



**TURUN
YLIOPISTO**
UNIVERSITY
OF TURKU

VOCATIONAL STUDENTS AND NICOTINE PRODUCTS

Attitudes, Beliefs and Perspectives
on Health Promotion

Anu Vaihekoski



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To Vocational Students
– *Live, Laugh and Be Healthy*

UNIVERSITY OF TURKU

Faculty of Medicine

Department of Clinical Medicine

Public Health Science

ANU VAIHEKOSKI: Vocational Students and Nicotine Products – Attitudes, Beliefs and Perspectives on Health Promotion

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ABSTRACT

The use of nicotine products among young people is a global challenge. Alongside conventional tobacco, new nicotine products, such as e-cigarettes, have arrived. In Finland, young people in vocational education use tobacco, snus, and nicotine pouches, binge drink more often, and self-rate their health more poorly than other upper-secondary education students. They represent an important subgroup of young people and were chosen to be the target group of this PhD thesis.

Young people's health behaviours are strongly influenced by the health behaviours of their close circle. Peer influence remains a dominant factor. Individuals' attitudes and perceptions toward nicotine products are connected to the initiation and continued use. Positive perceptions and social acceptance of nicotine use are associated with higher usage rates. The health behaviours established during adolescence have long-term implications for adult health. Schools can have an important role, and school-based substance use prevention programs are most effective with diverse, engaging activities, even though the evidence is limited.

Young people's health behaviour is a complex phenomenon. To understand their health behaviours and to promote health, it is essential to understand their attitudes, beliefs, and perceptions on health promotion. The PhD Thesis studied these factors among vocational students to support their substance-free living and health through a systematic review, quantitative, and qualitative data collection.

The main findings were that vocational students' nicotine and other substance use decisions are shaped by personal values, confidence, and social influence, with peers and family playing a major role. Supportive relationships protect against use, whereas peer pressure and strict parental control can increase risk. Vocational students favour engaging, voluntary school-based programs, especially peer-led initiatives, and teachers as role models can affect their attitudes. At the societal level, students support stricter age-related controls, recognise social media's impact, and value non-judgmental prevention approaches. The findings altogether describe the phenomenon of young people's substance-free living and their perceptions of health promotion in the school environment.

KEYWORDS: vocational students, nicotine, attitudes, school-based, health promotion

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Nuorten nikotiinituotteiden käyttö on maailmanlaajuinen haaste. Perinteisen tupakan rinnalle on tullut uusia nikotiinituotteita, kuten sähkösavukkeita. Suomessa ammatillisessa koulutuksessa opiskelevat nuoret käyttävät tupakkaa, nuuskaa, nikotiinipusseja, juovat humalahakuisesti useammin ja arvioivat terveytensä heikommaksi kuin muut toisen asteen opiskelijat. He muodostavat tärkeän nuorten alaryhmän ja valikoituivat siksi tämän väitöskirjan kohderyhmäksi.

Nuorten terveyskäyttäytymiseen vaikuttavat vahvasti heidän lähipiirinsä terveyskäyttäytyminen, ja vertaisten vaikutus on edelleen merkittävä tekijä. Yksilön asenteet ja käsitykset nikotiinituotteista ovat yhteydessä käytön aloittamiseen ja jatkamiseen. Positiiviset käsitykset ja nikotiinin käytön sosiaalinen hyväksyntä liittyvät korkeampaan käyttöasteeseen. Nuoruudessa omaksutuilla terveyskäyttäytymisen tavoilla on pitkäaikaisia yhteyksiä aikuisuuden terveyteen. Kouluilla voi olla tärkeä rooli, ja koulupohjaiset ehkäisyohjelmat ovat tehokkaimpia, kun ne sisältävät monipuolisia ja osallistavia toimintoja, vaikka näyttö on vielä rajallista.

Nuorten terveyskäyttäytyminen on monimutkainen ilmiö. Jotta heidän terveyskäyttäytymistään voidaan ymmärtää ja terveyttä edistää, on tärkeää tunnistaa heidän asenteensa, uskomuksensa ja käsityksensä terveyden edistämisestä. Väitöskirjassa tutkittiin näitä tekijöitä ammatillisissa oppilaitoksissa opiskelevien nuorten keskuudessa heidän päihteettömän elämänsä tukemiseksi systemaattisen kirjallisuuskatsauksen, määrällisen ja laadullisen aineiston kautta.

Keskeiset tulokset osoittivat, että ammattiin opiskelevien nuorten päätöksiin nikotiinin ja muiden päihteiden käytöstä vaikuttavat henkilökohtaiset arvot, itsevarmuus ja sosiaalinen vaikutus, erityisesti vertaisten ja perheen rooli. Tukevat ihmissuhteet suojaavat käytöltä, kun taas vertaispaine ja tiukka vanhempien kontrolli voivat lisätä riskiä. Nuoret toivovat osallistavia ja vapaaehtoisia koulupohjaisia terveyden edistämisen toimia. Yhteiskunnallisella tasolla nuoret kannattivat tiukempia ikärajoihin liittyviä sääntelyjä, tunnistivat sosiaalisen median vaikutuksen ja arvostivat tuomitsemattomuutta. Tulokset kuvaavat nuorten päihteettömyyteen liittyviä tekijöitä ja heidän käsityksiään terveyden edistämisestä kouluympäristössä.

AVAINSANAT: ammattiin opiskelevat nuoret, nikotiini, asenteet, koulupohjainen, terveyden edistäminen

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Abbreviations

AHLS	Adolescent Health and Lifestyle Survey
CINAHL	Cumulative Index of Nursing and Allied Health Literature
E-cigarettes	Electronic cigarettes
ENDS	Electronic nicotine delivery systems
ESPAD	European School Survey Project on Alcohol and Other Drugs
HPS	Health Promoting Schools
IBM	International Business Machines Corporation
JBI	Joanna Briggs Institute
MeSH	Medical Subject Headings
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-analysis
SES	Socioeconomic status
SPSS	Statistical Package for the Social Sciences
STM	Ministry of Social Affairs and Health
TENK	Finnish Advisory Board on Research Integrity
THL	Finnish Institute for Health and Welfare
TTI	Theory of Triadic Influence
UNESCO	United Nations Educational, Scientific and Cultural Organization
USA	United States of America
WHO	World Health Organization

List of Original Publications

This PhD Thesis is based on the following original publications, which are referred to in the text by their Roman numerals:

- I Vaihekoski A, Lagström H, Eloranta S, Bäärs S, Hannula A, Lehvikkö M, Salakari M. Influencing adolescents' attitudes towards nicotine products: A systematic review. *Nordic Studies on Alcohol and Drugs*, 2022; 39(5): 456–472 <https://doi.org/10.1177/14550725221096908>
- II Vaihekoski A, Eloranta S, Salakari M, Sillanmäki L, Lagström H. Attitudes towards the use of nicotine products among vocational school students in Finland. *Journal of Public Health*, 2025. <https://doi.org/10.1007/s10389-025-02454-9>
- III Vaihekoski A, Eloranta S, Salakari M, Lagström H. Nuorten näkemyksiä päihteettömyydestä sekä päihteiden käyttöä ehkäisevästä toiminnasta kouluympäristössä. *In press*.

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1 Introduction

The use of nicotine products is a global challenge among young people (Charrier et al., 2024; WHO, 2023b). Alongside conventional cigarettes, new nicotine products have even replaced conventional cigarette use among young people. The use of electronic nicotine delivery systems (ENDS), such as electronic cigarettes (e-cigarettes) and vape pens, has increased in popularity among young people worldwide. Globally, their use among school and college students is more common among males than females. (Albadrani et al., 2024.) In Finland, the trend is similar (Jääskeläinen & Kovanen, 2024; Ruokolainen et al. 2024; Ollila et al. 2022). In 2023, among young people (aged 14 to 20), six per cent of young males and four per cent of females smoked daily, seven per cent of males and two per cent of females used snus daily, and six per cent of males and five per cent of females used e-cigarettes daily. (Jääskeläinen & Kovanen, 2024.)

The use of nicotine products among Finnish young people varies according to educational settings (Helenius et al., 2025; Jääskeläinen & Kovanen, 2024). Young people in vocational education use tobacco, snus, and nicotine pouches more often than other upper-secondary education students. Among vocational students, males use these more often than females. E-cigarettes are an exception, where female vocational students use e-cigarettes the most compared to other upper-secondary education students. (Helenius et al., 2025).

Vocational students rate their self-rated health more poorly than other upper-secondary students (Salakari et al., 2023; Horváth et al., 2018; Kestilä et al., 2018; Hankonen et al., 2017; Andersen et al., 2015; Hietanen-Peltola & Korpilahti, 2015). This disparity contributes to broader inequalities in young people's health and well-being, with vocational students facing elevated risks and deficits in health outcomes. These disparities are closely linked to socioeconomic status (Knaappila et al., 2021) and educational attainment (Elgar et al., 2015; Ilmakunnas et al., 2015; Marttunen & Haravuori, 2015; Reiss, 2013; Sipilä et al., 2011; Chen et al., 2006). Family background is related to young people's health (Kestilä et al., 2018; Huurre et al., 2011; Latvala, 2011) and predicts their subsequent well-being (Kestilä et al., 2018). The socioeconomic status of the family and their environmental circumstances affect, for example, the quality of lifestyle choices and leisure opportunities (Kestilä et al., 2018).

Nicotine use among young people is strongly influenced by the behaviours of their immediate social circle. Young people are more likely to smoke if their parents (Mendel et al., 2012), siblings, or peers smoke (Aho et al., 2019; Murnaghan et al., 2009). Young people consider family members and health professionals to be credible sources for health information (Känsäkoski et al., 2021). Teachers can also shape young people's smoking behaviours. In schools where teachers smoke alongside students, the likelihood of students smoking increases (Andersen et al., 2019).

Schools can have a critical role in improving young people's health (Tancred et al., 2018). Evidence suggests that clear policies supporting nicotine-free environments and active intervention strategies can effectively reduce young people's nicotine use (Kelly et al., 2011). Furthermore, school-based substance use prevention is most effective when it includes diverse, engaging activities embedded in students' everyday environments (Horváth et al., 2018; Hankonen et al., 2017; Van Der Vlis et al., 2017; Wiss et al., 2017; Andersen et al., 2015). Smoking prevention programs implemented in schools seem to reduce the risk of smoking initiation (Giannotta et al., 2014; Isensee et al., 2014; La Torre et al., 2010; Levy et al., 2004; Wakefield & Chaloupka, 2000).

Health behaviours established during adolescence have long-term implications for adult health (Chen et al., 2006; Elgar et al., 2015; Ilmakunnas et al., 2015; Känsäkoski et al., 2021; Marttunen & Haravuori, 2015; Reiss, 2013; Sipilä et al., 2011). Young people are vulnerable to nicotine addiction. Nicotine exposure during adolescence can impair brain development and increase susceptibility to other substance dependencies (Murthy, 2017). The addictive potential of nicotine is age-dependent; adolescents under 15 who experiment with smoking face a 50% risk of developing addiction. Most of the tobacco addictions form before age 21. (WHO, 2017.)

Young people's attitudes toward nicotine products significantly influence initiation and continued use. Positive perceptions and social acceptance of nicotine use are associated with higher usage rates (Trapl et al., 2016; Kowitt et al., 2015; Tseveenjav et al., 2015; Cavazos-Rehg et al., 2014; Edvardsson et al., 2012; Pepper et al., 2013). Some young people possess incomplete or distorted knowledge about nicotine products, often perceiving them as harmless or socially desirable (Brennan et al., 2015; El-Shahawy et al., 2015; Kowitt et al., 2015; Choi et al., 2012).

Peer influence remains a dominant factor in young people's nicotine use. They often begin using nicotine products because their friends use them (Frederiksen, 2019; Spijkerman et al., 2007), and smoking is frequently perceived as cool or relaxing, or there is the curiosity to taste them (Dijk et al., 2007). E-cigarette use is affected by factors such as appealing flavours, perceived safety, accessibility, and targeted marketing. Sweet flavours, such as fruit or candy, are especially popular

among young people compared to tobacco or mint-flavoured (conventional) e-cigarettes. (Lyzwinski et al., 2022.)

Young people's health behaviour is a complex phenomenon affected by numerous factors. To understand young people's health behaviours and to promote their health, it is essential to understand their attitudes and beliefs about nicotine and perspectives on health promotion. Vocational students represent an important subgroup of young people because they use nicotine and other substances the most in this age group. The overall target group of this PhD Thesis are vocational students, aged 15 to 28. The age groups varied across the three substudies of the PhD Thesis: systematic review (under 25), quantitative study (15 to 28), and qualitative study (16 to 18). This PhD Thesis mainly focuses on nicotine products among vocational students, but the qualitative study also focuses on other substances, mostly alcohol. Substance-free living in these PhD refers to a lifestyle in which an individual does not use intoxicants or other substances that affect the central nervous system, such as alcohol, tobacco and nicotine products, or other intoxicants. The overall aim of this PhD Thesis was to provide a more comprehensive understanding of vocational students' orientation related to the use of tobacco and nicotine products and other substances, and to identify ways from the students' own perspective, how school environments can better support their substance-free living.

2 Review of the Literature

2.1 Identifying the Theoretical Background

This chapter is a review of the literature and the theoretical background of the PhD thesis. The review of the literature was guided by the Theory of Triadic Influence (TTI), which provides a multilevel framework integrating intrapersonal, interpersonal, and socio-cultural influences of young people's tobacco (Flay, 1999) and substance use (Bavarian et al., 2022). Firstly, young people and adolescence were examined as part of the development phase, when young people experience several developmental changes. Secondly, young people's health behaviours were studied, and the risk and protective factors of nicotine use were identified. Thirdly, young people's attitudes and beliefs towards nicotine use were viewed. Fourthly, health promotion among young people in general and in the school environment was examined. It was also examined from a theoretical perspective and through the involvement of young people. Finally, the review of the literature was summarised.

The databases PubMed (Medline), CINAHL and the Web of Science were systematically searched to review previous research on the factors related to young people's nicotine use. Four searches have covered previous research focusing on young people's attitudes and beliefs, risk and protective factors (Chapter 2.2) related mainly to nicotine but also other substance use, health promotion in the school environment, and young people's involvement (Chapter 2.3). The search period was initially set from 2020 to 2025. The search period was strictly defined to gather the relevant and newest research literature. Literary searches focused on meta-analyses and literature reviews. To complement the initial literature review and strengthen the theoretical perspective on young people's nicotine and alcohol use, health and health promotion, targeted database searches were conducted, and the search period was widened. Furthermore, the search was expanded by exploring relevant websites, official guidelines, and broader internet sources.

2.2 Young people

2.2.1 Young People and Adolescence

Different organisations and legal frameworks define youth-related terms with varying age ranges. For instance, “Adolescent” typically refers to individuals aged 10 to 19 years, while “Youth” includes those between 15 and 24 years. The term “Young Adult” refers to individuals 19 to 24. The broader category of “Young People” extends up to 28 years old. In this PhD Thesis, the term “Young People” is used specifically to denote the age range of 15 to 28 years. The age-based definitions of youth-related terms are presented in Table 1.

Table 1. Age-Based Definitions of Youth-Related Terms.

Term	Age-Based Definitions (years)	Literary Source
Adolescent	10–19	Charrier et al. 2024
Youth	15–24	UNESCO, n.d.
Young Adult	~19–24	Charrier et al. 2024
Young People*	<29	The Youth Act in Finland (1285/2016)

*The main term used in this PhD Thesis Literature Review

A crucial part of young people’s development is adolescence. Adolescence is the stage that follows childhood and precedes adulthood. It is a sensitive life phase when young people experience several developmental changes. Adolescence is often categorised into three developmental stages: early, middle, and late adolescence based on age-related psychological and physiological changes. (Salmela-Aro, 2011; Christie & Viner, 2005.) This period is characterised not only by somatic maturation but also by substantial emotional, cognitive, social, and psychological development. The stages are typically defined as early adolescence (~11–13 years), middle adolescence (14–17 years), and late adolescence (17–19 years) (Salmela-Aro, 2011; Smetana et al., 2006; Christie & Viner, 2005). The term ‘young adulthood’ is used to describe persons approximately 20–24 years old (Sawyer et al., 2012) and ‘emerging adulthood’ from 18 to 29 (Arnett, 2014). The focus of this literature review is on the later adolescence phases, young adulthood, and emerging adulthood. These development phases are presented in more detail in Table 2.

Table 2. The Developmental Phases of Adolescence, Young Adulthood, and Emerging Adulthood. (Adapted and modified from Christie & Viner, 2005, Sawyer et al., 2012 and Arnett, 2014).

	Physical development	Cognitive development	Social development
Mid-adolescence (14–17 years)	Puberty continues menarche and body shape development in girls, and spermatarche, voice changes, and growth spurts in boys.	Engage in abstract thinking, thoughts of invulnerability, verbal skills improve, and early ideological commitments are emerging.	Emotional distancing from parents, strong peer affiliation, increasing risk behaviours, and initial vocational aspirations.
Late adolescence (17–19 years)	The completion of puberty, particularly in boys, marks the continuation of physical maturation.	Thinking advances toward complex abstract reasoning, improved impulse control, and a more nuanced understanding of morality. Identity formation deepens, with further exploration or rejection of ideological beliefs.	Individuals develop autonomy, form intimate relationships, and begin to establish vocational competence and financial independence.
Young adulthood (~20–24 years)	The culmination of physical development for women occurs while men continue to gain height, muscle mass, and body hair.	Cognitive abilities mature, enabling sustained, logical thinking, greater self-control, and deeper reflection on moral and future-oriented concerns. Identity solidifies, including sexual identity, accompanied by increased emotional stability and self-reliance.	Maintaining important peer connections, forming more serious intimate relationships, and often renewing their engagement with cultural and social traditions.
Emerging adulthood (18–29 years)	The physical maturity has been reached.	Cognitive maturity increases, better ability to understand how past choices shaped the present and what changes are needed moving forward.	Exploring identity by trying out different life options and exploring who they are as individuals. Instability in love, work, and place of residence. Self-focused, because obligations to others are minimal, allowing attention to personal goals and autonomy. Individuals experience being in transition, neither adolescent nor adult.

Adolescence is the second most critical phase of brain development after early childhood (Hermanson & Sajaniemi, 2018). Young people's brain development is a prolonged and dynamic process that extends beyond the teenage years (Sawyer et al., 2012), and mature decision-making does not emerge until the mid-20s (Smetana et al., 2006). During this period, the brain undergoes significant structural and functional changes. White matter development progresses hierarchically, with sensorimotor regions maturing earlier than those responsible for executive functions and emotional regulation. Meanwhile, grey matter volume peaks in early adolescence and gradually declines, reflecting the refinement of neural circuits. (Hermanson & Sajaniemi, 2018; Sawyer et al., 2012).

Although basic cognitive abilities such as logical reasoning reach adult levels around age 16, more complex functions, for example, impulse control, affect regulation, and social cognition, continue to develop well into the third decade of life. These neurobiological changes underpin the behavioural and emotional shifts observed during adolescence. (Sawyer et al., 2018) A key feature of this developmental phase is the asynchronous maturation of brain systems. The limbic system, which governs emotional and reward processing, matures earlier than the prefrontal cortex, which is responsible for impulse control and decision-making. This imbalance contributes to heightened emotional sensitivity and increased susceptibility to risk-taking behaviours during adolescence. (Zanolie et al., 2022; Hermanson & Sajaniemi, 2018.)

Young people often struggle with regulating their emotional responses and therefore are more prone to impulsive reactions. This vulnerability is partly due to hormonal and neurochemical shifts, especially increased dopamine activity, which influences emotional control, social behaviour, and learning. (Wahlstrom et al., 2010.) During adolescence, the brain's reward system becomes highly sensitive to excitement and gratification, while the prefrontal cortex, responsible for self-regulation, remains underdeveloped compared to that of children and adults. This imbalance drives a stronger urge to seek novel and intensely rewarding experiences, particularly among boys. (Hermanson & Sajaniemi, 2018.)

Healthy development involves learning to resist impulsivity, reflect before acting, and delay gratification. These skills are linked to long-term success, well-being, and resilience. However, in a world saturated with digital stimuli and constant rewards, young people may find it especially challenging to navigate through these temptations. (Hermanson & Sajaniemi, 2018.) A social context also has a critical role in shaping young people's brain development. They are sensitive to peer feedback, group acceptance, and social exclusion. (Zanolie et al., 2022.) Recognising this extended developmental window is essential for aligning health policies, legal frameworks, and support systems with the realities of young people's maturation (Zanolie et al., 2022; Sawyer et al., 2012). From the TTI perspective, the

intrapersonal stream emphasises individual characteristics such as self-control, emotional regulation, and self-efficacy that influence young people's vulnerability to substance use (Bavarian et al., 2022).

2.2.2 Health Behaviours

Health is often described by the World Health Organization (WHO) definition of health from 1948, as a state of complete physical, mental, and social well-being, not just the absence of disease or infirmity. It is a fundamental human right for everyone, regardless of their background. (WHO, 2025.) In 1986, the definition of health was modified to include the perspective of health promotion. Health was defined as being social and personal capacities, as well as physical capabilities. To achieve physical, mental, and social well-being, individuals or groups must be able to identify and fulfil aspirations, satisfy needs, and adapt to or cope with their environment. (WHO, 1986). Health can also be understood as a multidimensional phenomenon that encompasses physical, mental, social, and sexual well-being. It reflects on an individual's functional capacity, subjective experience, and overall quality of life, and can consequently be regarded as a resource shaped by personal, environmental, and social determinants. (Metsäniemi, 2024.) This multidimensional view of health aligns with the TTI, which conceptualises health behaviour as the outcome of interacting intrapersonal, social, and environmental factors operating across multiple levels of influence (Flay & Petraitis, 1994).

Health behaviours refer to an individual's overt behavioural patterns, actions and habits related to maintaining, restoring and improving health. These factors that affect health and lifespan are, for example, nutrition, physical activity, smoking, and alcohol consumption. (Harris, 2020.) Risky health behaviours such as smoking and alcohol consumption in childhood or adolescence may persist into adulthood, as clear developmental trajectories for these behaviours have been observed (Wiium et al., 2015).

A global overview of young people's health behaviours highlights that nicotine and other substance use remain a significant public health concern (for Example Chen et al., 2025; Charrier et al., 2024; Bischops et al., 2022; Lyzwinski et al., 2022). Health behaviours are linked to a range of short-, medium-, and long-term consequences, including psychological and physical health impairments, unhealthy dietary habits, reduced academic performance, and disruptions to cognitive, emotional, and social development. Risk behaviours often co-occur and tend to accumulate over time. Although the use of substances such as tobacco and alcohol has declined in recent years, gender differences in substance use, historically higher among boys, are narrowing across many countries. (Charrier et al., 2024.) Globally, and similarly in Finland, traditional smoking has decreased among young people,

while the use of emerging nicotine products such as e-cigarettes and nicotine pouches has become more prevalent (Helenius et al., 2025; Charrier et al., 2024; Kinnunen et al., 2015).

Health Behaviour and Self-rated Health among Finnish Young People

In Finland, the systematic monitoring of young people's health and health behaviours began in 1977 with the Adolescent Health and Lifestyle Survey (AHLS). This survey continued until 2019. (Tampere University, n.d.). Another long-standing source of data on young people's health and health behaviours is the School Health Promotion study, launched in 1996 by the Finnish Institute for Health and Welfare (THL), which continues to this day. (Finnish Institute for Health and Welfare (THL), 2025.) One example of international systematic data on young people's health and health behaviours is the European School Survey Project on Alcohol and Other Drugs (ESPAD). This data collection started in 1995 and continues. The data is collected from 37 countries. (ESPAD, 2025.)

Nicotine Use

According to the AHLS, the use of nicotine products among young people has changed significantly over the decades. In the 1970s–1990s, experimenting with cigarettes and daily smoking were very common, and up to one-third of 16–18-year-olds smoked daily. Since the early 2000s, smoking has clearly decreased, and by 2015, fewer than 15% of 16–18-year-olds smoked daily (Kinnunen et al., 2015). However, the decline in smoking slowed down between 2017 and 2019; daily smoking remained at a low level, but among 16-year-old boys, experimentation even increased slightly. At the same time, the use of snus, which had previously been rare, began to grow from the mid-2000s and rose especially among boys. In 2019, nearly half of 18-year-old boys had tried snus, and 10% used it daily. (Kinnunen et al., 2019.)

In the 2010s, e-cigarettes entered the market, and experimentation with them became widespread, although daily use remained mostly a phenomenon among the oldest age groups. About half of those who used e-cigarettes used nicotine-containing liquids, which raises a new risk of addiction. Overall, the decline in cigarette use has been a significant step forward for public health. Still, the rise of snus and e-cigarettes indicates that nicotine product use is shifting to new forms. (Kinnunen et al., 2019, 2015). According to the School Health Promotion study from 2021 to 2025, e-cigarettes were commonly used among young people, and the use of nicotine pouches rose in 2023–2025 (Ollila & Ruokolainen, 2025).

Even though cigarette smoking among young people has declined since the early 2000s, in 2025, smoking was most common among vocational students, with 6% of boys and 5% of girls reporting daily smoking. These percentages represent a significant decrease from 2023 (13% and 14%, respectively). Among upper secondary students in the same year groups, daily smoking remained at 1% for both boys and girls, consistent with 2023 levels. (Helenius et al., 2025.)

In 2025, daily snus use was more common among boys than girls. Among upper secondary students, 2% of boys and 0.3% of girls used snus daily, while among vocational students, the corresponding figures were 8% for boys and 2% for girls. Daily snus use increased among vocational boys between 2010 and 2019. However, in 2025, the proportion of daily users declined among vocational students compared to 2023. (Helenius et al., 2025.)

In 2025, daily use of nicotine pouches increased markedly among both boys and girls compared to 2023. Among upper secondary students, 9% of boys and 4–5% of girls reported daily use. Among vocational students, the corresponding figures were 24% for boys and 15% for girls. (Helenius et al., 2025.)

The proportion of young people using e-cigarettes daily remained relatively stable between 2023 and 2025. Daily use was more common among girls than boys. In 2025, 1% of upper secondary school boys and 3% of girls reported daily use of e-cigarettes, compared to 5% of vocational boys and 9% of vocational girls. (Helenius et al., 2025.) When comparing nicotine product use between upper secondary and vocational students, usage was consistently higher among vocational students. Tobacco, snus, and nicotine pouches were most used by vocational boys, and e-cigarettes by vocational girls (Helenius et al., 2025), making the health promotion important to this specific target group.

Several factors help to explain changes in young people's nicotine product use in Finland and other Nordic countries. Traditional cigarette smoking among young people has declined markedly over the past two decades. However, the use of alternative nicotine products, such as e-cigarettes and nicotine pouches, has increased (ESPAD Group, 2025). This trend is partly attributable to the expanding availability and variety of these products, including disposable e-cigarettes and flavoured nicotine pouches (Nordic Welfare Centre, 2025), which are often perceived as more convenient or socially acceptable than conventional tobacco. Regulatory changes also have a role; for example, extending the Tobacco Act to cover e-cigarettes and new nicotine products has restricted their marketing and availability, supporting a decline in nicotine use (Puska et al., 2025). The 2025 reform of the Tobacco Act (251/2025) tightened the regulation of nicotine pouches and other smokeless nicotine products. At the same time, the possession of smokeless nicotine products was prohibited for minors.

Culture shapes health behaviours by providing shared beliefs, knowledge, and patterns of action through which individuals interpret their experiences. Social relationships and interactions further transmit these cultural meanings, which can, for example, normalise the use of new nicotine products, such as e-cigarettes and encourage experimentation. (Tremblay et al., 2022.) Gender differences are evolving as well. While boys traditionally used smokeless tobacco more frequently, recent data indicate that girls now experiment with e-cigarettes at similar or even higher rates, suggesting changing social norms and perceptions of acceptability (Charrier et al., 2024). These individual, social, and structural factors, including product innovation, regulatory environment, peer influence, and gendered social norms, help explain the observed changes in young people’s nicotine product use in Finland and the wider Nordic region over the past decade.

Alcohol Use

According to the AHLS, young people’s alcohol consumption and binge drinking have undergone significant changes across decades. In the late 1970s, alcohol use was minimal, and binge drinking was rare. (Kinnunen et al., 2015.) During the 1980s and 1990s, both alcohol consumption and binge drinking increased markedly, particularly among young people aged 14 to 18 years (Kinnunen et al., 2015; Lintonen et al., 2000). Following the turn of the millennium, the trend reversed, and abstinence became more common and regular drinking declined. (Kinnunen et al., 2015.) Since 2006, the proportion of young people who abstain from alcohol has increased almost continuously. In 2025, 45 % of upper secondary school boys and 43 % of girls, as well as 40 % of boys and 39 % of girls in vocational education, reported complete abstinence from alcohol. Monthly heavy drinking (drinking to intoxication at least once a month) was more prevalent among vocational students (boys 19%, girls 15%) than among upper secondary students (boys 13%, girls 11%). (Helenius et al., 2025.)

Studies have identified several factors explaining the decline in alcohol and nicotine use among young people. Societal and cultural changes appear to be key contributors. The increase in social media use and digital forms of interaction has altered young people’s social practices, reducing face-to-face situations in which alcohol was commonly consumed (Pennay et al., 2023; Törrönen et al., 2019). At the same time, the emphasis on health and wellness cultures, such as healthy lifestyles and physical activity, has influenced young people’s attitudes toward alcohol. Alcohol is increasingly perceived as a risk-related behaviour that young people aim to avoid, and its use is less integrated into everyday routines. (Pennay et al., 2023.) Young people have developed practices in which alcohol consumption does not fit with other daily activities, with alcohol thus “competing for time” with

safer, alternative activities (Törrönen et al., 2019). Moreover, changed social norms have made alcohol use less socially expected or acceptable among young people, and it no longer confers social status in the same way as in the past (Pennay et al., 2023; Törrönen et al., 2019).

There have been significant changes in drinking prevalence and patterns among young people. In Finland, the prevalence of alcohol drinking among 14- and 16-year-olds more than halved between 1999 and 2017. This decline was accompanied by notable shifts in beverage preferences: beer, cider, and strong beverages decreased in line with overall consumption, wine drinking declined only slightly, while alcopops gained popularity and more than doubled their share of pure ethanol consumed (Lintonen et al., 2018). According to the latest ESPAD report (2024), there were no differences in alcohol consumption between Finnish boys and girls (ESPAD Group, 2024).

Parental and family factors influence young people's drinking behaviour. Stricter parental monitoring and regulation are associated with delayed initiation of alcohol use and lower consumption levels, as evidenced in Finnish longitudinal studies based on school health survey data. Specifically, higher levels of parental monitoring at age 13 predict lower alcohol use at age 16 (Lindfors et al., 2017). Likewise, both maternal and paternal knowledge of children's whereabouts at age 13 has a protective (allegedly buffering) effect on increases in alcohol use by age 16, with maternal knowledge showing a somewhat stronger effect (Lindfors et al. 2019). In addition, political and structural factors, such as the regulation of alcohol and other substances, have been linked to reductions in young people's drinking. Research indicates that alcohol consumption has decreased in Finland and other Nordic countries, particularly between 2000 and 2019 (Moan et al., 2024). The combined effect of these factors helps to explain why young people's alcohol use has declined substantially over the past two decades and why alcohol has lost some of its socio-cultural significance in their daily lives.

Self-rated Health

According to the School Health Survey (2025), girls rated their health status as average or poor more often than boys, with 24% of girls in upper secondary school and 34% of girls in vocational school reporting this. The corresponding proportions were 15% and 17% for boys. The proportions of young people experiencing average or poor health increased, especially for girls, from 2015 to 2023. In 2025, the experience of moderate to poor health was slightly less common compared to 2023, and the proportion returned to pre-coronavirus pandemic levels. (Helenius et al., 2025.)

It has been identified in previous studies that gender differences in perceived health are commonly attributed to higher rates of psychological distress among girls,

including symptoms of depression, anxiety, and stress, which directly affect subjective health evaluations (Cosma et al., 2020). Social and cultural factors, such as appearance-related pressures and peer comparison, may weaken self-rated health, particularly among girls. Meland et al. (2021) found that concerns about appearance and weight had adverse effects on adolescents' self-rated health and self-esteem, and the impact was especially significant among girls (Meland et al., 2021). Furthermore, long-term trends in Finnish adolescents show that emotional problems have increased, particularly among girls. At the same time, alcohol consumption, conventional cigarettes, and other nicotine products use have decreased over the past two decades, reflecting notable changes in young people's mental health. (Mishina et al., 2025.)

Educational context has an impact on young people's health: young people in vocational education reported poorer health more frequently than those in upper secondary school. This may reflect differences in socioeconomic background, with vocational students more likely to experience financial or familial stressors, as well as variations in school structure and perceived institutional support (Helenius et al., 2025).

Temporal factors, including the COVID-19 pandemic, have additionally influenced young people's health experiences. While the prevalence of average or poor health increased during the pandemic due to social isolation (Loades et al., 2020), restrictions on schooling, and reduced physical activity, by 2025 these measures had returned to pre-pandemic levels (Helenius et al., 2025). Together, these individual, social, and structural factors provide a nuanced explanation for the observed trends in young people's self-rated health, highlighting the complex interplay between gender, educational context, and broader societal influences.

2.2.3 The Risk and Protective Factors

Young people's health behaviour is affected by risk and protective factors. Peer pressure, poor parental supervision and relationships, gender, and accessibility to substances are examples of risk factors. Some of the protective factors are high self-esteem, peer factors, self-control, parental monitoring, and anti-drug use policies (Nawi et al., 2021). These factors may either heighten vulnerability or serve as protective factors, depending on how they interact within a young person's developmental environment. Understanding both risk and protective factors is essential to understanding the phenomenon.

Research indicates that the determinants of young people's nicotine use include both stable factors that have persisted across generations and changing factors influenced by societal, cultural, and structural developments. Stable determinants include parental and family influences, peer networks, and individual psychological

characteristics. Parental and household nicotine use are consistently associated with a higher likelihood of young people's initiation, while strong parental monitoring and regulation can reduce early uptake (Zajdel et al., 2025). Parental monitoring and parental knowledge of adolescents' whereabouts can also reduce young people's alcohol consumption (Lindfors et al., 2019; 2017). Similarly, peer influence remains a central determinant of experimentation and regular use, as young people are highly responsive to the behaviours and norms of their social networks (Charrier et al., 2024). Individual traits such as self-esteem continue to be strongly linked to substance use patterns, with higher self-esteem acting as a protective factor against risk behaviours among adolescents (Martínez-Casanova et al., 2024)

Product innovations, such as e-cigarettes and nicotine pouches, have expanded availability and appeal, particularly among young people, contributing to shifts in nicotine use patterns (Nordic Welfare Centre, 2025). Young people's nicotine use has been affected by regulatory changes; for example, in Finland, the deregulation of nicotine pouch sales in 2023 was associated with a rapid increase in use among young people (Ollila & Ruokolainen, 2025). In addition, young people's increased use of social media has been linked to increasing alcohol consumption, tobacco use, and multiple risk behaviours (Purba et al., 2023). Furthermore, gender norms are evolving, with girls now experimenting with e-cigarettes at similar or higher rates than boys, reflecting changing social acceptability (Charrier et al., 2024). Adolescents' socioeconomic status is also associated with health and health behaviours (Koivusilta et al., 2024; Liu et al., 2018; Pampel et al., 2010). Finally, temporal factors such as the COVID-19 pandemic have influenced perceptions of health, highlighting the dynamic nature of young people's health behaviours (Loades et al., 2020).

Overall, while some determinants of substance use remain consistent, the context in which young people make decisions about alcohol consumption and nicotine use has evolved, resulting in both reductions in conventional cigarette smoking and increases in the use of alternative nicotine products. These individual and social factors correspond to the intrapersonal and interpersonal streams of the Theory of Triadic Influence (TTI), shaping behavioural intentions and substance use among young people (Bavarian et al., 2022; Flay, 1999). Understanding this interplay of stable and changing factors is essential for targeted health promotion and preventive interventions.

Young People's Socioeconomic Status

Socioeconomic status (SES) is a multidimensional measure of an individual's or family's position in the social hierarchy, assessed through education, occupation, and income. These health inequalities refer to systematic differences in health

outcomes, where individuals with lower levels of education, lower occupational status, or lower income are more likely to experience poorer health and shorter life expectancy. (Kröger et al., 2015.) Among adolescents, SES is measured at the parental or family level (for Example, Huurre et al. 2005) because young people have not yet established their own educational or occupational status. This makes SES measurement uniquely challenging, as data are often based on adolescents' self-reports of parental education (Gripe et al., 2021; Gerra et al., 2020; Huurre et al., 2005), which may introduce substantial misclassification and bias in estimated SES–health associations (Höfler, 2005).

Evidence indicates that family SES and adolescents' school performance strongly predict later educational attainment and adult socioeconomic position, highlighting adolescence as a critical period in the emergence of social inequality. Educational pathways and social inequalities begin to solidify during adolescence and continue into adulthood. Academic performance has been considered to be a predictor of higher education and higher SES in adulthood, even after adjusting for family background and health-related factors. (Koivusilta et al., 2024.) Similarly, longitudinal research has shown that both school achievement and family socioeconomic background are important predictors of later educational attainment, and that certain adolescent health and lifestyle factors, such as heavy drinking, limited engagement in hobbies, and other patterns of leisure-time use, may contribute to these outcomes (Huurre et al., 2006). Family socioeconomic background (measured through parental education, occupation, and family structure) has a role, as adolescents from higher-SES families are more likely to attain higher education and secure advantaged occupational positions. These effects operate both directly and indirectly through adolescent health, health behaviours, and school performance. (Koivusilta et al., 2024.)

SES also shapes adolescents' health behaviours, with lower SES consistently associated with higher rates of smoking and heavy episodic drinking (Pampel et al., 2010). Finnish data show that although young people's alcohol use has declined since the late 1990s, socioeconomic differences persist, and adolescents perceiving lower family wealth remain more likely to report frequent drunkenness (Liu et al., 2018). Health problems and health-compromising behaviours, such as smoking and frequent alcohol consumption, have been linked to lower educational attainment, illustrating an interplay between social causation and health selection. Although health and health behaviours show only modest direct effects on adult SES, they have a substantial indirect influence by shaping educational trajectories, which in turn determine later socioeconomic position. (Koivusilta et al., 2024.)

Sociodemographic differences are also observed in electronic cigarette use, as awareness, ever use, and current use vary across population groups. However, evidence for consistent socioeconomic status differences in e-cigarette use remains

mixed (Hartwell et al., 2017). Overall, adolescence represents a formative period during which socioeconomic inequalities begin to take shape. Strong school performance and supportive family environments are central in shaping individuals' later positions in the social hierarchy, underscoring the importance of promoting equal educational opportunities and adolescent well-being (Koivusilta et al., 2024).

Family and Social Environment

The family unit and broader social relationships shape young people's attitudes and behaviours toward nicotine and substance use, either reinforcing risk or fostering resilience. Parental closeness, support, and disapproval of nicotine and substance use serve as protective factors by reducing susceptibility to peer influence, particularly in early adolescence. (Rodríguez-Ruiz & Espejo-Siles, 2025.) Sibling willingness to use nicotine or substances increases young people's vulnerability to peer pressure (Rodríguez-Ruiz & Espejo-Siles, 2025; Rose et al., 1999).

While parental monitoring is protective, young people's voluntary disclosure appears to be a stronger predictor of reduced nicotine and substance use (Rodríguez-Ruiz & Espejo-Siles, 2025). Higher parental education and smoke-free home policies are associated with a lower likelihood of smokeless tobacco use (Lund et al., 2022) and conventional cigarette use (Zhang et al., 2015). Peer acceptance and modelling, especially among male friends and athletes, increase the likelihood of use (Lund et al., 2022).

Individual Risk and Protective Factors

The initiation and continuation of nicotine and other substance use among young people are shaped by individual-level characteristics, which can either heighten vulnerability or serve as protective factors against the risk (Rodríguez-Ruiz & Espejo-Siles, 2025). Sensation-seeking tendencies increase young people's vulnerability to peer influence, for example, alcohol (Rodríguez-Ruiz & Espejo-Siles, 2025; Henneberger et al., 2019; Sznitman & Engel-Yeger, 2017) and tobacco use (Henneberger et al., 2021). When young people in question, males are generally more susceptible to peer pressure than females, although recent trends indicate rising substance use among females (Rodríguez-Ruiz & Espejo-Siles, 2025).

Protective factors, such as moral rules against substance use, a sense of coherence, and decision-making, can help to protect against peer influence (Rodríguez-Ruiz & Espejo-Siles, 2025). Young people perceive electronic cigarettes as less harmful than conventional cigarettes, and this lower risk perception contributes to their use. High prevalence of alcohol use also increases the likelihood of electronic cigarette use among young people, particularly among males.

(Villanueva-Blasco et al., 2024.) Early initiation of substance use is strongly associated with continued and escalating patterns of use (Wang et al., 2025). Impulsivity, thrill-seeking, and low conscientiousness are personality traits linked to smokeless tobacco use (Lund et al., 2022).

School and Community Context

School and community contexts can either increase exposure to substance-related risks or offer protection through school bonding, disapproval, and social support (Rodríguez-Ruiz & Espejo-Siles, 2025). School absenteeism and maladjustment are associated with a higher likelihood of electronic cigarette and other substance use among young people (Villanueva-Blasco et al., 2024). Young people's alcohol consumption and tobacco use are also linked to their social environments. The school community influences this particularly through school connectedness and climate: a strong sense of belonging to school protects against substance use, whereas disengagement and truancy increase the risk. The school climate, teacher–student relationships, and clear school rules can therefore either prevent or contribute to young people's substance use. (Trucco et al., 2020.)

Community-level factors such as adult smoking prevalence and criminogenic environments reinforce peer effects and increase the risk of substance use (Rodríguez-Ruiz & Espejo-Siles, 2025). Living independently or in urban areas may increase the likelihood of smokeless tobacco use, although results differ by country; in Finland, urban youth had higher odds of snus use, while US studies found higher use in rural areas (Lund et al., 2022).

In the Nordic countries, studies from Norway and Finland show that urban residence and independent living are associated with higher smokeless tobacco use. This may reflect easier access to snus in urban areas and social environments where such use is more accepted and visible. Independent living among young people may also contribute to greater autonomy and exposure to peer networks in which smokeless tobacco use is common, thereby increasing the risk of uptake. (Lund et al., 2022.)

2.2.4 Attitudes and Beliefs Toward Nicotine Products and Alcohol

Research over the past years shows that young people's attitudes and beliefs about e-cigarettes, nicotine products, and alcohol are shaped by a complex interaction of social, psychological, cultural, and media-driven influences. These factors affect both the initiation of use and the continuation of risk behaviours. According to the TTI, attitudes and beliefs influence health behaviour through expectations and

values: young people assess the potential health, social, or financial outcomes of a behaviour and evaluate those outcomes based on their personal values. These evaluations guide their decisions to engage in either health-promoting or health-compromising behaviours (Flay & Petraitis, 1994)

Attitudes Toward E-Cigarettes

E-cigarettes have become a central focus in youth substance use research, particularly in high-income countries where their use has increased (Sharma et al., 2021). Young people's interest in e-cigarettes is influenced by curiosity, pleasure, social interaction, and especially flavours (Villanueva Blasco et al., 2024). Sweet and menthol/mint flavours are seen as more appealing than tobacco flavours, especially among never smokers (Jongenelis et al., 2025), and flavoured products are often viewed as less harmful (Sharma et al., 2021).

Device appearance also shapes attitudes. Young people exposed to box mod or disposable devices report higher intentions to try them compared to pen-like devices (Jongenelis et al., 2025), and branded or colourful designs are perceived more favourably than standardised or greyscale options (Gomes et al., 2023; Jongenelis et al., 2025).

Despite some stigma and disapproval from peers, many young people use e-cigarettes for social reasons, and early users often experience increased social acceptance (Tremblay et al., 2022). However, frequent e-cigarette use is associated with later cigarette smoking, nicotine dependence, and increased likelihood of using alcohol and other substances (Villanueva Blasco et al., 2024).

Perceptions of harm vary widely. Many young people believe e-cigarettes are less harmful than cigarettes (Villanueva Blasco et al., 2024; Sharma et al., 2021), though others express confusion or denial of health risks. Lack of accurate knowledge contributes to beliefs that normalise or support nicotine use (Tremblay et al., 2022).

Social media plays a important role: exposure to e-cigarette content is linked to more favourable attitudes, lower perceived risk, and higher susceptibility and use (Rutherford et al., 2023; Vogel et al., 2021). The broader cultural context, such as technology-driven novelty seeking and shifting social norms, also affects e-cigarette acceptability (Tremblay et al., 2022).

Attitudes Toward Nicotine Products More Broadly

Attitudes toward nicotine products are multifaceted and context-dependent (Oyosa Rojas et al., 2025; Wojtecka et al., 2023). Young people often hold misconceptions and more positive attitudes toward these newer products than toward conventional

smoking, especially among users (Gorukanti et al., 2017). Perceived harmfulness strongly predicts behaviour. Those who believe nicotine products are less harmful or less addictive are more likely to try and use them (Aly et al., 2022). Conversely, strong perceptions of harm protect against initiation (O'Brien et al., 2023). Users often associate nicotine products with relaxation and pleasure, while non-users report stronger refusal skills and perceive parents as more negative toward use (Aly et al., 2022).

Key factors shaping attitudes include perceived risks, social pressure, product design, flavours, marketing, cultural norms, and opportunities for discreet use (O'Brien et al., 2023; Rutherford et al., 2023; Sharma et al., 2021). For some, nicotine becomes part of identity formation, excitement seeking, or lifestyle expression (Villanueva Blasco et al., 2025). Snus use is similarly tied to risk-taking behaviour, and positive attitudes toward smoking often parallel favourable views of snus (Tseveenjav et al., 2015).

Attitudes Toward Alcohol

Positive attitudes toward alcohol, such as viewing it as socially acceptable or enjoyable, predict both early initiation and heavier use (Pinquart & Borgolte, 2025). Young people often expect alcohol to provide relaxation, confidence, or fun, and these expectations lead to higher consumption. Finnish young people recognise alcohol as harmful but also attractive, and their sense of responsibility incorporates health considerations, legality, decision making, and seeking help when needed (Mynttinen et al., 2021).

Cultural norms and family values strongly influence alcohol use patterns: young people whose family or peer groups accept alcohol tend to view it more favourably and subsequently begin drinking earlier (DeHaan & Boljevac, 2010). Attitudes toward alcohol advertising also predict later drinking behaviour: positive responses to ads are linked to earlier initiation and more frequent use (Nixon et al., 2022). Conversely, strong negative attitudes toward alcohol can serve as protective factors, and prevention efforts often aim to strengthen these beliefs (Pinquart & Borgolte, 2025).

2.3 Young People's Health Promotion

2.3.1 Conceptual Grounding

Young people's health behaviour is always influenced by social norms and cultural expectations. For example, the acceptability of alcohol use (Pennay et al., 2023), the social appeal of e-cigarettes (Sharma et al., 2021), and contemporary wellness cultures

affect what young people perceive as appropriate behaviour (Pennay et al., 2023; Elgar et al., 2015). Young people's health promotion refers to a set of planned actions, strategies, and policies that aim to strengthen the physical, mental, and social well-being of young people by enhancing protective factors, reducing risk behaviours, and creating supportive environments. According to the Ottawa Charter for Health Promotion, health promotion is a process that enables people to increase control over, and improve their health (WHO, 1986). Applied to young people, this means both individual empowerment and structural changes in schools, communities, and society to ensure that young people can make informed, healthy choices.

The foundational pillars of young people's health promotion are a holistic understanding of health, early guidance of lifestyle habits, collaboration between the individual and the community, consideration of social norms, and a multilevel approach. These principles have remained enduring over the decades, even as young people's living environments, technology, and culture have evolved. Over the years, health promotion for young people has evolved from focusing on individual behaviour to a comprehensive, multisectoral approach. In the 1980s (Ottawa Charter), the emphasis was on healthy public policy and community empowerment (WHO, 2009; WHO, 1986). In the 1990s, attention shifted to supportive environments and the challenges of globalisation, while in the 2000s, health promotion became a central element of policy, reducing inequities. (WHO, 2009.) Today, the focus is in a comprehensive, youth-centred approach that integrates health, education, and social support to strengthen adolescent well-being (WHO, 2023a).

The prevention of risk behaviours among young people, such as reducing the use of alcohol, tobacco, and other substances, has been a central focus of health promotion and public health monitoring throughout the 21st century (Helenius et al., 2025; Kinnunen et al., 2015). Health promotion among young people is based on the integration of individual, social, and structural factors. This multilevel approach considers the environment, legislation, the education system, and cultural trends (Mishina et al., 2025; Flay & Petraitis, 1994).

The shift towards rights-based and participatory approaches highlights the importance of targeting young people, as their health behaviours often persist into adulthood. Because adolescence is a critical developmental stage marked by rapid biological, psychological, and social changes, health behaviours established during this period often track into adulthood and significantly shape long-term health outcomes (Sawyer et al., 2012). A fundamental principle of health promotion is that the individual, family, school, and the broader community support young people's health together. For example, parental styles and the ability of young people to discuss personal matters with parents (Helenius et al., 2025), along with community-provided opportunities for physical activity and healthy choices (Törrönen et al., 2019), collectively serve as protective factors for young people's health. When

supporting young people's health and well-being, the result is immediate gains, long-term benefits throughout adulthood, and lasting advantages for the next generation (WHO, 2023a).

It is important to concentrate on young people's health promotion in the prevention of risk behaviours such as nicotine, alcohol and other substance use. The WHO identifies tobacco and alcohol as leading preventable causes of premature mortality globally (WHO, 2025b, 2018) and early initiation during adolescence is strongly associated with heavier use and dependence later in life (Wang et al., 2025, Trujillo et al., 2019, Poudel & Gautam, 2017). The School Health Promotion Study (2025) highlights the growing use of novel nicotine products, such as e-cigarettes and nicotine pouches (Helenius et al., 2025, Ollila & Ruokolainen, 2025). This introduces new challenges for public health among young people.

The importance of schools extends not only to the educational sense but also to shaping the health and well-being of young people. Recognising this, the WHO developed the Health Promoting Schools (HPS) framework as a comprehensive approach to integrate health into all aspects of school life. The HPS framework, introduced in the late 1980s, is built on the principle that health and education are closely interconnected and mutually reinforcing (Langford et al., 2015; WHO & UNESCO, 2021). It aims to move beyond the limited impact of traditional health education by adopting a holistic, whole-school approach to promoting health. Rather than focusing solely on classroom instruction, the HPS model integrates health promotion into all aspects of school life, from school curriculum to ethos, environment, and families and communities. (Langford et al. 2015; Goldberg et al. 2019.) Altogether, these aspects create a comprehensive system that supports young people's physical, mental, and social well-being while enhancing educational outcomes (Langford et al., 2015; WHO & UNESCO, 2021).

Recent evidence shows that whole-school interventions based on the HPS framework can reduce young people's regular smoking, for example, demonstrating substantial population-level benefits. However, the same review highlights that effects on, for example, mental health outcomes remain limited, often due to incomplete implementation of the framework's components and insufficient adaptation to adolescents' developmental needs. (Lekamge et al., 2025.)

Young people's health promotion also includes psychosocial well-being, resilience, and participation. The WHO highlights that young people's health cannot be reduced to the absence of risk behaviours; it must include the promotion of life skills, mental health, and supportive environments that reduce health inequalities. In this regard, schools, youth organisations, and digital platforms play a central role in shaping norms and offering resources for healthier lifestyles. (WHO, 2023a)

Young people's health promotion is also strongly shaped by societal-level policies and regulatory frameworks that create environments conducive to healthy

choices. In Finland, there have been numerous structural measures in reducing tobacco and nicotine use among young people. For example, in the 1990s, the minimum age for purchasing and receiving tobacco products was raised from 16 to 18 years, and additionally, in the 2000s, smoking in restaurants was increasingly restricted (STM, 2006). The 2010 Tobacco Act set a clear goal to end tobacco use, and it introduced measures such as banning all advertising, restricting product displays in stores, and using taxes to reduce consumption (Timberlake et al., 2019). These steps were a part of a long-term process of tightening laws, which has helped significantly reduce young people's smoking rates over time (Puska et al., 2025).

In 2016, Finland raised the goal from smoke-free to nicotine-free, covering all products with nicotine, including e-cigarettes. At the same time, it is introducing stricter marketing rules than those required by the EU Tobacco Products Directive to support nicotine-free living. (Timberlake et al., 2019.) This forward-thinking approach, along with early flavour bans and strict regulation of new products, made Finland a leader in Nordic tobacco prevention policies (Linnansaari et al., 2022). These measures demonstrate that broad societal actions, such as laws, pricing, and limits on availability, are key drivers of young people's health promotion, working alongside with school-based and other health promotion strategies.

Health Promotion through Theoretical Perspective

The theoretical perspective of this PhD Thesis is the TTI (Flay & Petraitis, 1994). It is chosen because the theory integrates concepts from multiple sociological and psychological theories, providing a multilevel framework for understanding young people's tobacco (Flay, 1999) and substance use (Bavarian et al., 2022) by linking individual, social, and cultural influences. The theory gives insights into the mechanisms that shape young people's health behaviours and informs targeted interventions that promote resilience and informed decision-making.

TTI organises influences into three main streams: intrapersonal, social, and cultural-environmental, each operating across proximal and distal levels (Flay & Petraitis, 1994) (Figure 1). This structure enables a nuanced examination of how personal traits, interpersonal relationships, and broader institutional forces interact to shape young people's attitudes and behaviours related to substance use (Bavarian et al., 2022).

The intrapersonal stream emphasises individual characteristics such as self-control, emotional regulation, and self-efficacy that influence young people's vulnerability to substance use. Empirical findings indicate that low self-control is associated with a greater likelihood of initiating and increasing substance use over time. (Bavarian et al., 2022.) At the proximal level, influences include attitudes toward the behaviour, social normative beliefs, self-efficacy, and intentions (Flay,

1999). The factors that influence behavioural intentions and expectancies, such as beliefs that substance use can relieve stress or support social acceptance (Bavarian et al., 2022). According to TTI, these internal drivers are shaped by deeper dispositional and developmental influences that predispose young people to use substances as coping mechanisms or identity tools (Bavarian et al., 2022).

The interpersonal stream focuses on social contexts, particularly peer and family influences, which shape adolescents' substance-related attitudes and behaviours. Peer affiliation with substance-using youth is a strong predictor of initiation and continued use, especially when peer norms support such behaviours. Family processes such as parental monitoring, communication, and parental substance use exert distal effects through modelling, reinforcement, and normative expectations. These operate through mechanisms such as modelling, reinforcement, and normative expectations, consistent with TTI's emphasis on the social transmission of behaviour. (Bavarian et al., 2022.)

The cultural-environmental stream encompasses broader contextual and institutional factors, such as school climate, engagement, and perceived support, that shape attitudes toward substance use. School environment, educational engagement, and perceived support from adults are key distal influences that affect young people's attitudes toward substance use. (Bavarian et al., 2022.)

Policies on pricing, advertising, and access can influence attitudes and normative beliefs by altering perceived availability and social acceptability of smoking (Flay, 1999). These structural factors are part of the environment that shapes how young people form beliefs and make choices about substance use (Bavarian et al., 2022; Flay, 1999). Other societal factors, such as marketing, social media (Jackson et al., 2018) and legislation also play a role. Marketing and social media can shape health behaviours and collective attitudes toward nicotine and other substance use (Jackson et al., 2018). Legislation is used to regulate the purchase and possession of young people's nicotine products: in Finland, by the Tobacco Act (549/2016).

The TTI's strength is in its ability to integrate multiple levels of influence, individual, social, and environmental, into a unified explanatory model that accounts for their dynamic interplay (Bavarian et al., 2022). By accounting for the dynamic interplay between individual dispositions, social networks, and structural conditions, the theory provides a framework for designing comprehensive prevention strategies (Bavarian et al., 2022; Flay, 1999).

In the context of young people's substance use, TTI supports interventions that simultaneously address personal motivations, peer dynamics, and institutional determinants (Bavarian et al., 2022). Its application enables a holistic understanding of substance use trajectories and the mechanisms through which risk and protective factors operate across developmental contexts. Moreover, TTI has been proposed not only as a theoretical model but also as a practical planning tool for prevention

programs, including those targeting nicotine use among youth. By guiding the selection of intervention targets across intrapersonal, social, and environmental domains, TTI facilitates the development of multi-component strategies that promote positive youth development and reduce substance-related risk behaviours. (Flay, 1999.)

The strength of TTI is in bringing together different levels of influence into a clear, unified model (Bavarian et al., 2022). It considers how individual traits, social connections, and broader social conditions interact (Bavarian et al., 2022; Flay, 1999). In prevention efforts targeting young people’s substance use, interventions should simultaneously address personal motivations, peer dynamics, and structural or institutional conditions. (Bavarian et al., 2022).

Overall, young people’s health promotion represents a multi-level approach aimed at enhancing their knowledge, skills, and the supportive environments for overcoming health challenges and avoiding harmful behaviours such as nicotine and other substance use. It is important to target the emergence of novel nicotine products and evolving patterns of substance use, which require ongoing evaluation of strategies and evidence-based interventions. These theoretical perspectives as an entity provide a comprehensive framework for young people’s health promotion within the context of nicotine use. Their combination helps create interventions that are based on evidence and consider the real-life developmental and social experiences of young people, making them more effective and relevant to them.

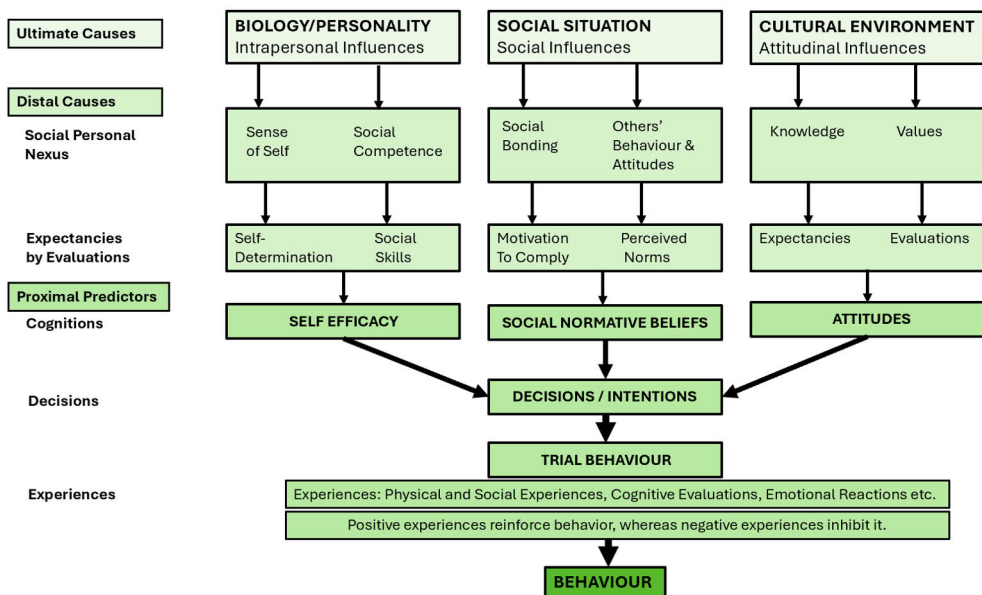


Figure 1. The Theory of Triadic Influence (TTI) for Describing Young People’s Health-related Behaviour. (Modified from Flay and Petraitis, 1994.)

2.3.2 The School Environment's Role in Health Promotion

2.3.2.1 School-based Health Promotion

School-based interventions have consistently been identified as effective strategies for health promotion and substance use prevention among young people, and evidence across decades demonstrates that they are also cost-effective and economically beneficial (for Example, Lin et al., 2024; Ekwaru et al., 2021; Flay, 2000; Hansen, 1992). Schools offer an opportune setting to reach young people during critical periods of exposure to substance use and within influential peer groups. If drug education is a mandatory part of health education curricula, implementing substance use prevention in schools is feasible. (Gardner et al., 2024.) From the TTI perspective, the school environment represents a distal cultural and institutional influence, but also social situations that can either reinforce or buffer substance-related behaviours (Bavarian et al., 2022).

When school-based interventions combine social and emotional learning with academic content, they can foster a supportive school climate, which in turn reinforces positive behaviours and improves outcomes (Tancred et al., 2018). Integrating social and emotional learning with efforts to strengthen school climate has an important role in supporting students' academic success and lifelong development (La Salle-Finley et al., 2024). While systematic reviews of integrated academic and health education programs are limited, emerging conceptual frameworks emphasise the importance of school-wide climate change, staff training, and parental engagement to improve both health behaviours and academic outcomes (Tancred et al., 2018).

Adolescence is a critical period when multiple risk behaviours such as smoking, drinking, and drug use often begin and tend to co-occur, increasing the likelihood of adverse health, educational, and social outcomes later in life. Because many substance use behaviours co-occur, interventions targeting multiple behaviours simultaneously have been recommended as potentially more efficient and cost-effective, although evidence of their superior effectiveness remains limited. (Tinner et al., 2022.) On that note, meta-analytic findings suggest that universal school-based programs are generally not highly effective during mid-adolescence, highlighting the need for interventions tailored to developmental stages (Onrust et al., 2015). School-based programs are the most common approach to preventing substance use among young people, but evidence suggests they offer limited short-term benefits, even when family involvement is included (Tinner et al., 2022).

Moreover, schools play a crucial role in promoting young people's health by integrating health education with academic learning (Pulimeno et al., 2020; Tancred et al., 2018). Programs that emphasise social and emotional learning help create a

supportive school climate, reinforcing positive behaviours and academic success. These interventions often extend beyond the classroom to engage families and the wider community, thereby amplifying their impact (Tancred et al., 2018). In addition, effective school-based prevention strategies should encourage students to internalise health knowledge and develop critical thinking about the harmful consequences of common risky behaviours (Pulimeno et al., 2020). Furthermore, in the early 2000s, information technology was recognised as a useful and promising tool for health promotion programs targeting young people (Lintonen et al., 2008). Although systematic reviews of combined academic and health education programs remain limited, emerging frameworks underscore the importance of school-wide climate change, staff training, and parental involvement to improve both health behaviours and educational outcomes (Tancred et al., 2018).

School-based interventions can prevent or delay the use of tobacco, alcohol, and other substances, with some programs demonstrating sustained effects into early adulthood (Gardner et al., 2024) while other studies have mixed results (Tinner et al., 2022; Onrust et al., 2016). Findings from systematic reviews and meta-analyses on school-based substance use prevention programmes are inconclusive. Onrust et al. (2016) found that programme effectiveness varies depending on delivery method and content: interactive programmes, those focusing on social and resistance skills, and multi-component approaches tend to be more effective than programmes targeting only knowledge or attitudes. However, no universally effective programme characteristics have been identified across all age groups. (Onrust et al., 2016.)

Gardner et al. (2024) did not find evidence that school-based interventions prevented e-cigarette use when measured at the longest follow-up (6–36 months). Some programs showed small protective effects; one study even reported an increase in e-cigarette initiation following a broad school theme week lacking classroom education and theoretical underpinning. (Gardner et al., 2024.) This contrasts with findings on traditional smoking prevention, where Thomas et al. (2015) reported that school-based curricula significantly reduced smoking initiation, especially when programs included social influence and skills-based components (Thomas et al., 2015). Nonetheless, short-term outcomes were more promising: interventions improved knowledge, reduced intentions to use, and fostered more negative attitudes toward e-cigarettes at post-test (Gardner et al., 2024). These findings support the importance of considering overall school well-being, as positive school climate and supportive relationships have been linked to better health outcomes among students. This is reflected in the School Well-being Profile model that emphasises conditions, social relationships, opportunities for self-fulfilment, and health status (Konu & Lintonen, 2006).

Some studies showed improvements in harm perceptions at longer follow-up, although effects were not consistent across trials. There was no significant effect on

lifetime tobacco use, but school-based interventions were associated with reductions in past 30-day tobacco use, which encompassed e-cigarettes in some studies. (Gardner et al., 2024.) Similarly, evidence from traditional smoking prevention indicates that programs focusing on social influence and skills training can significantly reduce smoking initiation among young people (Thomas et al., 2015). Thomas et al. (2015) also noted that multi-component curricula were more effective than information-only approaches, highlighting the importance of interactive and theory-based strategies. (Thomas et al., 2015.)

Some interventions were associated with improved mental health outcomes (for example, reduced stress, better well-being) and reductions in alcohol and illicit drug use. Overall, while school-based programs demonstrated potential for improving short-term knowledge, attitudes, and intentions, their ability to produce lasting reductions in e-cigarette use remains uncertain (Gardner et al., 2024). If the use is still occasional, the intervention may help reduce smoking among young people (Andersen et al., 2016).

2.3.2.2 Key Features of Efficacious School-based Interventions

Efficacious interventions had several common features. They were typically multicomponent, combining classroom education with additional elements such as parental or community involvement. They also tended to be delivered over multiple sessions, ranging from four 25-minute lessons to a 10-hour curriculum. They were grounded in established behavioural theories. (Gardner et al., 2024.) Thomas et al. (2015) similarly found that programs incorporating social influence and skills-based training, delivered across multiple sessions, were significantly more effective than information-only approaches. Their review emphasised that curricula grounded in theory and supported by interactive components, such as peer involvement, produced the most consistent reductions in smoking initiation among young people. (Thomas et al., 2015.)

Effective delivery methods included face-to-face or hybrid approaches involving both classroom and online activities, with sessions often facilitated by trained teachers and supported by peer involvement. Content usually addresses both e-cigarettes and tobacco, while also incorporating skills training to strengthen resistance to peer pressure and promote healthier decision-making. In contrast, interventions lacking classroom education, theoretical underpinning, or skills training, such as school-wide theme weeks or policies, were not effective and, in some cases, increased e-cigarette use. (Gardner et al., 2024.) Thomas et al. (2015) concluded that sustained effects were most likely when programs combined these elements and were reinforced over time, rather than delivered as one-off events. (Thomas et al., 2015).

Taken together, the evidence highlights that theory-driven, skills-based, and multi-session programs with classroom, peer, and parent components are most likely to achieve beneficial outcomes (Gardner et al., 2024; Thomas et al., 2015). There are still mixed outcomes for school-based substance use prevention programmes. One key reason for these mixed outcomes may be the lack of developmental orientation. Onrust et al. (2016) emphasise that programme effectiveness is systematically related to the psychological and cognitive needs of different age groups. In early adolescence, interventions targeting social norms and resistance skills are most effective. In middle adolescence, universal programmes show limited impact, suggesting the need for more tailored approaches. In late adolescence, targeted interventions become increasingly relevant as opportunities for substance use increase and individual risk profiles diversify. (Onrust et al., 2016.)

2.3.2.3 The Role of Youth Participation in School Health Promotion

In recent years, the role of young people in shaping health promotion actions has gained increasing attention. School-based health promotion highlights the importance of young people's participation, showing a wide range of positive outcomes, especially for students, schools, and their communities. Participation has been linked to increased satisfaction, motivation, ownership, and engagement among young people, alongside the development of knowledge, skills, and competencies. It supports personal growth, including greater self-confidence, self-efficacy, and health-related competencies. (Griebler et al., 2017.) Moreover, recent reviews emphasise that student involvement not only benefits individuals but also strengthens their sense of agency and belonging, which are critical for sustaining health promotion initiatives (Kontak et al., 2025; Pérez-Jorge et al., 2021). At the school level, student involvement can foster cultural shifts within schools and promote inclusive policies, curricula, and a more positive school climate (Griebler et al., 2017). Furthermore, participatory approaches strengthen relationships among peers and between students and adults, improving the overall social environment (Kontak et al., 2025; Griebler et al., 2017).

It is important to recognise the characteristics of young people, such as their growing autonomy and identity development. Settings meaningful to young people, such as higher education, work, sport, and leisure environments, as well as youth organisations, should be leveraged as key contexts for participatory prevention. Moreover, efforts should focus on integrating participatory processes with evidence-based approaches to achieve both empowerment and measurable effectiveness. (Aresi et al., 2023.) Recent reviews highlight that participatory strategies in health promotion not only empower young people but also strengthen their sense of agency

and belonging, which are essential for sustaining initiatives (Kontak et al., 2025; Pérez-Jorge et al., 2021).

Interventions that foster collaboration between schools and local communities and promote young people's involvement at representative or consensus levels have shown positive outcomes in their knowledge, motivation, social norms, and health behaviours, understanding the importance of authentic youth participation across multiple settings (Jourdan et al., 2016). Furthermore, student engagement has been associated with improved relationships between young people and adults and a more inclusive school climate, reinforcing the social environment necessary for effective health promotion (Kontak et al., 2025).

Young people are often viewed as passive recipients of health interventions rather than active contributors. This problem-focused approach overlooks their potential as legitimate stakeholders in addressing alcohol and drug-related issues. Participatory health promotion emphasises empowerment through shared decision-making and community engagement, positioning young people as co-creators of change. (Aresi et al., 2023.) Despite growing interest in participatory methods, only a minority of studies involve young people meaningfully across multiple stages of prevention, and only a few can be considered genuinely youth-led (Kontak et al., 2025; Pérez-Jorge et al., 2021).

Only a minority of studies demonstrate genuine youth leadership, where young people share power in shaping interventions (Kontak et al., 2025; Aresi et al., 2023; Pérez-Jorge et al., 2021). Jourdan et al. (2016) highlight that young people's participation occurs in a spectrum of representative roles, where young people provide input but do not make final decisions, to consensus-level involvement, where they actively co-design, implement, and evaluate interventions alongside adults (Jourdan et al., 2016). However, youth-led initiatives often struggle to implement and rigorously evaluate their interventions, limiting measurable outcomes. There is a clear tension between promoting participatory processes and maintaining evidence-based standards in public health research. Expanding meaningful youth involvement requires structural and methodological support, and recognition of young people's unique capacities and contexts. (Aresi et al., 2023.) Young people's involvement should be actively evaluated and explored in current health promotion to capture their insights into interventions and identify more effective ways to implement them.

2.4 The Summary of the Previous Literature

Promoting the health of young people in the context of nicotine use involves multiple interconnected factors that influence their behaviours. These contextual determinants of health promotion can be divided into six: individual factors, close

circle's health behaviour, school implementation, societal perspectives, theories and models based, and youth-centred. (Figure 2) At the core of individual factors, there are young people's attitudes, beliefs and decision-making, which are shaped by both risk and protective factors as well as their individuality and personal experiences. Close circles' health behaviour choices also have an impact. The influence of family and peers is significant, as those closest to young people help shape norms and behaviours related to health (Lund et al., 2022). This makes every individual unique with different needs. This should be considered in health promotion. It should target the wide range of young people, but also on a personal level.

Schools play important roles in promoting young people's health, particularly through interventions that integrate health and academic education (Gardner et al., 2024; Tancred et al., 2018), as well as in preventing nicotine and other substance use. They offer structured environments where young people can be reached during critical stages of behavioural development and within influential peer groups, making them a feasible and impactful setting for delivering preventive interventions (Gardner et al., 2024).

Beyond the school as a setting, young people's living environments and broader social perspectives, such as legislation, marketing (Puska et al., 2025; Mishina et al., 2025; Lyzwinski et al., 2022; Timberlake et al., 2019; Jackson et al., 2018), social media (Cheng et al., 2023; Purba et al., 2023; Rutherford et al., 2023; Jackson et al., 2018), and cultural factors (Deep et al., 2024) shape health behaviours and collective attitudes toward nicotine and other substance use. These societal contexts form the backdrop against which individual decisions are made, indicating the need for multi-level health promotion strategies that extend beyond institutional settings. Behind the young people's health promotion strategies are guidelines from WHO, which have, over the years, evolved from focusing on individual behaviour to a comprehensive, multisectoral approach (WHO, 2009).

Theoretical frameworks are useful in designing and structuring health promotion. Theories lighten the multiple levels of factors shaping, for example, young people's behaviour, attitudes and decision-making concerning health. A participatory and empowerment-based approach that recognises young people's unique capacities and contexts is essential for effective health promotion (Aresi et al., 2023), prioritising young people's voices and perspectives to ensure relevance and respect for their unique needs and experiences.

Health promotion requires a multi-level, theory-informed, and inclusive strategy that integrates all the diverse influences. By combining theoretical understanding with youth participation and attention to wider social determinants, interventions can more effectively reduce nicotine use and promote health among young people. Overall, the reviewed studies illustrate how intrapersonal dispositions, social interactions, and environmental contexts interact dynamically, as described in the

TTI framework, influencing young people’s attitudes and behaviours (Bavarian et al., 2022; Flay, 1999) toward nicotine.

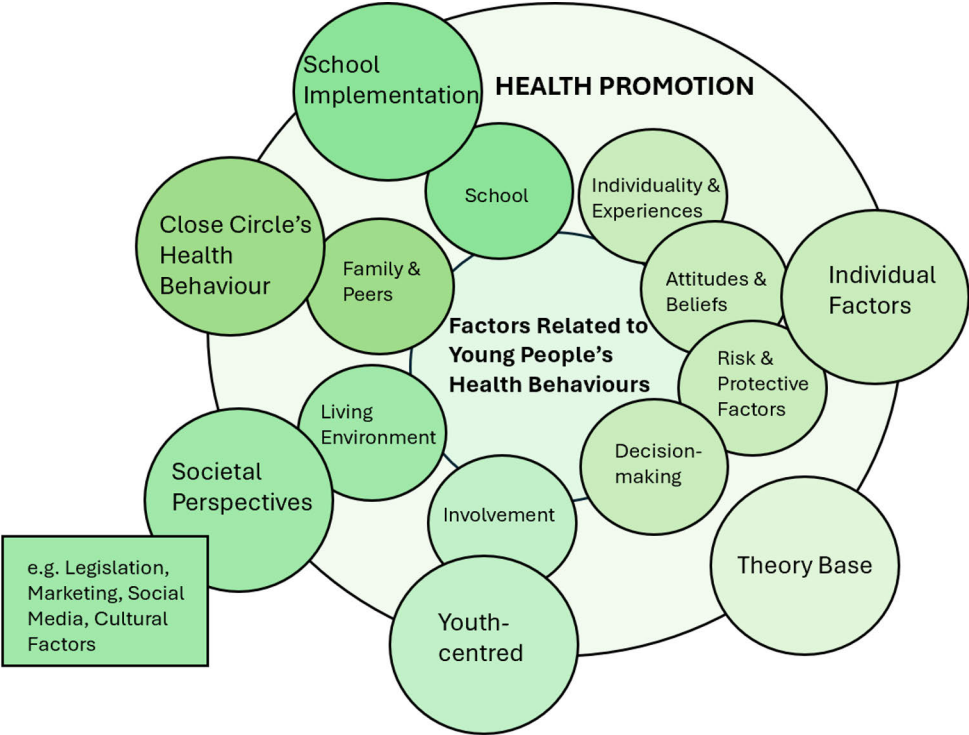


Figure 2. Young People's Health Promotion in the Context of Nicotine Use.

3 Aims

The overall aim of this PhD Thesis was to provide a more comprehensive understanding of vocational students' orientation related to the use of tobacco and nicotine products and other substances, and to identify ways from the students' own perspective, how school environments can better support their substance-free living. There were two research parts involved for collecting and integrating different data and research methods to achieve the overall aim and goal through the following research questions:

Part I:

1. How are attitudes and beliefs among young people linked to the use of nicotine products, and what interventions have been used to influence attitudes based on previous studies? (Study I)

Part II:

2. What factors are related to Finnish vocational students' usage of nicotine products, and what are their attitudes and beliefs toward nicotine products? (Study II)
3. What are Finnish vocational students' perspectives on the influencing factors in the use of nicotine products and other substances, and what health promotion actions vocational students consider to be supportive towards substance-free living in the school environment? (Study III)

4 Methods and Materials

4.1 Methodological Framework

The methodological framework of the PhD Thesis was based on a mixed-method approach (Vivek & Nanthagopan, 2021; Tashakkori & Teddlie, 2010), which integrates different methodological traditions to provide a more comprehensive understanding of the phenomenon. This approach was chosen because young people's health behaviours, attitudes, and beliefs are complex, multi-layered phenomena influenced by individual, social, and environmental factors, as outlined in the TTI (Flay & Petraitis, 1994). By combining both part I as systematic and part II as empirical phases, the study aimed to capture these multiple dimensions of influence in a coherent and complementary way.

The systematic literature review (Part I) provided an evidence-based foundation for understanding previously identified factors related to young people's nicotine use and school-based health promotion. The findings of the review were used to assess the questionnaire employed in the quantitative phase (Part II), and it was deemed appropriate for addressing the identified gap in evidence regarding vocational students' attitudes and beliefs towards nicotine products. The qualitative phase (in Part II), in turn, deepened the interpretation of quantitative results by exploring vocational students' perspectives on the meaning and implementation of health promotion within their school environment.

From the perspective of the PhD Thesis sub-studies timeline, it should be noted that the preliminary results of the systematic literature review were available in spring 2020, following the first database search. The questionnaire used for quantitative data collection was examined in light of the review findings and was found to address the gaps identified in the review. The quantitative data were collected in November 2020. The publication process of the systematic review was prolonged, and therefore, the database search was updated in October 2021. The updated search did not identify any new studies.

The methodological framework follows a mixed-method design, which allowed the integration of different types of data within a single study (Creswell & Plano Clark, 2017; Tashakkori & Teddlie, 2010). Each phase builds upon the previous one, contributing to a deeper understanding of the research problem. The integration of

findings occurred both at the level of data interpretation and in the discussion of results, aligning with the TTI's multi-level perspective on health behaviour.

In Part I, previous studies on young people's attitudes and beliefs toward nicotine products, as well as the methods employed to influence these attitudes and beliefs, were synthesised (Study I). Although previous knowledge of young people's attitudes and beliefs towards nicotine products existed, there was a lack of detailed knowledge about their attitudes and beliefs. The knowledge was more about the interventions' and campaigns' influences on them. There was also a research gap concerning young people's own perspectives on effective methods to promote their substance-free living in the school environment. The knowledge produced in Part I was used for the next part.

In Part II, the use of nicotine products among Finnish vocational students, related influencing factors, and their attitudes and beliefs toward nicotine use were examined (Study II), alongside their perspectives on nicotine and other substance use and methods to support substance-free living in the school environment (Study III). The results of Study II, concerning vocational students' attitudes and beliefs based on their nicotine use or non-use, were utilised in the design of Study III. Vocational students were chosen to be the target group based on the previous research on their nicotine and other substance use behaviours being unhealthier than those of other secondary education students. Both systematic literature review and quantitative and qualitative research methods were used to gather multifaceted data on the phenomenon. (Figure 3) The main findings of Parts I and II were combined into the summary of the results.

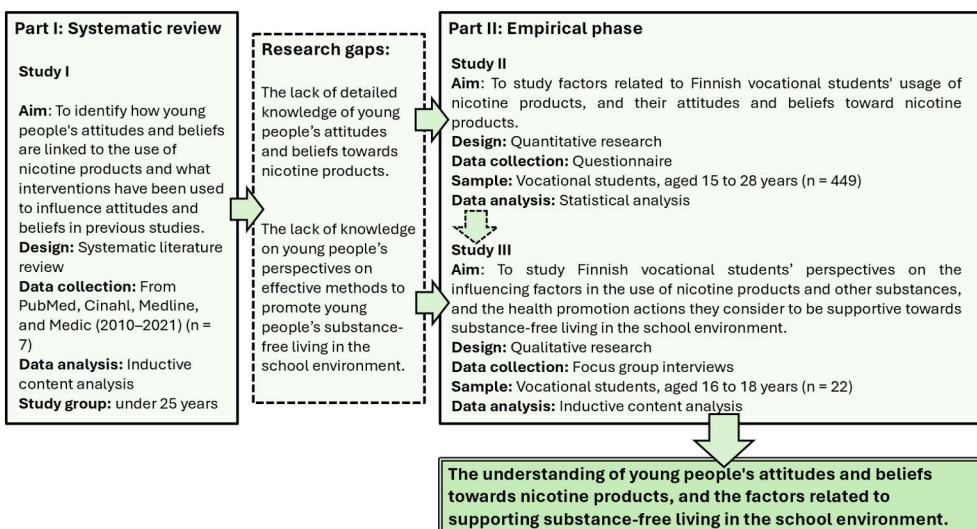


Figure 3. Parts of a PhD Thesis and Studies.

4.2 Part I: Systematic Literature Review

The first study was a systematic review. This systematic review was conducted using Fink's (2010) model, which is a systematic, accurate and reproducible method for identifying, evaluating and summarising published research material. The model starts by identifying the research questions, selecting the databases and search terms, then conducting the search, synthesising the results, and finally producing the descriptive review. (Fink, 2010)

Search Strategy and Criteria

The search terms consisted of the combination of MeSH terms, free words and their synonyms concerning young people, nicotine products, and attitudes. The search terms were combined into search phrases using Boolean operators. The databases PubMed, MEDLINE, CINAHL, and Medic were systematically searched in spring 2020 and the second time in October 2021. The searches were conducted both in English and Finnish. The age range of the participants in the searched studies was set as adolescents and young adults based on the age ranges in MEDLINE, resulting in an age range of under 25 years for all the databases. The eligibility criteria were participants to be under 25, adolescents' attitudes towards nicotine products and methods to influence their attitudes towards nicotine products as a topic, published between 2010 and 2021, randomised controlled trials, peer-reviewed, and payment-free full-text available in English or Finnish. The process of the database search is presented in Figure 4 in a PRISMA (Moher et al., 2009) flowchart. The interpretation of nicotine products included all the products that included nicotine, except nicotine replacement therapy products. The studies that examined both nicotine products and other drugs were included in the review only if the results could be separated.

Data Extraction and Analysis

Data extraction was done by two independent researchers (one being a doctoral researcher) who conducted the same database searches using the same criteria and did the evaluation. The database search results were a total of 322 studies. The studies were identified through a three-stage process based on the title, abstracts and full texts. They were screened according to the criteria, and duplicates were removed. A total of seven eligible studies were selected. (Figure 4.)

Quality Assessment of the Eligible Studies

The quality assessment of the eligible studies was done using the Joanna Briggs Institute (JBI) Checklist for Randomized Controlled Trials. The articles were rated

independently by two researchers (one being a doctoral researcher). The rated points were the research method, sample size, the authors' competence, publication place, and cultural suitability. This rating was done to evaluate the quality of the eligible studies. The studies were rated based on their points to excellence (11-13 points), good (8-10 points) or moderate (≤ 7 points). The articles scored between six and nine points. Three of the articles scored nine points, and two scored eight points. Two articles scored either seven or six points, but they were still included in the systematic review based on the value they added.

Data Analysis

The data were analysed in inductive content analysis. Firstly, all the articles were read thoroughly, familiarising oneself with the phenomenon. At the same time, the article's quality assessment was conducted. During the quality assessment, the articles were systematically marked and tabulated into a table (including authors, publication date, country of origin, study design, data collection method, and outcome measures). Secondly, the key findings of the methods on influencing young people's attitudes were classified and combined into descriptive categories. These categories gave a deeper explanatory understanding, aligning with the study's aims.

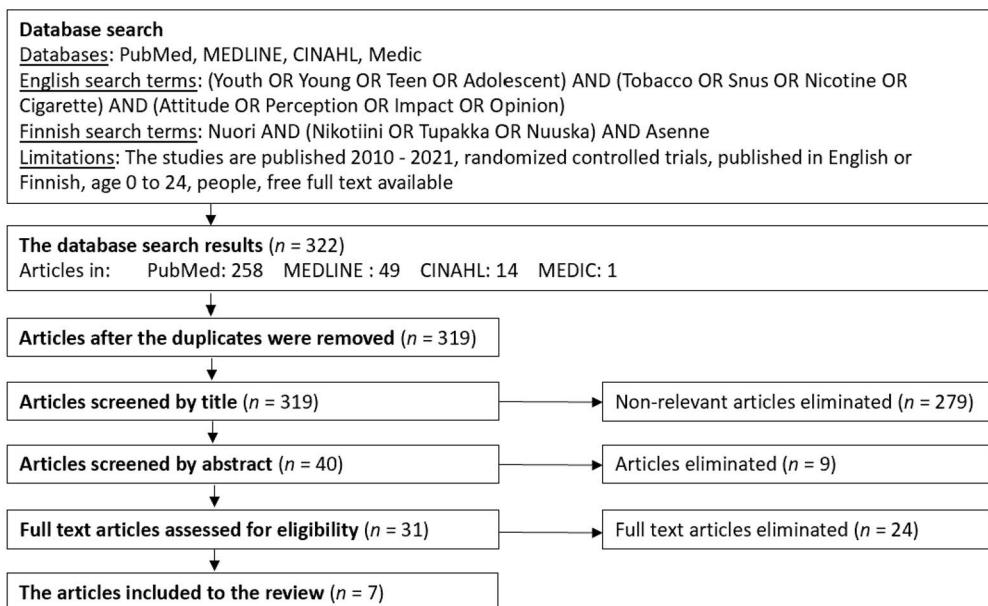


Figure 4. The PRISMA 2010 flow diagram (modified from Publication I; Vaihekoski et al. 2022).

Description of the Eligible Studies and Participants

All the eligible studies were randomised controlled trials. Four of the articles were conducted in Europe and three in the USA. Four studies were school-based interventions, two on the effects of nicotine-related advertisements, and one on the warnings on parents' cigarette packs. The number of participants in the studies ranged from 112 to 7,079, with ages between 9 and 17 years. The participants were from Europe or the USA.

4.3 Part II: Empirical Research Phase

4.3.1 Recruitment of Participants

Recruitment of Vocational Students in Study II

The Finnish vocational students were recruited from the Turku vocational institute in Southwest Finland as part of the ANKKURI project in November 2020. The project was coordinated by Turku University of Applied Sciences from 2020 to 2022. The project target group age range was from 15 to 28 years, based on the Youth Act definition of the age range for young people. This set the age range for Study II in this PhD Thesis. One of the project's aims was to develop operational models to support students' nicotine-free lifestyle. (Salakari, 2022.) The recruitment process, informing participants, minors' guardians and teachers, was done by the project.

461 vocational students participated, and seven participants were excluded because they were older than 28 years of age, resulting in a final study population becoming 449. The youngest students were 15 when they participated in the study, but they all turned 16 by the end of 2020. Most participants were under 18 years of age, female, living with parents or guardians, and self-rating their health as excellent or moderately good. 12.9 % of the participants smoke tobacco daily, 7.1 % smoked weekly, but not daily, 8.7 % less than weekly, and 65.7 % were non-smokers. The same numbers in snus use were: daily 8.7 %, weekly 5.3 %, less than weekly 4.2 %, and non-users 81.7 %. Participants who used e-cigarettes daily were 2.0 %, weekly 2.0 %, less than weekly 7.8 %, and non-users 88.2 %.

Recruitment of Vocational Students in Study III

The Finnish vocational students were recruited from one vocational institute in Southwest Finland. The participants' age group was limited to 16–18 years, as they represent a similar developmental stage (mid or late adolescence) and were expected to form a relatively homogeneous group, which would improve the reliability of the

results and reduce the influence of confounding factors such as different developmental stages and life situations. In this age group, they all had their experiences, for example, school-based health promotion from the same time slot.

The recruiting started in November 2022 and ended in May 2023. The school's contact person provided a list of student groups with students between the ages of 16 and 18. The list was an Excel file, which included information on how many students (in numbers) were suitable for the target group in each student group. The student groups were then randomly selected using Excel. Firstly, Excel randomly assigned the student groups and produced a new list of the groups. Thereafter, based on this list, the recruitment started.

The school's second contact person sent a Wilma message to the student groups, offering them the opportunity to participate in the study. The invitation to participate was sent to students and minors' guardians. It provided information about the study's purpose, the nature of participation, the voluntary basis of involvement, assurances of confidentiality, relevant contact details, and registration. Registration was either an electronic link or by a sealed form. Additionally, the same information was provided to the teachers of the selected student groups, and the doctoral researcher offered to present the study at the school. Beginning and during the requirements of the participants, the doctoral researcher informed them verbally about the study and participation in school lessons in the selected student groups, if there was someone in the student group interested in participating. The purpose of the face-to-face information was to answer questions about the study and participation. Students registered for the study either electronically or via a sealed form. This protocol was repeated until the required number of focus group interview participants had been gained.

In total, of 22 vocational students, aged 16 to 18, participated in the interviews, with 2 to 7 participants per group. The groups were from different vocational campuses. Every campus is divided into different vocational fields. The participants' vocational fields were not collected as part of the data collection. The participants in Studies II and III were not the same individuals.

4.3.2 Data Collection

Questionnaire in Study II

The data were collected through an electronic questionnaire survey by the ANKKURI project. The questionnaire was developed based on two Finnish survey instruments (1. The Adolescent Health and Lifestyle Survey 2015: Adolescent smoking, alcohol and substance use in 1977–2015, and 2. The Adolescent Health and Lifestyle Survey 2017: Adolescent smoking, alcohol use, and gambling)

(Kinnunen et al. 2015, 2017) and the results of two unpublished systematic literature reviews (Elo et al. 2017; Lehto 2017). (Granholm & Salakari, 2022.) The questionnaire was structured using elements already utilised in existing validated instruments and supplemented with target group-specific research knowledge from systematic literature reviews. The content validity of the questionnaire was pre-assessed in 2017 (Granholm & Salakari, 2022; Presser et al., 2004).

The questionnaire included questions related to demographic data, self-rated health, alcohol use and binge drinking, and the frequency of snus, traditional cigarettes, and e-cigarette use. Questions addressed statements about nicotine products, their appearance, health effects, and peer pressure on a Likert scale of 1–5 (1 strongly disagree, 4 strongly agree, and 5 “I do not know”). All participants answered the online questionnaire during a lesson. Participants were instructed to answer the questionnaire once. Answering was conducted with a computer or cell phone, and participants could edit their answers before the final submission.

Focus Group Interview on Study III

The data were collected through focus group interviews. The method targets a specific topic and perspective (Tausch & Menold, 2016) and is well-suited for studying young people’s views and experiences (Mäntyranta & Kaila, 2008). In a focus group interview, the group can support individual perspectives and expressions, offering a more comprehensive picture of the phenomenon under study than individual interviews (Tausch & Menold, 2016).

The aim was to study vocational students’ views on factors related to the use of nicotine and other substances and to describe the measures to support their substance-free living in the school environment. The interview framework was created based on the aim, the results of Study II, and the specific research questions in Study III, so that each research question formed one theme: 1) Meaningful factors for vocational students in activities supporting substance-free living, and 2) What kind of activities supporting vocational students’ substance-free living should be organised in schools? Sub-questions were written under both themes.

The interviews proceeded according to the planned framework and its themes. The doctoral researcher and an assistant were present during the interviews. The doctoral researcher was responsible for conducting the interviews, and the assistant handled the signing of informed consents and collecting them for archiving. The assistant took written notes during the interviews. The assistant had the opportunity to leave the interview to check on the participants’ situation and, if necessary, direct them to support services if the participant wished to discontinue the interview. None of the participants did so.

The interviews were documented with the time, place, and duration of the interview, the number of participants, their age range and the interviewers. The interviews were recorded as audio recordings with the participants' permission. The recording was made with two different recorders to ensure audibility and quality, and to prevent technical issues. The interviews lasted from 40 to 58 minutes. The audio recordings were transcribed into separate interview entities. The entire dataset comprises 103 pages (Times New Roman 12, 1.5-line spacing). The average length of the transcribed interviews was 22 pages, with the shortest being 17 and the longest 27 pages of text.

4.3.3 Data Analysis

In the empirical research phase, data analysis is divided into two headings: quantitative (Study II) and qualitative analysis (Study III).

4.3.3.1 Quantitative Analysis

This heading includes the Study II quantitative analysis in its totality. Starting with the outcome variables and covariates and ending with the statistical analysis.

4.3.3.1.1 Outcome Variables

In Study II, information about nicotine product use was collected with questions concerning tobacco smoking, snus, and e-cigarette use. Tobacco smoking options: do not use, on pause or ceased, use less frequently than once a week, use once a week or more, but not daily, and use once a day or more. Use of snus and e-cigarette options: do not use, use less frequently than once a week, use once a week or more, but not daily, and use once a day or more. Later, the participants were classified into non-users and users. Non-users were the ones who chose the option not to use snus and e-cigarettes, and in tobacco smoking, the options not to use, paused or ceased. The users could use snus, tobacco, e-cigarettes, or a combination of these products from less than once a week to more than once a day.

The participants' alcohol use was initially measured with nine options, ranging from no alcohol use to daily use. These were later combined into four categories: no use or very infrequent use, alcohol use 3-6 times a year, 1-2 times a month, and daily or 1-2 times a week. Participants also reported their binge drinking frequency, with options ranging from weekly to never.

Beliefs and attitudes towards nicotine products and their use were assessed with 20 statements using a Likert scale of 1-5 (strongly agree, somewhat agree, "I do not know", somewhat disagree, and strongly disagree). The statements were nicotine

product impressions, social norms, feelings of pleasure from nicotine products, nicotine products' appearance and their impacts on appearance, and the opinions of family members and friends.

4.3.3.1.2 Covariates

In Study II, sociodemographic factors, including age, gender, living conditions, and self-rated health, were covariates. Participants' genders were defined as female, male and other, where "I do not want to answer" was included due to low frequency ($n = 15$). The living conditions were living alone, with parents or guardians, with a cohabiting partner or spouse, with friends, and other living arrangements. The last two were combined due to low frequency ($n = 24$). The participants, who reported 'other living arrangements', included living with both parents in different apartments, with a sibling or grandparents, and in a foster home. The participants estimated their self-rated health on a Likert scale of 1–5 (from excellent, moderately good, and "I do not know", moderately poor, and very poor).

4.3.3.1.3 Statistical Analysis

The Study II's explanatory variables were current nicotine use status categorised into non-users and users. The background variables were age, gender, living conditions, self-rated health, use of snus, tobacco, e-cigarettes, alcohol, and binge drinking. Self-rated health was rescaled again before the analysis, so "I do not know" was centred as 3 on the Likert scale. This was done to prevent distortion of the statistical results, particularly to avoid amplifying any bias towards' disagreement with the statements. The proportion of participants in these variables was calculated and expressed as percentages. The prevalence of e-cigarettes, tobacco smoking, and the use of snus was determined.

Firstly, statement frequencies from nicotine product users and non-users were compared using the Mann–Whitney U tests. Secondly, the 20 statements were grouped based on factor analysis. The factor analysis was conducted with the principal components factor extraction method and varimax rotation, retaining all factors with eigenvalues exceeding a minimum value of 1. The data was suitable for factor analysis (The Kaiser–Meyer–Olkin (KMO) value 0.80 and Barlette's test p -value < 0.001). The values of two variables ('Nicotine products should be completely banned' and 'My parents do not care if I use nicotine products'), which had a different direction from the others, were reversed before creating the sum variables. Finally, all variables were computed into summary measures and tested with the Mann–Whitney U test to investigate the differences between non-users and users. The test was also used to research participants' attitudes and beliefs according to

their nicotine use status. The level of significance was set at $p\text{-value} \leq 0.05$. Statistical analyses were conducted using IBM SPSS Statistics for Windows, version 29 (IBM Corp, Armonk, NY, 2022).

4.3.3.2 Qualitative Analysis

Inductive Content Analysis

In Study III, the focus group interview data were analysed using inductive content analysis and Nvivo (Release 1.7.2, QSR International, 2024). The doctoral researcher read the transcribed data multiple times to gain a comprehensive understanding of the material. The analysis progressed from coding original expressions to grouping codes into subcategories and then into categories, from which themes were formed. (Table 3). The data were condensed by combining codes with similar content and removing irrelevant aspects of the phenomenon under study. The transcribed text was revisited multiple times during different phases of the analysis, and finally, the correspondence of themes and categories to the research questions was verified. (Graneheim & Lundman, 2004)

To enhance the reliability of the inductive coding process, the doctoral researcher maintained an audit trail by documenting coding decisions and revisiting the data throughout the analysis. Coding consistency was further supported through discussions within the research group, which included the doctoral researcher and the doctoral supervisors. In addition, the manuscript, based on Study III consists of an example illustrating how a code was formed, and original participant expressions were used in reporting the results of the article and this PhD Thesis to enhance transparency and credibility.

The inductive content analysis results were two themes and three categories that describe the perceptions of 16–18-year-old vocational students of substance-free living and related factors, as well as meaningful factors related to health promotion in the school environment. Table 3 presents the themes, categories, and their subcategories and codes.

Table 3. The Themes, Categories, Subcategories and Codes to Describe Vocational Students' Perceptions of Substance-free Living and its Related Factors, and Factors Related to Health Promotion in the School Environment.

Theme	Category	Subcategory	Code		
Factors That Matter to Young People in Activities Supporting Substance-Free Living	Factors Supporting Substance-Free Living Among Young People	Influence of Close Relationships and Hobbies on Young People's Substance-Free Living	Substance-free living and substance use behaviour of friends and close adults		
		Young People's Choices	Parental attitudes toward nicotine and substance use Participation in hobbies and shared activities Personal decision regarding nicotine and substance use Experiences with nicotine and substances Peer group and the desire to belong Attitudes, personal traits, and background Availability of nicotine products and other substances Maintaining a sense of control Willingness to care for others		
	Societal Perspectives on Young People's Use of Substances and Nicotine Products	Environmental Influences on Young People's Substance Use Behaviour	Impact of the school environment and teachers on young people's use of nicotine products		
		Concern for Younger Individuals	Worry about siblings and other younger individuals using nicotine and other substances		
		Criminalisation	Punishment related to nicotine and other substance use		
	Implementation of Health Promotion Activities Aimed at Reducing the Use of Substances and Nicotine Products Among Young People in the School Environment	Key Factors Related to Health Promotion Activities for Young People in the School Environment	Social Media	The influence of social media on young people	
			Participation in Activities	Willingness to participate Lack of interest Rewarding for participation	
		Implementing of Activities in the School Environment	Impactful Content of Activities	Awareness of the harms caused by substance use	Peer experts with lived experience
				Support for quitting nicotine and other substance use	Non-judgmental approach
			Factors related to the school day, timing, and execution	Factors related to space and practical arrangements	Factors related to the school day, timing, and execution
Factors related to space and practical arrangements					

4.4 Ethical Considerations

The systematic literature review (Study I) was carefully designed and thoroughly documented following the guidelines of the Finnish Advisory Board on Research Integrity (2019) (TENK, 2019). Ethical approval was applied for Studies II and III. Before the data collection for Study II in the ANKKURI project, ethical approval was granted by the Research Ethics Committee of Turku University of Applied Sciences, and permission to conduct research was obtained from the participating vocational institute in November 2020. In Study III, ethical approval was obtained from the Ethics Committee of the University of Turku (10/2022/37), and permission to conduct research was received from the participating vocational institute (11/2022/§76).

5 Results

5.1 Findings from The Systematic Review

Young people's attitudes and beliefs concerning nicotine products and other substance use have major implications for their decision-making and health-related choices. As shown in Study I, young people hold positive attitudes toward tobacco and nicotine products; their understanding of these substances was limited or incorrect, especially regarding newer nicotine products. Young people perceived e-cigarettes as high-tech and visually appealing, associating them with social benefits and enjoyment. When young people considered e-cigarettes to be healthy, they were more susceptible to trying e-cigarettes or cigarettes.

Exposure to knowledge of the health risks and the knowledge of the intake of harmful chemicals associated with smoking in campaign advertisements has been shown to increase young people's awareness of the health risks associated with smoking, leading to more negative attitudes and promoting non-smoking. Pictorial warnings on parents' cigarette packs were more effective than text-only warnings, and pictorial warnings encourage more discussion about health issues and smoking than text-only warnings. The effectiveness of these conversations depends on the accuracy of the information shared and the communication skills of those involved, as they impact young people's attitudes and beliefs. The downside of the pictorial warnings was that they raised young people's concern about their parents' health due to smoking.

The school environment is a unique and effective platform for shaping health behaviours and health promotion among young people. Specifically, interventions have been shown to influence their attitudes toward smoking, reducing both the likelihood of initiation and lifetime smoking rates. School-based programs significantly increase young people's knowledge about the risks and consequences of smoking and diminish positive attitudes toward tobacco use. The timing of these interventions is crucial. They are most effective when targeted at younger adolescents, before smoking habits are established. A summary of the systematic literature's eligible studies is shown in Table 4. The table includes JBI quality assessment points, sample characteristics, study aims, and outcome measures.

Table 4. Summary of the Eligible Studies. (Modified from Publication I; Vaihekoski et al. 2022.)

First Author, Publication Year, Country, and JBI Quality Assessment Points	Sample Characteristics	Aim	Outcome
Giannotta, 2014, Europe. JBI: 8	n = 7079 A four-arm, cluster randomised, controlled trial in which schools were randomly assigned either to one of three experimental arms or to a control group receiving the usual health education curriculum in seven European countries (Austria, Belgium, Germany, Greece, Italy, Spain, and Sweden). Participants' mean age was 13.25 years.	To study factors mediating the effects of a European school-based intervention based on a social influence approach to young people's tobacco, alcohol and cannabis use.	The intervention significantly reduced positive attitudes toward drugs, beliefs about the consequences of tobacco, alcohol, and cannabis use, and the perception of having many friends who smoke. It increased participants' knowledge and ability to refuse cigarette offers, improved class climate, and slightly enhanced refusal skills for alcohol and cannabis, as well as negative beliefs about tobacco use.
Isensee, 2014, Germany. JBI: 9.	n = 2513 A two-arm prospective cluster randomised controlled trial for students in grades 5 and 6 in four federal states in Germany with a follow-up survey. Participants' mean age was 10.37 and in follow-ups 12.50 years.	To study the effects of a school-based prevention programme on students' smoking-related behaviour, attitudes and knowledge.	School-based prevention increased smoking-related knowledge, reduced lifetime smoking rates, and shifted attitudes and risk perceptions toward smoking in a more critical direction.
La Torre, 2010, Italy. JBI: 9.	n = 842 The trial included 534 children (ages 9–11) and 308 adolescents (ages 14–15), who were randomly selected to receive or not to receive the prevention programme. A questionnaire was used before the intervention and two years later.	To study a school-based programme to prevent tobacco use in children and adolescents.	Smoking rates increased in both groups, but the difference was statistically significant only among children, with the intervention group showing only a slight increase compared to a much larger rise in the control group. The study suggests school-based prevention programs may be highly effective all over the world, especially when targeting children before adolescence.
Miovsky, 2012, Czech Republic. JBI: 9.	n = 1753 The 6th graders from three regions in the Czech Republic were randomised to the control or intervention arm.	To study a school-based intervention (Unplugged) on reducing the risk of alcohol, tobacco, inhalant and illegal drug use among children.	The program effectively reduced current tobacco and marijuana use. It prevented increases in lifetime drug use two years post-intervention, supporting its role as a foundation for universal substance abuse prevention.
Padon, 2018, USA. JBI: 8.	n = 417 Non-smoking adolescents (ages 13–17) were randomly assigned to the control group or the ads group. After exposure, participants completed both overt (self reported attitudes, product beliefs, susceptibility) and covert measures (time pressured product choice task and an implicit association test).	To study the effect of youth appealing e-cigarette ads on susceptibility to use e-cigarettes among young people.	Nearly half of respondents viewed e-cigarettes as high-tech, with many finding them visually appealing, socially beneficial, or fun. 15% believed they were healthy. Over half (54%) were open to trying e-cigarettes, and more than a third to tobacco cigarettes.
Peebles, 2016, USA. JBI: 6.	n = 112 Adolescents' (ages 13–17) parents received either text-only or pictorial warnings on their cigarette packs for four weeks. Adolescents' responses to these cigarette packs were measured.	To study adolescents' responses to warnings on their parents' cigarette packs.	Pictorial cigarette warnings triggered stronger negative emotions than text-only ones, were better recalled and recognised, drew more attention, and encouraged more discussion among adolescents.
Zhao, 2016, USA. JBI: 7.	n = 3258 The adolescents (ages 13–17) were randomized to control group or ad-viewing group.	To study youth receptivity to potential campaign ads.	Participants who saw the ads found them effective, perceiving higher health risks and chemical exposure from smoking, greater potential for loss of control, and expressing more negative attitudes toward smoking than the control group.

The Research Gaps

Based on the findings of the systematic literature review, two significant research gaps were identified. First, there is a limited understanding of young people's attitudes and beliefs regarding nicotine products and how these perceptions influence their behaviour. The review highlighted that some young people hold misconceptions about the risks and effects of nicotine use, and that peer norms may

reinforce positive associations with these products, even when individual attitudes are more cautious or negative. This underlines the need for deeper insight into the nuanced ways young people deal with the phenomena.

Second, according to the review, it seems that health-promoting interventions are frequently designed by individuals or institutions outside the target group, which may reduce their relevance and effectiveness. Young people's own perspectives on what constitutes meaningful and impactful health promotion and supports substance-free living should be researched.

In response to these gaps, Study II was designed to explore vocational students' attitudes toward nicotine products, comparing users and non-users to understand the factors shaping their perceptions. The results of Study II informed the design of Study III, which focused on vocational students' own perspectives on substance-free living and their perceptions of health promotion within the school environment. By grounding the research in young people's, especially vocational students', lived experiences and perceptions, the studies aim to contribute to more youth-centred and contextually relevant approaches to nicotine and other substances prevention. The results of the empirical phase (Study II and Study III) are presented in the following chapters.

5.2 Vocational Students' Decision-Making Related to the Use of Nicotine Products

5.2.1 Attitudes and Beliefs

Vocational students' attitudes and beliefs concerning nicotine products and other substance use have major implications for their decision-making and health-related choices. In Study II, the attitudes and beliefs were researched through categorising the participants into nicotine product users and non-users. The attitudes and beliefs of vocational students were grouped into six themes based on the results of factor analysis comparing nicotine product users with non-users (Table 5.). First, in **the theme of impressions of nicotine products**, the attitudes and beliefs of users and non-users differ. The users more often thought that snus is healthier than tobacco ($p=0.047$), that snus is a part of hockey culture than the non-users ($p=0.002$), or that adolescents with hobbies do not use snus ($p<0.001$). Second, regarding **the pleasure from nicotine products**, users stated that nicotine products were relaxing and beneficial for improving mood more often than non-users. In contrast, non-users strongly disagreed with these claims and were more inclined to support banning nicotine products. In this theme, non-users disagreed more often with the statements than users ($p<0.001$). These findings reflected the differing attitudes and beliefs between users and non-users. (Table 5, Figure 5.)

Third, in **the nicotine products appearance** theme, non-users were more likely to reject the idea that warnings on tobacco packaging were pointless ($p < 0.001$). Meanwhile, users found e-cigarettes more intriguing ($p = 0.002$) and were more likely to believe they were safe ($p = 0.018$), although many participants remained uncertain about their actual safety. The non-users disagreed more often with the theme than the users. Fourth, regarding **the impact of nicotine use on appearance**, non-users were more likely to believe that nicotine users performed worse in school. However, both groups largely disagreed with statements suggesting that nicotine users appeared older than their age or that smokers have more friends. Overall, the non-users' opinions were more similar within their group, whereas in the users', they varied more (Figure 5). Fifth, **the impact of others on their opinions** varied between non-users and users. Non-users found it easier to refuse nicotine products when offered by friends ($p < 0.001$) and believed their parents cared about their nicotine use ($p < 0.001$). Users were less likely to agree with these views. In this theme, the variation between users and non-users was similar, but the values were at different levels ($p < 0.001$) (Figure 5). (Table 5).

Finally, in terms of **attitudes toward nicotine use**, both groups agreed that non-smoking was fashionable and that friends played a role in influencing young people's nicotine use. Users and non-users approached this theme similarly, with no statistical difference.

Overall, Study II showed distinct differences in perceptions of the themes between users and non-users. Vocational students' attitudes toward nicotine products are closely tied to their own nicotine usage, social environment, and personal experiences. Non-users tend to be more critical of the social norms surrounding nicotine use and more concerned about its impact on appearance and academic performance. In contrast, users are more likely to emphasise the pleasurable effects of nicotine and probably downplay its potential negative consequences. Both groups recognise the influence of peer pressure, but non-users report stronger support from family and greater ability in refusing nicotine products. Overall, the study highlights differences in attitudes, beliefs and perceptions between users and non-users, shaped by both individual and social factors. (Table 5, Figure 5.)

Table 5. Attitudes and beliefs related to nicotine products and their use among non-users and users of nicotine products by themes (1–6) and statements. The figures are expressed as numbers (percentages). The scale is a Likert scale of 1–5 (1 as strongly disagree, 2 as somewhat disagree, 3 as not know, 4 as somewhat agree, and 5 as strongly agree). Non-users and users are compared with the Mann–Whitney U-Test. (Publication II, Vaihekoski et al. 2025.)

Theme	Statement	Agree				Disagree				p*
		Strongly	Somewhat	Not know	Somewhat	Strongly	Somewhat	Not know	Somewhat	
Impressions of nicotine products (1)	Nicotine product users are brave	Non-users	4 (1.4)	8 (2.8)	31 (10.8)	43 (15.0)	201 (70.0)			0.021
		Users	5 (3.1)	4 (2.5)	25 (15.4)	32 (19.8)	96 (59.3)			
	Snus is healthier than tobacco	Non-users	5 (1.7)	20 (7.0)	91 (31.7)	36 (12.5)	135 (47.0)			0.047
		Users	11 (6.8)	19 (11.7)	41 (25.3)	28 (17.3)	63 (38.9)			
	The use of snus is a part of ice hockey culture	Non-users	24 (8.4)	81 (28.2)	80 (27.9)	33 (11.5)	69 (24.0)			0.002
		Users	24 (14.8)	57 (35.2)	37 (22.8)	21 (13.0)	23 (14.2)			
	Snus enhances an athlete's performance	Non-users	3 (1.0)	9 (3.1)	72 (25.1)	21 (7.3)	182 (63.4)			0.358
		Users	6 (3.7)	11 (6.8)	31 (19.1)	17 (10.5)	97 (59.9)			
	Adolescents who have hobbies do not smoke	Non-users	5 (1.7)	35 (12.2)	67 (23.3)	82 (28.6)	98 (34.1)			0.018
		Users	7 (4.3)	17 (10.5)	23 (14.2)	36 (22.2)	79 (48.8)			
Snus users are smarter than smokers	Non-users	3 (1.0)	8 (2.8)	96 (33.4)	24 (8.4)	156 (54.4)			0.915	
	Users	9 (5.6)	5 (3.1)	41 (25.3)	19 (11.7)	88 (54.3)				
Adolescents with hobbies do not use snus	Non-users	5 (1.7)	14 (4.9)	77 (26.8)	73 (25.4)	118 (41.1)			<0.001	
	Users	2 (1.2)	6 (3.7)	29 (17.9)	27 (16.7)	98 (60.5)				
Pleasures from nicotine products (2)	Nicotine product use is relaxing	Non-users	10 (3.5)	53 (18.5)	135 (47.0)	28 (9.8)	61 (21.3)			<0.001
		Users	54 (33.3)	78 (48.1)	12 (7.4)	14 (8.6)	4 (2.5)			
	Nicotine product use improves mood	Non-users	3 (1.0)	49 (17.1)	123 (42.9)	30 (10.5)	82 (28.6)			<0.001
		Users	36 (22.2)	72 (44.4)	16 (9.9)	26 (16.0)	12 (7.4)			
	Nicotine products should be completely banned	Non-users	80 (27.9)	75 (26.1)	48 (16.7)	54 (18.8)	30 (10.5)			<0.001
		Users	7 (4.3)	21 (13.0)	26 (16.0)	39 (24.1)	69 (42.6)			

Table 5. (continued)

Theme	Statement	Agree				Disagree			p*
		Strongly	Somewhat	Not know	Somewhat	Strongly			
Nicotine products appearance (3)	Warnings on tobacco packages are pointless	Non-users 36 (12.5)	50 (17.4)	43 (15.0)	60 (20.9)	98 (34.1)			<0.001
		Users 44 (27.2)	36 (22.2)	15 (9.3)	37 (22.8)	30 (18.5)			
	E-cigarettes seem interesting	Non-users 16 (5.6)	58 (20.2)	48 (16.7)	30 (10.5)	135 (47.0)			0.002
		Users 25 (15.4)	35 (21.6)	19 (11.7)	31 (19.1)	52 (32.1)			
	E-cigarettes are safe to use	Non-users 6 (2.1)	25 (8.7)	69 (24.0)	60 (20.9)	127 (44.3)			0.018
		Users 15 (9.3)	17 (10.5)	26 (16.0)	54 (33.3)	50 (30.9)			
The impact of nicotine product use on appearance (4)	Nicotine users perform worse in school than others	Non-users 29 (10.1)	62 (21.6)	82 (28.6)	53 (18.5)	61 (21.3)			<0.001
		Users 4 (2.5)	24 (14.8)	27 (16.7)	31 (19.1)	76 (46.9)			
	Nicotine users appear older than their age	Non-users 15 (5.2)	40 (13.9)	55 (19.2)	55 (19.2)	122 (42.5)			0.671
		Users 3 (1.9)	24 (14.8)	27 (16.7)	42 (25.9)	66 (40.7)			
	Smokers have more friends	Non-users 12 (4.2)	46 (16.0)	103 (35.9)	50 (17.4)	76 (26.5)			0.124
		Users 8 (4.9)	26 (16.0)	42 (25.9)	28 (17.3)	58 (35.8)			
Impact of others on their opinions (5)	Refusing nicotine products is easy, even if a friend offers	Non-users 152 (53.0)	60 (20.9)	24 (8.4)	37 (12.9)	14 (4.9)			<0.001
		Users 49 (30.2)	41 (25.3)	16 (9.9)	42 (25.9)	14 (8.6)			
	My parents do not care if I use nicotine products	Non-users 8 (2.8)	19 (6.6)	39 (13.6)	35 (12.2)	186 (64.8)			<0.001
		Users 23 (14.2)	27 (16.7)	19 (11.7)	36 (22.2)	57 (35.2)			
Attitudes towards nicotine use (6)	Non-smoking is fashionable	Non-users 123 (42.9)	65 (22.6)	36 (12.5)	31 (10.8)	32 (11.1)			0.008
		Users 40 (24.7)	58 (35.8)	23 (14.2)	23 (14.2)	18 (11.1)			
	Friends influence the use of nicotine products	Non-users 111 (38.7)	118 (41.1)	28 (9.8)	20 (7.0)	10 (3.5)			0.444
		Users 67 (41.4)	68 (42.0)	10 (6.2)	13 (8.0)	4 (2.5)			

* Mann-Whitney U-Test

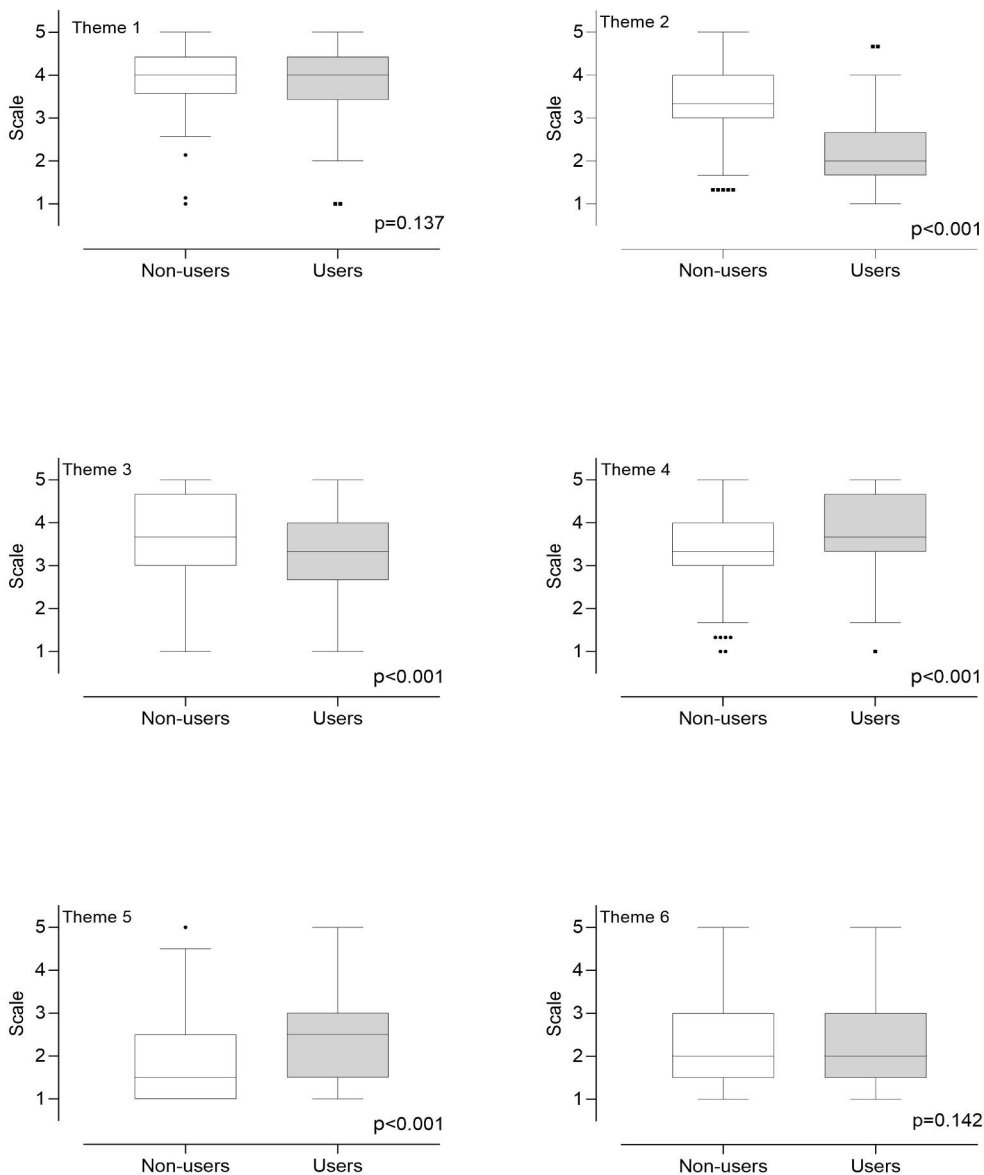


Figure 5. Attitudes and beliefs related to nicotine products and their use among non-users and users on six themes (box plots of theme 1-6 sums). Theme 1: Impressions of nicotine products, Theme 2: Pleasures from nicotine products, Theme 3: Nicotine products appearance, Theme 4: The impact of nicotine product use on appearance, Theme 5. Impact of others on their opinions, and Theme 6: Attitudes towards nicotine use. Likert scale of 1-5 (1 = strongly agree, 2 = somewhat agree, 3 = "I do not know", 4 = somewhat disagree and 5 = strongly disagree). Independent variable t-tests were used to describe the differences between the groups presented. (Publication II, Vaihekoski et al. 2025.)

5.2.2 Decision-Making

Various factors influence vocational students' decision-making concerning nicotine products and other substance use or substance-free living. According to Study III, the significant factors were personal choices made by the individual and the substance-free lifestyle or substance use of their close social circle. Substance use is often perceived as a personal decision, one that does not stem from a single defining factor. Vocational students' choices regarding substance use were reflected in descriptions as their own decision, their experiences with substances and nicotine products, the influence of their social circle and the need to belong, their attitudes, characteristics, and background, as well as the availability of nicotine products and other substances, the sense of control, and the concern for others.

A vocational student's decision to choose substance-free living plays a significant role in their overall nicotine product and substance-related behaviour. While some prioritise a substance-free life for their health and financial well-being, others may turn to substances as a coping mechanism during difficult life situations. *"The fact that they save money and their health stays good."* (Student 1 from the interview 3) *"Well, everyone is different, their own kind of person, and you can't really pinpoint any specific reason. For example, someone might be experiencing extreme stress at work or school and just want something numbing or relieving to feel better, or I don't know, just because. Everyone is different; each person has their own reasons, situations, and experiences."* (Student 3 from the interview 1) (Study III.)

Vocational students describe both positive and negative experiences with substance use. Curiosity, difficult life circumstances, withdrawal symptoms, fun, and the pursuit of well-being are key motivators. Alcohol use is often linked to having fun and the belief that consuming alcohol makes activities even more enjoyable. While alcohol can result in negative aftereffects, the memory of enjoyment remains, and the desire to use it again stands. *"Curiosity, things are going badly."* (Student 1 from the interview 4) *"Well, you just have to get more."* (Student 1 from the interview 3) *"So then, alcohol too — it's almost always about having fun."* (Student 1 from the interview 3) *"There's suffering, but you remember the fun."* (Student 3 from the interview 3.) Their personal motives and emotional experiences guide their substance use. Some seek relief, excitement, or pleasure through nicotine or alcohol, and others choose substance-free living to preserve their health and finances.

Friends and social circles play a crucial role in shaping attitudes and decision-making toward substance use. Social relationships and the desire to belong influence decisions. In Study III, some vocational students engage in substances to fit in with a group, while others actively choose to switch friend groups to support their substance-free living. The substance use of friends can affect what substances or nicotine products they use. An accepting social environment allows both users and non-users to coexist without pressure. *"The thing is, my friends who drink make me*

feel a thousand times more welcome without alcohol than in my old group, where I never felt like I was truly part of them." (Student 3 from the interview 4) (Study III.)

Another crucial thing that affects vocational students' substance-free living, or use of nicotine products or other substances, is their characteristics and background. Vocational students' attitudes, personal traits, background, self-confidence, the certainty gained from their upbringing, and their capability to handle peer pressure can affect their decision-making. Peer pressure can be strong, but some resist it due to their characteristics and background. Saying no is not necessarily difficult, but the temptation can still lead some to substance use. For others, resisting peer pressure is challenging. *"It's not hard to say no, but the urge to use does creep up."* (Student 2 from the interview 2) *"... And even if some in the group use, maybe it also depends on what kind of person you are, whether you can stand your ground and resist pressure. And probably also the upbringing you've had, and the environment you've lived in, like parents and friends, and just whether you have the confidence to stand your ground and not feel like saying no to substances will make your friends turn against you."* (Student 1 from the interview 5)

The behaviour and attitudes of friends and family members can either support substance-free living or reinforce substance use. *"Maybe it's the friend group, like how they use it and whether they use it at all."* (Student 1 from the interview 2) *"Well, if the parents smoke, there's a higher risk that the child or young person will use it too."* (Student 2 from the interview 2) *"My friends and their acquaintances have experience with the harms of it, so that's why I haven't started."* (Student 2 from the interview 5) Trustful relationships with parents and open communication have protective effects, whereas strict control may lead to secrecy or rebellious behaviour. *"Maybe if you really have a good relationship with your parents and all, then it might not lure you as much into smoking or stuff like that."* (Student 3 from the interview 4) *"Yeah, it lures you into starting to use substances, because strict, overly strict parents create this kind of shadowy kid who doesn't open up anymore. In a way, the trust in the parent fades... I lose all my freedom, so it lures me into using substances, and it's more like revenge against the parent: 'Ha, now I'm doing this.' ... 'Ha, I did this now because you took away all my freedom. Ha, what are you gonna do about it now?'"* (Student 1 from the interview 4)

A sense of control plays a role in substance-free choices. Being substance-free allows vocational students to maintain control over their behaviour, when the prevalence of smartphones and social media creates an additional concern. Vocational students do not want to be recorded or have embarrassing moments shared online, reinforcing their desire to stay substance-free. *"... But for me, it's the fact that I don't need to see pictures or videos later or hear someone say, 'Hey, do you remember doing this?' and then have to admit that I don't. That's what keeps me away from alcohol, it's just not my thing."* (Student 3 from the interview 4)

Vocational students' desire to care for others is another contributing factor. Some vocational students choose substance-free living so they can look after their intoxicated friends. They see themselves as guardians, ensuring their peers stay safe during social events. On the other hand, having a responsible, trusted person nearby can also lower the hesitation to use substances. *"I have a friend group that loves drinking on the weekends... but since I don't feel like it, I also don't want to go home. I feel like someone needs to be substance-free to watch over them. And even though it sounds like babysitting to my peers, I don't mind, as long as they're safe. I can have fun without being in the same condition they are, while also making sure they get home."* (Student 4 from the interview 4) *"Good supervision, having a reliable person around who can step in if things get out of hand, take someone home, or just make sure nothing bad happens. A best friend, a family member, or someone close in the family, for example."* (Student 2 from the interview 1)

Substance availability emerges as a key factor, as substances and nicotine products are often easily accessible. Whether through friends, strangers, or even parents who prefer to provide them to ensure safer usage. Vocational students acknowledge the need for better restrictions on nicotine products and other substances and the need for stricter enforcement of age restrictions. *"If your friends use it, then it's easy for you to get them too."* (Student 1 from the interview 5) *"... Just all kinds of tobacco products and stuff. And yeah, you can even get them from random people if you're lucky."* (Student 1 from the interview 5) *"... My mom prefers that I ask her to buy it for me instead of having someone else get it, so she knows what I use and can make sure I don't drink too much or something like that."* (Student 3 from the interview 4) *"That's why—so they don't just buy from some random person, and at least they get the product safely if they choose to use it."* (Student 1 from the interview 2) *"Or if vendors just followed the age limit, but that's kind of tricky."* (Student 2 from the interview 5)

Hobbies and meaningful activities can be protective factors. Activities, such as physical ones or group-based pastimes, were described as offering healthy alternatives to substance use, particularly during leisure time. Vocational students expressed a need for guidance and opportunities to support substance-free living, emphasizing that substance use tends to happen during free time. *"... Like, for example, if people were told what else they could do in their free time. So they'd have something else to do and could get their mind off feeling like they need substances."* (Student 1 from the interview 5) *"That opportunities are created so young people could do something else, like if in a certain friend group, substances are a big part of it or something..."* (Student 1 from the interview 5) *"Football, sprinting. If you smoke or use e-cigarettes, your lungs can't handle the overexertion that comes with it."* (Student 1 from the interview 4)

5.3 School-based Health Promotion among Vocational Students

5.3.1 Key Factors

Vocational students identified several key factors in health promotion activities aimed at reducing nicotine and other substance use. Based on Study III, the vocational students identified factors related to participation and the effectiveness of the content. Participation encompassed willingness and lack of interest in participating in the activities. Offering rewards for participation was considered beneficial. The effectiveness of the content was associated with awareness of substance-related harms, the involvement of peer experts, support for cessation, and a non-judgmental approach.

To ensure the participation of vocational students in health promotion activities, these initiatives should be based on voluntariness, provide new information, engage in interactive formats, and utilise rewards. The topic should be broad, for example, overall young people's well-being, with nicotine products and other substances addressed as one component. A vocational student's willingness to participate depends on personal reasons and whether the event is seen as interesting. Some may perceive the activity as unnecessary if they have already made decisions regarding substance use. *"Well, maybe it's that it still sounds kind of interesting, like if young people get something like 'this could be fun, let's go there, you get to do something,' ..."* (Student 1 from the interview 2) *"I wouldn't bother going to those kinds of places, since I've already decided, I don't want to use any nicotine products."*(Student 3 from the interview)

In terms of content, vocational students expressed awareness of the health risks and potential for addiction associated with nicotine products and other substance use. They also recognised that despite this awareness, many still choose to use these products. *"Quite a lot of people already know all the risks, but they still use it anyway."*(Student 1 from the interview 3) They tend to believe that health risks will not affect them personally, but rather someone else. There is a lack of understanding about how quickly health problems can arise from nicotine products and substance use. *"They think it takes many years for something to happen. But actually, it wouldn't take that long—if you use something continuously, the harms can come pretty fast."* (Student 2 from the interview 5)

Vocational students expressed a desire to see tangible examples of the health consequences of nicotine and substance use. They found peer experts, individuals with lived experience of addiction and recovery, particularly effective. These experts are relatable in age or background and can describe the realities of nicotine and substance use and the challenges of quitting in a way that feels authentic and non-judgmental.

Vocational students seek information and support for cessation. *“Someone with enough experience to share their own story and give tips, like how to get free from substances...”* (Student 3 from the interview 1) *“...They tell you the side effects, but they always forget to explain how you actually quit. ...Those [vocational school students] only know that some people say ‘quit cold turkey’ and others say ‘cut down gradually, smoke one less each day,’ but does that even help? If you’re still getting the same substance every day, just less of it.”*(Student 3 from the interview 4)

5.3.2 The Role of the School Environment

For vocational students, the school environment is an excellent setting for health promotion. By integrating health promotion activities into the school day and ensuring that these interventions are accessible, engaging, and tailored to the needs of vocational students, schools can foster healthier behaviours and attitudes. Vocational students perceive the school setting and school hours as the most effective context for health promotion activities. Participation during the school day is seen as more inclusive and accessible than activities organised during leisure time. *“Well, I think it would be better to have it at school rather than during free time. I feel like not many people would be able to attend if it were held during leisure time.”*(Student 2 from the interview 5)

The scheduling of health promotion activities also matters. If organised at the end of the school day, students are more likely to drop out in favour of going home. Instead, they propose that activities should be periodic and spaced out over longer intervals, rather than being continuous or overly frequent. *“Maybe just a short moment, like an hour at most during one day, but then again, maybe a similar session a year later. So there’s some repetition, but not regularly every couple of days. More like at long intervals.”* (Student 3 from the interview 1)

Teachers can facilitate student participation by guiding them toward health-related activities during lessons. However, students emphasise that actual participation remains a personal choice. *“But school is best during the lesson. Then the teacher just forces them to go there... or like, you have to go there, but who can force you to participate? No one.”* (Student 1 from the interview 1) This highlights the delicate balance between institutional encouragement and individual agency in health promotion.

A teacher’s behaviour can shape students’ attitudes toward nicotine use. When teachers take early action, by discussing the risks of nicotine products or sharing personal stories about quitting, they can positively influence students' health behaviour. Conversely, when teachers use nicotine products around students, it sends the wrong message and is often viewed as setting a poor example. Teachers should have a designated area for smoking, away from student spaces. *“Well, the [teacher]*

has shared their own experiences, how they got hooked on smoking and how they eventually quit.” (Student 1 from the interview 2) *“That [teacher] can explain it way better than someone who hasn’t used it. They know what it’s like and how it feels.”* (Student 1 from the interview 3) *“Or like, if teachers had their own smoking area, where they go, they wouldn’t be setting an example for younger students to smoke.”* (Student 2 from the interview 3)

The physical setting of health promotion activities also influences participation. Students prefer large spaces that can accommodate several participants and allow for staggered attendance. Social factors, such as attending with friends and having opportunities for dialogue with experts, are seen as beneficial. For more intimate discussions, smaller spaces with fewer participants are preferred. A modular approach with multiple thematic stations is also recommended. *“But like, there could be different stations with different things related to the same theme. Like in a mind map, there’s one main topic, but then smaller related things, there could be different stations for those... so you could go check out the ones that interest you instead of having to look at everything in one place.”* (Student 3 from the interview 1)

5.3.3 Health Promotion in the Societal Context

Vocational students had societal perspectives on young people’s nicotine and substance use. They expressed their concern about younger individuals’ use of substances and nicotine products, observing their increase and the rapid change in the situation over just a few years. Vocational students feel that preventive measures should be introduced earlier, especially for primary school students, as increasingly younger children are using nicotine products and other substances. These are easily accessible, even from their peers. They also recognise that the living environment influences younger individuals’ substance use and feel that interest in substances has grown among younger age groups compared to what they experienced at the same age. *“Well, what I’ve noticed myself is that it’s really worrying to see younger and younger kids getting interested in substances and how easily they can get them. Like, I have a little brother who’s 12, and I’ve seen 12-year-olds in [location] with cigarettes in their hands...”* (Student 1 from the interview 5)

Vocational students feel that the criminalisation of nicotine products or other substance use is a recognised issue that is addressed, but not strongly enough. They believe that simply notifying parents or social workers is not sufficient to prevent their use. Some support penalties for underage nicotine products or other substance use, seeing them to promote health and substance-free living through the fear of getting caught. *“... There has to be some way to stop it, maybe even through punishment. Like, there should be an age limit where it starts being taken seriously, not just police or social workers telling parents. If your home just gives you a timeout*

or something, that doesn't really stop a young person from doing it again right after... There should be tougher measures. If we want to make a difference, it has to come from higher up... Like, police could actually give a real punishment... So the young person wouldn't want to do it again and wouldn't use it." (Student 1 from the interview 5)

Vocational students emphasise that support should be offered to help individuals quit nicotine or other substances without blame. They feel that adults bear the responsibility, as they have a broader understanding of the effects of nicotine and other substance use than minors. On the other hand, some believe that by the age of 16, they can make their own decisions regarding nicotine and substance use, and that harsh punishments should not apply to them. Criminalisation and intervention should focus especially on younger minors, and the severity of punishment should depend on the youth's age and whether the behaviour is repeated. *"I think for those 16 and older, it shouldn't be like that. At that age, you can already decide for yourself whether you want to use it or not. So, not such harsh punishments. More the other way around... younger kids should get tougher penalties."* (Student 2 from the interview 5)

Vocational students also recognise the influence of social media on nicotine and substance use. They are influenced by what they see online and want to identify with influencers. They do not always understand how an influencer's real life differs from the lifestyle portrayed on social media. The impact on an individual's behaviour is highly personal. *"... because social media gives off the vibe that substances are okay. Like, a lot of celebrities use e-cigarettes or drink alcohol, so it makes it seem like it's okay... because they do it too... Social media is such a huge space, and it sends out so many different influences. Some people aren't affected, and some are. It's so individual."* (Student 1 from the interview 4)

5.4 Summary of the Results

General Summary of Findings

Main findings were young people's attitudes toward nicotine products and other substances, their awareness of health risks, influencing factors in vocational students' decision-making, close circles and environmental factors' impact, students' preferences for health promotion, the role of school environment, and societal factors supporting vocational students' substance-free living (Table 6). These results can be categorised into three categories: individual, close circles and environmental, and societal factors. These altogether describe the phenomenon of young people's substance-free living and their perceptions of health promotion in the school environment.

Table 6. Summary of the Results.

Factors	Main findings	Key insights
Individual	<p>Attitudes toward nicotine products and awareness of health risks</p> <p>Studies I, II, III</p>	<p>Young people hold positive attitudes toward nicotine products. These attitudes are especially prevalent among nicotine product users, who perceive nicotine as relaxing, mood-enhancing, and socially beneficial. E-cigarettes are viewed as modern and appealing due to a lack of knowledge about the new nicotine products.</p> <p>Some young people may lack a comprehensive understanding of the health risks associated with these products. Their knowledge is limited concerning health risks and withdrawal symptoms.</p> <p>Nicotine product users and non-users had differences in their attitudes and beliefs. Users tended to view nicotine products more favourably and reported higher levels of alcohol consumption and binge drinking. In contrast, non-users expressed stronger opposition to substance use and demonstrated greater resilience against peer pressure.</p>
	<p>Vocational students' Decision-making Factors</p> <p>Studies II, III</p>	<p>Decision-making around substance use was influenced by a range of factors, including individual values, social circles, upbringing, self-confidence, and the availability of substances. Peer pressure and family dynamics were seen as significant in shaping these choices.</p>
Close circle and living environment	<p>Close circles' health behaviour and attitudes towards nicotine and other substance use</p> <p>Studies I, II, III</p>	<p>Friends and social circles shape young people's attitudes and decision-making toward substance use. Social relationships and the desire to belong influence decisions. Peer pressure is a significant factor in their decision to try nicotine products. They were more willing to try the products, particularly when offered by a friend and the same substances or nicotine products friends use. Friends and family members' behaviour and attitudes can either support substance-free living or reinforce substance use. Trustful relationships with parents and open communication have protective effects, whereas strict control may lead to secrecy or rebellious behaviour. Vocational students need a sense of control, and their desire to care for others can also reinforce substance-free choices.</p>
	<p>Vocational Students' Preferences for Health Promotion and The Role of School Environment</p> <p>Studies I, III</p>	<p>School-based interventions were found to be effective, especially when implemented early. Programs that targeted younger adolescents helped reduce smoking initiation and improved students' knowledge about substance use.</p> <p>Vocational students preferred voluntary, engaging, and informative activities tailored to their needs. They responded positively to programs integrated into the school day and valued peer-led initiatives and real-life stories.</p> <p>Teachers can affect vocational students' attitudes toward nicotine use by taking early action, discussing the risks of nicotine products or sharing personal stories about quitting. Their own nicotine use around students sends the wrong message and sets a poor example.</p>
Societal	<p>Societal factors to support vocational students' substance-free living</p> <p>Studies I, III</p>	<p>Tobacco prevention campaigns, including pictorial warnings, have shown some success in raising awareness and promoting non-smoking behaviours.</p> <p>Vocational students expressed concern about the accessibility of substances to younger individuals and supported age-appropriate penalties. They feel that the criminalisation of nicotine products or other substance use is a recognised issue and currently addressed, but not strongly enough.</p> <p>They acknowledged the influence of social media and emphasised the importance of supportive, non-judgmental approaches.</p>

6 Discussion

6.1 Discussion of the Results

The findings suggest that young people's attitudes, beliefs, and decision-making processes are a combination of individual experiences, peer and family influences, and broader societal factors aligned within the Theory of Triadic Influence (TTI). Personal experiences and perceptions of risk determine how vocational students evaluate the use of nicotine products, while social relationships and peer norms further reinforce or inhibit these behaviours. At the societal level, accessibility, social media, and legislation influence both curiosity and actual use. These findings largely align with previous research on young people's nicotine and substance use, while highlighting novel insights such as the protective role of digital surveillance (being recorded or publicly embarrassed via social media) and active peer support. The following discussion explores these results in detail at the individual, close-circle, and societal levels, with implications for tailored interventions and health promotion strategies.

6.1.1 Individual Level

Attitudes toward Nicotine Products and Awareness of Health Risks

According to this PhD Thesis, young people's attitudes, beliefs, and perceptions were influenced by their own choices concerning nicotine. Young people's choices were shaped by individual experience, social environment, and perceived norms. Nicotine users expressed more favourable views toward nicotine products, describing them as relaxing and mood-enhancing. In contrast, non-users strongly rejected such claims and were more likely to support restrictive policies, such as banning nicotine products and endorsing warning labels on tobacco packaging. Users were more favourable towards e-cigarettes and more likely to believe they were safe, although uncertainty about their actual safety remained prevalent and presented knowledge gaps. These findings align with previous studies showing that many young people consider e-cigarettes less harmful than conventional cigarette products and hold misperceptions about their health risks (Villanueva-Blasco et al.,

2024; Sharma et al., 2021). A meta-analysis by Aly et al. (2022) demonstrated that young people who had ever used e-cigarettes were significantly more likely to perceive them as less harmful and less addictive than non-users (Aly et al., 2022). This highlights the attitudes, beliefs, and knowledge behind the role of product experience in shaping risk perceptions. Another meta-analysis by Khouja et al. (2021) found evidence linking e-cigarette use among non-smoking young people to subsequent initiation of later smoking, suggesting that underestimation of risks may have long-term behavioural consequences (Khouja et al., 2021).

Social influences were another key factor, and peer and family networks influence young people's perceptions (Sharma et al., 2021). In the PhD Thesis, non-users reported stronger parental support and better refusal skills of nicotine products offered by peers. Users, by contrast, were more susceptible to peer pressure and less likely to experience parental guidance. These dynamics with peers are supported by findings by Kelly et al. (2011), which showed that young people with close friends who used nicotine products were substantially more likely to initiate use themselves. The probability of smoking increased almost proportionally with the number of close friends who smoked, highlighting the dominant role of peer behaviour in early nicotine experimentation. In contrast, parental nicotine use showed only a modest association with youth initiation, indicating that while parental modelling may spark awareness or curiosity, it plays a much weaker role in predicting actual substance use compared to peer influence. (Kelly et al., 2011.) However, according to Mills et al. (2021), efficient parental support and monitoring serve as a protective factor against young people's nicotine and alcohol use (Mills et al., 2021).

Young people agreed that non-smoking was fashionable and acknowledged the influence of peers in shaping nicotine-related decisions. However, non-users were more critical of the social norms surrounding nicotine use and more concerned about its impact on appearance and academic performance. These distinctions suggest that prevention efforts should be tailored to address the social frameworks of users and non-users.

The PhD Thesis findings are consistent with international literature, indicating that young people's nicotine use is closely tied to attitudes, beliefs, perceived benefits, social reinforcement, and risk minimisation among users, while non-users tend to adopt more critical and health-conscious stances. These insights highlight the importance of targeted interventions that consider both individual and contextual factors in shaping young people's attitudes toward nicotine products.

Factors Related to Decision-making

According to PhD Thesis Studies II and III, nicotine and other substance use decision-making among vocational students is shaped by a complex interplay of

personal, social, and environmental factors. Choices regarding nicotine and other substance use are interactions of individual values, self-confidence, upbringing, and the availability of nicotine and other substances. Young people's impulsivity, difficulties in emotional regulation and accessibility of substances are key individual-level risk factors (Nawi et al., 2021). Their brains develop unevenly, and the limbic system matures earlier than the prefrontal cortex, leading to heightened emotional reactivity and risk-taking (Zanolie et al., 2022; Hermanson & Sajaniemi, 2018). Because brain development continues into the mid-20s, mature decision-making is not fully established until early adulthood (Sawyer et al., 2012; Smetana et al., 2006). This can support risk-taking and unhealthy choices in decision-making.

Peer pressure and family dynamics had an impact on young people's decision-making. Vocational students describe both the challenge of resisting peer influence and the protective role of supportive social environments. Deep et al. (2024) confirm that young people with a stronger sense of self-control are less vulnerable to peer influence. Young people with weak family attachment and antisocial peer models are also more likely to use substances. (Deep et al., 2024.) Conversely, strong parental monitoring and positive peer relationships serve as protective factors (Mills et al., 2021). Emotional regulation, moral rules against substance use, and decision-making skills act as individual protective factors against peer influence (Rodríguez-Ruiz & Espejo-Siles, 2025).

Vocational students framed substance use as a personal decision, influenced by their own experiences, attitudes, and social belonging. Decision-making regarding substance-related choices involves both emotional and rational processes, including affective responses and cognitive reasoning (Cheng et al., 2023). Vocational students reveal that curiosity, difficult life circumstances, and the pursuit of pleasure or relief are common motivators, particularly in relation to alcohol and nicotine. Alcohol use is frequently linked to social enjoyment, despite awareness of its negative aftereffects and a pattern in young people's reward-seeking behaviour. Among Finns, both social pressure and encouragement to drink and cultural norms around alcohol use were found to be significant factors influencing drinking habits, specifically among young adults (Deep et al., 2024).

Importantly, some vocational students actively choose substance-free living to preserve their health, finances, and sense of control. This decision is often reinforced by concerns about being recorded or publicly embarrassed via social media, highlighting the role of digital surveillance in shaping behavioural choices. The previous literature did not support these findings. Social media's effect on young people's nicotine and substance use is viewed as its influence on attitudes, mental images, and substance-use behaviour, not as a proactive behaviour protector of substance use (for Example, Cheng et al., 2023; Purba et al., 2023; Rutherford et al., 2023).

Social relationships are in a dual role; some vocational students engage in nicotine and other substance use to fit in, while others switch peer groups to support their substance-free living. The presence of accepting environments, where users and non-users coexist without pressure, might reduce the risk of peer-pressured nicotine and other substance use. The concept of peer norms is known to support young people's behaviour, where peer approval of a behaviour promotes that behaviour (Trucco, 2020). Vocational students also describe caring for intoxicated peers as a reason to remain sober, positioning themselves as guardians during social events. They report easy access to nicotine products and other substances, sometimes facilitated by friends, adults and even parents. They notice the need for stricter enforcement of age restrictions and regulatory measures.

Finally, meaningful activities, particularly physical and group-based hobbies, were described as protective alternatives during leisure time. Vocational students express a need for structured guidance and opportunities to support substance-free living in leisure time. According to Woodward et al. (2023), young people who engage regularly in structured leisure activities, such as organised sports, arts, or clubs, are generally less likely to use substances or engage in other risky behaviours. These activities can act as protective factors, especially when young people have access to positive role models and inclusive opportunities. Conversely, limited participation in structured leisure has been associated with higher substance use. While some structured settings, like competitive sports, may carry their own risks, the overall evidence suggests that meaningful, well-supported leisure environments can promote healthier choices and reduce vulnerability to substance-related harm. (Woodward et al., 2023.)

6.1.2 Close Circle and Environmental Level

Close Circles' Health Behaviour and Attitudes towards Nicotine and Other Substance Use

Friends and social circles shape young people's attitudes and decision-making toward substance use. Social relationships and the desire to belong influence decisions. Peer pressure is a significant factor in their decision to try nicotine products and alcohol. Peer and social groups influence young people's use of tobacco, alcohol and other drugs. Friends and social networks have an impact on what substances young people use through peer selection and peer socialisation. (Henneberger et al., 2021.) The frequent use of social media among young people has been associated with increased alcohol and tobacco use. Similarly, seeing health-risk behaviour on social media was linked to the use of ENDS. (Purba et al., 2023.)

Moral rules against substance use, sense of coherence, and decision-making can be protective factors against peer influence (Rodríguez-Ruiz & Espejo-Siles, 2025). Incorrect knowledge about the risk of, for example, e-cigarettes' harmfulness, can contribute to their use (Villanueva-Blasco et al., 2024). Vocational students were more willing to try the products, particularly when offered by a friend and the same substances or nicotine products that friends use.

Friends and family members' behaviour and attitudes can either support substance-free living or reinforce the use of nicotine and other substances. Peer acceptance and modelling increase the likelihood of use (Lund et al., 2022). Parental smoking increases the risk of young people's smoking initiation (Mays et al., 2014; Vuolo & Staff, 2013; Kelly et al., 2011). Relationships between parents and young people need to be trustworthy, and communication should be open. Then it could serve as a protective factor against nicotine and substance use, whereas strict control may lead to secrecy or rebellious behaviour. According to Rodríguez-Ruiz & Espejo-Siles (2025), parental closeness, support, and disapproval of nicotine and substance use serve as protective factors by reducing susceptibility to peer influence, particularly in early adolescence. Young people's voluntary disclosure appears to be a stronger predictor of reduced nicotine and substance use than parental monitoring. Siblings' nicotine or substance use is known to increase young people's vulnerability to peer pressure. (Rodríguez-Ruiz & Espejo-Siles, 2025.) Vocational students need a sense of control, and their desire to care for others can also reinforce substance-free choices.

Vocational Students' Preferences for Health Promotion and the Role of School Environment

There is mixed evidence regarding the effectiveness of school-based health promotion (Onrust et al., 2016). Some effectiveness was found when they were implemented early and targeted to younger adolescents, helping them reduce smoking initiation and improve their knowledge (Gardner et al., 2024). Vocational students believed that schools are a good place for health promotion. This was because it is easier to reach young people during school hours than in their leisure time. It would ensure the interventions are accessible. They should also be engaging and tailored to the needs of vocational students. According to Onrust et al. (2016), the developmental orientation should be considered, and the content of the health promotion should be targeted to fit the age group (Onrust et al., 2016).

Vocational students preferred voluntary and informative activities, and valued peer-led initiatives and real-life stories. Attending with friends and having chances to interact with experts are social factors that students consider beneficial. This raises the question of how to reach those young people who most need support and

information to strengthen their commitment to a substance-free lifestyle, especially if participation is entirely voluntary. On the other hand, young people's right to self-determination must be respected. This means finding ways to offer help that feel voluntary, youth-friendly and flexible, so that the information can reach those who need it most. Multiple themes and a modular approach were recommended to be held in large spaces and smaller spaces for private discussions. It is known that the effectiveness of the health promotion program varies by the method and content. Interactive programs that focus on social and resistance skills, and are multi-component approaches, tend to be more effective than programs targeting only knowledge or attitudes. (Onrust et al., 2016.) It is important to carefully consider the content of the programme or activity, not to increase young people's initiation (Gardner et al., 2024) for nicotine or other substance use.

Teachers also have their role. They can take early action, discuss the risks of nicotine products or share personal stories about quitting. Their own nicotine use around students sends the wrong message and sets a poor example (Andersen et al., 2019). From the perspective of young people, consistent actions by teachers in schools convey that a substance-free lifestyle is valued and encouraged through practical measures (Lipperman-Kreda et al., 2009; Lovato et al., 2007). Also, by encouraging young people to participate in health promotion activities during lessons, teachers can help foster their involvement. Still, the decision to participate is a matter of personal choice. Trained teachers can also facilitate the activities (Gardner et al., 2024).

The success of the health promotion program or activity also depends on individual factors, such as personal nicotine or substance use. Adolescence is a period for multiple risk behaviours, such as smoking and drinking, and they tend to co-occur (Charrier et al., 2024; Tinner et al., 2022). According to Study II, the nicotine product users have more acceptable attitudes and beliefs towards nicotine and other substance use than the non-users. This indicates different needs for health promotion content between users and non-users. Because many substance-use behaviours co-occur, interventions targeting multiple behaviours simultaneously are recommended, although the evidence of their effectiveness is limited (Tinner et al., 2022). Still, school-based programs are the most common approach to preventing substance use among young people (Tinner et al., 2022). This could be because of the convenience of reaching young people. However, carefully chosen social media channels can also be a place to connect young people without the time pressure and pressure of participating in a group.

6.1.3 Societal Level

Vocational students noted several societal factors that can affect and support substance-free living. They were nicotine and other substances accessibility, social media's influence, a non-judgmental approach, age-appropriate penalties, and criminalisation. Vocational students expressed concern about the rapid change in nicotine and substance use among younger individuals than themselves. This was partly because of the easy access to nicotine and other substances. According to the report of the Nordic Welfare Centre (2025), in recent years, e-cigarettes and nicotine pouches have entered the market, and they are particularly appealing to children and young people. Attractive marketing, including diverse flavours and designs, may contribute to the rising use of e-cigarettes, especially among girls. Moreover, the increasing availability of new nicotine products, particularly e-cigarettes and nicotine pouches, has accelerated their uptake among young people, including girls, whose use has risen markedly since 2021 and in many countries even more sharply than among boys. Consequently, this broader accessibility is reshaping the consumer landscape and attracting new user groups, such as young girls who have traditionally been less likely to engage in tobacco and nicotine use. (Nordic Welfare Centre, 2025.) Vocational students noted that preventive health promotion measures against nicotine and other substances should be introduced early, even in primary schools.

Vocational students acknowledged the influence of social media. They are aware that social media affects their attitudes toward nicotine and substance use by the content they see online, and their desire to emulate influencers. However, they do not always realise that an influencer's real life may differ significantly from the image presented on social media. The influencer's impact on young people is noted to be highly personal. Social media and its connection to risk behaviours are identified in the literature (Deep et al., 2024; Cheng et al., 2023; Purba et al., 2023; Rutherford et al., 2023). The frequent use of social media increases young people's alcohol consumption, tobacco use, and multiple risk behaviours (Purba et al., 2023). For example, exposure to e-cigarette and tobacco content on social media is linked to more positive attitudes, lower risk perception, and a higher likelihood of use among young people. Seeing both types of content further increases the risk of dual use and susceptibility. (Rutherford et al., 2023)

Vocational students supported age-appropriate penalties, and they feel that the criminalisation of nicotine products or other substance use is a recognised issue, but not addressed strongly enough. Some of them supported penalties for underage individuals for nicotine products or other substance use. The severity of the punishment should depend on the individual's age and the repetitiveness of the behaviour. This was seen to promote health and substance-free living through the fear of getting caught. Previous Finnish research has noted that for illicit drugs such as opioids, amphetamine, cannabis, and hashish, the severity of sanctions does not

appear to influence the likelihood of reoffending. This is because no statistically significant differences in recidivism were found between custodial and non-custodial sentences for offences related to the use of these substances. Moreover, the deterrence mechanisms, including the perceived certainty or severity of punishment, play only a limited role, as prior studies have shown that such deterrent effects are largely ineffective in reducing criminal or substance-related behaviour. (Miller et al., 2022.)

The Tobacco Act (549/2016) regulates the nicotine products in Finland. Recent amendments to the Act place nicotine pouches and other smokeless nicotine products under stricter regulation. The reforms introduce plain packaging, mandatory health warnings in Finnish and Swedish, and sales license requirements for retailers. These measures will take effect gradually between 2025 and 2026. The main goal of these changes is to prevent young people from starting to use nicotine products. By making packaging less appealing, restricting availability through licensing, and strengthening marketing and sales supervision, the law seeks to reduce the attractiveness, accessibility, and social visibility of nicotine use among young people. Clear health warnings are also intended to increase awareness of health risks and discourage experimentation. (Nawi et al., 2021)

Tobacco prevention campaigns and pictorial warnings have shown some success in raising awareness and promoting non-smoking behaviours. Factors, such as young people's attitudes towards nicotine and other substances, are shaped by a mix of perceived harm reduction, novelty of the products, the appearance of the device, social media, cultural norms, and law enforcement, which can affect young people's susceptibility to these products and increase the normalisation of their use. Nawi et al. (2021) found, in the context of drugs, that young people's perceptions of drug accessibility were associated with the strictness of law enforcement. (Nawi et al., 2021).

6.1.4 Summary of the Findings in the Context of the Theory of Triadic Influence

The key findings from Studies I, II and III are based on the Theory of Triadic Influence. It highlights how individual, social, and societal factors shape vocational students' attitudes and decisions related to nicotine and substance use (Table 7).

Table 7. Summary of Findings Based on the Theory of Triadic Influence.

Theory of Triadic Influence (TTI) level	Systematic Review (Study I)	Quantitative Finding (Study II)	Qualitative Explanation (Study III)	Theoretical Interpretation of TTI
Intrapersonal/ Individual	Young people's limited or incorrect understanding of nicotine products; perception of e-cigarettes as healthy and appealing increases susceptibility to use.	Users more often believe nicotine products are relaxing and improve mood; non-users disagree and support bans. ($p < 0.001$).	Substance use is described as a personal choice; motives include stress relief, curiosity, and emotional coping.	Reflects personal attitudes, beliefs, and emotional regulation influencing health behaviour.
Social, interpersonal/ Close circle & living environment	Pictorial warnings on parents' cigarette packs are more effective than text-only, promote discussion, but raise concern for parental health.	Non-users report stronger parental disapproval and greater ease in refusing nicotine from peers ($p < 0.001$); users show more peer influence.	Peer pressure, parental relationships, and social belonging shape decisions; some switch friend groups to support substance-free living. Teachers act as role models: positive when sharing quitting stories, negative when smoking near students.	Highlights proximal social influences: peer norms, family modelling, and relational dynamics.
Cultural-environmental/ Societal	School-based interventions reduce smoking initiation and improve knowledge: timing is critical for effectiveness.	Users associate snus with hockey culture; e-cigarettes are not seen as safe and intriguing, and non-smoking is considered to be fashionable regardless of personal nicotine use or non-use.	Vocational students suggest earlier prevention, critique weak enforcement, and suggest societal-level support and penalties; social media normalises nicotine and other substance use.	Captures broader societal norms, institutional structures, and media influence shaping young people's substance attitudes.

6.2 Ethical Perspectives

Throughout the entire PhD Thesis and its studies, the principles of responsible research conduct and research integrity were consistently upheld. The Thesis and its studies were designed, executed, analysed, and reported in a manner that upheld research integrity through accuracy, transparency, responsibility, thoroughness, and respect. Ethically sound research practices were applied throughout, ensuring that both the sampling and methodological choices were appropriately aligned with the research questions, objectives, and aims of the related studies. (TENK, 2023)

Part I: Systematic Literature Review

The systematic literature review was carefully designed and thoroughly documented following the guidelines of the Finnish Advisory Board on Research Integrity (2019) (TENK, 2019). Both the search strategy and data analysis met the standards for methodological reliability (Graneheim & Lundman, 2004). The literature searches were conducted in accordance with the PRISMA guidelines for systematic reviews (Moher et al., 2009), as detailed in Study I (Figure 4). The quality assessment of the eligible articles was conducted using the JBI Checklist for Randomized Controlled Trials. The findings from the selected studies were presented with integrity and originality, and all references were accurately cited, respecting the original data and authorship (TENK, 2019).

Part II: Quantitative and Qualitative Studies

Ethical approval was applied for Studies II and III. Before the data collection for Study II in the ANKKURI project, ethical approval was granted by the Research Ethics Committee of Turku University of Applied Sciences, and permission to conduct research was obtained from the participating vocational institute in November 2020. In Study III, ethical approval was obtained from the Ethics Committee of the University of Turku (10/2022/37), and permission to conduct research was received from the participating vocational institute (11/2022/§76).

This PhD Thesis was conducted in accordance with ethical guidelines and principles concerning research involving young people. The emphasis was placed on valuing young people's own perspectives and views, and they were invited to participate in Studies II and III. The research objectives could not have been met without collecting data directly from the young participants themselves. In line with the TENK (2019 & 2023), minors must have the opportunity to influence matters concerning them, in accordance with their level of maturity (TENK, 2023, 2019). Consequently, the research instruments used in the studies were carefully selected to suit young participants. Both the questionnaire and the focus group interview

framework were pre-tested. Participation in the studies involved completing a questionnaire in Study II and participating in a focus group interview in Study III. Before data collection, separate information sheets were prepared for participants and minors' guardians, using language tailored to each audience. Efforts were made to ensure that the young participants clearly understood the study's topic, the meaning of participation, and their right to decline. The studies did not compromise the physical integrity of the participants, nor did they expose them to any significant risk or harm (TENK, 2023, 2019).

The Studies were non-invasive and assessed to pose minimal risk to participants. In Study III, the topic of nicotine and other substance use, while not considered highly sensitive and commonly addressed in school settings, could still cause discomfort for some young people. This was considered when forming the focus groups (Tausch & Menold, 2016; Mäntyranta & Kaila, 2008). To support a comfortable environment, the groups were kept small, with a maximum of eight participants. All participants were studying the same vocational field, shared a common language, and the age gap between them did not exceed two years.

Studies II and III included a request for informed consent from the participants. In Study II, vocational students provided their consent at the beginning of the questionnaire, which was completed during a regular classroom lesson. In Study III, the informed consent form was written using easily understood language. The form was pre-tested with the young people beforehand, and the necessary improvements were made. The participants signed a written consent before the focus group interview. Although data collection for both studies took place during school hours, participation or the decision not to participate did not have a significant impact on the students' academic work.

The studies adhered to current data protection regulations. The General Data Protection Regulation (GDPR 2016/679) regulation and guidelines were followed in Studies II and III (Eur-Lex, 2016). Participation was entirely voluntary, and young people retained the right to withdraw at any point before data collection was completed. Once the data had been gathered, withdrawal was no longer possible due to the de-identification of the data before analysis, which ensured the privacy of all participants. None of the participants wanted to withdraw from the studies.

In Study III, personal information (including name, email address, and phone number) was stored separately from the research data and was permanently deleted once it was no longer required. This personal information was used solely to communicate practical matters related to the interview beforehand. It remained confidential and was accessible only to the doctoral researcher. The informed consent forms in Study III were completed on paper, scanned into electronic format and stored separately from the interview data on a computer protected by a user ID

and a secure password. The originals were destroyed by shredding. Participants' identities were kept anonymous in all publications.

The Use of Artificial Intelligence in the PhD Thesis

Artificial intelligence (AI) has been used in this PhD Thesis in accordance with the guidelines of the University of Turku (UtuGuides, 2025). AI-assisted tools (Grammarly and Copilot) were employed exclusively for language refinement, including grammatical improvement, summarisation, and enhancing the fluency of self-authored text. Copilot was also used to assess the interpretability of some of the self-produced figures and tables as standalone elements without accompanying textual explanation. Based on this assessment, no modifications were made to the figures, and some clarification was made to the text in the tables. The use of AI did not influence the scientific content or conclusions of the research, thereby ensuring transparency and integrity.

6.3 Strengths and Limitations

This PhD Thesis addresses a topic of considerable societal and public health importance by examining young people's nicotine use and opinions about health promotion. The timing of the study is particularly relevant, as young people's health-related choices have far-reaching implications not only for individual well-being but also for broader societal and public health outcomes. By focusing on young people's nicotine and other substance use, the Thesis contributes to an area that is both important and time-specific.

A key strength is the Thesis's mixed-method design, which enabled a nuanced exploration of factors associated with young people's use of nicotine and other substances. The integration of a systematic literature review, quantitative, and qualitative methods allowed a rich and multifaceted understanding of the phenomenon. This methodological triangulation enhances the credibility and depth of the findings.

The application of the TTI provides a robust theoretical framework that supports and strengthens the interpretation of the results. TTI's alignment with the empirical findings adds conceptual coherence and reinforces the theoretical value of the Thesis. Importantly, the results have practical relevance for health promotion efforts. They can be applied in educational and health settings, particularly among vocational students in the school environment. Moreover, the findings offer insights that are transferable to broader youth contexts, including school environments and other health promotion platforms.

Despite its strengths, the Thesis has several limitations that should be considered. Both the quantitative and qualitative data were collected from a local context and were cross-sectional research. This limits the generalisability of the findings to broader populations or international settings. In Study II, the survey's instrument validity of content was assessed, and it was pre-tested beforehand. The instrument comprises detailed questions measuring young people's attitudes and use of nicotine products, giving a perspective on the research matter. However, our research includes respondents aged 15 to 28 years, with age limits varying across the substudies. This broad age range may affect the results because the study population is heterogeneous, and young people tend to become more adult-like toward the upper end of this range (Arnett, 2000). Such developmental differences may reduce the coherence of the study. In addition, varying age limits across the substudies may make it difficult to compare the results.

It should be noted that the Study II data collection was during the COVID-19 pandemic, and it might have had an impact on the vocational students' nicotine and substance use either way. Systematic review found little evidence that young people's substance use, such as tobacco, e-cigarettes, and alcohol, increased in response to the potential social and emotional deprivations caused by the pandemic. On the contrary, most of the available research evidence suggested that substance use among young people declined during the first two years of the pandemic. (Layman et al., 2022.)

Another limitation of the instrument was that it does not comprehensively capture nicotine and other substance use within the respondent's close circle. This restricts the scope of interpretation regarding the close circle's influences, which are known to be significant in young people's nicotine and other substance use behaviours. As well, with all survey-based research, there is a potential for response bias. Participants may respond truthfully, inaccurately, or in ways they perceive as socially desirable. (Kreuter et al., 2008.) This introduces uncertainty into the data and may affect the reliability of the findings.

Another limitation of the PhD Thesis is that it did not address nicotine pouches or other newer nicotine products, which can be considered a limitation. As a result, the findings may not fully capture current patterns of nicotine use and may therefore limit the completeness and contemporary relevance of the conclusions. Also, the study design did not allow for assessing causal relationships, which affects the interpretation of the findings because it is not possible to conclude whether the observed associations are causal or simply reflect correlations influenced by other factors.

The doctoral researcher's positionality may also have influenced aspects of data collection and interpretation, particularly in the qualitative component. The doctoral researcher's position in relation to the participants, such as age, gender, profession,

or perceived expertise, can influence how participants respond and what they choose to disclose. This remains a factor that could shape the research process and outcomes. (Holmes, 2020.) Nevertheless, this PhD Thesis still sheds light on the important theme of young people's health behaviour, attitudes and beliefs towards nicotine and other substances, and gives perspectives on health promotion. The Thesis also provides insight into the situation in the 2020s.

6.4 Significance of the Findings

This PhD Thesis enhances the understanding of young people's, especially vocational students', attitudes, beliefs and perceptions on health promotion. It highlights the importance of an individual's decision-making and the factors that impact it. Even though the final decision is the individual's, it should be supported at the individual, close circle, environmental, and societal levels. Close circles (including family members, peers, and other significant adults), health behaviour and attitudes towards nicotine and other substances have an impact on young people's choices and decision-making. The living environment (such as schools and leisure time places) and societal perspectives (such as legislation, social media, marketing and cultural factors) can reinforce or reduce the susceptibility to and normalisation of nicotine and other substance use. There is no one effective way to implement health promotion activities among young people. Health promotion needs to be age-appropriate and fit to the developmental stage. It needs to consider individual factors, such as nicotine or other substance use, refusal skills and self-confidence, and focus on current themes that are important to the target group. Health promotion should be easily accessible, low-threshold activities close to the everyday environment of young people.

6.4.1 Practical Implementation

The findings highlight the need for early and relatable health education that addresses misconceptions about nicotine products and their health risks. Practical measures include providing concrete examples of health consequences and offering accessible cessation support. Because peer influence strongly shapes young people's health behaviour, interventions should leverage peer educators and individuals with lived experience to deliver authentic, non-judgmental messages.

Schools represent a key setting for health promotion among vocational students. Health-related activities should be integrated into the school day to ensure accessibility and participation. Interventions need to be voluntary, engaging, and tailored to students' interests, using interactive formats and real-life stories. Teachers play an important role as role models; therefore, their own nicotine use should

remain out of sight, and they should be encouraged to share personal experiences of quitting to strengthen credibility and to supervise the school's substance-free policies.

At the societal level, stricter enforcement of age restrictions and reduced availability of nicotine products to minors are essential. Preventive measures should target younger age groups, as initiation occurs increasingly early. Social media's influence on nicotine and other substance use calls for campaigns that counteract positive portrayals of nicotine and alcohol, using relatable influencers and evidence-based messaging. Support for quitting should be widely available and framed in a non-judgmental way to reduce stigma and encourage help-seeking.

6.4.2 Suggestions for Future Research

Based on the findings of this PhD Thesis, several suggestions for future research can be identified in relation to the development of health promotion and nicotine and other substance use among young people. Future research should aim to deepen the understanding of the effectiveness of health promotion, strengthen young people's participation, and develop new, long-term and participatory approaches across various settings.

Firstly, there is a need for in-depth and longitudinal research on the effectiveness of health promotion. It is essential to examine how health promotion measures influence young people's well-being, attitudes, and behaviours over time, and to identify the factors that either increase or decrease the long-term integration of positive health behaviours into everyday life. Longitudinal research designs would enable an assessment of how early health promotion efforts influence later well-being and substance use.

Secondly, it is important to explore youth participation in the planning, implementation, and research of health promotion activities. Young people's experiential knowledge and perspectives on their own needs are crucial in designing meaningful and effective preventive interventions. Research is needed to determine how participatory and co-creative methods can be used to engage young people as active contributors and partners. At the same time, there is a need to identify and disseminate best practices for young people's engagement in different contexts, including schools, youth work, leisure settings, and digital environments.

Thirdly, future studies should aim to develop and evaluate youth-tailored preventive approaches that enhance decision-making capacity, critical thinking, and autonomy. Such methods should strengthen young people's ability to assess risks related to nicotine and other substance use and other health behaviours independently and based on reliable information. Research in this area could support the

development of practices that promote health literacy and the ability to identify credible health information in a rapidly evolving media environment.

A particularly relevant direction for future research concerns the use of social media and digital environments in health promotion among young people. There is a growing need to understand how social media can serve as an engaging and effective channel for health communication, supporting informed decision-making and improving the accessibility of health information. Social media platforms also provide opportunities for peer influence and positive peer support, the potential of which should be systematically explored in preventive work.

Future research should examine multisectoral and community-level models of cooperation, in which schools, health and social services, youth work, and families collaborate to promote young people's health and well-being. The structures and effectiveness of such intersectoral collaboration remain understudied, despite their critical role in developing sustainable health promotion solutions. Research could explore how various actors can collectively build environments that foster young people's health competencies and prevent substance use. It would also be justified to direct future research toward new and emerging nicotine products.

In addition, it is essential to expand knowledge of the role of health policy and structural factors in shaping young people's health promotion and prevention practices. Research could analyse how legislation, national strategies, municipal policies, and resource allocation influence the implementation of health promotion. A particular attention should be given to how structural solutions can support equity and enhance opportunities for youth participation across different settings.

Moreover, future research should further examine the influence of parents, families, and peer groups on young people's health attitudes and decision-making processes. The interplay between family, school, and community contexts forms a complex environment where health-related attitudes and behaviours develop. Understanding these dynamics will enable the development of more targeted and effective strategies for health promotion and prevention. In conclusion, future research should adopt a comprehensive, participatory, and long-term perspective that integrates individual, community, and structural dimensions. The ultimate goal is to generate knowledge that supports the development of more effective and contextually grounded practices to enhance young people's health and well-being and promote healthy lifestyles in an evolving social and digital landscape.

7 Conclusions

The conclusions of this PhD thesis can be considered on three levels: individual, close circle and environment, and societal:

1. *Individual level:* Vocational students' attitudes, beliefs, and personal characteristics strongly influence their decisions regarding nicotine and other substance use. Positive perceptions of nicotine products, limited awareness of health risks, and the belief that substances provide relaxation or improve mood increase the likelihood of use. Conversely, valuing health, financial well-being, and maintaining control over one's actions support substance-free living. Strengthening young people's sense of agency is essential, as ultimately their own decisions determine their health behaviours and choices regarding nicotine and substance use. These findings highlight the importance of early, clear, and relatable health education that addresses misconceptions and provides practical support for cessation, underscoring the consideration of both individual and contextual factors in shaping young people's attitudes toward nicotine and other substances.
2. *Close circles and the living environment:* Peers and family play a central role in shaping young people's health behaviours. Peer pressure and the desire to belong are key influencers of nicotine and other substance use, while supportive relationships and open communication with parents act as protective factors. The school environment offers a unique opportunity for health promotion. Interventions that are voluntary, engaging, and integrated into the school day, combined with peer-led initiatives and teachers acting as positive role models, can strengthen substance-free choices.
3. *Societal level:* The findings underline the need for evaluation of the stricter enforcement of age restrictions and reduced availability of nicotine products to minors. Preventive measures should target the right age groups. Social media's influence on nicotine and other substance use calls for campaigns that counteract positive portrayals of nicotine and other substances through relatable influencers and evidence-based messaging. Support for quitting

should be widely available and framed in a non-judgmental way to reduce stigma and encourage help-seeking.

Overall, the results show that promoting substance-free living among vocational students requires a comprehensive, multi-level approach that combines individual support and education, supportive close circles and social environments, and societal measures to reduce the availability and acceptance of nicotine and other substance use.

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