Longitudinal analysis of how time, loneliness, and school connectedness predict academic self-efficacy among general- and vocational upper secondary school students in Finland?

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PIRPA SANI: Longitudinal analysis of how time, loneliness and school connectedness predict academic self-efficacy among general- and vocational upper secondary school students in Finland?

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Abstract

Previous longitudinal research revealed that academic self-efficacy (ASE) is affected by loneliness (Chemers, Hu, & Garcia 2001, Galla et al. 2014). The current thesis investigates the association of ASE to loneliness and school connectedness (SC) in the general- and vocational upper secondary schools, and the Finnish adolescents over time. Results confirm what was previously reported in a cross-sectional study concerning an association between ASE and loneliness (Grotan et al. 2019). In the current thesis, panel data from three waves produced evidence of temporal outcomes. The results suggest a descending trend in ASE and SC, while loneliness reveals an ascending trend over three semesters, at individual level in both school types. Moderate school type differences occur. Both schools ASE decline was statistically significant over time. The negative effect of time and loneliness on ASE continues throughout the models. The positive effect of school connectedness on ASE is significant in all the models, particularly for the vocational upper secondary school (VUSS). Research was conducted with fixed effects (FE) method and interaction terms. Interaction results reveal that ASE increases the most for those VUSS students whose school connectedness is elevated. However, the causal relationship cannot be detected with the current method.

Keywords: Academic self-efficacy, adolescents, loneliness, school connectedness, school type

1. Introduction

As adolescents age, demanding new situations, feelings, and social expectations are directed at them (Brage & William 1994). Additionally, adolescents rely less on their families, practice independence, and rely on relationships outside families more than younger children (Zeinalipour 2022). Adolescents require transition skills and strategies when they progress in their studies (Midgley et al. 2000). Moreover, certain abilities and psychological traits must be acquired prior to entering upper secondary education. In academic research, theses abilities and traits are often referred to as academic self-efficacy (ASE). When adolescents acquire ASE, it has the potential to prevent school dropouts (Supervia, Bordas & Robres 2022); counteracts social isolation (Grotan et al. 2019); and reduces social rejection and -exclusion (Bean and Eaton 2022). Few longitudinal studies were found on ASE and social relationships, and these studies lacked data from upper secondary schools.

Studies suggested further scientific analyses that syndicate sociological education study, and psychological theory (Chemers, Hu, & Garcia 2001, Grotan et al. 2019). However, there is longitudinal research gap on what factors explain the ASE. Previously, low ASE was associated with high social and emotional loneliness in a cross-sectional study (Grotan et al. 2019). Correspondingly, the current thesis considers the ASE as an outcome variable. The time and loneliness are treated as the primary independent variables. Furthermore, school connectedness (SC) predicts better educational- and social consequences (Sampasa-Kanyinga et al. 2019, Zeinalipour 2022), thus may also associate to higher ASE. In the current thesis, the SC is the secondary independent variable. Thesis focuses on longitudinal inspection of ASE and its possible predictors. The previous studies have found level of ASE differing in loneliness and SC (Chemers, Hu, & Garcia 2001, Galla et al. 2014, Grotan et al. 2019, Wei et al. 2022, Zeinalipour 2022). The present study considers two different school contexts, as these school types may differ in ASE levels. General upper secondary school (GUSS) is theoretical, whereas vocational upper secondary school (VUSS) is practical.

1.1 Academic self-efficacy as an adolescents' transition skill

The theory of self-efficacy represents to ones perception of their competence to establish and implement the necessary achievement to construct achievements (Bandura 1998). Self-efficacy is entrenched in the social cognitive theory that delivers information for forecasting behaviour, and concept of learning (Bandura 2012). Cheng et al. (2015) defined that academic self-efficacy principles focus on academic fields, and refers to confidence in student's ability to achieve academically. Therefore, ASE must be identified independently from general, non-academic self-efficacies, such as career- and social self-efficacies.

High ASE is generally referred to as viewing tasks as accepted challenges, and recuperating confidence after obstacle. Impeded ASE is referred to as belief of failure, and learned helplessness (Cheng et al. 2015). Student's with advanced ASE perception of successful academic undertakings, indicated stronger internal motivation, and enhanced academic performance (Cheng et al. 2015, Dogan 2015, Galla et al. 2014, Lei et al. 2022, Robbins et al. 2004, Supervia, Bordas & Robres 2022), thus ASE forecasts confident outlook in life. ASE enhances students' academic performance (Cheng et al. 2015), resilience and study experience (Supervia, Bordas & Robres 2022). Therefore, ASE is essential for the students personal- and psychological development (Supervia, Bordas & Robres 2022). Those with higher ASE are more likely to remain in academia, had higher academic expectations, and perceived better coping abilities (Chemers, Hu, & Garcia 2001, Galla et al. 2014).

Previous longitudinal studies research demonstrated that high perception of ASE, impacts better academic performance, and social outcomes for the college students (Chemers, Hu, & Garcia 2001, Galla et al. 2014). Previous research has confirmed the ASE's value for students, and encouraged

development of it from the pre-school to post-secondary education (Chemers, Hu, & Garcia 2001). To improve and maintain ASE, it is significant to recognize what factors are related to it.

1.2 Academic self-efficacy relation to adolescents' loneliness

Loneliness refers to social distress that follows when relationships are seen as less adequate than anticipated (Feldman et al. 2016). Adolescents loneliness is related to social anxiety and -phobia. Loneliness is causing distress, as well as functional impairment (Junttila 2010). Subsequent social avoidance and unfavorable social outcomes may reduce opportunities for further psychosocial development (Junttila 2010), such as improvement of ASE. Two types; social- and emotional loneliness, must be distinguished. Social loneliness is due to not being socially integrated, while emotional loneliness refers to deficiency of close relationships. (Diehl et al. 2018, Junttila 2010). Furthermore, loneliness is a risk factor for adolescents socio-emotional wellbeing and learning (Junttila 2010).

A Norwegian study found that the probability of low ASE was high among the 18–25-year-old students, who described social and emotional loneliness (Grotan et al. 2019). According to research, loneliness is widespread in Finland in comparison to other Nordic countries (Lyyra et al. 2021). One study established a need for loneliness prevention with student support networks, and ASE courses for students (Diehl et al. 2018). Moreover, loneliness in online learning was measured severely problematic (Walter & Parks 2002). This may indicate lack of social support in the school environment, where there is distance learning.

Distance learning is not suitable for everyone, and social workers in Finland are worried about the loneliness it produces (Nelimarkka, Hietamäki & Hyväri 2021). Recent years induced loneliness due to several factors, such as withdrawal of the school contacts due to pandemic induced online studies. Moreover, hobbies and other social situation were on hold, thus adolescents may have withdrawn from the social life that they desperately need in adolescence. Removed social life in adolescence induces social exclusion. (Nelimarkka, Hietamäki & Hyväri 2021). Subsequently, student's need for support may have increased during the pandemic that induced more loneliness in adolescence.

Loneliness is associated with problems in academic adjustment throughout the transition to college (Feldman et al. 2016). There is a motive to consider that loneliness is associated to lower ASE-skills (Grotan et al. 2019). However, the course of the relationship fit in both directions (Lei et al. 2021). Giving support at early adolescence may prevent from chronic loneliness later in life (Diehl et al. 2018), thus early interventions are important. ASE skills are required during the school transitions and adjustment. Instructor support assist students to reduce social loneliness in the online learning setting (Wei et al. 2022). Instructor support may improve psychosocial skills, and enhance ASE. Moreover, the older students' transition skills are constantly affected by loneliness (Grotan et al. 2019). The current study attempts to distinguish the effect of loneliness on ASE in the Finnish school context during the earlier age. It has been observed that college students loneliness may be predicted with the qualitative appraisals of social relations, and subjective satisfaction for social relations (Feldman et al. 2016). Therefore, it is arguable to distinguish the social satisfaction in schools with the school connectedness variable presented in the next chapter.

1.3 Academic self-efficacy and school connectedness in adolescence

According to CDC (2009), the school connectedness (SC) is the understanding by students that adults and peers in the school are attentive to them as individuals, and support their studying. The Social Cognitive Theory (Bandura 1998, 2012) explains the mechanism of the school connectedness on ASE. According to Bandura (1998, 2012), social learning arises through observing adults in schools, and displaying their progressive behaviors. SC describes the connection students' feel toward their school, thus quantifies psychological engagement with robust psychometric properties. It is a tool that is used in comprehensive school health screening, and student wellbeing assessment. However, SC does not measure academic-, behavioral-, or cognitive engagement. (Furlong, O'Brennan & You 2011). Previous studies presented that both ASE, and SC together predict academic success (Zeinalipour 2022), thus they are related. The current thesis considers the perception of school connectedness, as a quantitative predictor for the social contact satisfaction of the upper secondary school students.

Both educational- and public health researchers use school connectedness, to measure linkages amid academic outcomes, or at-risk behaviors (Furlong, O'Brennan & You 2011). SC relate to encouraging peer relations; safety insights; teacher assistance; school supports; confidence over own influence in life; presence of fair corrective practices in schools; and student's perceptions on belongingness to school (Brown 1999, Brown & Evans 2005, Furlong, O'Brennan & You 2011, Waters at al. 2010, Zeinalipour 2022). Moreover, those who perceived high SC had higher academic attainment, and less problematic behaviours in schools (Brown & Evans 2005). School connectedness schemes can increase shielding aspects amid adolescents (CDC 2009); thus, it is a social health factor.

SC can be amplified with well-structured strategies that recognise risks- and protective factors (CDC 2009). Adult encouragement, fitting to a encouraging peer group, commitment to education, and school environment are influences that may increase SC (CDC 2009). Involvement in the free time activities in the school environment may increase school connectedness (Brown 1999, Feldman et al. 2016). Enjoyable activities together with peers and teachers, within and outside of the school environment projected better study outcomes (Brown 1999, Feldman et al. 2016).

Furthermore, the teacher-student relationship in the school connectedness, predicted school related outcomes (Furlong, O'Brennan & You 2011). Teacher-student connection provides opportunities for students to develop their positive connections. Teacher overhauls construct the students pathways to achieving their goals (Zeinalipour 2022). It has been projected that receiving continuous feedback from a teacher, as part of effective learning process, may expand academic self-efficacy (Wei et al. 2022, Zeinalipour 2022). Therefore, the school connectedness and perception of teacher assistance, may also predict ASE. Vygotsky (1978) theorised that the potential of learning lays in a sociocultural process of the level of potential development, which emerges under the surveillance of more capable adults and peers. Accordingly, perception of teacher support and school connectedness are imperative for the student's educational progression.

In the 2021, the Finnish National Core Curricula of 2021, called for additional student support, and guidance (Finnish National Agency for Education 2021). Previous studies found school-based interventions that focus on promoting ASE skills, and school connectedness valuable (Cheng et al. 2015). School connectedness facilitated students' to acquire transition skills (Lei et al. 2022), and it improves mental health of the students (Zeinalipour 2022). School connectedness may increase ASE by students' confidence in personal study skills. Increased social supports at the university, increased the students' ASE-level (Wright et al. 2014). However, those results cannot be generalized to non-

university populations. With enhanced SC, students may construct better ASE skills that lead to improved academic performance (Sampasa-Kanyinga et al. 2019, Zeinalipour 2022). Aligned with referred literature, it is assumed that higher school connectedness predicts advanced ASE. Recommended school connectedness approaches are open policymaking that enable student-, family-, and community commitment; staff empowerment; and finally academic achievement (CDC 2009). According to CDC (2009), the school connectedness strategies deliver students the essential academic-, emotional-, and social abilities.

1.4 Academic self-efficacy relationship to Finnish school types, loneliness and school connectedness

The current thesis investigated ASE disparities in the two Finnish school types of general upper secondary school (GUSS) and vocational upper secondary school (VUSS). The Finnish public school system may counteract large school type disparities. First educational transit point in the Finnish schooling occurs at around age of sixteen (Ministry of Education & Culture 2022). Thereafter, the Finnish students face a new school and peer adjustment. Adolescents decide of entering general- or vocational upper secondary school (Ministry of Education & Culture 2022, Prix & Kilpi-Jakonen 2022). Both school types may proceed into tertiary level, and two tracks may reduce inequalities in education (Ministry of Education & Culture 2022, Kilpi-Jakonen, Erola & Karhula 2016). However, substantial socioeconomic (SES) inequalities exist between these school types. Parental education, -social class, and -income predict, which school the adolescent is located. Adolescents' from a low SES background frequently adapt into the vocational school types. (Kilpi-Jakonen, Erola & Karhula 2016). Correspondingly, these adolescents ASE trends may vary for several reasons.

School types differ in several reasons: support systems; teaching styles; school climate; and requirements. Therefore, the adolescents may need different abilities during the school transition. For

instance, vocational upper secondary school requires school-based, and occupation-specific contact instruction that cannot be taught online, due to the skilled manual nature of the studies (Prix & Kilpi-Jakonen 2022). In comparison to apprenticeship training, most vocational professions are accomplished within the institutional workshops in Finland. Emphasis is on applied skills with more industry relevance.

General upper secondary school law (2018/714) refers to fourteen hours and fifteen minutes of teaching per study credit, which extends to 150 ECTS (European Credit Transfer System) in three years' of time (Ministry of Education & Culture 2022). Vocational school law (2017/531) refers to approximately 180 ECTS of practical learning with no precise customary distant- or contact teaching hours, as the applied skills are met predominantly in the working assessments (Government Act for Finnish Parliament 2017). Students may require suitable assistance with the transitional skills and school connectedness, appropriate to these differences.

Loneliness occurred greater during the GUSS (17.8%), and VUSS (17%), in comparison to 8. to 9. grade (15.9%) (National Institute for Health & Welfare 2022). Longitudinal study discovered a higher probability of loneliness throughout adolescence that is measurable in puberty. In addition, Finnish study found a cumulative loneliness trend over the twelve-year period (2006-2018) among the 15-year-olds (Lyyra et al. 2022). Through the transition period, peers may transfer into separate schools, and adolescent may feel more loneliness. Loneliness and school connectedness may vary according to the school type, thus inversely affect ASE levels.

Considering the school type differences in the school connectedness in the Finnish adolescents in 2021, 35.6% of the general upper secondary school students perceived they did not get help and support during the Covid-19 online learning. In comparison, 18.8% of the vocational upper secondary

school students perceived the same. In the 2021, 30% of the Finnish GUSS students perceived that teachers were not interested in how the student was performing. In comparison, 17% of the VUSS students perceived teachers non-attentiveness of their performance. Similarly, 32,7% of the GUSS students, and 24,5% of the VUSS students, perceived that teacher did not give them tolerable and equitable treatment. Accordingly, more preparation for initiating school connectedness in the Finnish schools is required. (National Institute for Health & Welfare 2021).

Moreover, several ASE studies have been completed observing the older college students (Feldman et al. 2016, Wei et al. 2022), thus more research on the upper secondary school students is needed. Two studies explored ASE and loneliness together (Feldman et al. 2016, Grotan et al. 2019). However, there were limitations to these studies. Feldman et al. (2016), studied students with learning restrictions, thus the results cannot be generalized to other populations. While Grotan's et al. (2019) used ASE as an outcome similar to the current study, the cross-sectional study was also completed with elderly students who were up to twenty-five years of age. Lack of longitudinal research on the Finnish sixteen- to seventeen-year-old GUSS and VUSS students' perception of ASE, loneliness, and school connectedness fortified the current thesis.

Previous studies proposed empirical studies from a sociological education-, and psychological theory angle (Chemers, Hu, & Garcia 2001, Grotan et al. 2019), thus the current study was conducted. Previous international studies examined the university students ASE (Feldman et al. 2016, Vuong et al. 2010), and there was no ASE research found on the Finnish Upper Secondary School students. The literature is limited; thus, the current thesis evaluate the ASE- relationship of the two different public-school students, prior to the higher education scheme. Purpose of this study is to expand evidence on the societal factors that are associated to ASE in the typical Finnish school types. Despite the past research, more detailed longitudinal research is required, to determine the association concerning ASE, loneliness, SC (Brown 1999, Bean & Eaton 2022, Grotan et al. 2019, Lei et al. 2022,

Supervia, Bordas & Robres 2022). The current thesis responded to this research gap. Previous research found that loneliness was directly related to ASE at the beginning of university, but not after a month (Feldman et al. 2010). Therefore, the current thesis examines the first three semesters.

2. Purpose, study questions and hypothesis

Despite past research, further investigation is required on the Finnish students' academic self-efficacy relationship to loneliness and school connectedness. The lower level of loneliness was directly related to higher ASE (Feldman et al. 2016), the current thesis aimed to study the ASE association to loneliness and school connectedness in the Finnish context using a panel data. The current study examines the association of ASE and loneliness over time, evaluates whether the SC explained this association, and whether school type differences exist in Finland. An association between loneliness and ASE was discovered in the Grotan's et al. (2019) cross-sectional research. Main aim of the current thesis is to test their findings in a Finnish school context using longitudinal data, and to see whether school type differences in ASE, loneliness and SC occurs over time.

Research question

Are loneliness and school connectedness associated to academic self-efficacy in time, and does the associations differ amid the two school types?

H1 (Academic self-efficacy, time and loneliness context):

a) *ASE is associated to time and decreases in time.*

b) *ASE is associated to loneliness that increases in time.*

H2 (Academic self-efficacy and school connectedness context):

a) *School connectedness decreases in time.*

b) *School connectedness explains part of the effect of loneliness on ASE.*

H3 (Academic self-efficacy and school type context):

a) *VUSS type reduces the effect of time on ASE.*

b) *VUSS type increases the effect of school connectedness on ASE.*

3. Data and methods

Data originated from the StudyPal (Opintokamu) 2016-17 survey, which was a first major survey that comprised questions from mental health, ASE, school performance, and psychosocial factors among Upper Secondary -level students. Data was chosen due to data's appropriate variables, and representativeness of the youth population studying in general upper secondary school (GUSS) or vocational upper secondary school (VUSS) in Finland (Opintokamu 2016). There was 3512 observations in the sample. There was some panel attrition, as some individuals dropped out of the panel at some point in time. The final analysis included 2,084 GUSS responses in all the three waves, which represented 58% of the sample, and 1,428 VUSS responses, which represented 42% of the sample. The GUSS responses were 767 in the wave one, 762 in the wave two, and 555 in the wave three. The VUSS responses were 514 in the wave one, 515 in the wave two, and 399 in the wave three. (Appendix 2.). Respondents were mostly 16-17 years of age at the time of the first data collection. The first data collection round started their first year of GUSS or VUSS in the wave one (W1) in August 2016. The last collection took place in the W3. Waves one to three are three semesters. W1 intake was during the fall 2016, W2 during the spring 2017 and W3 during the fall 2017. Listwise deletion of the missing values was used, and there were more missing values in the third wave.

3.1 Measures

Main continuous outcome variable was ASE. ASE was measured with five questions from the Patterns of Academic Learning Scales (PALS) – manual that was established by scholars to inspect relation of learning environment and student's motivation (Mingley et al. 1998, 2000). The student

was asked: 'To what extent the following claims hold true to you?'. All statements were in a positive manner, such as "*I can do even the hardest work in this class if I try.*" (Appendix 1.). Five-point Likert type scales were used with higher values indicating higher levels of ASE. The individual mean score of all five questions was used in a scale.

Main categorical explanatory variable was time. Time is measured in waves (W1-W3); thus, the variable wave is used to capture the time. Final analysis included W1 (n=1281), W2 (n=1277), and W3 (n=954). Waves 1-3 are three semesters, beginning from the August 2016.

Second explanatory variable was social and emotional loneliness. The emotional loneliness (e.g., "*No one really knows me well"*), and the social loneliness (e.g., "*I feel left out"*) both contained six items each (Appendix 1.) (Opintokamu 2016). The loneliness scale was created by averaging across the twelve items tailored to academic setting with the Finnish version of the UCLA loneliness scale (Junttila 2013). Initially, students was asked: 'To what extent the following claims hold true to you?'. All items were measured with four-point scale (1=never, 4=always). The questions were asked in a negative and positive form. All the positive items were reverse coded into negative ones. The greater scores represented more loneliness. The responses were totalled to specify a total scale mean.

Third independent variable, school connectedness (SC), was measured with Adolescent Health's School Connectedness Scale that is frequently expended in public health-, psychological-, and education research (Furlong, O'Brennan & You 2011). School connectedness functions equivalently across different social groups, thus can be used as one factor scale in studying diverse populations (Furlong, O'Brennan and You 2011). The SC-scale included five positive items, with 1-5 Likert Scale (1=Do not agree, 5=Agree) answers. All statements were in a positive manner (e.g., "*My schools*

teachers treat students fairly"). (Appendix 1). (Furlong, O'Brennan & You 2011, Opintokamu 2016). ASE-scale and SC-scale had low positive correlation (.35).

Fourth variable was school type (0=GUSS, 1=VUSS). Other presumed time-constant predictors (e.g., demographic factors) are controlled with fixed-effects (FE) method, as described in the next section.

3.2 Main analysis

Main analysis was conducted in the individual level with the fixed effects (FE). The stable unobserved characteristics, such as ability, ethnicity, and gender that do not change over time are controlled with FE (Andreß, Golsch & Schmidt 2013). The observations from the same subjects are followed multiple times. Therefore, FE makes it possible to study for maturation effects, and answers the study question according to individual change. (Andreß, Golsch & Schmidt 2013).

Initially, the FE requires at least two timepoints, thus those who had only one observation in the waves were excluded from the waves one to three. The FE uses individuals as their own controls (Andreß, Golsch & Schmidt 2013), thus FE is comparing each individual ASE score, when exposed to a given level of loneliness, with that same individual's ASE score, when he or she is exposed to a different level of loneliness. Accordingly, this may prevent omitted variable bias that may occur if the statistical model leaves out one or more relevant variables, thus the influence of the missing variables are included. In addition, the cluster robust standard errors were used to account for heteroscedasticity across the observations (Andreß, Golsch & Schmidt 2013).

The Hausman specification test was performed to examine whether the results of the FE estimator are systematically different over the random-effects (RE) results. The Hausman test specified the FE as the preferred method.

3.3. Models

This study followed stepwise approach in the construction of the FE models, starting with the basic Model 1 that controlled for the effect of time (waves 1-3) to identify whether ASE was changing through time. In the Model 2, loneliness was introduced to determine the loneliness influences on the ASE. In the Model 3, the independent variable school connectedness was introduced to determine the SC influences on the ASE. In the Model 4, interaction term with time and school type were added to explore whether school type moderated the effect of time over ASE. In the Model 5, school type and school connectedness interaction term effect on ASE was examined, to distinguish if school type moderated the effect of SC over ASE.

4. Results

4.1 Descriptive statistics

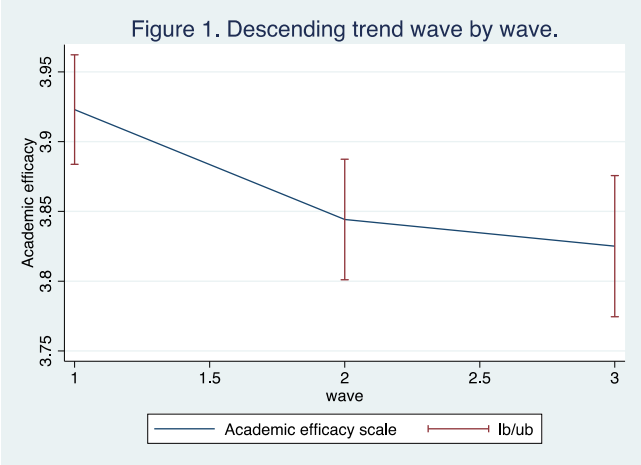
Descriptive statistics of the variables wave by wave are found in the Appendix 2. The correlation matrix of the main variables presents the negative correlation the outcome variable academic self-efficacy and the predictor variable loneliness. Therefore, if the academic efficacy increases, the loneliness decreases, and vice versa. There is a positive correlation between the outcome variable academic self-efficacy and the predictor variable school connectedness (Appendix 2.). Therefore, if the academic self-efficacy increases, the school connectedness increases, and vice versa. The predictors loneliness and school connectedness have a negative correlation. Therefore, if the loneliness increases, the school connectedness decreases, and vice versa. (Appendix 2.).

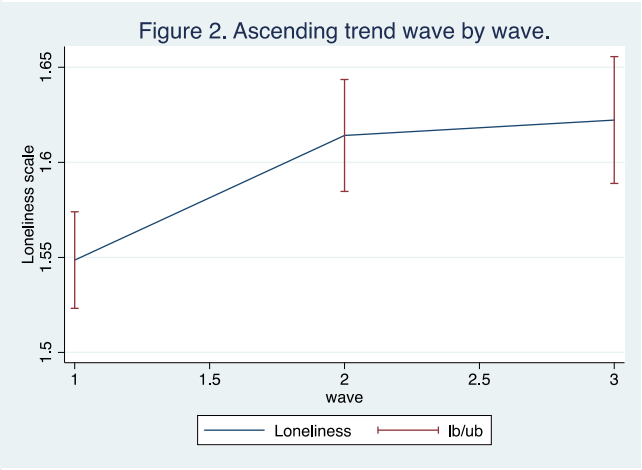
While the course is consistent, there is minor variances between the school types. The academic self-efficacy and loneliness are further negatively correlated in the VUSS. The positive correlation between the academic self-efficacy and school connectedness is higher in the VUSS. The negative correlation of the independent variables, loneliness and school connectedness, is slighter in the VUSS. (Appendix 2.).

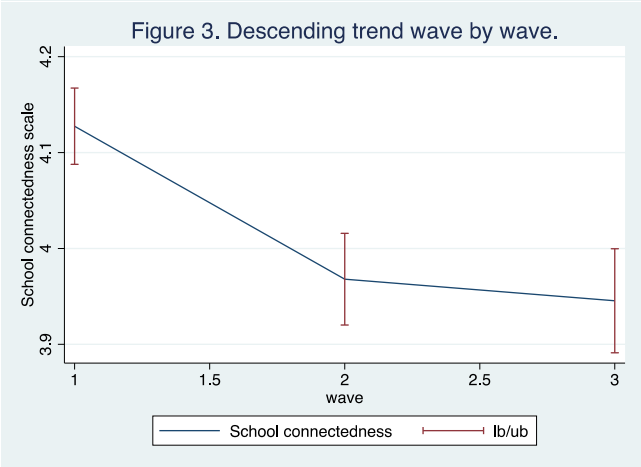
4.1.1 Trends of the variables in the upper secondary schools

Overall ASE trend is descending for both school types, particularly from the wave one (W1) to wave two (W2) (Figure 1.). Loneliness trend increases from the W1 to W2, and the minor ascending trend continues to the wave three (W3) for both school types (Figure 2.). SC decreases from the W1 to W2 for both school types, and the minor descending trend remains to the W3 (Figure 3.).

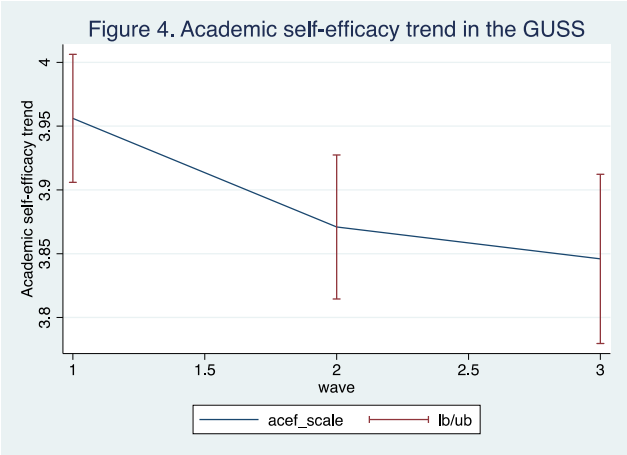
4.1.1.1 Overall trends of ASE, loneliness and SC in upper secondary schools

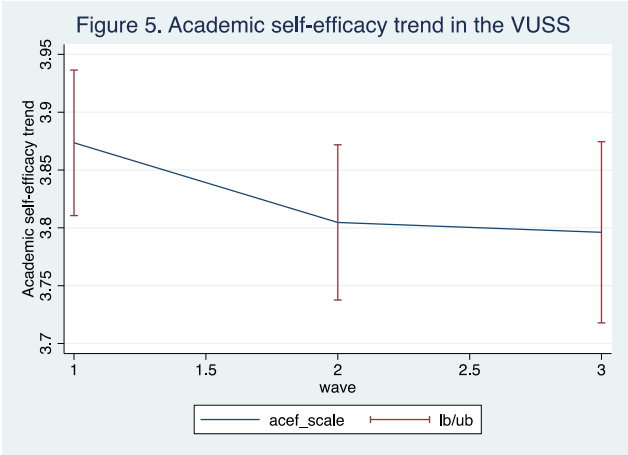






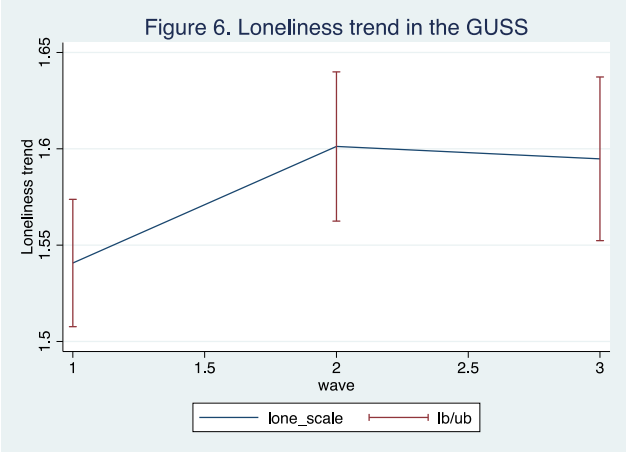
4.1.1.2 ASE trends in the upper secondary schools separately

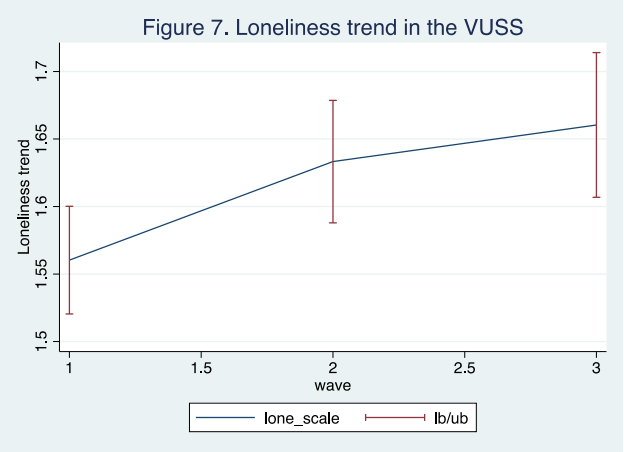




The over-time trend of academic self-efficacy is slightly different for the two school types. ASE instigates higher levels for GUSS students, in comparison to VUSS students (Figures 4. and 5.). However, the ASE decline is slightly steeper for the GUSS students. From the second to third semester (waves 2 to 3), the VUSS students declining ASE trend decreases, while GUSS students ASE descline resists.

4.1.1.3 Loneliness trends in the upper secondary schools separately





The over-time trend of loneliness is slightly different for these school types (Figures 6. and 7.). Loneliness is ascending for both schools from the first- to second semester. However, the VUSS students loneliness begins from a slightly higher level. The general upper secondary school presents decending loneliness trend from the second semester to the third, while the VUSS students ascending loneliness trend maintains. Vocational upper secondary school students perceive slightly higher loneliness than GUSS students.

4.1.1.4 School connectedness trends in the upper secondary schools separately

Figure 8. School connectedness trend in the GUSS

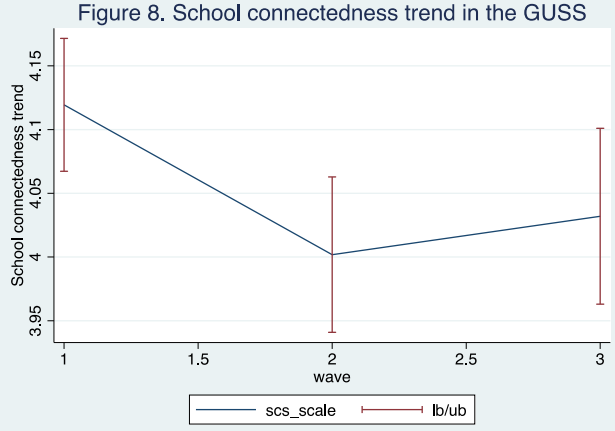
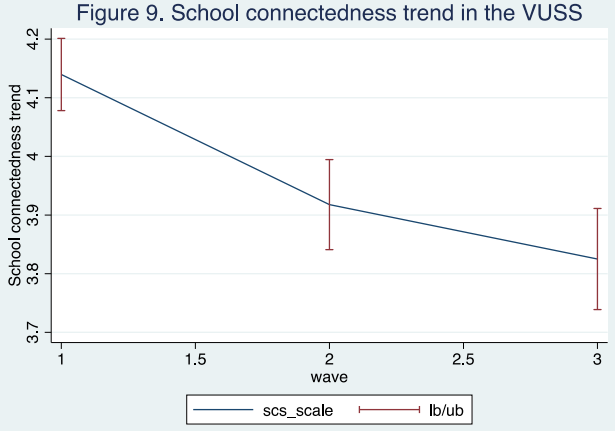


Figure 9. School connectedness trend in the VUSS



The over-time trend of school connectedness is slightly different for the two school types, although initially SC begins from an equal level in the upper secondary schools (Figures 8. and 9.). Both students SC drops more from the first semester to the second. The SC trends are opposite from the semester two to three; and the GUSS students SC initiates an ascending trend, in comparison to the VUSS declining SC trend. However, the trend differences are minor, as the confidence intervals are overlapping.

4.2 Main models

In the Model 1., the negative effect of time over ASE is significant. The negative effect of time continues throughout the models. In the Model 2., loneliness was added. The negative effect of loneliness on ASE is highly significant throughout the models. In the Model 3., school connectedness was added. SC explains part of the effect of loneliness on ASE, as the effect of loneliness is decreasing. The positive effect of SC on ASE is significant. (Table 1.).

Table 1. Associations of academic efficacy among general upper secondary- (GUSS), and vocational upper secondary (VUSS) School students in Finland, with fixed effects and interaction terms.

Academic efficacy	Model 1	Model 2	Model 3	Model 4	Model 5
Time ref. W1					
Time W2	-.08***	-.06**	-.05*	-.06*	-.07*
	(.022)	(.021)	(.021)	(.027)	(.027)
Time W3	-.10***	-.08**	-.06*	-.09**	-.10**
	(.024)	(.024)	(.024)	(.031)	(.031)
Loneliness		-.28***	-.23***	-.23***	-.22***
		(.033)	(.034)	(.034)	(.034)
School connectedness			.10***	.11***	.06*
			(.018)	(.018)	(.025)
Time##school type					
VUSS W2				.03	.05
				(.043)	(.043)
VUSS W3				.08	.10*
				(.048)	(.049)
School type##SC					
VUSS					.10**
					(.035)
No. of observations	3512	3512	3512	3512	3512

Opintokamu panel data 2016-2017, W1-W3. ***p<0.001 **p<0.01 *p<0.05
SC=School connectedness, W=wave

In the Model 4., the interaction term between time and school type is introduced. The interaction term with time and school type was not significant. (Table 1.), thus opposite to the H3 a, the VUSS type did not reduce the effect of time on ASE. Therefore, the academic self-efficacy decline is a parallel for both general upper secondary students over time. (Table 1.).

In the Model 5., interaction term with school type and school connectedness is significant for the vocational school students. The difference between the school type's school connectedness on ASE is .10 units. The effect of school connectedness on ASE is .16 units in the VUSS, and .6 units in the GUSS. Furthermore, school connectedness predicts ASE stronger for the VUSS students, as the VUSS type increases the effect of school connectedness significantly (H3 b). Therefore, the academic self-efficacy declines the least for those VUSS students whose SC increases. This interaction term exposed that greater school connectedness did not explain higher ASE on the GUSS students. (Table 1.).

5. Discussion

Strength of this study was the longitudinal method that presented the temporal effects. Loneliness and school connectedness were associated to academic self-efficacy in time. The previous study presented the negative association of loneliness and ASE with older students (Grotan et al. 2019), and the current study found the same association. Firstly, as predicted (H1a) the ASE is negatively associated to time, and it decreases in time. As expected (H1b) loneliness increases in time while ASE decreases in the Finnish Upper Secondary Schools. Secondly, SC is positively associated to ASE. As projected (H2 a) , the SC controlled the association of loneliness on ASE, thus partially explained the effect of loneliness on ASE. Thirdly, conflicting the (H3 a) assumption, the VUSS school type did not reduce the effect of time on ASE, thus both school types ASE decline is alike. However, as expected (H3 b), the school connectedness explains the association on ASE for VUSS students. In other words, ASE declined the least for those VUSS students with elevated SC in the Finnish school context.

It appears that SC explains all the time trend in ASE for VUSS. Therefore, supporting school connectedness is important for ASE maintenance, particularly for the VUSS students. For unsolved reason, the GUSS students SC increases in the third semester, while VUSS students SC decreases. Circumstantial reasons may prevent from the declining school connectedness in the third semester, as the GUSS students may be protected via parental support that is related to their SES - background. Furthermore, GUSS environment may sustain school connectedness throughout studies, thus declining loneliness trend may be reduced due to higher SC in the third semester.

The current study found that loneliness and school connectedness do not vary much according to the school type, thus do not inversely affect the ASE levels. Nevertheless, closer inspection indicated minor differences in the school connectedness and loneliness trends, while academic self-efficacy

trend sustained almost parallel for both school types. The VUSS do not reduce the effect of time on ASE. In other words, major differences do not occur for the Finnish upper secondary school's ASE decline over time. However, the VUSS increases the effect of school connectedness significantly. In other words, those who had higher school connectedness in the VUSS had greater ASE. This indicates that VUSS students academic self-efficacy would benefit from a greater school connectedness.

Further analysis determined that the ASE is negatively associated to loneliness, and positively to school connectedness. Loneliness and SC both partially explain the declining ASE. According to the current results, SC may supplement the student's ASE perception. Therefore, supporting the SC strategies during the transition into independent schooling, and a new peer group, may help to gain the essential transitional skills. Too much independency instead, may depress adolescents academic self-efficacy and induce loneliness.

According to the current thesis, during the first three semesters in the upper secondary school, there is a decreasing trend of academic efficacy and school connectedness, in addition to cumulative loneliness. Minor differences in the upper secondary school type's ASE, loneliness and SC occur in Finland. As the declining ASE - trend from the second to third semester, discontinues for the VUSS students, particular mechanism in the applied learning methods may prevent VUSS students from the ASE decline. However, the GUSS students ascending SC - trend and diminishing loneliness trend in the second to third semester, initiates unidentified mechanism in the theoretical learning approaches that forces better outcomes.

While VUSS students' academic self-efficacy is explained with SC and loneliness, the GUSS students ASE remains partially unsolved. The higher correlation of the GUSS students school connectedness and loneliness may indicate that their school connectedness is further associated to loneliness, in

comparison to VUSS students. However, it is pertinent to prevent loneliness among both upper secondary school students. The final interaction term exposed that greater school connectedness did not predict higher ASE on the GUSS students. Therefore, unidentified factors explain part of the GUSS students ASE. FE method calculates the stable unobserved characteristics, thus other unstable characteristics may control the GUSS students ASE. Grotan et al. (2019), measured depression that also affects ASE; thus, depression may control GUSS students ASE.

Moreover, antisocial- or destructive behaviors, and physical activity were not controlled for. These variables can be considered stable unobserved characteristics that FE automatically controls for. However, rendering the sensitive adolescence phase, destructive behaviors may be considered as unstable unobserved characteristics, which should be included in the further studies. Although FE controlled for stable unobserved family- and peer influences, such as stable SES-status; the unstable characteristics, such as sudden economic hardship, parental separation, or a loss of a friend were not controlled for. In addition, Grotan et al. (2019) controlled for hours spent on study, thus avoidance and neglect of study may signify low ASE.

Students who are involved in the theoretical testing approaches that require further self-governing efforts, may have different transitional skills and support systems, in comparison to students in practical learning. Conclusively, the individual stressors of the adolescents' should be addressed. Diverse stressors could appear in online learning, unsupervised placements, or during the long independent study periods. Therefore, school support system should be directed at the specific individual stressors during the transition phase. Rendering the CDC (2009), SC is maintained with effective classroom management and teaching methods that promote positive environment. Furthermore, the SC promotes positive health- and educational outcomes. (CDC 2009).

Corresponding the earlier research, school connectedness associates to higher ASE, as it predicts better learning and social outcomes (Sampasa-Kanyinga et al. 2019, Zeinalipour 2022). Furthermore, the current study showed that GUSS students who have more contact teaching had also higher SC in the third semester. School support services provide safe adult relationships that have positive effect on the psychological aspects of students. When students experience raised school connectedness, they perceive constructive, committed, and professional determinations in schools (Zeinalipour 2022).

According to previous research, teachers deliver hope to their students, and identifying the confidence of the teacher can positively influence ASE (Zeinalipour 2022). Opposingly, studying in isolation from the school environment may strain the upper secondary school students ASE. The GUSS students may be more connected to the school environment and teachers, as the VUSS students mainly rely on the workplace instructions. As no precise customary distant- or contact teaching hours are set, the applied skills are met mainly in the working valuations (Government Act for Finnish Parliament 2017). Therefore, VUSS students depend on the individual tuition responsiveness of the instructors. As the guidance, coaching, support and commands are based on the practical work only, school connectedness appears to decline. Adolescents need peer support and connection maintenance at the vulnerable self-government age.

The pandemic induced more loneliness (Nelimarkka, Hietamäki & Hyväri 2021) may negatively impact the declining ASE – trend among the upper secondary school students. As announced, almost one fifth of the Finnish Upper Secondary School students suffer from loneliness (National Institute for Health and Welfare 2021). The current thesis indicates that VUSS students are lonelier than GUSS students, with an ascending trend of loneliness over time. Therefore, other unstable SES - factors may emerge for the VUSS students. It is essential to follow the VUSS students ASE after the isolation period, as they have been affected by structural SES -factors. Structural inequalities (Kilpi-Jakonen,

Erola & Karhula 2016) may demonstrate the trend differences between schools. Nevertheless, the stable unobserved SES characteristcis, such a s family structure, were controlled with FE - method. Teaching ASE skills in schools may support through forthcoming challenges in life. Teacher overhauls construct the students pathways to achieving their goals (Zeinalipour 2022). School programs must help students to develop their personal abilities, and psychological skills that improves both academic-, and social self-efficacy (Bandura 1997, 2012, Bean & Eaton 2022). School activities that prevent loneliness, and get students acquainted with the new school environment, may aid student adjustment to an upper secondary education. In line with previous research (Zeinalipour 2022), SC is associated to ASE in the current thesis. Sociocultural learning in school environment is important for the students ASE. Students learn through observing and modelling others (Bandura 1998, 2012, Vygotsky 1978), thus cannot stay isolated from the school environment.

The current results are theoretically related to social cognitive theory (Bandura 1998, 2012), and former social learning theory by Vygotsky (1978). According to Bandura and Vygotsky (November 17, 1896 – June 11, 1934), the social learning occurs through observing other people's behaviors, and modelling those manners. In the theory's principles, people imitate the behaviour they observe in their environment. Therefore, the theory can be applied in teaching students positive behaviors at the school environment. These manners may counteract negative role models, encourage desirable behaviors and support positive social change. In addition, the teacher-student connection provides opportunities for students to develop their positive attachments (Zeinalipour 2022). School connectedness may prevent loneliness that may negatively affect ASE.

As the adolescents life skills are not fully developed yet, institutions can offer programs that help student's to develop academic coping strategies (Bean & Eaton 2022, Cheng et al. 2015, Opintokamu 2016, Välilä 2022), such as ASE and SC. Upper secondary schools must prevent loneliness by

enhancing school connectedness strategies, and teaching academic self-efficacy skills. CDC (2009) collected policies that help to increase school connectedness. Further investigations should combine qualitative and quantitative methods for outlining other feasible academic self-efficacy predictors.

5.1 Limitations

Despite the longitudinal study, this study design is non-experimental, and restrictions to causal inferences occur. Further research should include other variables, such as types of teacher-, peer-, and family support into the equation. In addition, reverse causality may be regarded, as the direction of the association cannot be determined with this method. Selection issues may occur, as the present sample might be composed of prosocial youth rather than the overall youth population in Finland. Those adolescents who choose to answer the survey may be more active in general. Therefore, students from less advantaged background may not be in the survey. These results should be generalized cautiously to diverse student populations. To optimally benefit from this result, future studies should examine school-level effects. Furthermore, full information maximum likelihood would offer more sophisticated effects than listwise deletion (Galla et al. 2014). All variables were measured with self-reported scales, which may result in inaccuracies. Length of the study was concise, and result variations may occur after this measurement period. These weaknesses warrant caution when assembling any conclusions from the results. Further research should determine what unsolved factors predict ASE.

6. Conclusion

According to this thesis, school programs are encouraged to prevent loneliness, and increase school connectedness to avoid low academic self-efficacy. Psychosocial traits, such as loneliness and school connectedness were shown to be associated to ASE. Along with previous research, the current thesis showed that loneliness is negatively (Grotan et al. 2019), and SC is positively (Zeinalipour 2022) associated to the reduction of ASE. These results offer scientific support for coaching psychosocial skills, as means to avoiding loneliness and low ASE. Developing school connectedness may potentially increase the adolescents' ASE. In the current study, selected significant school type differences were detected, and VUSS school type's ASE may further profit from the increasing school connectedness. Each of the school programs should be clearly intended to facilitate psychological growth (Bean & Eaton 2022), which can be reinforced thru social learning, from proficient adults, or peer guidance (Bandura 1998, 2012, CDC 2009, Vygotsky 1978). Therefore, support programs that increase social connectedness in schools, and decrease loneliness via constructive school contacts, maintain the upper secondary school students academic self-efficacy.

7. References

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8. Appendices

Appendix 1. Items and answering options in the scales used in the analyses. Opintokamu 2016-17

Scale	Items	Answer options
Academic self-efficacy (Mingley et al. 1998, Mingley et al. 2000, Opintokamu 2016)	I'm certain I can master the skills taught in class this year. I'm certain I can figure out how to do the most difficult class work. I can do almost all the work in class if I don't give up. Even if the work is hard, I can learn it. I can do the hardest work in this class if I try.	1='Not at all true' 2='Fairly disagree' 3='Somewhat true' 4='Fairly agree' 5= 'Very true'
Loneliness (Junttila et al. 2013, Opintokamu 2016)	I feel like a part of a friend group. I have a lot in common with people around me. I feel I have been left out. I feel isolated from other people. I find company when I want. I feel bad that I'm so isolated. I'm not close to anyone anymore. My relationships are shallow. There is people who I feel really close to. Nobody really knows me very well. There is people who truly understand me. There is people who I can talk to.	1='Not correct' 2='Not very correct' 3='Fairly correct' 4='Totally correct'
School connectedness (Furlong, O'Brennan, and You 2011, Opintokamu 2016)	I perceive this schools people close to me I feel like I belong to the school community. I feel safe in this school I am happy that I can go to this school. My schools teachers treat students fairly.	1='Not at all true' 2='Fairly disagree' 3='Somewhat true' 4='Fairly agree' 5= 'Very true'

Appendix 2. Descriptive statistics of the variables wave by wave among 16-17-year-old general- and vocational upper secondary school students in Finland, and correlation matrix (N=3512).

	GUSS* School		Total n=2084						
	Wave1 n=767		Wave 2 n=762		Wave3 n=555				
	m	SD	m	SD	m	SD	ASE*	Lone*	SC*
ASE	4.0	.71	3.9	.80	3.8	.80	1.0		
Loneliness	1.5	.47	1.6	.55	1.6	.51	-.30***	1.0	
School connectedness	4.1	.74	4.0	.86	4.0	.83	.32***	-.44***	1.0

	VUSS* School		Total n=1428						
	Wave1 n=514		Wave 2 n=515		Wave3 n=399				
	m	SD	m	SD	m	SD	ASE*	Lone*	SC*
ASE	3.9	.73	3.8	.78	3.8	.80	1.0		
Loneliness	1.6	.46	1.6	.52	1.7	.54	-.34***	1.0	
School connectedness	4.1	.71	3.9	.89	3.8	.88	.37***	-.41***	1.0

ASE*=Academic self-efficacy
Lone*=Loneliness
SC*=School connectedness
GUSS*=General upper secondary school
VUSS*=Vocational upper secondary school

StudyPal – Opintokamu panel data – 2016-2017
m=mean, SD=standard deviation
***p<0.001