influence on the selection of non-smoking friends by their children (Mercken, Sleddens, de Vries, & Steglich, 2013; C. Wang, Hipp, Butts, Jose, & Lakon, 2016). Adolescent smoking behavior and internalizing symptoms such as depression and anxiety are more usual if parents do not know

where their teens spend their time and do not know their friends (Fröjd, Kaltiala-Heino, & Rimpelä, 2007). High-risk youths with low parental monitoring have been found to be significantly more likely to smoke and use a variety of other substances (Shillingtonz et al., 2005). It has been observed that frequent family meals are linked with positive effects in an adolescent's well-being (Musick & Meier, 2012)(De Clercq, Pfoertner, Elgar, Hublet, & Maes, 2014; Mure, Konu, Kivimäki, Koivisto, & Joronen, 2014). As adolescents start having more hobbies and other activities spent outside the home, dinner is possibly the only time of day when the family can sit together around the table and talk. In this study, 35% of girls and 39% of boys reported having a proper family meal. Previously it has been found that boys are more likely to eat family meals compared to girls and this practice is more common in families with high SES than in families with a lower SES (Berge, Wall, Neumark-Sztainer, Larson, & Story, 2010).

The multinomial regression analysis indicated that boys and girls who reported a lower level of teacher support were more often daily smokers. Earlier studies have reported that warm, supportive, and stable relationships between teachers and students were associated with a decrease in school problems, less inattention, and fewer overall emotional symptoms (Chung-D et al., 2013; Murnaghan, Morrison, Laurence, & Bell, 2014; Tennant et al., 2015). Additionally, good interrelationships between students and staff have been found to be a facilitator for smoking restrictions in the school's grounds (Rozema, Mathijssen, Jansen, & van Oers, 2018). A sense of school connectedness can be created by teachers who incorporate their personalities into lessons, producing more lively discussions and opportunities to build a team spirit. (Murnaghan et al., 2014; Tennant et al., 2015). Previously, it has been found that teachers play a crucial role in students' social integration in the vocational school environment by reinforcing the level of confidence felt by students about their teachers (Van Houtte & Van Maele, 2012).

In this study, truancy was a significant predictor for daily, occasional, and former smoking in both genders. It has been found previously that truancy-related behaviors are linked to the use of tobacco, alcohol and other drugs, delinquency, and poor academic achievement (Barry, Chaney, & Chaney, 2011; Luk, Wang, & Simons-Morton, 2012). Moderate and frequent school-truants are less likely to like school (Luk et al., 2012). Being constantly absent from school predicts dropping out of school altogether; subsequently these young people are less likely to find employment and as a result have decreased lifetime earning potentials (Barry et al., 2011; Mau & Bikos, 2000; Pengpid & Peltzer, 2017). Although truancy has been found to associate with a cluster of factors, it has been considered to be always a

school engagement problem but little is known about the link between school attachment and bonding (Archambault, Janosz, Fallu, & Pagani, 2009; Luk et al., 2012). One major reason given by adolescents themselves for their truancy is that they have poor relationships with their teachers and that they do not feel that they are able to reach the expectations of their teachers (Markham, Young, Sweeting, West, & Aveyard, 2012).

Previous research has pointed to the benefits of stringent smoking policies instead of partial smoking restrictions (B. Bennett, Deiner, & Pokhrel, 2017; Fallin, Roditis, & Glantz, 2015; Rozema et al., 2018). According to the second sub-study, most students reported that the vocational schools had provided a place designated for smoking (i.e. partial smoking restrictions). In other words, if students smoke in the designated area during recesses, they are not punished for smoking. First- and second-year students of vocational schools are mostly underage, but third-year students are 18 years old and at least according to the law, they are capable of deciding for themselves whether or not they wish to smoke, although the tobacco act (2016) forbids smoking around schools where under-aged people are studying. Large schools (Rozema et al., 2018) trying to cater to large populations of both underage and over-18 students and with technically oriented students (Loukas et al., 2008; Rozema et al., 2018) might resort to partial smoking restrictions; these seem to be rather common in vocational schools. Our results highlighted the fact that if students were allowed to smoke on school premises then this was significantly associated with daily smoking among boys but not among girls. In contrast, partial smoking restrictions were not associated with occasional smoking or with students who had given up smoking.

Here, close monitoring of school smoking restrictions was associated with daily smoking in both genders. Close monitoring might act adversely as intended and fuel rebelliousness against authority contributing to maladaptive coping mechanisms and increasing adolescent smoking (Paek, Hove, & Jung Oh, 2013; Zimmerman & Rees, 2014). It is also possible that the penalty for smoking during school hours is considered marginal, even insignificant (Hefler & Chapman, 2015). It has been recommended that monitoring anti-smoking policies should not only be the responsibility of a few active teachers (Chatterjee, Patil, Kadam, & Fernandes, 2018) instead all staff should take part. Furthermore, it has been claimed that involving students with anti-smoking policy-making might strengthen the commitment and sustainability of the policies (Rozema et al., 2018).

The tobacco act (2016) applies not only to students but it also demands that teachers and other staff should refrain from smoking during working hours. The

adjusted multinomial regression in this study indicated that if students perceived that their teachers and other school personnel were smoking during recesses, then this was significantly associated with daily smoking, occasional smoking, and former smoking in both genders. Strict smoking policies should apply to everyone and therefore exceptions from the smoking bans have a negative effect, as they can undermine the smoking restrictions meant to be applied to all. (Bhatt & Hinrichs, 2017; Rozema et al., 2018). An Iranian review came to the same conclusions and suggested that rigorous measures should be instigated against smoking in schools not only by the students but also by the staff, teachers, visitors, and service personnel (Ansari-Moghaddam et al., 2016).

The third sub-study investigated whether social involvement in peer relations is associated with adolescent smoking in a vocational school setting. After controlling for the respondents' age, family type, and parental education level, this study detected that having a friend or friends but not necessarily a classmate increased the odds for smoking in both genders. However, difficulties in relations with classmates were not associated with smoking behaviour. Additionally, being a bully increased the odds for smoking either on a daily basis or occasionally and furthermore, also being a bully-victim (i.e., a bully who is also been bullied) increased the odds for daily smoking only in boys. In this study, poorer perceived health was associated with smoking behaviour in both girls and boys.

Adolescents without a close friend(s) (i.e. isolates) have been found more likely to smoke than their counterparts with a better peer network structure (Seo & Huang, 2012). These results differ from the findings described here. In the present study, having at least one close friend was associated with a higher odd of daily smoking in both genders and additionally in girls with occasional smoking. Results from a previous study claimed that adolescents with at least 6 friends who smoke increasingly highlighted the supposed benefits of smoking (Morrell, Song, & Halpern-Felsher, 2010). The smoking status of a friend/friends was not investigated but according to previous research, either a peer group or having a best friend who smokes, increases the likelihood of an adolescent starting to smoke, and might explain some of the high rates of adolescent smoking in vocational schools. Moreover, it has been found that in schools where there are more smokers, there are also more individuals who are taking up smoking (A. C. Johnson, Mays, Hawkins, Denzel, & Tercyak, 2017; Masood et al., 2015).

The social identification theory might explain why adolescents smoke with friends and why smoking is more common in surroundings where smoking is more ubiquitous. According to Tajfel (1981), individuals can be categorized as belonging

to groups and they make a social comparison with members of their own group. Smokers identify themselves as part of the "smokers' group". In their social comparisons, smokers make a distinction between us and them, i.e. between smokers and non-smokers. Eventually, the fear of losing social status, being excluded from a group of people with similar values and attitudes becomes a part of the smoker's self-identity. Based on the literature review, it is the smoker identity that prevents established smokers from quitting smoking even though they are well aware of the disadvantages of smoking (Mantler et al., 2015; Tombor et al., 2015). It is even possible that educational campaigns which hope to reduce smoking by highlighting the fact that it is an abnormal habit might increase the gap between the groups of smokers and non-smokers; in this case, these campaigns evidently cause more harm than good.

A recent study conducted in Danish vocational school students indicated that smoking plays a significant role in social interactions and forming new relationships across educational programs. Therefore, students may take up smoking as a way of establishing social relationships with peers and thus non-smoking could lead to their exclusion from relationships forged around an ashtray (Ingholt et al., 2015). In this study, there was no association between difficulties with schoolmates and smoking behavior. This may indicate that smoking is considered one way to fit in and conduct social relations (Osgood, Feinberg, Wallace, & Moody, 2014; Suh, Shi, & Brashears, 2017). Conversely, it is likely that difficulties with schoolmates could lead to exclusion from some groups.

In this study after adjusting for respondents' age, family type and parental education, bullying was related only with smoking in boys; both being a bully and being a bully who has also been a bullying victim were associated with smoking behavior. An unexpected finding was that among girls either participating in bullying behavior or being a victim of bullying was not associated with smoking. Bullying was not very widespread in vocational schools although it is possible that students underreported the incidences of bullying behaviours. Another explanation for these results is that different aspects of peer relations other than bullying may increase the odds related to smoking behaviors. Among vocational students, smoking may be more prevalent with popular students and bullying is not considered as desirable behavior and being a bully is not a successful way to seek the positive attention of popular students.

In this study, smokers perceived their health as poorer than their non-smoking classmates. Earlier studies have reported that daily and occasional smokers experience more health complaints and have a lower quality of life than individuals

who have managed to quit smoking (Dube, Thompson, Homa, & Zack, 2013; Hansen, Lindström, & Rosvall, 2015; Tian et al., 2016; M. Wang, Ho, Lo, Lai, & Lam, 2012). Our research did not cover the age when individuals started experimenting with smoking, but it has been found that students report poorer subjective health if they initiated smoking before the age of 14 than smokers who start later. Daily smokers are mainly aware of the addictive nature of cigarettes and the health hazards linked with cigarette smoking, even more so than their non-smoking counterparts. Nonetheless, smokers tend to underestimate the addictiveness of nicotine and try to convince themselves that it is possible to stop smoking before any health consequences emerge (Twigg & Byrne, 2015). Students in vocational school invariably rate peer relations as being more important than their health, however the intensity of the addiction may come as a surprise to these young people.

Adolescent perceptions of their smoking

In this study, one essential source in the normalization of smoking was family and friends who smoked. This was important both at the time of smoking initiation and later as a factor preventing cessation. Normalization of smoking refers to smoking being considered as normal behaviour, although the reasoning and philosophy would be the opposite of normal public opinion. This type of thinking is appreciated only by the peers and family members that behave in the same way (Measham, O'Brien, & Turnbull, 2016). The stigma associated with smoking is even more evident in health care settings where smoking is banned legally as well as being frowned upon on ethical grounds. Employers are obligated to follow the tobacco act (Finlex, 2016) and smoking during working hours can subject a worker to penalties such as warnings and fines; there are even newspaper reports of people losing their job for disobeying the smoking restrictions set by an employer after warnings.

The present results showed that students were aware of the stigmatization of smoking and that smoking is a health-endangering behaviour, but their smoking was justified by their belief that their smoking was under their control. As all of the effects of smoking on health and beauty take place later in life, they believed that there was no need to quit smoking until sometime in the future. Several reasons were provided to explain why cessation would not be possible while they were studying and should be postponed until later in life.

The students argued that even though it was their decision to smoke, they took into consideration the feelings of non-smokers, particularly children, who needed to

be protected from passive smoking and not provided with a model of smoking. However, not smoking while close relatives and grandparents were present was not simply intended to avoid puffing smoke into the air around non-smokers, but actually a way of protecting themselves against the disapproval and disgust of their loved ones. Similar results of wanting to present oneself as a non-smoker as a way of avoiding social stigma have been found in US college students (Tombor et al., 2015). Responsibility was considered a way to justify smoking as not causing harm to non-smokers.

The presence of the smoker identity was evident in all of the focus group discussions. First, students discussed the smoker identity as a way of lessening anxiety and depressive moods. They claimed that they were nicer, happier, and better able to control negative feelings because they smoked. Some students even believed that their mothers liked them better when they smoked since they had a more balanced temperament. Second, the smoker identity was considered as a way of binding a smoking family and friends together in a meaningful group that separated them from others. Additionally, new friends, even boyfriends, had been found by asking for a cigarette and smoking was considered to be a convenient way to start chatting to strangers. The fear of being excluded from the smokers' group was intense, preventing students from quitting even though they were well aware of the disadvantages of smoking. According to Tajfel (1981), the smoker identity relates to the group identity, where the distinction between us and them, in this case, smokers and nonsmokers, is made. The fear of being excluded from a group of people with similar attitudes and therefore losing social status is so intense that eventually it becomes a part of self-identity.

The conflict between a strong smoker identity and their future professional identity could encourage practical nurse students to quit smoking (Tombor et al., 2015). According to Harré's theory, the formation of a professional identity occurs through the development of a social identity. This theory states that development is a multi-stage process that begins with education as the individual adopts models, values, and beliefs of professionally important communities that the student encounters over time (Harré, 1983).

With respect to the development of a nursing culture, it is essential that professional values are embraced as a well-developed nursing identity enhances patient care and outcomes (Hunter & Cook, 2018). The development of a professional identity is not solely the responsibility of teachers, the school's curriculum and policymakers but also a part of the everyday work of qualified practical nurses and nurses who have the responsibility for tutoring students during

their on-the-job training. Tutors are authorities whose views are generally not questioned (Hunter & Cook, 2018) and therefore they exert a critical influence on the development of a student's professional identity. The language and practices used in practical training support the formation of a vocational and professional identity through a kind of hidden curriculum. Therefore, on-the-job instructors can either enhance or affect negatively the behaviours and attitudes of their present-day students and their future colleagues. (Karimi et al., 2014; Phillips & Clarke, 2012).

Study findings embedded in the Theory of Triadic Influence

The conceptual model of the Theory of Triadic Influence was used first as a theoretical framework of this study. This dissertation contained a comprehensive literature section in which it was also possible to take into account aspects that were not possible to find out from the research data.

Second, the conceptual model of the Theory of Triadic Influence was used to compile the study evidence of this dissertation into a meaningful entity. Summarizing and integrating the study results to the model that was modified from the original broad model (Flay & Petraitis, 1994) led to deeper understanding of smoking in adolescence. Smoking is a dynamic and multifaceted phenomenon depending on personal, social and broader environmental factors. Students' experiences and views and their thoughts of being a smoker were studied with a focus group study with discursive grip which for its part deepened the knowledge base of adolescent smoking and gave information that could not otherwise obtain.

6.3 Implications

6.3.1 Implications for practice

These dissertation study results have several implications for practice.
For parents:

1. Parents need to know their adolescents' friends and their children's whereabouts during weekends, they need to express interest in their teenage children's education and always attempt to arrange time for family dinners where all of the family members are present several times a week. The relationship with their adolescent child should remain close so that their

child should be able to confide to his/her parents about the topics that concern him/her.

2. In the case of parental divorce or separation, it is important that their children can maintain close relationships with both biological parents; they should consider a joint custody arrangement where the adolescent has the possibility live in two homes on alternate weeks.

3. Both parents should acknowledge that their smoking increases the risk that their children will start smoking.

For vocational schools:

4. Vocational schools should invest in promoting school connectedness in their students as this may enhance non-smoking in schools.

5. Smoking may be reduced through smoking-related training and on-going cessation programs; these should focus on friendships and on identifying and changing the smoker identity.

6. Enhancing social relationships and increasing the opportunities for social activities within the school and working together with students might help to create a healthy study-environment in vocational schools.

7. Schools and parents need to be aware that among adolescent vocational students there is bullying behaviour, especially among boys.

8. Non-smoking work environments should be present not only on the school property of vocational schools but also at off-campus school events and worksites.

9. The curriculum in vocational schools might strive to weaken the smoker identity and to strengthen the professional identity as soon as the student embarks on vocational school studies.

For teachers:

10. This study found that teacher support has a direct bearing on their students' sense of connectedness to the school. The significance of teachers in fostering an open atmosphere and encouraging students to express their opinions in class might reduce the prevalence of student smoking in vocational schools. It is possible that active support from teachers may encourage students to become more engaged in school and this could reduce risky behaviours.

11. Teachers need to acknowledge the impact of their own smoking on adolescent smoking.

For employers:

12. The professional identity of students develops during practical training and permitting a tobacco culture among staff impacts negatively on the smoking behaviour of students.

For school health professionals:

13. Parents of adolescents studying in a vocational school need accurate information and support to help them to maintain family involvement with teenagers. School health nurse and teachers are in an ideal position to promote family involvement as a part of health promotion practices.

14. Community and school health professionals are well positioned to provide education, support and to promote methods for effective smoking cessation and to advocate strong parental involvement in their adolescents' lives.

15. The use of snuff, e-cigarettes, and their dual use with other tobacco products have become more common in recent years, especially among boys in vocational schools. In school health care, it is also important to identify these young people who do not necessarily consider themselves as smokers.

For special care:

16. Smoking habits of all patients should be part of history taking, and cessation interventions should be reinforced according to the concept of the non-smoking hospital and smoke-free for surgery (TUPLEI).

For Finnish society

17. Education of healthcare professionals should take into account the crucial position of smoking in young people's lives and the significant part of his or her identity that smoking confers. It might be worthwhile incorporating into the curriculum ways to overcome the smoker identity; this should be an on-going commitment provided throughout the student's training intended to promote the growth of his/her professional identity.

18. Strategies to reduce socio-economic inequalities among adolescents who smoke should target aspects of peer relationships and smoker identity which have been formed at a young age.

For health sciences and nursing sciences

19. These study results add to our knowledge that smoking is a multifaceted social phenomenon in adolescence with strong identity-related aspects. This dissertation study highlights that secondary data use is possible and highly advantageous as it allows an investigator to undertake a well-designed study.

6.3.2 Implications for further research

1. Further research is needed using longitudinal data to unravel the temporal relationships between parental involvement, school connectedness, school anti-smoking policies, peer relations, and adolescent smoking, including use of snuff and vaping.

2. It would be valuable to investigate the views of teachers and other school personnel on their abilities and possibilities to give personal attention to their students and to be aware of their students' peer relations.

3. Associations between peer relations and adolescents' smoking are complex in vocational schools; further research with diverse methods is needed to clarify these associations.

4. There is international evidence that risk of using substances is elevated with LGBTQ (lesbian, gay, bi transgender, queer) youths. Further research of smoking among LGBTQ youths with qualitative methods is needed.

5. Valuable future lines of inquiry would include increasing our knowledge of the utilization (and potential harms) of smokeless tobacco (snuff) and electronic cigarette among health care students. It should be considered whether assessments of the prevalence of vaping and snuffing need to be added to school health promotion programmes.

6. A longitudinal qualitative study setting would provide vital information of how knowledge and attitudes towards smoking change during student training and if the existing smoker identity can be diminished while practical nurses are acquiring a professional identity.

7 CONCLUSIONS

1. Even if a young person needs space to grow, parents' responsibility to support and guide growth does not diminish. Parents should know who adolescents' friends are and where the adolescent spend their free time. Family meals should be preferred as often as possible. Parents should be interested in vocational school attendance and respond to adolescent's potential need for help with school work or school related issues.
2. Adolescent smoking was associated with family type. Living with other than intact family was associated with smoking habit in adolescence. Also, living for alternate weeks with both parents who had separated and now live in two homes, was not reflected in daily or occasional smoking in either sex.
3. Vocational students who received less teacher support, liked going to school less and skipped school more often than their nonsmoking classmates were more often daily smokers. Close monitoring of smoking at school was associated with an increased number of daily smokers.
4. Teachers' and other personnel's smoking during school hours increased the odds of students' daily, occasional, and former smoking. These findings emphasize the need for strict smoking policy in schools for students, and the staff; teachers, visitors, and service personnel.
5. Friendships and bullying were robustly associated with an increased probability of smoking behavior. Furthermore, daily smoking girls and boys, and occasional smoking girls rated their health more often as only moderate or bad compared to their non-smoking classmates.
6. The practical nursing students who smoked justified their smoking and defended against non-smokers' contempt in different ways.
7. The practical nursing students did not admit smoking effect or hindered their work in the health and social care sector in any way. In personal life and at school, smoking was considered a normal habit of unifying friends and empowering them against life stresses. Smoker identity may play a part in preventing students from smoking cessation.

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APPENDICIES

Appendix 1. Main results of the systematic reviews and reviews

Reference (year)	Main outcomes of the review
Wellman et al. (2016)	*Increased risk:* age/grade, lower SES, poor academic performance, sensation seeking or rebelliousness, intention to smoke in the future, receptivity to tobacco promotion efforts, susceptibility to smoking, family members' smoking, having friends who smoke, and exposure to films. *Decreased risk:* higher self-esteem and high parental monitoring/supervision
Talip et al. (2016)	*Increased risk:* male gender, low SES, low parental monitoring, no discussions about smoking at home, conflicts with family, family members, friends, teachers and other social contacts who smoke, peer influence, poor school performance, poor knowledge about smoking, attitudes towards smoking behavior (parents and peers approve of smoking, positive attitude towards smoking, thin body image, belief that it is glamorous, having a subjective norm towards smoking, having psychological problems (stress, depression, anxiousness, having low self-esteem), low behavioral control (intention to smoke, self-control), having low self-efficacy,
Okoli et al. (2013)	*Sex differences* found for age at initiation, source of first cigarette, person with whom first cigarette was smoked, place where first cigarette was smoked, and reasons for smoking initiation
Skeer et al. (2013)	An inverse relationship between *family meal* frequency and tobacco use and other risk-taking behavior among teens especially in females.
Filho et al. (2012)	*Increased risk*: Age. female gender, alcohol use, family member/members who smoke, parents who drink alcohol, exposure to second hand smoke at home, friends who smoke, psychological problems (feelings of sadness, loneliness, insomnia, suicidal ideation) illicit drug use poor relationships with parents, separated parents, religious concerns (not following, adopting or being faithful to a religion)
Freedman et al. (2012)	*Increased risk* among college students and young adults serving in military: the use of alcohol and illegal drugs, exposure to smoking, boredom, stress, attending tobacco sponsored social events, exposure to social norms and perceptions that encourage smoking.
Gengelli et al. (2012)	*Self-initiated smoking cessation* was successful if adolescent did not have friends who smoke, did not have intentions to smoke in the future, resisted peer pressure to smoke, was older at first use of cigarette and had negative beliefs about smoking.
Hong et al. (2011)	*Increased risk:* Processes at multiple levels may lead to tobacco use among adolescent. These are the sociodemographic background (age, gender, depression), micro-level (family, peer, teachers) mesolevel (relations between

	home and school, exo-level (parent-related life events and media) macrolevel (parenting practices, academic stress), and chrono-system levels (Asia-Pacific financial crisis in 1997). Increased risk of tobacco use: Age at first use of tobacco, male gender, depression, parental influences, parental attitudes /behaviors, family functioning, parenting practices, parent-youth relations, family violence, tobacco use among siblings, peer influences and relationships, peer attachment, teacher smoking, parent-related life events, unemployment of a parent, media, academic stress and underachievement. Media: adolescents are likely to model their behavior on characters they admire on television shows and in the movies. Media can impact on adolescent cognitive abilities and influence their perceptions toward smoking.
Sullivan et al. (2011)	*Mother's prenatal and postnatal smoking* influences girls' smoking more than boys' smoking.
Leonardi-Bee et al. (2011)	*Increased risk:* smoking by siblings, parents or other household members, strongest for smoking by the mother, but is still stronger when both parents smoke, with a near threefold increase in risk
Emory et al. (2010)	*Decreased risk*: home smoking rules and restrictions (communication about smoking, parental warnings about smoking, anti-smoking statements by parents, knowledge about their child's smoking, knowledge about friends smoking, parental psychological control, confidence in influencing a child's smoking behavior and the availability of cigarettes within the home) and later age of initiation in home where there was no second-hand smoke. Smoking cessation: the quit ratio (QR) was doubled for youths living in smoke-free homes.
Ansari-Moghaddam et al. (2016)	*Decreased risk:* tobacco price and tax, parental close control and monitoring over adolescents, their friends and schools, strict measures need to be taken against smoking in schools by the staff, teachers, visitors, service personnel, and students.
Almutairi (2014)	*Increased risk:* easy access to cigarettes, passing of time, imitation of father and brothers and presence of friends who smoke and persons at home who smoke, seeing one of their teachers smoking Initiation among college students: influence of friends and peer pressure, psychological relief, curiosity and entertainment. Health concerns and religion were the most important factors for not being a smoker.
Choi et al. (2013)	*Adolescents' positions in their social networks* are related to their smoking behaviors, with isolates showing higher odds of smoking than members and liaisons. Differences in smoking based on network positions have decreased over the past 15 years
Simons-Morton et al. (2010)	*Increased risk:* smoking by siblings, parents or other household members, strongest for smoking by the mother, but is still stronger when both parents smoke, with a near threefold increase in risk
Seo et al (2013)	*Decreased risk*: home smoking rules and restrictions (communication about smoking, parental warnings about smoking, anti-smoking statements by parents, knowledge about their child's smoking, knowledge about friends smoking, parental psychological control, confidence in influencing a child's smoking behavior and the availability of cigarettes within the home) and later age of initiation in home where there was no second-hand smoke. Smoking cessation: the quit ratio (QR) was doubled for youths living in smoke-free homes.

Appendix 2. Background of the students in the focus groups

Student's Age	Family type	Parental unemployment in last year	Mother's education[1]	Father's education[1]	Mother's smoking status	Father's smoking status
17	Co-parenting/ dual residence	One parent	Medium	Medium	Smoked but quit	Smoker
18	Lives alone	Neither	Medium	High	Never smoked	Smoker
18	Nuclear family	Neither	Medium	Medium	Smoked but quit	Smoked but quit
16	Single parent	Neither	High	Low	Smoked but quit	Smoked but quit
25	Lives alone	One parent	Low	Low	Smoker	smoker
18	Nuclear family	Neither	medium	medium	Smoker	Smoked but quit
19	Step family	Neither	Medium	Medium	Smoker	Smoked but quit
18	Nuclear family	One parent	High	High	Never smoked	Never smoked
20	Lives alone	One parent	Medium	Low	Smoked but quit	smoker
17	Single parent	Nether	Medium	medium	Smoker	Smoker
17	Lives alone	One parent	Medium	Low	Smoked but quit	Smoked but quit
18	Nuclear family	Both parents	Medium	Medium	Never smoked	smoker
18	Lives alone	Neither	Medium	Medium	Smoker	Never smoked
21	Lives alone	Neither	Low	Low	Smoked but quit	smoker
16	Step family	Neither	Low	Low	Smoked but quit	Never smoked
16	Lives alone	Neither	Medium	Medium	Smoked but quit	smoker
17	Single parent	Neither	Medium	Medium	Smoked but quit	Smoker
17	Nuclear family	Neither	High	Medium	Smoked but quit	Smoker
21	Lives alone	One parent	Medium	Low	Don't know	Smoker
17	Nuclear family	Both parents	Medium	Low	Never smoked	Smoker
18	Nuclear family	Neither	Medium	Medium	Never smoked	Smoker

[1]Low: no education after compulsory school; Medium: Secondary school and vocational studies or vocational school; High: university studies

Appendix 3. discussion guide

Smoking uptake	**What age did you start smoking?**
	What kind of social aspects do you think were involved that time?
Parental involvement	How did your parents react when they found out that you smoked
	Describe what kind of attitude your parents have towards smoking/ on your smoking
	How have your parents affected your smoking initiation and daily smoking?
	Describe how your parents might have supported your smoking initiation/ How might they support you to quit smoking?
School connectedness, social belonging	What kind of actions might your school, impose that would decrease smoking among students?
	How would you describe your friend's feelings to your smoking?
Perceived health	Does smoking affect your health?
	Has smoking affected your hobbies?
Advantages and disadvantages of smoking	What kind of good things does smoking give to you?
	Can you think any disadvantages of smoking?
Smoking during on-the job training or at work	Do you smoke while undertaking on the job training or at work?
	What do you think of smoke free hospitals and working environments?
Smoking cessation	What would make you to quit smoking?
	Could anyone help, give you encouragement or influence you enough that you would quit smoking?

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Parental involvement and adolescent smoking in vocational setting in Finland

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Parental involvement and adolescent smoking in vocational setting in Finland

SUMMARY

The present study examined whether parental involvement in their adolescents' lives is associated with adolescent smoking in a vocational school setting when controlling for socioeconomic background and parental smoking. The study was conducted in spring 2013 and involved 34,776 Finnish vocational school students (mean age 17.6 years). The data were analyzed using multinomial regression. The results showed that lower parental involvement was significantly associated with adolescent daily smoking in both genders and with occasional smoking in girls. Parental daily smoking predicted adolescent daily smoking, and this association was also seen for those adolescents whose mother and father had quitted smoking. Furthermore, our results indicate that mothers' smoking may be more influential on adolescents' smoking than fathers' smoking. Multivariate analysis showed that living in a nuclear family or alternately with both parents in two homes decreased daily smoking in both genders compared to living in other family arrangements.

INTRODUCTION

Cigarette smoking is usually initiated in adolescence, and experimenting with cigarettes frequently develops into regular smoking. Tobacco use often starts in response to emotional distress, which then becomes exacerbated over time(McDermott, Dobson, & Owen, 2006; Orlando, Ellickson, & Jinnett, 2001). Research has shown that smoking is associated with other health risk behavior in adolescence, such as alcohol and other substance use (Mathers, Toumbourou, Catalano, Williams, & Patton, 2006; O'Loughlin, Dugas, O'Loughlin, Karp, & Sylvestre, 2014; Piko & Balázs, 2012) and a low level of physical activity (Kauranen, 2013; Nieminen, 2015). Associations have also been established with lower academic achievement (Pennanen, Vartiainen, & Haukkala, 2012; Vartiainen et al., 2007), bullying (Luk, Wang, & Simons-Morton, 2012), and truancy (Barreto et al., 2012; Vaughn, Maynard, Salas-Wright, Perron, & Abdon, 2013). Poor health choices in adolescence have major public health implications and lead to health inequality in adulthood (World Health Organization, 2015).

Family and parental factors influence various health-related behaviors such as smoking (Johnson, McBride, Hopkins, & Pepper, 2014; Piko & Balázs, 2012). Family bonding, good family management (de Araujo, Loukas, & Gottlieb, 2011; Rainio, 2009), and parents' negative reactions toward adolescent smoking (Barreto et al., 2012; Mahabee-Gittens, Xiao, Gordon, & Khoury, 2012) have an important role in reducing the onset of daily smoking in adolescence. A strong parent–child relationship where adolescents talk first with their parents about serious problems is protective against established smoking (Distefan, Gilpin, Choi, & Pierce, 1998).

There is strong evidence that socioeconomic family factors such as lower parental education, lower family income and especially a household structure other than nuclear family (Bolte & Fromme,H for the GME Study Group, 2009; Fergusson, Horwood, Boden J., & Jenkin, 2007; Moore & Littlecott, 2015) predict adolescent smoking. Parental smoking is associated with adolescent smoking(Fröjd, Kaltiala-Heino, & Rimpelä, 2007; Ruokolainen, Ollila, & Heloma, 2013), and there is also some evidence that intergenerational smoking transmission is more common within gender: mothers' smoking is more closely associated with girls' smoking and fathers' smoking with boys' smoking (Barreto et al., 2012; Gilman et al., 2009).

The WHO (2016) has been estimated that there are one billion smokers worldwide. In Finland the typical age range for experimenting with tobacco is from 13 to 16 years. According to the latest Adolescent Health and Lifestyle Survey (2015), 12% of Finnish boys and girls aged 14–18 smoke daily. By comparison some 15% of young Australians aged 15-24 were smokers in 2010 (WHO 2015). Although Finland has had some success with its efforts to reduce tobacco use in the past decade, smoking rates among adolescents studying for a specific vocation are much higher than among high school students. In 2013 the proportion of daily smokers among Finnish high school was 8%, compared with 36% among vocational school students (National Institute for Health and Welfare, 2016). This huge difference has received attention even internationally (Huisman, van de Werfhorst, & Monshouwer, 2012a; Lee, Goldstein, Klein, Ranney, & Carver, 2012; Loukas, Murphy, & Gottlieb, 2008) TAFE students' smoking has not been studied recently but that smoking rates tend to be high, and similar to those for unemployed youth.(Bonevski, Paul, Walsh, Bryant, & Lecathelinais, 2011.)

The Finnish education system begins with a nine-year compulsory basic education for the whole age cohort. Beyond this first step 95.5% of school-leavers continue either in upper secondary schools i.e. high schools (54.5%) or in initial vocational education and training (38.5%), or in additional voluntary basic education (2.5%). The aim of vocational education and training is to improve the skills of the work force and to provide students with the skills and knowledge they will need in specific vocations. The largest fields are technology and transport, business and administration, and health and social services (Ministry of Education and Culture, Finland, 2016).

Some research has been undertaken into smoking prevention and cessation programs among post-compulsory school students (Lee et al., 2012; Loukas et al., 2008), but there are only few recent studies of family factors related to adolescent smoking in upper secondary or vocational school settings. It is known that adolescents' smoking behavior is associated with family connectedness (Piko & Balázs, 2012; Wen, Van Duker, & Olson, 2009). Internationally, more than one-third of vocational students smoke cigarettes daily, and therefore it is crucial to examine the associations between family involvement and vocational students' life and their smoking behavior. Parents may think that adolescents studying for a specific occupation should be mature enough to cope with any difficulties without their getting involved: after all, in a year or two they will be working and earning their own income. Furthermore, there remain

unanswered questions about the predictive value of family factors for vocational students' daily smoking, occasional smoking and former smoking.

Purpose of study and hypotheses

The aim of this study is to examine the association of parental involvement and other family factors with adolescent smoking. We used a large nationally representative sample of vocational school students in order to make an interesting contribution to the literature. We test four hypotheses in the light of the information presented in the introduction:

Hypothesis 1: Fewer adolescents living in a nuclear family are daily smokers as compared to adolescents in other family types.

Hypothesis 2: The lower the level of parental education, the higher the level of adolescent daily smoking.

Hypothesis 3: The lower the level of family involvement, the higher the level of adolescent daily smoking.

Hypothesis 4: Mothers' smoking shows a closer association with girls' smoking and fathers' smoking with boys' smoking.

METHODS

Sample and procedures

Associations between parental involvement and adolescent smoking were studied using data from the School Health Promotion Study (SHP) by the National Institute for Health and Welfare in Finland. SHP is a nationwide survey conducted every other year in March-April. The target group for this study consisted of 1st and 2nd grade students from all vocational schools in Finland in 2013. A total of 34,776 students from 419 vocational schools anonymously and voluntarily completed a classroom-administered questionnaire under their teacher's supervision. SHP was approved by the ethical committee of the National Institute for Health and Welfare in 2012 and 2014. Students were informed about the study in advance and given the researchers' contact information in case they wanted to discuss any concerns they had about the study. Good scientific practice was followed throughout the research. The questionnaire can be found online at http://www.thl.fi/fi/web/thlfi-en/research-and-expertwork/population-studies/school-health promotion-study.

The respondents were aged between 14 and 20 (Mean= 17.6, S.D. 0.90). Over half (55.6%) were males (n= 19336) and 44.4% females (n= 15440). To account for potential gender differences, separate analyses were conducted for boys and girls. Sample statistics of selected variables are shown in supplementary table 1. The response rate for SHP was not able to count reliably as the number of students were not inquired from the institutes but from statistics that could only give the total number of adolescents studying in vocational schools. This study was not conducted for students in their 3rd year. Vocational training is also based on long practical training periods and that was not taken into account when conducting the SHP study. However, in this secondary analysis, the rate of missing values was quite low (between 1.3%-2.4%), with one exception: missing values for parents' education were somewhat higher (mothers' education 3.6% and fathers' education 4.7%).

Measurement

Adolescent smoking

Adolescent smoking behavior was originally assessed by two questions: 1. How many cigarettes, pipefuls and cigars have you smoked altogether (none, only one, about 2-50 and over 50)? 2. Which of the following alternatives best describes your current smoking habits? (I smoke once a day or more often, I smoke once a week or more often, but not every day, I smoke less often than once a week, I have quit smoking). These adolescent smoking variables were combined into one variable with response categories: daily smokers (I smoke once a day or more often), occasional smokers (I smoke once a week or less often), those who had quit smoking (I have quit smoking) and non-smokers (I have smoked altogether only one or none).

Sociodemographic status

The following three demographic variables were used: family structure, parental education and parental unemployment. *Family structure* was assessed by asking the respondents to identify the adults with whom they lived. We subsequently coded this variable into living in a nuclear family, living with a single parent, living in a step family, living alternately with separated parents in two homes, and living in some other arrangement. *Parental education level* was assessed by asking the participants to state their mother's and father's highest level of education. The variable was categorized into three levels: low education (comprehensive or primary school), middle education (upper secondary school and/or vocational institution), and high education (university, university of applied sciences or other higher education institution). To assess *parental unemployment,* students were asked if their parents had been unemployed or laid off during the past year. The options were: neither of my parents, one of my parents and both of my parents.

Parental involvement

Parental involvement was studied using five questions measuring parent-child relationship, family connectedness, and parental monitoring. All these questions were dichotomized into two categories. The first category (coded as 1) referred to a high level of parental involvement and the second category (coded as 0) to a low level or no parental involvement. The dichotomized variables were then summed up to create an involvement indicator ranging from 0 to 5, with 0 referring to no or low parental involvement and 5 to parental involvement in all five items. The dichotomization of these questions is shown in supplementary table 2.

Parental smoking

Parental smoking status was measured by the question: During your lifetime, has your father / mother (separately) smoked? The response options were: never smoked, used to but has now quit, smokes nowadays and don't know. The responses were combined into the categories daily smoker (smokes nowadays and don't know), quit smoking and non-smoker.

Data analysis

The primary research questions focused on associations between vocational school student cigarette smoking and *parental factors*. Cross-tabulation and x^2 tests were performed for categorical variables to establish the proportion of students who smoked daily, who smoked occasionally, and who had quit smoking and those students who were non-smoking on various *family factors* (Table 1). Unadjusted (i.e. univariate; suppl. table 3) and adjusted (i.e. multivariate; table 2) multinomial logistic regression analyses were then performed to describe and test the associations between smoking and family factors. In the unadjusted model (suppl. table 3), one variable was entered at a time. In the adjusted model (table 2), all of the variables were examined at the same time. Adolescent smoking was set as a dependent variable and family factors as independent variables. Adolescents' age was set as covariate. Daily smokers, occasional smokers and those who had quit smoking were compared to non-smokers, who were used as a reference group. To account for potential gender differences, separate analyses were conducted for girls and boys. To find out if mothers' and fathers' smoking was equally important for both boys and girls, two multivariate multinomial regression analyses with interactions were performed for the whole dataset. The first analysis included the interaction term between gender and mother's smoking, and the second analysis the interaction term between gender and father's smoking. All other independent variables were also included in the models.

The statistical analyses were conducted using IBM (Armonk, NY) SPSS statistics 23. Results from the multinomial regression analyses are presented as odds ratios (ORs) and their 95% confidence intervals. The level of statistical significance was set at $p<0.001$ due to the large number of respondents.

RESULTS

Adolescent smoking prevalence, gender, and age differences

Just over one-third or 36% of all vocational school students reported smoking daily. Girls were daily smokers (37%) slightly more often than boys (36%) (suppl. table 1). Girls were also occasional smokers (15%) slightly more often than boys (13%). 15% of girls and 14% of boys said they had quit smoking. One-third of girls (33%) and 38% of boys reported being non-smokers. The multivariate models indicated that age was statistically significantly associated with daily smoking (Table 2).

Are sociodemographic factors associated with adolescent smoking (H1and H2)?

In nuclear families, 29% of girls and 30% of boys were daily smokers. Among adolescents living alternately with both biological parents in two separate homes, the proportion was 36% for both girls and boys. Girls living in a single parent family were daily smokers slightly more often (42%) than boys living in a single parent family (40%). Among adolescents living with a biological parent and his/her partner, 43% of girls and 41% of boys were daily smokers. Among adolescents with other living arrangements, girls (46%) were daily smokers less often than boys (49%) (Table 1). Family type was statistically significantly associated with girls' and boys' smoking in the multivariate model (table 2). In multivariate analysis (table 2), other living arrangements than living with a biological parent or parents increased daily and occasional smoking in both genders. In girls, other living arrangements than living in an intact family, living with a single parent, and living with a biological parent and his/her partner were also associated with being a former smoker. Living with separated biological parents in two homes was not associated with smoking either daily or occasionally in multivariate analysis.

In the univariate model (suppl. table 1), adolescents living with parents who had been unemployed or laid off during the past year reported smoking daily more often than their peers who lived with employed parents. Mother's education level showed no significant association with smoking in the univariate model (suppl. table 3), but low paternal education level was significantly associated with daily smoking in boys. In the multivariate model (table 2), unemployment and adolescent smoking did not show a statistically significant association, but girls whose mother had a medium or low level of education were daily smokers significantly less often than girls whose mothers had a university or university of applied sciences degrees. Girls were also occasional smokers less often if their mother had a low education. In fact, girls smoked more often daily when their level of education differed widely from their mothers' education.

Does parental involvement in adolescents' lives prevent smoking (H3)?

Higher overall scores of parental involvement reflected less adolescent smoking. Less than one-third of adolescents (30% of girls and 29% of boys) with very high parental involvement indicator scores were daily smokers. Among girls and boys with zero parental involvement scores, over half were daily smokers. Boys and girls with other than the highest parental involvement scores were daily smokers significantly more often than others (Suppl. table 3 and Table 2). The odds of girls' smoking occasionally were also significantly higher if they reported any other than the highest parental involvement score. This association is also seen when age, socioeconomic factors, and parental smoking were controlled for in the multivariate model (Table 2).

Is parental smoking associated with adolescent smoking (H4)?

The univariate model (suppl. table 3) shows that adolescents whose parents were smokers were more often daily smokers than those whose parents didn't smoke. This association was also seen for adolescents whose parents who had given up smoking. These associations remained in the multivariate model (table 2): mothers' smoking was associated with girls' and boys' daily smoking. Having a mother who was a former smoker was associated with girls' daily and occasional smoking, as well as with being a former smoker. Father's smoking was significantly associated with girls' and boys' daily smoking and with being a former smoker. Having a father who was a former smoker was associated with girls' and boys' daily and occasional smoking, and with boys' being a former smoker.

To find out whether mother's and father's smoking was equally important for boys and girls, two multivariate multinomial regression analyses with interactions were performed for the whole dataset. The first analysis included the main effect of gender and interaction term with gender and mother's smoking, and all other independent variables. The second analysis included the main effect of gender and interaction term with gender and father's smoking. It emerged that the interaction between gender and mother's smoking was statistically significant ($p<0.001$), but the interaction between gender and father's smoking was not ($p=0.023$). This suggests that there are some gender differences in the association between mother's smoking and boys' and girls' smoking, but not in the association between fathers' smoking and girls' and boys' smoking. Therefore, our hypothesis of intergender transmission was not confirmed.

DISCUSSION

The results of our study lend support to earlier findings on the relationships between parental involvement, family type, parental smoking and adolescent daily smoking. Over one-third or 36% of our vocational school students smoked cigarettes daily; this is in line with results from a study measuring adolescent smoking among trade and technical students in Texas (Loukas et al., 2008). Girls' and boys' smoking vary in different countries (Moor et al., 2015). This research

from Finland showed that girls smoked daily and occasionally and had quit smoking more often than boys. Earlier studies indicate that smoking cessation is gender-blind (Amos, Greaves, Nichter, & Bloch, 2012; Struik, O'Loughlin, Dugas, Bottorff, & O'Loughlin, 2014), but it has been reported that the reasons for giving up smoking differ: girls are more concerned about adverse aesthetic effects such as the smell of smoke on their clothes and bodies, while boys are more concerned about the impact of smoking on their fitness and sporting performance (Amos & Bostock, 2007). An earlier Finnish study (Kauranen, 2013) identified three main reasons why boys at vocational school said they smoked. First, smoking was considered to project an image of a skilled professional and to communicate social belonging. Second, smoking offers an opportunity for time-out and a chance to figure out what to do next. Finally, smoking was said to help to relax and calm you down. Technical students in Texas had similar reasons for smoking (de Araujo et al., 2011).

Socioeconomic factors

Earlier results on the associations between family socioeconomic background (SES) and adolescent smoking behavior are inconsistent. Some studies show no or slight associations (Barreto et al., 2012; Wen et al., 2009), others report that low socioeconomic status correlates with higher smoking frequencies (Bolte & Fromme,H for the GME Study Group, 2009; Fergusson et al., 2007; Moore & Littlecott, 2015). It has been shown that higher parental education and higher family income are protective against adolescent smoking, but their influences are indirect and mediated by other factors (Wen et al., 2009). It has also been found that parents smoke more often (Fergusson et al., 2007), eat family dinners together less often (Neumark-Sztainer, Wall, Fulkerson, & Larson, 2013) and family structure is more often other than a nuclear family (Bolte & Fromme,H for the GME Study Group, 2009) with low SES than with higher SES. In this study, the results of multinomial regression ran counter to our expectations and showed that girls were daily smokers less often if their mother had a lower level of education than a university or university of applied sciences degree. Girls were also occasional smokers less often if their mother had a low education. Parental unemployment showed no association with adolescent daily or occasional smoking (H2). Previous research has shown that parents of vocational school students have a lower educational level than adolescents studying in upper secondary school, but social background effects were almost fully explained by the differential enrollment of students in different institutions (Huisman et al., 2012a; Huisman, van de Werfhorst, & Monshouwer, 2012b). It is possible that girls who have mothers with a higher education need to show off and to try to fit in by smoking. Daughters who have a lower level of education than their mothers may also be at greater risk of smoking.

Extensive studies into family structure and its association with adolescent smoking have shown that adolescent smoking differs across family structures. (Brown & Rinelli, 2010; Razaz-Rahmati, Nourian, & Okoli, 2012). Also in this study adolescents living with two biological married parents are least likely to smoke, while adolescents in cohabiting stepfamilies are most likely to smoke. Those living in single parent families and married stepfamilies fall in between these groups. Adolescents living with other than their parents were most likely to smoke daily and occasionally in both genders, but the association was also apparent in girls' smoking cessation. Our results suggest that girls living in a stepfamily might be more likely to smoke daily than those living with a single parent.

Our hypothesis that adolescents living in a nuclear family are less often daily smokers than those living in other family types received only partial support as living alternately with separated parents in two homes was not associated with daily or occasional smoking in either girls or boys (H1). This is an interesting result because dual parenting is a relatively new form of family, and international results on co-parenting and its association with adolescents' smoking are scarce. In settings where adolescents have two homes and live alternately with both biological parents, parenting is particularly important to the health and well-being of children as adolescents with strong ties to both parents exhibit fewer internalizing and externalizing problems, higher grades and less acting out at school than those with weak ties to both parents (King & Sobolewski, 2006). Children with co-parenting parents have been found to feel safe and loved after divorce (Parlakian & Lerner, 2012) when both parents are still equally responsible and present. It has also been found that nonresident father involvement decreases both participation in smoking and intensity of smoking in adolescence and young adulthood (Ali & Dean, 2015).

Parental involvement

There is consistent evidence that family involvement, family monitoring and family connectedness have an inverse association with risk-taking behavior (Borawski, Ievers-Landis, Lovegreen, & Trapl, 2003) such as smoking. However, as adolescents mature, parents often change their parenting practices and allow their teens more independence (Borawski et al., 2003; McGue, Elkins, Walden, & Iacono, 2005; Piko & Balázs, 2012; Shanahan, McHale, Crouter, & Osgood, 2007). Our results indicate that parents should maintain a strong family involvement as their children grow up and transit to vocational school.

Our findings lend support to our hypothesis that parental involvement is significantly associated with

daily smoking and occasional smoking in boys and girls when controlling for age, socioeconomic factors and parental smoking (H3). In this study we formed a parental involvement indicator including the measures of parent-child relationship, parental monitoring and family connectedness.

There is evidence that a good relationship and good communication with parents are associated with lower levels of adolescent smoking (Cheney, Oman, Vesely, Aspy, & Tolma, 2015; Distefan et al., 1998; Johnson et al., 2014), whereas a low level of parental communication can be positively correlated with smoking when adolescents feel they are not so close to their parents and smoking is seen as a way to rebel against parents (Harakeh, Scholte, Vermulst, de Vries, & Engels, 2010; Wen et al., 2009). It is possible that a less than a close relationship signals a superficial level of communication or a forced format of conversation, which may become a stressor stimulating deviant behaviors in adolescents.

Earlier reports suggest that parental monitoring and knowledge of friends and whereabouts are associated with lower levels of smoking initiation and daily smoking (Johnson et al., 2014; Mahabee-Gittens et al., 2012). A reasonable amount of parental monitoring has been found to mediate peer influence and have a strong effect on adolescents' selection of friends (Mercken, Sleddens, de Vries, & Steglich, 2013; C. Wang, Hipp, Butts, Jose, & Lakon, 2016). Smoking and other substance use as well as symptoms such as depression and anxiety are more common if parents don't know the whereabouts of their adolescents and don't know their friends (Fröjd et al., 2007). Among high-risk adolescents, those who reported low parental monitoring were significantly more likely to smoke and use a variety of other substances (Shillingtonz et al., 2005).

Previous research has shown that more frequent family meals are associated with positive outcomes in adolescents' well-being (Musick & Meier, 2012) and smoking (Distefan et al., 1998). As teens start having more hobbies and get involved in other events, dinner might be the only time of day when the family comes together. According to our study, 35% of girls and 39% of boys enjoyed a proper meal together with usually everyone at the table. Earlier studies also indicate that boys eat family meals more frequently than girls (Berge, Wall, Neumark-Sztainer, Larson, & Story, 2010). In addition to the evidence that family meals are associated with smoking and other substance use (De Clercq, Pfoertner, Elgar, Hublet, & Maes, 2014; Mure, Konu, Kivimäki, Koivisto, & Joronen, 2014), it has been reported that adolescents from low SES families eat fewer family dinners and that families with low SES might have more difficulties getting together for family meals on a regular basis (Neumark-Sztainer et al., 2013).

Parental smoking

There is an abundance of evidence that smoking parents have smoking adolescents, and according to several studies smoking mothers have smoking daughters and smoking fathers have smoking sons (Barreto et al., 2012; Gilman et al., 2009). We also found that maternal and paternal smoking were related to the risk of adolescent smoking, and that this association remained even if parents had quit smoking. Our results indicate that maternal daily smoking is differently associated with girls' and boys' smoking, but the association of fathers' smoking with adolescents' smoking is similar in both genders. According to an earlier study (Gilman et al., 2009), children whose parents had quit smoking are not more likely to begin smoking than children whose parents had never smoked. The same study also found that intergenerational transmission is more likely before than after age 13. Our respondents were older, and we were not able to identify the age of the children at the time that their parents had quit smoking. Our results also showed that occasional adolescent smoking was significantly more common even if the father had given up smoking, but if the mother had quit smoking it implicated only daughter's occasional smoking.

Earlier studies have found that the intergenerational transmission of smoking is mediated by several factors. Smoking parents have more lenient attitudes toward smoking, have less smoking-related rules at home (Pennanen et al., 2012) and have less smoking-related conversations (Y. Wang, Krishnakumar, & Narine, 2014). A lower level of parental control (Wen et al., 2009) and the availability of cigarettes in the house have been found to be associated with adolescent smoking (Abar, Jackson, Colby, & Barnett, 2014; Rainio, 2009). Smoking parents also have difficulty maintaining anti-smoking practices as adolescents get older (Pennanen et al., 2012).

The main goal of the present paper was to examine the role of parental involvement and other family factors in the life of adolescents studying for a specific vocation. Although there is an extensive literature on the determinants of smoking in adolescence, studies focusing on adolescent smoking in vocational school settings are scarce. It is possible that adolescents who are set to earn their own living in couple of years' time are viewed as young adults rather than adolescents and therefore tend to be excluded from adolescent studies. Using data from a major national survey and analyzing this data with multinomial regression models, this study makes a unique contribution to smoking research as we tested variables of social involvement within the family and other family factors with daily smoking, occasional smoking, and former smoking in adolescents in a vocational school setting.

LIMITATIONS

There are some limitations in this study that should be noted when interpreting our findings. Despite the many advantages of secondary analysis, including the large sample size, the method does have some inherent limitations, most notably the fact that the researchers are limited to the data collected during the original data collection. Primary data set was insufficient due to missing data and could not be estimated reliably. However, strength of the primary data collection was that it was obtained from every vocational institute in Finland. In this secondary analysis rate of missing values was low (between 1.3%-4.7%). Because the information was gathered by self-report, we cannot ignore the possibility of under- or over-reporting (Brener, Billy, & Grady, 2003). In this study, we did not validate smoking by biological indicators because of the large sample sizes. However, self-reports have been shown to be reliable when conducted under optimized measurement conditions, ensuring anonymity and when using various questions (Brener et al., 2003; Caraballo, Giovino, & Pechacek, 2004). It needs to be noted that causal conclusions cannot be drawn from these cross-sectional survey data. Further research is needed using longitudinal data to determine the temporal relationship between parental involvement and adolescent smoking.

CONCLUSION

As far as we know this is the first study to examine adolescent smoking behavior related to family involvement in adolescents who are studying for a specific occupation. It sheds further light on the role of parental involvement in their adolescents' lives and on adolescent daily, occasional and former smoking in a large sample of vocational school students. Our findings highlight the importance of parental involvement as a strong protective factor against adolescent smoking and speak against more lenient parenting practices. We recommend that health care services and schools advocate strong parental involvement in their adolescents' lives.

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Table 1. Cross tabulation

	GIRLS									BOYS								
	smokes daily		occasionally		has quit smoking		non-smoker			smokes daily		occasionally		has quit smoking		non-smoker		
	N	%	N	%	N	%	N	%	P*	N	%	N	%	N	%	N	%	P*
Family type									<0.001									<0.001
nuclear family	1961	29%	1078	16%	921	14%	2718	41%		2988	30%	1285	13%	1426	14%	4216	43%	
shared custody	229	36%	112	18%	94	15%	202	32%		506	36%	192	14%	191	14%	530	37%	
single parent	965	42%	300	13%	358	15%	695	30%		1180	40%	350	12%	380	13%	1012	35%	
step family	611	43%	202	14%	207	15%	388	28%		680	41%	201	12%	239	15%	527	32%	
other	1760	46%	526	14%	656	17%	892	23%		947	49%	229	12%	258	13%	510	26%	
Mother's education level									0.004									<0.001
low	888	40%	293	13%	321	14%	734	33%		963	40%	260	11%	269	11%	909	38%	
medium	3476	37%	1429	15%	1434	15%	3180	33%		3836	35%	1424	13%	1601	15%	4196	38%	
high	1117	38%	477	16%	465	16%	911	31%		1412	34%	543	13%	590	14%	1573	38%	
Father's education level									0.005									<0.001
low	1330	40%	465	14%	479	14%	1056	32%		1428	41%	385	11%	431	12%	1258	36%	
medium	3312	37%	1357	15%	1389	15%	2947	33%		3639	34%	1364	13%	1470	14%	4133	39%	
high	770	35%	356	16%	325	15%	746	34%		1082	33%	468	14%	533	16%	1219	37%	
Parental unemployment									<0.001									<0.001
neither parent	3325	35%	1482	16%	1452	15%	3325	35%		3951	34%	1525	13%	1673	14%	4617	39%	
one parent	1865	41%	634	14%	678	15%	1371	30%		1959	38%	625	12%	703	14%	1865	36%	
both parents	341	46%	99	13%	105	14%	205	27%		392	43%	103	11%	110	12%	309	34%	
Help from parents									<0.001									<0.001
gets help	4090	36%	1690	15%	1722	15%	3864	34%		5134	35%	1855	13%	2073	14%	5632	38%	
doesn't get help	1452	42%	521	15%	484	14%	981	29%		1275	40%	408	13%	409	13%	1134	35%	
Dialogue with parent									<0.001									<0.001
hardly ever	480	41%	178	15%	168	14%	348	30%		569	43%	158	12%	171	13%	429	32%	
once in a while	1704	37%	754	17%	670	15%	1448	32%		2018	37%	728	13%	766	14%	1943	36%	
often	3429	37%	1317	14%	1416	15%	3159	34%		3935	34%	1425	12%	1606	14%	4576	40%	
Family dinner									<0.001									<0.001
family dinners	1656	31%	723	14%	807	15%	2081	40%		2128	31%	850	12%	988	14%	3009	43%	
no family dinners	3871	40%	1494	16%	1421	15%	2820	29%		4195	39%	1389	13%	1488	14%	3772	35%	
Parental knowledge of friends									<0.001									<0.001
Parents don't know	524	38%	212	15%	212	15%	440	32%		873	34%	268	11%	374	15%	1027	40%	

Only father knows	156	47%	49	15%	38	12%	88	27%		310	42%	113	15%	97	13%	215	29%	
Only mother knows	1628	44%	497	13%	581	16%	1009	27%		1133	43%	297	11%	351	13%	845	32%	
Both know	3235	34%	1462	15%	1411	15%	3384	36%		4016	34%	1583	13%	1674	14%	4721	39%	
Weekend whereabouts									<0.001									<0.001
parents know	2713	32%	1110	13%	1282	15%	3498	41%		2687	29%	1020	11%	1224	13%	4399	47%	
do not know	2822	45%	1109	18%	955	15%	1413	22%		3635	43%	1247	15%	1264	15%	2399	28%	
Parental involvement									<0.001									<0.001
No involvement	77	51%	25	17%	25	17%	24	16%		86	51%	18	11%	26	16%	38	23%	
Very low involvement	257	45%	94	17%	73	13%	144	25%		280	44%	69	11%	98	15%	193	30%	
Rather low involvement	671	41%	263	16%	221	14%	465	29%		715	39%	230	13%	255	14%	631	35%	
Rather high involvement	1399	40%	542	15%	541	15%	1029	29%		1642	39%	541	13%	537	13%	1444	35%	
High involvement	2124	37%	867	15%	868	15%	1893	33%		2255	35%	868	13%	908	14%	2456	38%	
Very high involvement	860	30%	363	13%	437	15%	1197	42%		1082	29%	436	12%	556	15%	1718	45%	
Mother's smoking									<0.001									<0.001
daily smoker	2341	50%	555	12%	625	14%	1120	24%		2424	46%	533	10%	614	12%	1653	3%	
has quit smoking	1312	43%	484	16%	456	15%	787	26%		1610	42%	490	13%	521	14%	1174	31%	
non-smoker	1960	27%	1210	16%	1175	16%	3048	41%		2488	27%	1288	14%	1408	15%	4121	44%	
Father's smoking									<0.001									<0.001
daily smoker	2341	50%	555	12%	625	14%	1120	24%		2424	46%	533	10%	614	12%	1653	32%	
has quit smoking	1312	43%	484	16%	456	15%	787	26%		1610	42%	490	13%	521	14%	1174	31%	
non-smoker	1960	27%	1210	16%	1173	16%	3048	41%		2488	27%	1288	14%	1408	15%	4121	44%	

**) = Chi Square*

Table 2. Adjusted odd ratios (and 95% confidence intervals) in the multinomial logistic regression of smoking on family factors.

Table 2. Adjusted odd ratios (and 95% confidence intervals) in the multinomial logistic regression of smoking on family factors.

	GIRLS									BOYS								
	smokes daily			smokes occasionally			has quit smoking			smokes daily			smokes occasionally			has quit smoking		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
Age	0.92	0.88-0.96	**<0.001**	0.92	0.87-0.97	0.003	0.96	0.91-1.02	0.207	1.11	1.06-1.16	**<0.001**	1.03	0.97-1.10	0.301	1.02	0.96-1.09	0.473
Family type																		
Other type	2.36	2.11-2.64	**<0.001**	1.43	1.24-1.65	**<0.001**	2.07	1.80-2.38	**<0.001**	2.00	1.75-2.29	**<0.001**	1.41	1.17-1.70	**<0.001**	1.35	1.12-1.62	0.001
Step family	1.62	1.39-1.88	**<0.001**	1.17	0.96-1.43	0.110	1.42	1.20-1.73	**<0.001**	1.40	1.22-1.60	**<0.001**	1.17	0.97-1.40	0.057	1.29	1.08-1.53	0.005
Single parent	1.50	1.34-1.70	**<0.001**	1.01	0.86-1.20	0.866	1.40	1.20-1.64	**<0.001**	1.30	1.16-1.44	**<0.001**	1.07	0.92-1.24	0.157	1.06	0.92-1.23	0.433
Co-parenting/dual residence	1.23	1.00-1.53	0.055	1.26	0.97-1.62	0.080	1.32	1.01-1.71	0.043	1.13	0.98-1.30	0.093	1.09	0.91-1.32	0.355	0.97	0.81-1.17	0.757
Intact	1			1			1			1			1			1		
Mother's education																		
Low	0.65	0.56-0.77	**<0.001**	0.69	0.56-0.84	**<0.001**	0.74	0.61-0.91	0.004	0.86	0.74-0.99	0.038	0.87	0.71-1.07	0.181	0.87	0.71-1.06	0.166
Medium	0.75	0.67-0.84	**<0.001**	0.83	0.72-1.96	0.013	0.82	0.71-0.95	0.007	0.96	0.87-1.05	0.363	1.03	0.91-1.18	0.623	1.10	0.97-1.25	0.123
High	1			1			1			1			1			1		
Father'seducation																		
Low	1.06	0.90-1.23	0.424	1.02	0.84-1.24	0.854	1.02	0.88-1.30	0.524	1.02	0.89-1.17	0.746	0.75	0.62-0.91	0.003	0.78	0.65-0.94	0.007
Medium	0.99	0.87-1.13	0.666	0.99	0.72-1.16	0.935	1.09	0.93-1.28	0.299	0.86	0.77-0.96	0.005	0.81	0.71-0.93	0.003	0.76	0.97-1.25	**<0.001**
High	1			1			1			1			1			1		
Parental unemployment																		
One parent	1.16	0.95-1.42	0.145	1.01	0.77-1.31	0.966	1.3	0.80-1.33	0.819	1.07	0.90-1.28	0.435	1.04	0.81-1.33	0.758	0.99	0.78-1.27	0.958
Both parents	1.11	1.01-1.21	0.036	1.01	0.89-1.13	0.908	1.01	0.93-1.28	0.832	0.99	0.91-1.08	0.896	1.00	0.89-1.12	0.943	1.03	0.92-1.15	0.668
Neither parent	1			1			1						1			1		
Parental involvement																		
No involvement	2.90	1.79-4.70	**<0.001**	2.90	1.62-5.19	**<0.001**	1.90	1.06-3.42	0.033	2.44	1.59-3.72	**<0.001**	1.54	0.82-2.87	0.176	1.99	1.16-3.41	0.012
Very low involvement	2.04	1.61-2.59	**<0.001**	2.16	1.61-2.89	**<0.001**	1.22	0.90-1.67	0.206	1.76	1.41-2.18	**<0.001**	1.38	1.01-1.87	0.040	1.48	1.12-1.96	0.006
Rather low involvement	1.70	1.45-1.99	**<0.001**	1.74	1.42-2.12	**<0.001**	1.19	0.97-1.45	0.095	1.47	1.28-1.69	**<0.001**	1.34	1.11-1.62	0.003	1.21	1.00-1.44	0.045
Rather high involvement	1.75	1.54-1.98	**<0.001**	1.75	1.49-2.06	**<0.001**	1.39	1.19-1.60	**<0.001**	1.69	1.51-1.88	**<0.001**	1.44	1.24-1.68	**<0.001**	1.17	1.02-1.35	0.030
High involvement	1.49	1.33-1.67	**<0.001**	1.56	1.29-1.73	**<0.001**	1.24	1.08-1.43	0.002	1.36	1.23-1.51	**<0.001**	1.36	1.19-1.56	**<0.001**	1.14	1.00-1.29	0.050
Very high involvement	1			1			1			1			1			1		
Mother'ssmoking																		
Smokesnowadays	2.46	2.21-2.73	**<0.001**	1.15	1.00-1.33	0.048	1.28	1.12-1.47	**<0.001**	1.75	1.59-1.93	**<0.001**	0.89	0.78-1.03	0.108	0.97	0.85-1.11	0.656
Used to smoke but has now quit	2.05	1.83-2.30	**<0.001**	1.43	1.24-1.65	**<0.001**	1.35	1.17-1.56	**<0.001**	1.68	1.52-1.87	**<0.001**	1.17	1.02-1.34	0.022	1.16	1.01-1.32	0.034
Never smoked	1			1			1			1			1			1		
Father'ssmoking																		
Smokesnowadays	1.74	1.56-1.94	**<0.001**	1.23	1.07-1.40	0.003	1.30	1.14-1.49	**<0.001**	2.10	1.90-2.32	**<0.001**	1.26	1.11-1.44	0.001	1.28	1.12-1.45	**<0.001**
Used to smoke but has now quit	1.59	1.42-1.78	**<0.001**	1.28	1.12-1.47	**<0.001**	1.23	1.07-1.41	0.003	2.05	1.85-2.26	**<0.001**	1.55	1.36-1.76	**<0.001**	1.47	1.30-1.67	**<0.001**
Never smoked	1			1			1			1			1			1		

Supplementary table 1. Sample statistics of selected variables

Variables	Girls		Boys		
	N	%	N	%	P*
Family type					<0.001
Intact	6847	45.0	10359	55.2	
Co-parenting/dual residence	662	4.3	1491	7.9	
Single parent	2364	15.5	3127	16.7	
Step family	1437	9.4	1712	9.1	
Other type	3914	25.7	2080	11.1	
Mother's education level					<0.001
Comprehensive school or primary school or no education	2321	15.4	2655	14.4	
Upper secondary school or vocational education	6550	43.5	7617	41.2	
Occupational studies in addition to upper secondary school or vocational education	3166	21.0	3917	21.2	
University, university of applied sciences of other higher education	3028	20.1	4279	23.2	
Father's education level					<0.001
Comprehensive school or primary school or no education	3419	23.0	3761	20.6	
Upper secondary school or vocational education	6953	46.8	8151	44.6	
Occupational studies in addition to upper secondary school or vocational education	2248	15.1	2933	16.0	
University, university of applied sciences of other higher education	2243	15.1	3450	18.9	
Parental unemployment last year					0.016
Neither parent	9812	64.6	12319	65.7	
One parent	4643	30.5	5452	29.1	
Both parents	771	5.1	982	5.2	
Help from parents if facing difficulties with school or school work					<0.001
Whenever I need	7140	47.1	9568	50.6	
On most occasions	4488	29.6	5876	31.1	
Rarely	2009	13.3	1962	10.4	
Hardly ever	1521	10.0	1485	7.9	
Parents know most of adolescent's friends					<0.001
Both know	9711	63.6	12549	66.6	
Only father	351	2.3	857	4.8	
Only mother	3801	24.9	2738	14.5	
Neither parent	1415	9.3	2684	14.3	
Parents know whereabouts on weekends					<0.001
Yes, always	8800	57.7	9786	52.1	
Yes, sometimes	5296	34.7	7391	39.3	
Most of the time they don't know	1153	7.6	1621	8.6	
Adolescent can discuss personal issues with parents					0.801
Often	4898	32.1	5631	29.9	
Fairly often	4452	29.2	5950	31.6	
Once in a while	4702	30.8	5763	30.6	
Hardly ever	1213	7.9	1467	7.8	
Family eating habits at dinner time					<0.001
Proper meal together and usually everyone is at the table	5394	35.4	7292	39.0	
Do not have a proper meal together	6728	44.2	8568	45.8	
Do not have a proper meal	3096	20.3	2856	15.3	
Current smoking habit					<0.001
Daily	5613	37.2	6522	35.6	
Weekly or less than weekly	2249	14.9	2311	12.6	
I have quit smoking	2254	15.0	2543	13.9	
Non-smoking	4955	32.9	6948	37.9	
Mother's smoking					<0.001
Mother never smoked	7587	49.5	9820	51.7	
Mother used to smoke but has now quit	3098	20.2	3968	20.9	
Mother smokes nowadays	4154	27.1	4302	22.6	
I don't know (mother)	486	3.2	915	4.8	
Father's smoking					<0.001
Father never smoked	5259	34.4	7013	36.9	
Father used to smoke but has now quit	4091	26.7	5132	27.0	
Father smokes nowadays	5035	32.9	5624	29.6	
I don't know (father)	921	6.0	1246	6.6	

**) = Chi Square*

Supplementary table 2. Formulation of family involvement indicator

Original question	Dichotomized variable
Parent-child relationship	
"If you have difficulties at school or with your school work, how often do you get help"	
Whenever I need	1
On most occasions	1
Rarely	0
Hardly ever	0
"Can you talk about things that concern you with your parents"	
Often	1
Fairly often	1
in and a while	1
Hardly ever	0
Connectedness of family	
"Which of the following alternatives best describes your family's eating habits in the afternoon or evening?"	
Family dinners with usually everyone at the table	1
Have a meal but family does not eat at the same time	0
No proper meal, everyone grabs something to eat	0
Parental monitoring	
"Do your parents know most of your friends?"	
They both know	1
Only my father does	1
Only my mother does	1
Neither does	0
"Do your parents know where you spend your Friday and Saturday nights?"	
Yes, always	1
Yes, sometimes	1
Most of the time they don't know	0

Supplementary table 3. Unadjusted odd ratios (and 95% confidence intervals) in the multinomial logistic regression of smoking on family factors.

	GIRLS									BOYS								
	smokes daily			smokes occasionally			has quit smoking			smokes daily			smokes occasionally			has quit smoking		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
Age	1.01	0.98-1.05	0.444	0.96	0.92-1.01	0.13	1.05	1.00-1.10	0.045	1.14	1.10-1.18	**<0.001**	1.06	1.01-1.12	0.024	1.03	0.98-1.09	0.201
Family structure																		
Other type	2.74	2.48-3.02	**<0.001**	1.49	1.31-1.69	**<0.001**	2.17	1.91-2.46	**<0.001**	2.62	2.33-2.95	**<0.001**	1.47	1.25-1.74	**<0.001**	1.50	1.27-1.76	**<0.001**
Step family	2.18	1.90-2.51	**<0.001**	1.31	1.09-1.58	0.004	1.57	1.30-1.89	**<0.001**	1.82	1.61-2.06	**<0.001**	1.25	1.05-1.49	0.012	1.34	1.14-1.58	**<0.001**
Single parent	1.92	1.72-2.16	**<0.001**	1.09	0.93-1.27	0.277	1.52	1.31-1.76	**<0.001**	1.65	1.49-1.81	**<0.001**	1.14	0.99-1.30	0.070	1.11	0.97-1.27	0.122
Co-parenting/dual residence	1.57	1.29-1.92	**<0.001**	1.40	1.10-1.78	0.007	1.37	1.06-1.77	0.015	1.35	1.18-1.54	**<0.001**	1.19	0.10-1.42	0.055	1.07	0.89-1.27	0.480
Intact	1			1			1			1			1			1		
Mother's education																		
Low	0.99	0.87-1.13	0.841	0.76	0.64-0.91	0.002	0.86	0.72-1.02	0.079	1.18	1.05-1.33	0.005	0.83	0.70-0.98	0.029	0.79	0.67-0.93	0.005
Medium	0.89	0.81-0.99	0.024	0.86	0.76-0.98	0.018	0.88	0.78-1.00	0.058	1.02	0.94-1.11	0.670	0.98	0.88-1.10	0.771	1.02	0.91-1.14	0.762
High	1			1			1			1			1			1		
Father's education																		
Low	1.22	1.07-1.39	0.003	0.92	0.78-1.09	0.345	1.04	0.88-1.23	0.640	1.28	1.14-1.43	**<0.001**	0.80	0.68-0.93	0.004	0.78	0.68-0.91	0.001
Medium	1.09	0.97-1.22	0.137	0.97	0.84-1.11	0.621	1.08	0.94-1.25	0.288	0.99	0.90-1.09	0.865	0.86	0.76-0.97	0.016	0.81	0.72-0.92	0.001
High	1			1			1			1			1			1		
Parental unemployment																		
One parent	1.66	1.39-1.99	**<0.001**	1.08	0.85-1.39	0.526	1.08	0.92-1.50	0.199	1.48	1.27-1.73	**<0.001**	1.01	0.80-1.27	0.938	0.98	0.79-1.23	0.877
Both parents	1.36	1.25-1.48	**<0.001**	1.04	0.93-1.16	0.520	1.04	1.01-1.27	0.028	1.23	1.14-1.33	**<0.001**	1.02	0.91-1.13	0.792	1.04	0.94-1.15	0.454
Neither parent	1			1			1			1			1			1		
Parental involvement																		
No involvement	4.47	2.80-7.12	**<0.001**	3.44	1.94-6.09	**<0.001**	2.85	1.61-5.05	**<0.001**	3.59	2.44-5.30	**<0.001**	1.87	1.06-3.30	0.032	2.11	1.27-3.51	0.004
Very low involvement	2.48	1.99-3.10	**<0.001**	2.15	1.62-2.86	**<0.001**	1.39	1.03-1.88	0.033	2.30	1.89-2.81	**<0.001**	1.41	1.05-1.89	0.022	1.57	1.21-2.04	0.001
Rather low involvement	2.01	1.73-2.33	**<0.001**	1.87	1.54-2.26	**<0.001**	1.30	1.07-1.58	0.008	1.80	1.58-2.05	**<0.001**	1.44	1.20-1.73	**<0.001**	1.25	1.05-1.49	0.012
Rather high involvement	1.89	1.68-2.13	**<0.001**	1.74	1.49-2.03	**<0.001**	1.44	1.24-1.68	**<0.001**	1.81	1.63-2.00	**<0.001**	1.48	1.28-1.71	**<0.001**	1.15	1.00-1.32	0.048
High involvement	1.56	1.40-1.74	**<0.001**	1.51	1.31-1.74	**<0.001**	1.26	1.10-1.44	0.001	1.46	1.33-1.60	**<0.001**	1.39	1.22-1.59	**<0.001**	1.14	1.01-1.29	0.033
Very high involvement	1			1			1			1			1			1		
Mother's smoking																		
Smokes nowadays	3.36	3.07-3.69	**<0.001**	1.27	1.12-1.44	**<0.001**	1.49	1.32-1.68	**<0.001**	2.54	2.34-2.75	**<0.001**	1.06	0.95-1.20	0.299	1.11	1.00-1.24	0.084
Used to smoke but has now quit	2.59	2.33-2.88	**<0.001**	1.55	1.36-1.77	**<0.001**	1.51	1.32-1.72	**<0.001**	2.27	2.08-2.49	**<0.001**	1.34	1.18-1.51	**<0.001**	1.30	1.15-1.46	**<0.001**
Never smoked	1			1			1			1			1			1		
Father's smoking																		
Smokes nowadays	2.78	2.54-3.05	**<0.001**	1.39	1.24-1.57	**<0.001**	1.54	1.37-1.73	**<0.001**	2.82	2.60-3.07	**<0.001**	1.25	1.11-1.39	**<0.001**	1.29	1.16-1.43	**<0.001**
Used to smoke but has now quit	2.09	1.89-2.31	**<0.001**	1.40	1.23-1.58	**<0.001**	1.41	1.24-1.60	**<0.001**	2.41	2.20-2.63	**<0.001**	1.53	1.36-1.72	**<0.001**	1.49	1.33-1.67	**<0.001**
Never smoked	1			1			1			1			1			1		

PUBLICATION II

Relationship among School Connectedness, Smoking Policy, and Smoking Behaviour in Finish Vocational Schools

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Relationship among School Connectedness, Smoking Policy, and Smoking Behavior in Finnish Vocational Schools

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Objective: We examined school connectedness as a significant predictor of adolescent well-being. **Methods:** We analyzed data for 34,776 adolescents who took part in the School Health Promotion study in Finland. We used a multinomial regression model to assess the associations among adolescent smoking, school connectedness, and anti-smoking policies. **Results:** A lower level of perceived teacher support, disliking school, and more than 2 days of skipping school increased the odds of smoking behavior among vocational students. In addition, school staff smoking and close monitoring of student smoking were associated with increased smoking among students. **Conclusions:** Our results suggest that it is possible to reduce the odds of smoking by enhancing school connectedness and by enforcing anti-smoking school policies.

Key words: adolescent health; smoking policy; school connectedness; vocational school; smoking
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Experimenting with cigarettes in early teens is a strong predictor of daily smoking later in adolescence and later in life.[1] According to a longitudinal study, this association remains regardless of the level of experimentation, or whether the adolescent subsequently rejected early smoking.[2] Smoking in adolescence is known to be associated with other health-risk behaviors, including alcohol and other substance use[3-5] and a low level of physical activity.[6,7] Additionally, smoking has been connected to school-related factors such as lower academic achievement,[8,9] bullying,[10] and truancy.[11] Poor health and education-related choices in adolescence lead to inequalities in adulthood and have major health consequences. Therefore, major public health implications abound.[12]

Smoking has been studied in many ways to find and accumulate associations and to make recommendations to curb adolescent smoking. Theoretical perspectives like Social Learning Theory[13] and Problem Behavior Theory[14] have tried to shed light on deviant behavior and have been used as frameworks to explain adolescent smoking and other substance use.[15,16] The Theory of Triadic Influence (TTI)[17,18] has been developed solely for understanding complexity of adolescent smoking. TTI suggests that adolescents' smoking behavior is influenced by, among other things, broad contextual factors such as school environment, including the behavior of others, social attachment, and knowledge and behavioral expectations. The supply-side variables include ease of access and smoking policies and laws. Smoking policies have been found to be effective ways of combating adolescent smoking,[19] but there are questions about how the policies should be addressed,[20,21] given that strict regulation and monitoring could cause rebelliousness[22] and add discomfort and the shame of a smoking-related stigma.[23]

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The definition of school connectedness varies across disciplines, as do the concepts used, which range from connectedness, bonding, belonging, and engagement to attachment.[24] The common denominators are the school social context and school relationships as well as the perception of teacher support as a significant predictor of students' connectedness.[24,25] Furthermore, school connectedness has been defined as a belief by students that adults and peers in the school care about their learning as well as about them as individuals.[26] Chung-Do et al[24] have developed a comprehensive school connectedness scale involving the elements of school involvement, academic motivation, school attachment, teacher support, and peer relations. In this study we used perceived teacher support and school attachment as predictors of school connectedness. Adolescents who feel that their teachers care about them personally and about their learning are more likely to be engaged in school, to do better academically, and to have fewer health-risk behaviors.[27]

Smoking rates among adolescents in vocational schools are much higher than among general upper secondary students. There is similar evidence from other Western countries.[28,29] In Finland, 36% of students in upper secondary vocational schools were daily smokers as compared to 8% of their former classmates who continued in academically-focused general upper secondary school after ninth grade. After 9 years of compulsory education, young people in Finland have the choice of continuing in either general upper secondary school (54.5%), initial vocational education and training (38.5%), or additional voluntary basic education (2.5%). The aim of vocational education and training is to improve the skills of the work force and prepare students for specific vocations. The largest fields are technology and transport, business and administration, and health and social services. Mechanics, retail administrators, and practical nurses, to name a few, qualify through vocational school. Training is different for registered nurses and practical nurses. Registered nurses receive a bachelor's degree, which they pursue after graduating from upper secondary school or, in some cases, after qualifying as a practical nurse and gaining practical experience after graduation. In Finland, registered nurses are educated in universities of applied sciences, whereas practical nurses attend vocational school.[30]

Past research has studied smoking among post-compulsory students,[31,32] and some earlier research has been done on smoking cessation programs among post-compulsory students,[22,33] but only a few studies explore the associations of teacher support and school connectedness with adolescent smoking in vocational school settings.[28,29,34] The effectiveness of smoking restrictions and smoking policies within vocational institutions also has gone unexamined. Many questions remain regarding the predictive value of school connectedness for adolescent daily smoking, occasional smoking, and former smoking. In this study we explore whether (1) teacher support, (2) school connectedness, and (3) school smoking policies are associated with smoking behavior among adolescents in upper secondary vocational schools in Finland.

METHODS

Sample and Procedures

The School Health Promotion (SHP) study is a nationwide survey conducted every other year by the National Institute for Health and Welfare in Finland. The SHP survey provides versatile and reliable provincial and local follow-up information on multiple aspects of the well-being and health of Finnish adolescents. Results are used widely in society, and original data is provided for further use as secondary data. Use of existing secondary data allows researchers to study variables and their relationships in a way that has not been previously analyzed and can lead to significant new findings and insights.[35,36]

The SHP survey was distributed and administered in March 2013 to all vocational schools in Finland. Students were informed of the nature of the study and that their participation was voluntary and confidential. Those students who were present and participated in the study were instructed to seal their completed surveys in envelopes without identification details to ensure confidentiality. Students also were informed that the envelopes would be sent directly to the SHP research group rather than analyzed at the school. Students completed the survey on their own during class under the supervision of teachers, who did not interfere with the responses. Students who were absent on the day of the survey were not contacted afterwards. The questionnaire took 30 to 45 minutes to complete.

Returning the sealed survey was considered consent to participate. No incentive was offered for participation. The SHP study was approved by the ethics committee of the National Institute for Health and Welfare in 2012, and good scientific practice was followed throughout the research. The questionnaire can be found online at http://www.thl.fi/fi/web/thlfi-en/research-and-expertwork/population-studies/school-health promotion-study. For this study, ethical approval was not needed; the secondary data set has the benefit of not exposing subjects to any potential harm associated with research participation, as respondents have already experienced burdens associated with participating in the primary research.[37]

The target group for the SHP study consisted of first-year and second-year students from all upper secondary vocational schools in Finland in 2013. A total of 34,776 students from 419 vocational schools completed the survey in 2013. The respondents for this study were aged between 14 and 20 (Median = 17.6, SD = 0.90). Of the respondents, 56% were males and 44% females. Table 1 presents descriptive information about the students. The exact response rate could not be retrieved for the biennial data. The number of participants was estimated on the basis of state statistics providing the total number of students in vocational schools in Finland, without breakdowns for first- and second-year students. Further, vocational school includes significant on-the-job training, and it was not possible to determine retrospectively how many students were away from school due to practical training, how many refused to answer, and how many were absent for truancy from school on the day of the survey.

Variables

Adolescents' smoking behavior was originally assessed by 2 questions: (1) How many cigarettes, pipefuls, and cigars have you smoked altogether (none, only one, about 2-50, and over 50)? and (2) Which of the following alternatives best describes your current smoking habits? (I smoke once a day or more often, I smoke once a week or more often but not every day, I smoke less often than once a week, I have quit smoking). The adolescent smoking variable consisted of 4 classes: daily smokers (I smoke once a day or more often), occasional smokers (I smoke once a week or less often), those who have quit smoking (I have quit smoking), and nonsmokers (I have smoked altogether only one or none). All 846 respondents who gave inconsistent responses (eg, who said they were both nonsmokers and daily smokers) were excluded from the analysis.

Adolescents' school connectedness was measured by questions concerning teacher support, liking school, and truancy. *Teacher support* was assessed with 3 Likert-style statements: (1) Teachers encourage me to express my opinions in class, (2) Teachers are interested in how I am doing, and (3) Teachers treat us fairly. The response options were "fully agree," "agree," "disagree," and "fully disagree." All responses were first dichotomized into 2 categories: the first category (coded as 1) referred to a high level of teacher support (fully agree/agree), and the second category (coded as 0) to a low level or no teacher support (disagree/fully disagree). The dichotomized variables were then summed to create a teacher support indicator with a value range from 0 to 3. The support indicator was then categorized into 2 groups, with value 1 indicating that the adolescent has received teacher support on at least 2 of 3 measures, and value 0 indicating that the adolescent had agreed with only one teacher support item or disagreed with all 3 teacher support items. If any of the 3 items were unanswered, the indicator was marked as a missing value. The internal consistency (Cronbach's alpha) for the teacher support indicator was 0.72.

Secondly, adolescents' school connectedness was assessed with a question about *liking school*, with response options ranging from very much (1) to not at all (4). This scale was dichotomized into "very much/rather much" and "rather little/not at all." Thirdly, school connectedness was measured with a question about *truancy* during the last 30 days. The response options were "none," "1 day," "2 to 3 days," and "more than 3 days." This measure was again dichotomized: skipping school for 2 days or more in the past 30 days and no school absences for truancy (none and 1 day).

School policy on smoking was assessed with 3 measures. Firstly, the respondents were asked whether smoking was allowed at school, with the following response options: (1) forbidden, (2) allowed in certain areas, and (3) allowed without restrictions. This measure was dichotomized into "forbidden"

Table 1
Sample Statistics of Selected Variables

Variables	Girls		Boys		
	N	%	N	%	p*
DEPENDENT VARIABLES					
Current smoking habit					<.001
Daily	5613	37.2	6522	35.6	
Weekly or less than weekly	2249	14.9	2311	12.6	
I have quit smoking	2254	15.0	2543	13.9	
Non-smoking	4955	32.9	6948	37.9	
INDEPENDENT VARIABLES					
Teachers are interested in how I am doing					<.001
Fully agree	1544	10.0	1858	9.6	
Agree	8144	52.9	11049	57.5	
Disagree	4915	31.9	5374	27.9	
Fully disagree	794	5.2	968	5.0	
Teachers treat us fairly					<.001
Fully agree	1998	13.1	3092	16.2	
Agree	9463	62.1	12676	66.5	
Disagree	3126	20.5	2652	13.8	
Fully disagree	649	4.3	646	3.4	
Teachers encourage me to express my opinions in class					<.001
Fully agree	1665	10.8	2320	12.0	
Agree	9370	60.8	12701	65.8	
Disagree	3835	24.9	3712	19.2	
Fully disagree	548	3.6	563	2.9	
Teachers' support indicator					<.001
Disagree	4147	27.3	3986	21.0	
Agree	11035	72.7	14975	79.0	
Do you like school?					<.001
Very much	8201	18.1	3804	19.8	
Rather much	9313	60.3	12135	63.0	
Rather little	3055	19.8	2993	15.5	
Not at all	243	1.6	316	1.6	

(continued on next page)

and "allowed" (allowed in certain areas/allowed without restrictions). Secondly, the adolescents were asked how closely the smoking restrictions were monitored: "very closely," "fairly closely," or "hardly at all." These responses were dichotomized as "closely" (very closely and fairly closely) and "hardly at all." Thirdly, the adolescents were asked whether teachers or other personnel smoked at school or on school premises: "yes, daily," "yes, sometimes," "no," and "I don't know." Teachers and other personnel who were said to smoke daily or sometimes on school premises were considered as smokers and other teachers and school personnel as nonsmokers.

Mother's and father's educational level, and family structure (family socioeconomic status, or SES, variables) and adolescent's age *were set as covariates*. Family structure was measured by asking the respondents to identify the adults with whom they lived. We subsequently coded this variable into:

Table 1 (*continued*)
Sample Statistics of Selected Variables

Variables	Girls		Boys		
	N	%	N	%	p[a]
During the LAST 30 DAYS, how many whole school days have you been absent from school for truancy?					<.001
None	9698	66.5	12682	65.6	
1 day	2265	15.5	2806	14.5	
2 to 3 days	1399	9.6	1487	7.7	
More than 3 days	1213	8.3	1500	7.8	
Is smoking allowed in your school?					<.001
Forbidden	6420	41.8	6640	34.7	
Allowed in certain areas	8799	57.3	12054	63.0	
Allowed without restrictions	138	0.9	432	2.3	
How closely are the smoking restrictions concerning pupils monitored?					<.001
Very closely	741	4.8	1711	9.0	
Fairly closely	6366	41.5	9131	47.8	
Hardly at all	8237	53.7	8260	43.2	
Do the teachers or other personnel smoke in the school or on school premises?					<.001
Yes, daily	3202	20.8	4935	25.8	
Yes, sometimes	3646	23.7	4591	24.0	
No	2382	15.5	3445	18.0	
I don't know	6139	39.9	6154	32.2	
COVARIATES					
Respondents age					<.001
14	26	0.2	13	0.1	
15-16	3674	23.7	5217	27.1	
17-18	9750	63.4	12747	66-3	
Family type					<.001
Intact	6847	45.0	10359	55.2	
Co-parenting/dual residences	662	4.3	1491	7.9	
Single parent	2364	15.5	3127	16.7	
Biological parent + partner	1437	9.4	1712	9.1	
Other type	3914	25.7	2080	11.1	
Mother's education level					<.001
Comprehensive school or primary school	2321	15.4	2655	14.4	
Upper secondary school or vocational education institution	6550	43.5	7617	41.2	
Occupational studies in addition to upper secondary school or vocational school	3166	21.0	3917	21.2	
University, university of applied sciences of other higher education institution	3028	20.1	4279	23.2	
Father's education level					<.001
Comprehensive school or primary school	3419	23.0	3761	20.6	
Upper secondary school or vocational education institution	6953	46.8	8151	44.6	
Occupational studies in addition to upper secondary school or vocational school	2248	15.1	2933	16.0	
University, university of applied sciences of other higher education institution	2243	15.1	3450	18.9	

Note.
a: Chi-square

Table 2
Association (Cross-tabulation) between School Connection and School Policy Factors and Adolescent Girls' Smoking

	GIRLS' SMOKING								
	Smokes daily		Occasionally		Has quit smoking		Non-smoker		
	N	%	N	%	N	%	N	%	p[a]
Teachers' support									<.001
Does not get support	1740	42.9%	614	15.1%	634	15.6%	1067	26.3%	
Gets support	3785	35.2%	1600	14.9%	1584	14.7%	3799	35.3%	
Likes school									<.001
Rather little or not at all	1448	45.1%	504	15.7%	492	15.3%	768	23.9%	
Rather or very much	4157	35.1%	1741	14.7%	1759	14.9%	4177	35.3%	
Truancy last 30 days									<.001
At least 2 days	1464	57.0%	384	15.0%	340	13.2%	380	14.8%	
None or one day	3847	33.0%	1730	14.8%	1791	15.4%	4297	36.8%	
Smoking policy									.003
Allowed with restrictions	3357	38.4%	1266	14.5%	1260	14.4%	2852	32.7%	
Forbidden	2247	35.8%	978	15.6%	990	15.8%	2063	32.9%	
Smoking restrictions are monitored									<.001
Hardly at all	2834	35.1%	1231	15.3%	1298	16.1%	2701	33.5%	
Closely	2762	39.8%	1008	14.5%	946	13.6%	2220	32.0%	
Teachers smoke on school premises?									<.001
Yes	2920	43.6%	1031	15.4%	984	14.7%	1764	26.3%	
I don't know	1802	30.0%	872	14.5%	936	15.6%	2388	39.8%	
No	878	37.4%	342	14.7%	321	13.8%	785	33.7%	

Note.
a: Chi Square

"nuclear family," "living with single parent," "living in a step family," "living alternatively with separated parents in 2 residences," "living in some other way." Parents' education level was assessed by asking the subjects their mother's and father's highest level of education. The variable was categorized into "low education" (comprehensive or primary school), "middle education" (upper secondary school and/or vocational school), and "high education" (university, university of applied science, or other higher education institution).

Data Analysis

Percentages, cross-tabulation, and χ^2 analyses (Table 2 and Table 3) were undertaken for categorical variables to examine the association between adolescent smoking status and teacher support, school connectedness, and school smoking policy. Separate analyses were conducted for males and females as there is evident that smoking behavior varies between sexes.[38]

Adjusted multinomial logistic regression analysis (Table 4 and Table 5) was performed to describe and test the associations between smoking and school-related factors. In the adjusted model (Table 4 and Table 5), all variables were examined at the same time. Adolescent smoking was set as the dependent variable and school-related factors as independent variables. Daily smokers, occasional smokers, and those who had quit smoking were compared with nonsmokers, who were used as a reference group. Adolescents' age and family SES variables were set as covariates. The statistical

Table 3
Association (Crosstabulation) Between School Connection and School Policy Factors and Adolescent Boys' Smoking

	BOYS' SMOKING								
	Smokes daily		Occasionally		Has quit smoking		non-smoker		
	N	%	N	%	N	%	N	%	p[a]
Teachers' support									<.001
Does not get support	1556	41.5%	493	13.2%	555	14.8%	1143	30.5%	
Gets support	4858	34.2%	1765	12.4%	1935	13.6%	5663	39.8%	
Likes school									<.001
Rather little or not at all	1341	43.2%	434	14.0%	452	14.6%	876	28.2%	
Rather or very much	5159	34.1%	1864	12.3%	2081	13.7%	6042	39.9%	
Truancy last 30 days									<.001
At least 2 days	1563	55.2%	390	13.8%	367	13.0%	509	18.0%	
None or one day	4681	31.9%	1808	12.3%	2050	14.0%	6153	41.9%	
Smoking policy									<.001
Allowed with restrictions	4475	37.6%	1502	12.6%	1614	13.6%	4315	36.2%	
Forbidden	2032	32.3%	800	12.7%	915	14.5%	2553	40.5%	
Smoking restrictions are monitored									<.001
Hardly at all	2668	33.7%	1011	12.8%	1107	14.0%	3134	39.6%	
Closely	3811	37.1%	1284	12.5%	1419	13.8%	3759	36.6%	
Teachers smoke on school premises?									<.001
Yes	3646	40.4%	1191	13.2%	1283	14.2%	2911	32.2%	
I don't know	1772	30.1%	671	11.4%	781	13.3%	2664	45.2%	
No	1079	32.7%	436	13.2%	458	13.9%	1323	40.1%	

Note.
a: Chi-square

analyses were conducted using IBM (Armonk, NY) SPSS statistics 23. The results are presented as odds ratios (ORs) and their 95% confidence intervals. The level of statistical significance was set at $p < .001$ due to the large sample size.

RESULTS

Table 1 shows that 36% of the adolescents who were studying for vocational qualifications smoked daily. Girls were daily smokers slightly more often than boys. Girls were also occasional smokers more often than boys. 15% of girls and 14% of boys said they had quit smoking. Among girls 33% and among boys 38% reported being nonsmokers. Most of the girls (78%) and boys (83%) liked going to school very or rather much. More than 3 out of 5 students had not been truant, but 8% had skipped school more than 3 days in the previous month. Smoking was allowed in around two-thirds of all vocational schools. Girls reported smoking bans more often (42%) than boys (35%). Over half (54%) of the girls and 43% of the boys reported that smoking restrictions were hardly monitored at all. Approximately 45% of the girls and half (50%) of the boys reported that teachers or other personnel smoked on school premises daily or sometimes.

Bivariate Analysis (Cross-tabulation)

Tables 2 and 3 show the results of the bivariate analysis. Lack of *teacher support* was significantly ($p < .001$) associated with smoking measurement: Those girls and boys who smoked daily, occasion-

Table 4
Adjusted Odd Ratios (and 95% Confidence Intervals) in the Multinomial Logistic Regression of Smoking on School Related Issues (Girls)

	GIRLS' SMOKING								
	Smokes daily			Smokes occasionally			Has quit smoking		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Teachers' support									
Low level	1.38	1.25-1.53	<.001	1.21	1.06-1.38	.004	1.25	1.10-1.42	.001
High level	1			1			1		
Likes school									
Rather little or not at all	1.37	1.22-1.54	<.001	1.32	1.15-1.53	<.001	1.29	1.12-1.49	.001
Rather or very much	1			1			1		
Truancy last 30 days									
At least 2 days	3.60	3.16-4.10	<.001	2.30	1.96-2.71	<.001	1.85	1.57-2.19	<.001
None	1			1			1		
Smoking is allowed									
Allowed in school	1.02	0.93-1.11	0.698	0.89	0.80-1.00	.031	0.89	0.80-0.99	.036
Forbidden in school	1			1			1		
Smoking restrictions are monitored									
Hardly at all	0.74	0.68-0.81	<.001	0.92	0.83-1.03	.149	1.04	0.93-1.15	.534
Closely	1			1			1		
School personnel smoke on school premises?									
Yes	1.91	1.75-2.08	<.001	1.49	1.34-1.67	<.001	1.40	1.26-1.56	<.001
No	1			1			1		

Note.
The reference group for dependent variable was "Non-smoker" and smokers and those who have quit smoking are compared to non-smokers. School related factors were set as independent factors. In the adjusted model all the variables were examined at the same time. Family SES variables and respondents age was adjusted.

ally, or had recanted smoking did not perceive statistically significantly teacher support. Of girls smoking daily, 43% reported not getting teacher support and 35% reported getting support. Girls who smoked occasionally or were former smokers had no big difference of perceived teacher support. Of the nonsmoking girls 26% did not perceive teacher support while 35% reported getting teacher support. Among boys smoking daily 42% reported not getting and 34% getting teacher support. Approximately the same number of boys who reported being occasional smokers or former smokers reported not perceiving and perceiving teacher support. Of nonsmoking boys 31% did not perceive and 40% perceived teacher support.

Bivariate analysis (Tables 2 and 3) also showed that not *liking school* was statistically significantly ($p < .001$) associated with smoking in both genders. Of the girls smoking daily 45% did not like school and 35% reported liking school. Occasional smoker and former smoker girls had no big difference in whether they liked school on not. One in 4 (24%) nonsmoking girls did not like school but 35% of nonsmoking girls liked school. A similar pattern was found for boys: among boys smoking daily 43% did not like school and 34% liked school. Boys who were occasional and former smokers had no big difference between not liking and liking school. Among nonsmoking boys 28% did not like and 40% liked school.

Truancy was also statistically significantly ($p < .001$) associated with daily, occasional, and for-

Table 5
Adjusted Odd Ratios (and 95% Confidence Intervals) in the Multinomial Logistic Regression of Smoking on School Related Issues (Boys)

	BOYS' SMOKING								
	Smokes daily			Smokes occasionally			Has quit smoking		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Teachers' support									
Low level	1.35	1.22-1.49	<.001	1.18	1.03-1.35	.015	1.26	1.11-1.43	<.001
High level	1			1			1		
Likes school									
Rather little or not at all	1.25	1.12-1.40	<.001	1.29	1.12-1.50	<.001	1.25	1.09-1.44	.002
Rather or very much	1			1			1		
Truancy last 30 days									
At least 2 days	3.43	3.06-3.86	<.001	2.43	2.09-2.83	<.001	1.94	1.66-2.26	<.001
None	1			1			1		
Smoking is allowed									
Allowed in school	1.20	1.11-1.30	<.001	1.01	0.91-1.13	.822	0.96	0.87-1.07	.463
Forbidden in school	1			1			1		
Smoking restrictions are monitored									
Hardly at all	0.73	0.67-0.79	<.001	0.87	0.78-0.97	.008	0.87	0.79-0.97	.008
Closely	1			1			1		
School personnel smoke on school premises?									
Yes	1.67	1.54-1.80	<.001	1.44	1.29-1.59	<.001	1.41	1.27-1.56	<.001
No	1			1			1		

Note.
The reference group for dependent variable was "Non-smoker" and smokers and those who have quit smoking are compared to non-smokers. School related factors were set as independent factors. In the adjusted model all the variables were examined at the same time. Family SES variables and respondents age was adjusted.

mer smoking in both genders. Nearly 60% of girls smoking daily had been truant at least 2 days during the prior 30 days and one in 3 (33%) girls smoking daily had not been truant. Girls who were occasional smokers or former smokers had no big difference on truancy. Of nonsmoking girls 15% reported playing truant in the preceding 30 days and 37% had not been absent because of truancy during the previous month. The pattern was similar with boys. Over half (55%) of daily smoking boys were truant during the prior month and 36% had not played truant. With boys smoking occasionally and formerly smoking boys, the difference in the level of truancy was not big. Of the nonsmoking boys 18% had played truant in the prior 30 days and 42% had not.

In cross-tabulation analysis, reporting of *smoking restrictions* was statistically significant ($p < .001$) among boys only. Among daily smoking boys 38% reported smoking to be allowed with restrictions and 32% of boys reported that smoking was forbidden in school premises. Occasional smokers and former smokers' views of school smoking restrictions did not vary much. Of nonsmoking boys 31% reported some restrictions and 41% of nonsmokers said smoking was forbidden.

Smoking was statistically significant ($p < .001$) with *smoking policy monitoring* in both genders. Girls smoking daily reported more often of smoking policy being closely monitored. Occasional smokers, former smokers, and nonsmoking girls reported slightly more often that smoking restric-

tions were monitored hardly at all. Boys had a similar pattern: Daily smokers reported more close monitoring of smoking policies than occasional smokers, former smokers, or nonsmokers.

Smoking was associated statistically significantly ($p < .001$) with students' perceived *school staff smoking* in both genders. Among girls smoking daily 44% perceived staff smoking and 34% did not. Occasional smoker and former smoker girls perceived slightly more than nonsmokers of staff smoking. Of nonsmoking girls 34% perceived that school staff did not smoke and 26% that they did. Boys had a similar pattern: 43% of boys smoking daily reported staff smoking at school and 33% did not. Occasional smokers' and former smokers' views of staff smoking did not vary much. Of nonsmoking boys 32% perceived teachers or other staff members smoking and 40% did not.

The Adjusted Multinomial Regression

The adjusted multinomial regression model (Table 4 and Table 5) revealed that perceived teacher support was statistically significantly associated with daily smoking among boys and girls, when adjusted for covariates: age of respondents, family socioeconomic variables (SES), family type, and all other independent variables within the model. Disliking school was associated with daily and occasional smoking in both genders. Adolescents who played truant for 2 or more days a month were more likely to be daily smokers, but also occasional smokers and former smokers, than those who did not play truant for more than one day a month.

Perceived teachers' and other staff members' smoking on school premises significantly increased the odds of adolescents' daily smoking, occasional smoking, and former smoking. However, close monitoring of smoking restrictions increased the odds of daily smoking in both genders.

DISCUSSION

Smoking was more common than nonsmoking among adolescents who were studying for vocational qualifications. More than one-third (36%) of adolescents smoked cigarettes daily, girls slightly more often than boys. Girls were also occasional smokers more often than boys. Over half of the girls and slightly less of the boys reported that smoking restrictions were hardly monitored at all at school. Approximately 45% of the girls and half (50%) of the boys reported that teachers or other personnel smoked cigarettes on school premises during the day.

Girls reported having quit smoking more often than boys. According to a longitudinal study, young people who reported having quit smoking smoked statistically significantly more often later in adolescence and adults compared to those who reported being nonsmokers.[2] It is possible that those who said that they had quit smoking had begun to use some other tobacco products, they still smoked occasionally, or smoking had been quit only recently.

Perceived teacher support, students' liking of school, and low level of truancy were negatively associated with smoking among girls and boys. Teachers' and other school personnel's smoking was positively associated with adolescents' daily smoking, occasional smoking, and former smoking. Smoking restrictions on school premises had no association with smoking among girls but reduced the odds of boys' daily smoking. In our research, the boys reported that they had quit smoking but experienced less support from the teacher. In addition, both girls and boys who had quit played truant more statistically significantly and attached more attention to teachers' smoking on school premises than did nonsmoking students. In line with previous studies, we found that close monitoring of smoking restrictions may increase daily smoking among adolescents.[39] Close monitoring may stimulate deviant behavior and as such be counterproductive. It is also possible that the penalty for smoking is considered lenient or insignificant. Qualitative data are needed to shed light to this matter.

Previous studies in the US have shown that students' connectedness to school is negatively associated with a variety of adolescent risk behaviors also beyond the school setting.[19,40] Although students' connectedness to school has been found to decrease throughout adolescence, it has been reported that increased school connectedness correlates with less school misbehavior and fewer risk-taking behaviors at 18 years of age.[41]

Our results indicate that boys and girls who reported a lower level of teacher support were more often daily smokers. Earlier studies have found

that warm, supportive, and stable relationships between school personnel and students are associated with lower levels of school problems, inattention, and overall emotional symptoms.[20,25,42] Additionally, good interrelationships between students and staff have been reported to be a facilitator for outdoor school ground smoking bans.[22] Teachers can also help build up students' sense of school connectedness by incorporating their personal experiences into lessons and facilitating more interactive discussions and team-building opportunities.[20,42] Teachers play a crucial role in students' social integration in a technical/vocational school environment, and strengthening teachers' level of trust in students could be crucial.[43]

Our findings indicate that boys and girls who like school smoke less frequently than their counterparts who dislike school. It has been reported that moderate and high school-skippers are less likely to like school.[44] In our study, truancy was a statistically significant predictor for daily, occasional, and former smoking in both genders. Previously, truant-related behaviors have also been linked to the use of tobacco, alcohol and other drugs, delinquency, and poor academic achievement.[44,45] Students who are chronically absent from school are more likely to drop out of school and less likely to be employed, which in turn negatively impacts their earning potential over their lifetimes.[11,45,46]Although truancy has been found to be a result of a cluster of factors, it is always a school engagement problem where school attachment and bonding are scarce.[44,47] A major explanation given by young people themselves for their non-attendance is poor relationships with teachers, including teachers failing to match their expectations.[48]

Smoking Policies

Previous results are conflicting on whether strict smoke-free school policies reduce adolescent smoking or in fact fuel rebelliousness against authority and so contribute to deviant behavior and increase adolescent smoking.[19] The existing research suggests on behalf of stricter smoking policies[22,31,32,49] instead of partial smoking restrictions. In this study, most students reported partial smoking restrictions, meaning that vocational schools provided a designated place for smoking. If students smoke in the designated area during recesses, they do not get punished for smoking. First- and second-year students of vocational schools are mostly underage, but third-year students are 18 and by law capable of making the decision on smoking. Some vocational schools also train adult students who were not included in this study setting. Big schools[22] with lots of both underage and over-18 students and lots of technical trait students[50,22] might have played a part in the fact that partial smoking restrictions have been widely used in vocational schools. In this study results of the multinomial regression model indicated that students being allowed to smoke on school premises was significantly associated with daily smoking among boys but not among girls. Additionally, partial smoking restrictions were not associated with occasional smoking or with students who had given up smoking.

We found that close monitoring of smoking restrictions were associated with daily smoking in girls and boys. This may be explained by rebelliousness against authority and peer pressure.[51] While our results speak against the application of a strict monitoring of smoke-free policy, it was not studied how the monitoring should be done, as there is also contradictory evidence with high school students indicating that the higher the level of punishment, the less likely it is that individual students smoke.[19,49] Monitoring anti-smoking policies should not be only on a few active teachers' shoulders[49] but all staff should take part. Involving students with anti-smoke policymaking might strengthen the commitment and sustainability of the policies.[22]

There is evidence for implementing a strict anti-smoking policy within school premises. As a result anti-smoking policies are greatly encouraged, as investments tend to endure after policy implementation; once implemented, the ban will become "normal."[22] The law on tobacco[52] states that smoking is prohibited in public buildings and near schools with underage (i.e., under 18) students. Application of this law is a possibility to enforce strict anti-smoking rules in vocational schools as well.

Abiding by the law on tobacco (2016)[52] would also mean teachers and other staff should refrain from smoking during working hours. Our results indicated that student perceived teachers' and other personnel's smoking during recesses was significantly associated with daily smoking, occa-

sional smoking, and former smoking among girls and boys. Strict smoking policies should apply to everyone, including the staff; exceptions from the smoke-free policies are counterproductive, as they can undermine the smoking ban.[22,53]

Most recent research on school connectedness has focused on indicators other than smoking. Some studies are simply concerned with finding ways to enhance student-school connectedness, teacher support, and school attachment. International studies on adolescents in vocational training are scarce. There are only few recent studies conducted of smoking related issues in vocational school settings. However, our findings are mostly consistent with previous research on the relationship between school connectedness, teacher support, and students' school attachment and smoking policies in upper secondary schools, but our study extends extant research by including an analysis of vocational school girls and boys in a large-scale setting.

Limitations

Despite the many advantages of secondary analysis, including large sample size, the method has some limitations. First, using secondary data sets, researchers are always limited to the original data collection. The primary data set was insufficient to determine missing data and could not retrieve it retrospectively. Whereas the large sample size contributes to reliability, it is possible that the students who were absent on the survey day were playing truant, which might mean that the role of truancy is underestimated in this data.

Second, the way adolescent smoking is measured varies.[54] In the School Health Promotion survey, the "smoker" indicator has been available for several years, ie, the indicator is comparable. This similar measurement has been used in other WHO collaborative studies such as HBSC.[55,56] Also the "teacher support" indicator may vary globally, but this measurement has been used to indicate teachers' emotional support when reporting results of the School Health Promotion study. The dichotomized variable is needed to emphasize whether a student perceives teacher support or not.

Third, in this study smoking was measured by tobacco smoking only. Since the time data were collected, smokeless tobacco use and electronic tobacco smoking have become more popular among adolescents. There is evidence that dual users of tobacco products belittle dangers of other tobacco products, and they have a higher proportion of friends who use other tobacco, compared to cigarette users and non-users of these products.[57] Further research is needed on the prevalence of all tobacco products and associations with school connectedness of all tobacco products among vocational students.

Because the information for our study was gathered by self-report, we cannot ignore the possibility of under- or over reporting. Truthfulness and accuracy always may be compromised in instruments based on self-reported responses concerning health-risk behaviors.[58] In this study smoking was not biochemically verified for obvious practical reasons. Besides, it would have been impossible to corroborate reports of having quit smoking. However, it has been shown that self-reports are reliable when collected under optimized measurement conditions, ensuring anonymity and using multiple questions.[58,59] It also needs to be noted that we cannot make causal inferences based on these cross-sectional survey data. Further research is needed using longitudinal data to determine temporal relationships between school connectedness, school anti-smoking policies, and adolescent smoking.

Conclusions

We found that adolescent smoking was related to various school connectedness variables. Vocational students who smoked daily felt they received less teacher support, liked going to school less, and skipped school more often than their nonsmoking classmates. Close monitoring of smoking was associated with an increased number of daily smokers. Furthermore, teachers' and other personnel's smoking during school hours increased the odds of students' daily, occasional, and former smoking. These results provide important information for designing smoking prevention programs in vocational schools. In addition, our findings emphasize the need for further research into adolescent smoking and school connectedness in vocational school settings.

IMPLICATIONS FOR HEALTH BEHAVIOR OR POLICY

Schools have an important responsibility for making changes and adopting strategies that foster

school connectedness among their students, as well as for reducing students' risk-taking behaviors[27,40] and drop-out rates.[21,47] It is vital that vocational schools consider developing prevention programs to enhance school connectedness as well as implementing school smoking policies with a view to tackling health-risk factors such as smoking.

This study found that teacher support has a direct bearing on students' sense of connectedness to school. In order to reduce the prevalence of smoking in vocational schools, teachers should seek to foster an open atmosphere and encourage students to express their opinions in class. They should show an interest in every student, in how they are doing, and treat their students fairly and even-handedly. It is possible that teachers' support may encourage students to engage in school and reduce risk behaviour. Earlier research has found that teachers' support is associated with a reduced dropout rate.[21] In our opinion, students' daily smoking may be an indication of their need for profound support from their teachers. It is vital that students get good advice so that they can make the right choices of vocational branch and important also that they have easy access to study counselling.

Anti-smoking policies can reinforce schools' attempts to provide pro-health messages and provide a smoke-free environment. It is vital that the importance of nonsmoking to health and well-being is emphasized at school,[42] that schools recognize the importance of role models in fostering nonsmoking, and that they involve students in the process of developing anti-smoking strategies. Our suggestion is that schools should enforce strict anti-smoking policies on teachers, other school personnel, and visitors at all times both on school property and at off-campus school events and worksites.[19] It is vital that steps are taken to reduce smoking in schools, as students are more likely to take up smoking in those schools where smoking is already more common, and younger students are more likely to take up smoking if older students smoke.[24,42]

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Human Subjects Approval Statement

This study was based on secondary data collected under the auspices of the National Institute for Health and Welfare in Finland, and therefore, is exempt from institutional review board approval.

Conflict of Interest Disclosure Statement

None declared.

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PUBLICATION III

The relationship between peer relations, self-rated health and smoking behavior in secondary vocational schools

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RESEARCH ARTICLE

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The relationship between peer relations, self-rated health and smoking behaviour in secondary vocational schools

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Abstract

Aims: To examine the association between peer relations, self-rated health and smoking behaviour in vocational school setting.

Background: Smoking in adolescence causes health and socioeconomic inequality in adulthood. There is evidence that smokers are physically less active, have lower academic aspirations and perceive poorer health than non-smokers.

Method: The study was conducted in spring 2013 and involved 34,776 vocational students who took part in the School Health Promotion Study in Finland. The associations between adolescent smoking habits and peer relations and smokers' self-rated health were studied adjusting for the respondents' age, parental education and family type.

Results: A substantial proportion of the respondents, 37% of the girls and 36% of the boys, reported smoking daily, 15% of the girls and 14% boys smoked occasionally with a further 15% of the girls and 13% of the boys stating that they were ex-smokers. Of the girls, 33% and 38% of the boys were non-smokers. Adjusted multinomial regression revealed that having a close friend or friends predicted smoking among girls and boys. Additionally, the adjusted model indicated that being a bully and/or a bully + bully-victim was associated with smoking behaviour in boys only. Boys and girls who rated their health as moderate or poor were more often daily smokers; in girls, this was also the case in occasional smokers.

Conclusion: Smoking prevention aimed at vocational schools should take into consideration the norms and expectations related to peer relations which strongly influence adolescents' smoking habits.

KEYWORDS
adolescent health, bullying, health promotion, inequalities of health, school health, school nursing, smoking

1 | INTRODUCTION

Smoking among adolescents is a major public health concern as smoking poses many health risks such as substance use (O'Loughlin, Dugas, O'Loughlin, Karp, & Sylvestre, 2014) and lower level of physical activity (Kauranen, 2013) leading to health inequalities in adulthood (World Health Organization, 2015). Furthermore, adolescents who smoke have been associated with negative behaviours, such as

truancy (Vaughn, Maynard, Salas-Wright, Perron, & Abdon, 2013) and bullying (Luk, Wang, & Simons-Morton, 2012). More than four out of every five U.S adult smokers have begun smoking before 18 years of age and smokers who start smoking at a young age are more likely to smoke as adults (American Lung Association, 2016). High school students who are acquainted with peers and family members who are smokers have been found to report more positive symptoms from their initial smoking experience (Okoli, Richardson, & Johnson, 2008). Therefore, although prevention of intergenerational transmission is important, also peer relationships and social relationships should be accounted for while planning research into ways to curb adolescent smoking.

The relationships between peer relations to adolescent smoking are complex. Peer relationships at school and perceptions of belongingness can mitigate the effects of risk factors linked to substance use. Friendships have been found to be protective against substance use, as well as mediating the relationship between social self-control (Forster, Grigsby, Bunyan, Unger, & Valente, 2015; Tang & Loke, 2012). Thus, social bonding with friends and classmates is highly recommendable, and it is peer selection and influence that have found to precede adolescent and young adult smoking (Jones et al., 2013; Seo & Huang, 2012). It has been demonstrated that adolescents with friends who smoke are likely to smoke themselves or to take up smoking over time (Simons-Morton & Farhat, 2010).

In Finland, after 9-year compulsory elementary school, there are two separate types of secondary schools. After the compulsory schooling, 55% of school-leavers of Finland choose to continue into the academically oriented upper secondary school, which prepares students for graduate education. About 39% will choose vocational schooling and training that is aiming to improve the skills of the workforce and prepare students for specific vocations. The largest fields are technology and transport, business and administration and health and social services leading to professions such as car mechanic, carpenter, sales personnel, practical nurse, that is care assistant, hairdresser or dental laboratory assistant. All study programmes in vocational qualifications take three years (120 credits) to complete. In the initial vocational upper secondary level, there are 52 vocational qualifications, and in all programmes, there is a compulsory minimum of six-month period of on-the-job learning. (Ministry of Education & Culture, Finland, 2016).

According to Belgian research, students in vocational schools have a significant lower sense of belonging than students in academic high school (Van Houtte & Van Maele, 2012). Studying requires more independence on behalf of the student; he/she is responsible for how well or badly they make progress on the road to becoming a skilled professional. Smoking rates among adolescents' studying for different vocations are much higher than among high school students. It was estimated in 2013 that about 36% of those Finnish adolescents learning a specific trade in vocational schools are smoking daily, compared with only 8% of their previous classmates that continued to the academically focused upper secondary school after ninth grade. This relationship has been noted also in other Western countries (Huisman, Werfhorst, & Monshouwer, 2012; Ingholt et al., 2015; Lee, Goldstein, Klein, Ranney, & Carver, 2012; Loukas, Murphy, & Gottlieb, 2008). Furthermore, academic achievement and smoking behaviour exhibit an association, that is individuals with lower levels of academic achievement seem to be more likely to smoke cigarettes (Andersen et al., 2015). A study conducted

Why is this research needed?

- Tobacco smoking is a preventable cause on health inequality and premature death. Youths studying for blue-collar trades in vocational schools smoke significantly more than those youths who have selected academically orientated upper secondary school, that is high school.
- There are very few good quality studies conducted on smoking among vocational students.

What are the key findings?

- Tobacco smoking is disproportionately prevalent among vocational students.
- Friendships are related to smoking among vocational school students.
- Bullies and/or bullies who are also bullying victims are more frequently smokers than students who do not participate in bullying behaviour among boys only.
- Adolescents that rate their health as moderate or bad are more likely smokers.
- Relationship between peer relations and adolescents' smoking is complex also in vocational schools; further research with multiple methods will be needed to clarify this association.

How should the findings be used to influence policy/practice/research/education?

- Enhancing school activity in school premises aiming social bonding to all schoolmates and connectedness to school might have a great impact of creating healthy study environment.
- Both community and school nurses are well positioned to provide education and support at reducing smoking and to promote methods for effective smoking cessation.
- Strategies to reduce socioeconomic inequalities in smoking should involve aspects of peer relationships.

Impact statement

Smoking in adolescence leads to health inequality in adulthood. According to this study, health inequality is evident much earlier, already in adolescence. School health nurses and community health nurses have an unique opportunity to promote effectively healthy study environments by taking account of peer relations at school.

among vocational school in Finland found some students believing that smoking enhances their social standing and projects an image of a skilled professional (Kauranen, 2013). Blue-collar workers also smoke significantly more than their white-collar counterparts. Since vocational training has periods of on-the-job learning, the students may mimic the behaviour of their workmates/instructors (Bonevski, Paul, Walsh, Bryant, & Lecathelinais, 2011). Tutors are considered as authorities whose views and example are generally not opposed (Kiri & Catherine, 2018).

1.1 | Background

Smoking is a multifaceted behaviour influenced by several factors, and undoubtedly, the school environment exerts a critical influence on adolescent well-being. The theory of triadic influence (TTI) (Flay & Petraitis, 1994; Flay, Petraitis, & Hu, 1999) suggests that adolescents' smoking behaviour is influenced by intrapersonal factors and contextual features but also by socio-environmental aspects such as friends and family; learning, bonding and normative beliefs. Peer relations and social belonging have a major influence on the adolescent's school perception, that is the so-called school connection; these factors have been shown to affect educational ambitions, for example decreasing truancy and dropout rates (Crosnoe & Johnson, 2011; Seo & Huang, 2012).

1.1.1 | Peer relations

Classmates have been shown to be important to allow vocational students to become engaged with their school (Elffers, Oort, & Karsten, 2012) A lack of peer relations has been shown to result in school dropout (Havik, Bru, & Ertesvåg, 2015). Bullying behaviour exerts a significant detrimental impact on adolescent well-being; for instance, it is responsible for truancy and dropout, even suicide (Havik et al., 2015; Kelly et al., 2015). Previously, bullying has been shown to be more prevalent among middle school adolescents than older students but it does persist also in the final school years (Azagba, 2016; Radliff, Wheaton, Robinson, & Morris, 2012). There is research evidence indicating that bullying is related to smoking behaviour (Azagba, 2016; Klein, Cornell, & Konold, 2012; Luk et al., 2012; Niemelä et al., 2011; Radliff et al., 2012). Studies conducted in Australia and the USA among middle and high school students found that both bullies and bullies that have been bullied themselves reported the greatest levels of substance misuse and smoking while bullying victims and students not involved in bullying were less likely to abuse substances (Kelly et al., 2015; Radliff et al., 2012) Furthermore, those bullied during childhood were more likely to be regular smokers by the age of 18 (Niemelä et al., 2011).

1.1.2 | Self-rated perceived health

Adolescent students' well-being is related to their subjective social status (Zorotovich, Johnson, & Linn, 2016), but the social status gained by smoking does not seem to correlate with perceived or self-rated health (Hansen, Lindström, & Rosvall, 2015). Daily and occasional smokers have reported more physical and psychological complaints and lower quality of life than never smokers (Dube, Thompson, Homa, & Zack, 2013; Hansen et al., 2015; Wang, Ho, Lo, Lai, & Lam, 2012). Previously, early smoking initiators have reported poorer health than later initiators and this poorer self-rated health remains even after smoking cessation among boys who started to smoke at an early age (Hansen et al., 2015).

2 | AIMS

There are studies conducted in primary and secondary schools examining the association between peer relations with smoking but fewer studies have investigated peer relations related to adolescent smoking in the vocational school setting, even though there has been a traditionally high prevalence of vocational school students who are smokers. Furthermore, smokers' self-rated health has not previously been studied in this setting. In this study, we will examine whether: (a) peer relations; and (b) self-rated health are associated with adolescents' daily, occasional and former smoking behaviour in a vocational school setting.

3 | DESIGN

This was a secondary data analysis using the data of School Health Promotion Study carried by Institution of National Health and Welfare in Finland. The data were analysed with multinomial regression, cross-sectional design.

3.1 | Participants

The target group for this study consisted of 1st (57%) and 2nd (43%) grade students in vocational schools in Finland in 2013. A total of 34,776 students from all 419 vocational schools in Finland completed the questionnaire. The response rate of biennial study was not able to count reliably as the number of students was not inquired from the institutes but from statistics that could only give the total number of adolescents studying in vocational schools. However, this study was not conducted for students in their third year. Furthermore, vocational training is based on long practical training periods and that was not considered when conducting the SHP study. Respondents that were out of school the day of the study were not contacted afterwards. However, in this secondary analysis, the rate of missing values was quite low (between 0.3%–2.3%), with one exception: missing values for parents' education were somewhat higher (mothers' education 3.6% and fathers' education 4.7%) and question whether been bullied 12.5%. Vocational training can be started after the ninth grade of elementary school, but it is also possible to start later. For this reason, age distribution within the 1st and 2nd grades may vary. The respondents were aged between 14–20 (Mean = 17.6, *SD* 0.90). Over half (55.6%) were males

TABLE 1 Sample statistics of selected variables

Variables	Girls		Boys		
	N	%	*N*	%	*p*
Current smoking habit					
Daily	5,613	37.2	6,522	35.6	<0.001
Weekly or less than weekly	2,249	14.9	2,311	12.6	
I have quit smoking	2,254	15.0	2,543	13.9	
Non-smoking	4,955	32.9	6,948	37.9	
Are you experiencing difficulties in getting along with schoolmates					
Not at all	10,795	56.4	9,370	61.1	<0.001
Rather little	5,978	31.2	4,431	28.9	
Rather much	1,753	9.2	1,082	7.1	
Very much	629	3.3	451	2.9	
At the moment, do you have a close friend with whom you can talk confidentially about almost everything concerning yourself?					
I do not have any close friends	736	4.8	1,844	9.8	<0.001
I have one close friend	3,203	21.0	3,797	20.2	
I have two close friends	4,183	27.4	3,755	19.9	
I have several close friends	7,166	46.9	9,441	50.1	
How often have you been bullied at school during this semester?					
Several times a week	209	1.4	557	2.9	<0.001
About once a week	273	1.8	525	2.7	
Rarely	2,170	14.1	3,159	16.4	
Not at all	12,757	82.8	15,035	78.0	
How often have you participated in bullying other pupils during this semester?					
Several times a week	87	0.6	478	2.5	<0.001
About once a week	148	1.0	524	2.7	
Rarely	1,876	12.2	4,112	21.4	
Not at all	13,295	86.3	14,144	73.4	
Bullying indicator					
Bullied bully	80	0.5	492	2.6	<0.001
Bully	154	1.0	510	2.7	
Victim	401	2.6	582	3.0	
Not bullied not bully	14,746	95.9	17,644	91.8	
Self-rated health					
Moderate or poor	4,064	26.5	3,251	17.0	<0.001
Fairly good or good	11,286	73.5	15,837	83.0	
Respondents age					
14	26	0.2	13	0.1	<0.001
15–16	3,674	23.7	5,217	27.1	
17–18	9,750	63.4	12,747	66.3	
Family type					
Intact	6,847	45.0	10,359	55.2	<0.001
Co-parenting/dual residence	662	4.3	1,491	7.9	
Single parent	2,364	15.5	3,127	16.7	
Step family	1,437	9.4	1,712	9.1	
Other type	3,914	25.7	2,080	11.1	

(Continues)

TABLE 1 (Continued)

Variables	Girls		Boys		
	N	%	*N*	%	*p*
Mother's education level					
Comprehensive school or primary school or no education	2,321	15.4	2,655	14.4	<0.001
Upper secondary school or vocational education	6,550	43.5	7,617	41.2	
Occupational studies in addition to upper secondary school or vocational education	3,166	21.0	3,917	21.2	
University, university of applied sciences of other higher education	3,028	20.1	4,279	23.2	
Father's education level					
Comprehensive school or primary school or no education	3,419	23.0	3,761	20.6	<0.001
Upper secondary school or vocational education	6,953	46.8	8,151	44.6	
Occupational studies in addition to upper secondary school or vocational education	2,248	15.1	2,933	16.0	
University, university of applied sciences of other higher education	2,243	15.1	3,450	18.9	

(*N* = 19,336) and 44.4% females (*N* = 15,440). To account for potential gender differences, separate analyses were conducted for boys and girls. Sample statistics of selected variables are shown in Table 1.

3.2 | Data collection

Data from the School Health Promotion Study (SHP) conducted by the National Institute for Health and Welfare in Finland were used in this study. SHP is a nationwide survey of adolescents' health and well-being and is conducted every other year in March–April. The target group for this study consisted of 1st and 2nd grade students in vocational schools in Finland in 2013. A total of 34,776 students from 419 vocational schools anonymously and voluntarily completed a classroom-administered questionnaire of comprehensive measures of their health and well-being under their teacher's supervision. The questionnaire can be found online at http://www.thl.fi/fi/web/thlfi-en/research-and-expertwork/population-studies/school-healthpromotion-study

3.3 | Ethical considerations

The study was approved by the Institute for Health and Welfare Institutional Review Board in Finland. All students were given a detailed explanation of the study by the research team, and voluntary participation to the study was considered as the informed consent according to local regulations. Respondents anonymously completed on their own a classroom-administered questionnaire under their teacher's supervision, which most likely added the response rate of the study. Participants were informed of their right to withdraw at any phase of the study.

3.4 | Measures

Adolescent smoking behaviour was originally assessed by two questions: (a) How many cigarettes, pipefuls and cigars have you smoked altogether (none, only one, about 2–50 and over 50)? (b) Which of the following alternatives best describes your current smoking habits? (I smoke once a day or more often, I smoke once a week or more often, but not every day, I smoke less often than once a week, I have quit smoking, I have smoked total of only one time and I have never smoked). These adolescent smoking variables were combined into one variable with response categories: daily smokers (I smoke once a day or more often), occasional smokers (I smoke once a week or less often), those who had quit smoking (I have quit smoking) and non-smokers (I have smoked a total of only one time or never smoked). A total of 846 respondents had inconsistent responses such as they claimed to be non-smokers in their response to the first question but claimed to smoke on a daily basis in the second question. All those 846 respondents were excluded from the analysis.

Peer relations were measured by two questions. First respondents were asked if they are experiencing difficulties in getting along with their schoolmates with 4-point scale response categories varying from (1) *not at all* to (4) *very much*. This scale was dichotomized into not at all/rather little and very much/rather much. Secondly, respondents were asked if a student had a close friend with whom the respondent could talk confidentially about almost everything concerning her/him. Response categories were as follows: "I do not have any close friends"; "I have one close friend"; "I have two close friends"; and "I have several close friends." This measure was dichotomized as "having at least one close friend" and "not having any close friends." Next, the respondent was asked of how often they had been bullied at school during this school semester. The response category was as follows: "several times a week"; "about once a week"; "rarely"; and "not at all." Students who responded that they had been bullied weekly (several times a week/about once a week) were considered as being bullied at school and the rest of respondents as not bullied at school. Last question that measured students' peer relations was how often you have participated in bullying other pupils during this semester with response categories:"several times a week"; "about once a week"; "rarely"; and "not at all." Respondents that bullied other pupils on a weekly basis were considered as bullies.

TABLE 2 Cross-tabulation

	Girls' smoking									Boys' smoking								
	Smokes daily		Occasionally		Has quit smoking		Non-smoker			Smokes daily		occasionally		Has quit smoking		Non-smoker		
	N	%	*N*	%	*N*	%	*N*	%	*p*	*N*	%	*N*	%	*N*	%	*N*	%	*p*
Difficulties with mates																		
Rather little or not at all	5,028	37.3	2,017	15.0	2,027	15.0	4,419	32.8	0.140	5,656	35.3	2,035	12.7	2,237	14.0	6,088	38.0	0.879
Rather or very much	540	36.6	218	14.8	219	14.8	499	33.8		808	37.8	254	11.9	282	13.2	794	37.1	
Having a close friend																		
I have a friend or friends	5,362	37.7	2,143	15.1	2,118	14.9	4,611	32.4	<0.001	5,862	36.1	2,115	13.0	2,278	14.0	5,964	36.8	<0.001
Don't have any friends	192	27.4	78	11.1	123	17.5	308	43.9		464	27.5	154	9.1	212	12.6	857	50.8	
Bullied at school																		
Several times a week	92	47.7	15	7.8	33	17.1	53	27.5	0.003	226	46.8	52	10.8	58	12.0	147	30.4	<0.001
Weekly	110	41.8	32	12.2	31	11.8	90	34.2		164	37.5	53	12.1	56	12.8	164	37.5	
Rarely	797	37.6	334	15.7	337	15.9	654	30.8		1,079	35.8	389	12.9	397	13.2	1,147	38.1	
Not at all	4,608	37.0	1,860	14.9	1,849	14.8	4,150	33.3		5,039	35.1	1,806	12.6	2,027	14.1	5,474	38.2	
Participated in bullying																		
Several times a week	43	56.6	8	10.5	9	11.8	16	21.1	<0.001	218	52.9	48	11.7	52	12.6	94	22.8	<0.001
Weekly	70	50.4	22	15.8	19	13.7	28	20.1		187	43.7	63	14.7	55	12.9	123	28.7	
Rarely	876	47.6	311	16.9	263	14.3	392	21.3		1,708	43.6	561	14.3	557	14.2	1,088	27.8	
Not at all	4,614	35.5	1,903	14.7	1,955	15.1	4,512	34.8		4,382	32.4	1,630	12.1	1,872	13.9	5,625	41.6	
Bullying status																		
Bullied bully	41	63.1	4	6.2	6	9.2	14	21.5	<0.001	185	47.9	49	12.7	46	11.9	106	27.5	<0.001
Bully	72	48.3	26	17.4	21	14.1	30	20.1		220	48.5	62	13.7	61	13.4	111	24.4	
Victim	161	41.2	43	11.0	58	14.8	129	33.0		203	38.4	55	10.4	68	12.9	203	38.4	
Not bullied not bully	5,324	36.9	2,165	15.0	2,157	15.0	4,769	33.1		5,881	34.9	2,130	12.6	2,357	14.0	6,499	38.5	
Self-rated health																		
Moderate or bad	1,914	48.0	555	13.9	503	12.6	1,018	25.5	<0.001	1,383	44.7	346	11.2	379	12.2	987	31.9	<0.001
Very good or good	3,661	33.3	1,688	15.3	1,738	15.8	3,912	35.6		5,068	33.7	1,940	12.9	2,138	14.2	5,890	39.2	

The association between bullying with adolescents' smoking was explored by clarifying the bullying status. Measurements of being bullied and being a bully were combined to create a *bullying status* to clarify the complex nature of bullying with a new measurement: (a) bullied bull;, (b) bully not bullied; (c) bullied not bully; and (d) not bullied not bully.

In the *Self-rated perceived health*, the respondent evaluated her/his health. Responses were "good"; "rather good"; "moderate"; and "poor." Measurements were dichotomized as self-reported health as being "good/rather good" and" moderate/poor.".

3.5 | Data analysis

Cross-tabulation and chi-squared tests were performed for categorical variables to establish the proportion of students who smoked daily, those who smoked occasionally, those who had quit smoking and finally those students who were non-smokers on various peer relations factors as well as with the adolescents' perceived health (Table 2). Adjusted (i.e. multivariate analysis) (Table 3) multinomial logistic regression analyses were then performed to examine and evaluate the associations between smoking and peer relations and perceived health factors. Adolescent smoking was set as a dependent variable and peer relations factors and perceived health factor as independent variables. Adolescents' age, mothers' and fathers' education and family type were set as covariates (Aho, Koivisto, Paavilainen, & Joronen, 2017; Wellman et al., 2016). Daily smokers, occasional smokers and those who had quit smoking were compared with non-smokers, who were used as the reference group. To account for potential gender differences, separate analyses were conducted for girls and boys.

The statistical analyses were conducted using IBM (Armonk, NY) SPSS statistics 23. Results from the multinomial regression analyses are presented as odds ratio (ORs) and their 95% confidence intervals. The level of statistical significance was set at $p < 0.001$ due to the large number of respondents.

4 | RESULTS

4.1 | Adolescent smoking prevalence

As shown in Table 1, 37% of girls were daily smokers and 36% of boys. Girls were also occasional smokers (15%) slightly more often than boys (13%). Almost equal numbers, 15% of girls and 14% of boys, said they had quit smoking. Every third girl (33%) and almost four out of every 10 boys (38%) reported being non-smokers.

4.2 | Bivariate associations between peer relations and adolescent smoking compared with non-smokers

In Table 2, we present the cross-tabulation and chi-square tests of smoking behaviour according to the peer relations variables and self-rated health variable. Difficulties with schoolmates were not associated with smoking in either girls or boys. Instead, having a close friend or friends was significantly associated with smoking in both genders. Isolates, that is adolescents without a friend in whom they could confide, were less frequently daily smokers and were more often non-smokers.

Being a victim of bullying at school was significantly associated with smoking in boys but not in girls. Participation of bullying behaviour was associated with smoking behaviour in both genders. Bullying status was significantly associated with smoking in both genders, and bullies were more frequently daily smokers than their classmates who did not participate in bullying behaviour.

Self-rated health was significantly associated with smoking behaviour in girls and boys. Adolescents who assessed their health as moderate or poor were more often daily smokers than their counterparts who rated their health as follows: fairly good or good.

4.3 | Multivariate associations between the peer relations variables, self-perceived health and smoking behaviour

Multivariate associations between the peer relations and adolescent smoking and perceived health, for girls and boys respectively, are presented as ORs, and estimates are adjusted for the age of the respondent, parent's education level and family type (Table 3). Even after adjustment for these socio-demographic characteristics and having a close friend and bullying status, difficulties with mates were not associated with smoking behaviour in either gender. However, having a close friend or friends added to the odds of girl's daily smoking and occasional smoking and to boys' daily smoking, occasional smoking and former smoking.

Adjusted model of bullying behaviour was not associated with smoking in girls. Boys who bullied others and were bullying victims themselves (bullied bully) were significantly more often daily smokers. In addition, bullies who were not themselves bullied (bully–not bullied) were significantly more often daily and occasional smokers. Being a victim (bullied–not bully) was not associated with smoking.

Adjusted (Table 3) multivariate regression analysis revealed that those girls who rated their health as moderate or bad smoked daily and occasionally significantly more often than their non-smoking classmates. Boys who assessed their health as moderate or poor were significantly more often daily smokers.

5 | DISCUSSION

In this nationally representative sample of Finnish 14- to 20-year-old vocational school students, peer relations and self-rated health were associated with smoking behaviour in both girls and boys studying in upper secondary vocational schools. After controlling for the respondents age, family type and parents education level, this study identified: (a) having a friend or friends but not necessarily a class mate increased the odds for girls' and boys' smoking either daily or

TABLE 3 Adjusted odd ratios (and 95% confidence intervals) in the multinomial logistic regression of smoking on peer-related issues

	Girls' smoking									Boys' smoking								
	Smokes daily			Smokes occasionally			Has quit smoking			Smokes daily			Smokes occasionally			Has quit smoking		
	OR	95% CI	*p*	OR	95% CI	*p*	OR	95% CI	*p*	OR	95% CI	*p*	OR	95% CI	*p*	OR	95% CI	*p*
Difficulties with mates																		
Has difficulties	0.89	0.77–1.02	0.081	0.98	0.82–1.16	0.785	0.95	0.79–1.13	0.532	1.02	0.91–1.14	0.704	0.98	0.84–1.14	0.772	0.95	0.82–1.11	0.538
No difficulties with mates	1			1			1			1			1			1		
Having a close friend																		
Don't have friends	**0.44**	**0.36–0.53**	**<0.001**	**0.53**	**0.41–0.67**	**<0.001**	0.85	0.79–1.06	0.139	**0.45**	**0.40–0.52**	**<0.001**	**0.49**	**0.41–0.59**	**<0.001**	**0.63**	**0.54–0.75**	**<0.001**
Has a friend or friends	1			1			1			1			1			1		
Bullying status																		
Bullied bully	2.41	1.26–4.64	0.008	0.69	0.23–2.14	0.525	0.81	0.29–2.30	0.695	**2.11**	**1.62–2.75**	**<0.001**	1.60	1.09–2.30	0.017	1.22	0.83–1.80	0.319
Bully	2.00	1.27–3.14	0.003	1.92	1.12.3.29	0.018	1.57	0.88–2.78	0.126	**2.23**	**1.74–2.86**	**<0.001**	**1.89**	**1.36–2.62**	**<0.001**	1.63	1.17–2.27	0.004
Victim	0.98	0.76–1.25	0.852	0.72	0.50–1.02	0.066	0.99	0.72–1.36	0.934	1.03	0.84–1.27	0.778	0.85	0.62–1.16	0.311	0.96	0.72–1.28	0.786
Not bullied not bully	1			1			1			1			1			1		
Perceived health																		
Moderate or bad	**1.95**	**1.78–2.14**	**<0.001**	**1.28**	**1.13–1.44**	**<0.001**	1.06	0.94–1.21	0.326	**1.59**	**1.44–1.75**	**<0.001**	1.10	0.95–1.26	0.196	1.05	0.92–1.20	0.478
Good or very good	1			1			1			1			1			1		

Note. Adjusted for age, family type, mothers' education and fathers' education
Bold values indicate $p > 0.001$

occasionally as well as being an ex-smoker; (b) difficulties in relations with classmates were not associated with smoking behaviour; (c) being a bully increased the odds for smoking daily and occasionally and being a bully-victim increased the odds for daily smoking only in boys; and d) poorer self-rated health was associated with smoking behaviour in both girls and boys.

A literature review reported that isolates, that is adolescents without close friend (s), were more likely to smoke than their counterparts with a better peer network structure (Seo & Huang, 2012). This differs from the findings presented here. In this study, having at least one close friend was associated with higher odds of daily smoking in girls and boys and additionally in girls with occasional smoking. In this study, the smoking status of a friend was not investigated but according to previous research friends who smoke, peer influence and crowd affiliation (lähteet) increase adolescent smoking and also might explain some of the high rates of smoking adolescents in upper vocational schools. However, some social psychology theories might explain why adolescents smoke with friends and why smoking is more common in surroundings where smoking is more ubiquitous. These theories hypothesize that people can be categorized as belonging to groups, and they make social comparison with members of their own group—a process called social identification (Tajfel, 1981). Smokers identify themselves as part of the "smokers group," and in their social comparisons, they make a distinction between us and them; that is between smokers and non-smokers. It is possible that the fear of losing social status, being excluded from a group of people with similar values and attitudes will eventually become a part of their self-identity. This may prevent established smokers from quitting smoking even though their awareness of the disadvantages of smoking is obvious. Furthermore, educational campaigns which hope reduce smoking by highlighting the fact that it is an abnormal habit might increase the gap between the groups of smokers and non-smokers; in this case, these campaigns evidently cause more harm than benefit.

A recent study of Danish vocational school students indicated that smoking plays a significant role in social interactions and making new relationships across educational programmes, in other words, for example students from the painting programme or hairdressing can meet students from the carpentering and plumbing programmes. In that study, the vocational school context enhanced the likelihood of smoking; students took up smoking as a way of establishing social relationships with peers, and non-smoking could lead to exclusion from relationships forged around an ashtray (Ingholt et al., 2015). Surprisingly, we did not find any association between difficulties with schoolmates and smoking behaviour. This may indicate that smoking is seen a way to fit in and conduct social relations. (Osgood, Feinberg, Wallace, & Moody, 2014; Suh, Shi, & Brashears, 2017) Instead, it is possible that difficulties with schoolmates can lead to withdrawal from the group of classmates.

In this study after controlling for respondents age, family type and parents' education bullying was related only with smoking in boys; both being a bully and being a bully who has also been a bullying victim were associated with smoking. An unanticipated finding was that among girls either participating in bullying behaviour or being a victim was not associated with smoking. In fact, bullying was not very widespread in vocational schools. On the other hand, it is possible that students underreported bullying. Another explanation for these results is that different aspects of peer relations other than bullying may increase the odds of smoking behaviour in upper vocational school. Smoking may be more prevalent with popular students and bullying is not considered as desirable behaviour, and being a bully is not a successful way to seek the positive attention of popular students.

We found that smokers evaluated their health as poorer than their non-smoking classmates. Our research did not cover the age started experimenting with smoking but earlier studies have reported daily and occasional smokers to experience more health complaints and to have a lower quality of life than quitters, respectively (Dube et al., 2013; Hansen et al., 2015; Tian et al., 2016; Wang et al., 2012). Previously, it has been found that students report poorer subjective health if they had initiated smoking before the age of 14 than later starters. Established smokers are broadly aware of the addictive nature of cigarettes and the health consequences of cigarette smoking causes, even more so than their non-smoking counterparts. However, smokers underestimate the addictive potency of nicotine and assure themselves that they will be able to quit before their health becomes compromised. (Twigg & Byrne, 2015) Furthermore, a longitudinal study has shown that adolescents with more than six smoking friends report increasing perceptions of benefits of smoking over time (Morrell, Song, & Halpern-Felsher, 2010). Students in vocational school invariably rate peer relations as being more important than their health; however, addiction may come as surprise.

5.1 | Limitations

Although the size, demographic coverage and long-term stability of the SHP are impressive, there are limitations that give rise to caution. First, the cross-sectional design prevents us from determining causality. Longitudinal data would have allowed us to examine temporal relationships between variables and the onset and progression of students' smoking behaviour. A second limitation is the usage of self-report data; we cannot ignore the possibility of under- or over-reporting of problematic behaviours (Brener, Billy, & Grady, 2003). Nevertheless, little data were available on peer relations and smoking behaviour outside of the self-report paradigm. However, self-reports have been shown to be reliable when conducted under optimized measurement conditions, ensuring anonymity and when using a variety of questions (Brener et al., 2003; Caraballo, Giovino, & Pechacek, 2004). Our approach could have underestimated the prevalence of bullying, because bullying has been associated with truancy (Havik et al., 2015) and students who are often absent from school may not have been included in the survey. Additionally, total of 12.5% or the respondents left the question of whether they had been bullied or not, unanswered. Last, despite the many advantages of secondary data, researchers are limited to the data collected during the original data collection.

The primary data set was insufficient concerning missing data estimation; therefore, missing data could not be measured reliably. However, a clear strength of the primary data collection was that it was collected from every vocational institute in Finland. In this secondary analysis, the numbers of values which had to be excluded were low (between 0.3%–2.3%).

6 | CONCLUSION

This study provides convincing evidence of the associations of peer relations and self-reported health and smoking behaviour in the vocational school setting in a nationally representative sample. We found that friendships and bullying were robustly associated with an increased probability of smoking behaviour. Furthermore, daily smoking girls and boys and occasional smoking girls rated their health more often as only moderate or bad compared with their non-smoking classmates. This new evidence highlights the importance of taking account of peer relations as well as the norms and expectations that peer relations might create for smoking. Therefore, schools should: (a) consider executing smoking-related education and programmes for quitting using peer groups; and (b) enhancing social relationships and increasing the opportunities for social activities in the school and work together with students towards creating a healthy study environment. Further studies should consider using longitudinal data and investigate the relationship between peer relations and smoking behaviour in the vocational school setting with qualitative data.

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CONFLICTS OF INTEREST

No conflict of interest has been declared by the authors.

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