The Relationship Between Social and Academic Integration and Dropout from a Gender-Atypical Vocational Education

Master’s Degree Programme in Inequalities, Interventions and New Welfare State (INVEST)
Master's thesis

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Abstract

Gender segregation has been an issue in the Finnish education system for decades. Since the system is highly profession-oriented, gender-segregated fields of education tend to result in gender-segregated occupations, which is one of the main contributors of the gender pay gap.

Several studies have researched dropouts from tertiary education but there are fewer articles on dropouts from vocational education and training (VET), although the dropout rates are the highest at VET. It is proposed that men studying in female-dominated or women in male-dominated fields of education might have a higher dropout risk than students in gender-typical study programs. If students with a gender minority status drop out from fields dominated by one gender, it does not only have implications on the gender pay gap and gender equality in labor markets but also on gender equality in the whole society.

This study aims to provide information about dropouts from gender-atypical fields in VET. First, I study if students in gender-atypical fields drop out more often than students in gender-typical and -balanced fields. Next, I apply Tinto's student integration theory to study the relationship between social and academic integration and dropout. Finally, I analyse the interaction effects between indicators of social and academic integration, and gender-typical, -balanced and -atypical students.

The dataset combines two waves of Vocational School Student Surveys. The analysis method is binary logistic regression with interaction models. Female students in gender-atypical fields drop out more often than their peers in gender-typical fields, but students in gender-balanced fields have the highest relative dropout risk. A similar relationship was not found in men. Social and academic integration did not explain the differences in women's dropout behavior between gender-typical, balanced, and atypical study programs.

Keywords: dropout, gender typical, gender balanced, gender atypical, integration, VET

1. Introduction

The Finnish education system is highly profession-oriented, hence, the segregation in the field of education often reflects the segregation in the labor market (Prix et al., 2022, pp. 113-115). Horizontal segregation – the gender segregation within fields of education inside different educational levels – is one of the main contributors to the gender wage gap (Leuze & Strauß, 2016). Horizontal gender segregation is mostly formed by gendered educational and career choices, and gendered dropout patterns (Beckmann, 2023). Gender segregation in education decreased in Finland after the 1970s but has remained approximately at the same level between 2005 and 2019 (Prix et al., 2022, pp. 123-125).

Students in vocational education are in a higher dropout risk compared to students in tertiary education (Official Statistics of Finland, 2022; Van Houtte & Demanet, 2016). Dropout rates might be higher in gender-atypical education than in gender-typical or gender-balanced fields of education (Beckmann, 2023; Official Statistics of Finland, 2022). It is proposed that apprentices in gender-atypical occupations face more adverse experiences in social and professional contexts in comparison to their peers in gender-typical fields (England, 2010). In addition, for instance, poor social and academic integration may have a bigger impact on dropout rates among students in gender-atypical study programs than their peers in gender-typical education (Beckmann, 2023). If the relative dropout is higher among students in gender-atypical education, it might influence the gender pay gap and inequalities in labor markets.

To prevent dropouts, we must understand the underlying reasons to intervene in the process at an early stage and create preventative, targeted, policies. This study scrutinizes if male and female students in gender-atypical vocational education drop out more often than their counterparts in gender-typical and -balanced vocational degree programs. Furthermore, the study aims to define if the relationship between academic and social integration and dropout differs between students in gender-typical, -balanced, and -atypical fields of education. The dataset sums up two student cohorts between the years of 2015 and 2019. This approach enables the recognition of more robust trends in dropout behavior.

2. Literature review

Gender segregation in education

The choice of education highly influences the occupational trajectory (Barone, 2011), and hence, gender segregation in different educational fields result in gender separation in the labor markets (Smyth & Steinmetz, 2008). Gender segregation in education occurs when educational levels or fields are male- or female-dominated. In gender-segregated educational levels and fields, students of opposite gender are distinctly underrepresented (Prix, Sirniö, Kilpi-Jakonen, 2022, p. 113).

Educational level or field is usually defined as gender-segregated if the share of students in gender minority is no more than 30% (Beckmann, 2023). Social sector, health studies, and education as typically female-dominated, whereas STEM fields (science, technology, engineering, mathematics) are often male-dominated (Prix et al., 2022, pp. 113-115). Official Statistics of Finland (2021a) has stated that in 2018, approximately 9% of all Finnish wage earners were employed in a gender-balanced field. However, men work more in female-dominated fields than women in male-dominated fields (Official Statistics of Finland, 2021a).

Student integration theory

Tinto's (1975) student integration theory indicates a lack of social and academic integration is a significant predictor of dropping out. The theory suggests that students should get integrated academically and socially to stay in the study program. Although Tinto's (1975) model was originally designed for dropping out of higher education, it has also been used in VET context (Beckmann, 2023).

Tinto (1975) divides academic and social integration into two components. Academic integration includes grade performance and intellectual development, and social integration interaction with peer groups and faculty. Tinto (1975) suggests dropout is more likely if students do not have frequent interaction with their peers and teaching staff. Friendships with fellow students and academic support from the faculty can be seen as social rewards, hence, dropping out can become a social loss for the student. Well-integrated students usually internalize the values of the faculty (Tinto, 1975). Furthermore, especially at university, peers provide emotional and social support and enable informal academic cooperation which can be an integral factor in staying in the study program (Piepenburg & Beckmann, 2022).

A study about university students in gender-atypical fields suggests that social integration especially with the teaching staff would protect both men and women from dropping out of the gender-atypical field (Meyer & Strauß, 2019), however, the evidence is mixed (Piepenburg & Beckmann, 2022). In this study, support from student counsellor measures students' faculty integration.

Tinto's (1975) sub-dimensions for academic integration include intellectual development and grade performance. According to Tinto, intellectual development plays an integral role in personality development and reflects student's intellectual integration into the educational institution's academic system (Tinto, 1975). Recent studies have often defined this as students' commitment to the content of their program (Piepenburg & Beckmann, 2022).

According to Mäkinen, Olkinuora, and Lonka (2004), and Rautopuro and Korhonen (2011), non-committed students are at a significant risk of completely dropping out or changing their field of studies in tertiary education. These students are usually also poorly integrated into their social and academic communities and are often absent from their education (Mäkinen et al., 2004; Rautopuro & Korhonen, 2011). Thus, time spent in contact teaching measures students' intellectual development in this study.

A second sub-dimension of academic performance is grade performance. Tinto (1975) defines it as meeting the set standards of the educational system. If a student does not meet the standards, it can be understood as a discrepancy between their abilities and the requirements the study program sets. (Tinto, 1975). Perceived academic difficulty might indicate this mismatch students can face (Piepenburg & Beckmann, 2022).

Dropping out of education

Official Statistics of Finland (2022) states that during the academic year of 2019-2020, 6.8% of all attending students in Finland dropped out of their education leading to a qualification or a degree. Discontinuation in own sector of education is slightly more common than completely dropping out of education leading to a qualification of a degree. Men are in general at a higher risk of dropping out compared to women. In addition, dropout behavior differs between educational fields (Official Statistics of Finland, 2022).

Students in vocational education are at the highest risk of dropping out (Van Houtte & Demanet, 2016) whereas students in the university of applied sciences or university have a significantly lower risk to discontinue their education. During the academic year of 2019-2020, the dropout in Finnish VET was 13.3%, in university of applied sciences 7.2% and in universities 5.4%. (Official Statistics of Finland, 2022). The dropout rate at universities is the highest in the fields of information and communication technologies, and natural sciences (Rautopuro & Korhonen, 2011). Natural sciences also have the highest dropout rate in vocational education (Official Statistics of Finland, 2022, 2021b)

A study conducted in Spain concluded that 21.5% of students in VET have intentions to drop out (Cerda-Navarro et al., 2019). In a German study approximately one-third of apprentices considered dropping out (Seidel, 2019). Dropout considerations strongly predict actualized dropout (Sandler, 2000).

Dropout is usually caused by a bundle of accumulated disadvantages, for instance, students with low interest in studies often also have difficulties in academic performance (Behr et al., 2021). However, lack of interest and unfulfilled expectations about the studies seem to be one of the main motivations to drop out of university or VET (Beckmann, 2023; Beckmann et al., 2023; Behr et al., 2021). Events in family or personal life are seldom decisive factors for dropping out (Behr et al., 2021). Because interest in studies is one of the strongest factors indicating student's persistence in their current degree program, this study estimates dropout rates through students' interest in their studies.

Persistence in tertiary education and VET is dependent on different individual and institutional characteristics, and economic resources (Aina et al., 2022; Beckmann et al., 2023; Behr et al., 2021; Rautopuro & Korhonen, 2011; Seidel, 2019). However, the influence of these factors is mediated in tertiary education by an individual's capability to integrate into the academic environment (Aina et al., 2022).

In general, social networks outside the university influence student's possibilities to engage in studies (Rautopuro & Korhonen, 2011, p. 45). Family support influences student persistence at school; regardless of ethnicity and income, students with high levels of parental support are less likely to drop out than their peers with lower levels of parental support. (Cooper et al., 2005). However, socioeconomically disadvantaged students have a higher dropout likelihood than their more advantaged peers (Herbaut, 2021). Thus, students with migrant backgrounds are generally more disadvantaged compared to students with native Finn parents, as they often come from families with a lower socioeconomic status, since their parents are more likely to have low-status jobs and lower education (Cerdá-Navarro et al. 2022).

A student's socioeconomic background might also influence their dropout risk through career compromise. Beckmann, Wicht, and Siembab (2023) define career compromise as the difference between desired and attained VET. These compromises can for instance be related to social status and gender. Acquiring a degree in VET with a lower social status than expected by the family background increases the risk of dropout. Inversely, gaining a VET position with a higher social status than expected lowers the risk of dropping out. (Beckmann et al., 2023).

Dropout from gender-atypical education

Students in a gender atypical VET are enrolled in a heavily gender-segregated field where a maximum of 30% of students represent the same gender as them (e.g. Beckmann 2023). These educational fields can also be called female or male-dominated.

Study programs in the fields of engineering, manufacturing, construction, and ICT are gender-typical for men, in turn, programs in the field of health and welfare are female-typical (Official Statistics of Finland, 2022). Gender-balanced study programs are not heavily segregated by gender (e.g. Beckmann 2023). These fields of studies include arts and humanities; business administration and law; agriculture, forestry, fisheries and veterinary, and services.

Students entering a gender-atypical VET might have a higher dropout risk (Beckmann et al., 2023; Official Statistics of Finland, 2022). Gender does not seem to play a significant role in dropout behavior in gender-balanced fields but men and women drop out approximately as much (Beckmann et al., 2023).

According to the Official Statistics of Finland (2022), during the academic year of 2019-2020, both men and women dropped out most often from natural sciences, however, women's dropout was pronounced in male-dominated, and men's in female-dominated study programs. Nevertheless, men's dropout rates were higher than women's also in natural sciences, mathematics, and statistics, although those fields are typically male-dominated (Official Statistics of Finland, 2022).

Students with a gender minority status are significantly more likely to drop out due to a lack of social integration and unfulfilled aspirations than their peers in gender-balanced or -typical fields (Beckmann, 2023). Social integration is defined as social relations with study-related communities, like fellow students, and personal connections with the academic staff (Tinto, 1997). Although men with gender minority status drop out due to unfulfilled aspirations more often than their female peers with gender minority status, lack of social integration might also affect men's dropout in highly female-dominated occupations, where the share of women is at least 80% (Beckmann, 2023).

Kanter's (1977) theory of tokenism might explain the differences in dropout behavior between students in gender-typical and atypical study programs. The theory explains minorities' experiences in their occupation and argues that the more skewed the gender ratio is, the more the tokens – individuals with a gender minority status – receive attention from the dominant group. The high visibility can result in performance issues for the minority group. Furthermore, the dominant group might experience the token as a threat to their commonality which might lead to exaggerating the differences between tokens and dominants. These trends lead to tokens being captured by their role (Kanter, 1977). Earlier studies have applied Kanter's (1997) theory to examine dropout patterns among students in gender-atypical study programs (Beckmann, 2023; Meyer & Strauß, 2019). However, the results have been contradictory.

Both upper-class men and women are most often entering gender-balanced fields. However, the class differences in family background in attaining and graduating from a gender-atypical education are prominent (Seehuus, 2019). According to Prix et al. (2022), men from the upper classes tend to avoid male-dominated fields in VET and higher-level vocational training. At university avoidance significantly decreases. However, men from upper-class families might be slightly more likely to hold a gender-atypical VET degree in comparison to working-class men. Among women, however, the likelihood may be inverse (Prix et al. 2022 pp. 131-133).

3. Research questions

1. To what extent are female and male students in gender-atypical VET more likely to drop out of their study programme than their same-gender counterparts in gender typical and balanced fields?
2. A. Does social integration with peers influence dropout differently between female and male students in gender-atypical VET and their same-gender counterparts in gender-typical, and -balanced VET?

B. Does social integration with academic staff influence dropout differently between female and male students in gender-atypical VET and their same-gender counterparts in gender-typical, and -balanced VET?

3. A. Do studies' perceived difficulty influence dropout differently between female and male students in gender-atypical VET and their same-gender counterparts in gender-typical, and -balanced VET?

   B. Does time spent in contact teaching influence dropout differently between female and male students in gender-atypical VET and their same-gender counterparts in gender-typical, and -balanced VET?

4. Data

This study uses survey data collected from Finnish residents currently studying in a Finnish vocational training school. The datasets are repeated cross-sectional surveys from the Vocational School Student Survey 2015 and 2019. The data is available free of charge for everyone. The data collection is conducted by the Research Foundation for Studies and Education (Otus) and the National Union of Vocational Students in Finland (SAKKI). The questionnaire was sent to every vocational training school in continental Finland. (Otus & SAKKI, 2019).

Otus & SAKKI collected the data during the school terms of 2015 and 2019. I merged the data into one dataset and restricted the sample to participants aged 19 and under to eliminate the risk of the same students taking part in the study twice. The survey should be conducted during the classes in the presence of a teacher or a group leader of the class. However, some students may have answered the questionnaire in other ways due to an internship or other reasonable obstacles. The questionnaire is a structured online form to which every student answers independently. The respondents can have and answer the form in Finnish, Swedish, or English (Otus & SAKKI, 2015, 2019).

In 2015, 87 (83%) vocational training schools took part in the study. Overall, 20,840 students answered the questionnaire. (Otus & SAKKI, 2015). In 2019, 59 vocational training schools took part in the study which constitutes 37% of the schools where the survey was sent. The data was collected from 9584 students. (Otus & SAKKI, 2019). The final sample includes 10,374 participants. The sample is substantially smaller than the overall number of students taking the questionnaire. The decrease in the number of participants stems from a relatively big number of missing values in the sample. A considerable number of students did not define their mother's and/or father's highest qualification and hence, were excluded from the sample. Several participants neither answered the question measuring their level of peer integration.

Variables

Interest in studies is the dependent variable and indicates students' dropout likelihood. The dependent variable was measured by asking "Do you feel you are studying a field that is right for you?" The variable was recoded into "Yes" (0) and "No" (1).

Social integration with fellow students indicating student's peer integration was measured by asking: "Are there people among your leisure time friends that currently study the same field in the same institution?" Students' answers were coded to either the "integrated" (0) or "not integrated" (1) category.

Support from the student counsellor indicates integration with academic staff. It was measured by asking: "I have received support and guidance in my studies from the guidance counsellor whenever I've needed it." The variable is on a scale from 1 to 7 – 1 indicating "completely disagree" and 7 "completely agree".

Studies perceived difficulty aims to measure students' grade performance. Students were asked if their "studies are easy". The variable is on a scale from 1 to 7 – 1 indicating "completely disagree" and 7 "completely agree".

Time spent in contact teaching measures the number of hours students spend in on-campus lectures during an average week. The variable is on a scale from 1 to 8, 1 indicating "none" and 8 "over 30 hours".

Socioeconomic background was measured by the mother and father's highest completed degree. Categories include elementary school (0), secondary education (1), and tertiary education or higher (2).

Social support indicates students' perception of their overall social support system. Measured by answering if "there are enough people around me whose support I can count on whenever I have problems". The variable is on a scale from 1 to 7 – 1 indicating "completely disagree" and 7 "completely agree".

Financial stress was measured by asking if students' "disposable income is sufficient for your needs in the last 6 months?". I coded the options into two categories "enough money" (0), and "not enough money" (1).

Migration background is defined by the question "How long have you lived in Finland?". I coded the options into "has always lived in Finland" (0) and "has not always lived in Finland" (1).

Female and male students' degree program's gender type divide students into three different groups depending on the gender typicality of their studies. Women and men are coded into separate variables and treated individually in the analysis. The categories include gender-typical, balanced, and atypical study programs. Hence, women in male-dominated and men in female-dominated VET are classified as gender atypical students, women in female-dominated and men in male-dominated VET as gender typical students, and women and men in gender neutral VET as gender-balanced students.

According to the Official Statistics of Finland (2022), study programs in the fields of engineering, manufacturing, construction, and ICT are gender male-dominated, and programs in the field of health and welfare are female-dominated. Gender balanced educational fields include arts and humanities; business administration and law; agriculture, forestry, fisheries and veterinary, and services. Finally, men in female-dominated and women in male-dominated fields of education study in a gender-atypical field (Official Statistics of Finland, 2022).

5. Methods

I use binary logistic regression to compare students' dropout likelihood between gender-typical, balanced, and atypical VET. All calculations for men and women are conducted in separate models.

I use average marginal effects (AME) in all logistic models to compare the differences between groups. AMEs are the average impacts of changes in independent variables on a dependent variable. They are calculated for every observation by using the observed values of the parameters (Mize et al., 2019). In addition, I use linear combination of estimators for the interactions to test if the differences in AMEs between gender-typical, balanced, and atypical students are statistically significant.

I utilize weighted variables in each analysis to minimize the risk of selection bias. Weighted variables are coded by researchers who assembled the Vocational School Student Survey 2015 and 2019. The weighting factor in 2015's dataset is defined by the official statistics from the Finnish National Agency for Education and aims to stabilize the bias arising from the differences in responses between regions (Otus & SAKKI, 2015). Weighted variable from 2019's dataset includes age group, gender, AVI of the area where the institution/unit is located, the field of study corrected based on open-ended responses, and gender*field of study (Otus & SAKKI, 2019).

The analysis consists of three separate models. Each model includes all variables, and they are implemented separately for men and women. Model 1 answers the first research question. The main independent variables in the model are the gender composition of the student's degree program and factors indicating social and academic integration. Additionally, I use the linear combinations of estimators to examine differences in dropout rates between study groups. Model 2 answers to questions 2 A & B and respectively, model 3 questions 3 A & B. The main independent variable in each model is a single indicator of social or academic integration. Models 2 and 3 include an interaction term between the variables of interest, and test if the association between independent and dependent variables is moderated differently between groups.

6. Results

In this dataset, women are most often in the gender-balanced field of education (49.5%) whereas a great majority of men study in a gender-typical field (72.1%). For both men and women, the gender-atypical field was the least popular choice. Overall, 84.2% of women and 88.6% of men are staying enrolled in their current study program while 15.8% of women and 11.4% of men are in risk of dropping out. Students lacking social or academic integration have higher dropout percents compared to their well-integrated counterparts in all four dimensions of Tinto's (1975) social integration framework. Descriptive statistics are presented in Table 1 (p. 14).

Table 1. Descriptive statistics by gender, gender type of VET, and intention to drop out by percents and means.

	Women (n=4665)***(persistence=84.2%, dropout=15.8%)						Men (n=5709) (persistence=88,6%, dropout=11.4%)					
	Gender-typical % (n=1684, %=36.1)		Gender-balanced % (n=2309, %=49.5)		Gender-atypical % (n=672, %=14.4)		Gender-typical % (n=4118, %=72.1)		Gender-balanced % (n=1420, %=24.9)		Gender-atypical % (n=171, %=3)	
	Persistence	Dropout	Persistence	Dropout	Persistence	Dropout	Persistence	Dropout	Persistence	Dropout	Persistence	Dropout
	91.5	8.5	79.3	20.7	82.7	17.3	88.3	11.7	89.1	10.9	90.1	9.9
Peer integration												
Non-integrated	90	10	78.3	21.8	80.3	19.7	84.2	15.8	85.4	14.6	89.7	10.3
Integrated	91.9	8.1	79.6	20.4	84.05	15.95	89.6	10.4	90.4	9.6	90.15	9.85
Mother's degree												
Elementary	91	9	75	25	77.3	22.7	86.65	13.35	88.8	11.2	78.95	21.05
Secondary	91.2	8.8	79.8	20.2	84	16	87.9	12.1	88.7	11.3	88.8	11.2
Tertiary or higher	92.5	7.5	80	20	82.4	17.6	90	10	90	10	96.3	3.7
Father's degree												
Elementary	89.4	10.6	74.5	25.5	78.4	21.6	88.3	11,7	86.6	13.4	90.3	9.7
Secondary	92.7	7.3	81.1	18.9	85.95	15.05	88.3	11.7	89.9	10.1	89.4	10.6
Tertiary or higher	89.2	10.8	77.8	22.2	80.4	19.6	88.6	11.4	88.45	11.55	91.7	8.3
Financial stress												
No	92.3	7.7	81.7	18.3	84.65	15.35	90	10	90	10	89.8	10.2
Yes	89.4	10.6	72.8	27.2	77.9	22.1	81.9	18.1	84	16	91.2	8.8
Migration background												
No	91.7	8.3	79.4	20.6	82.5	17.5	88.7	11.3	89.2	10.8	90.2	9.8
Yes	85	15	76.3	23.7	87.1	12.9	78.95	21.05	85.7	14.3	87.5	12.5
	Mean (SD)											
Support from student counsellor 1: no support – 7: high support	4.9 (1.2)	4.4 (1.3)	4.8 (1.3)	4.4 (1.4)	4.7 (1.3)	4.3 (1.4)	4.9 (1.2)	4.5 (1.3)	5.0 (1.2)	4.6 (1.2)	4.9 (1.3)	4.5 (0.6)
Time spent in contact teaching 1: none – 8: more than 30h	6.4 (1.8)	5.9 (2.0)	5.7 (2.0)	5.6 (2.0)	5.8 (2.1)	4.9 (2.3)	5.1 (2.3)	4.5 (2.3)	5.3 (2.2)	5.0 (2.1)	6.2 (2.0)	5.1 (2.5)
Studies' perceived difficulty 1: studies hard – 7: easy	4.1 (1.1)	3.5 (1.3)	4.5 (1.0)	3.9 (1.2)	4.4 (1.1)	3.9 (1.3)	4.5 (1.1)	4.0 (1.3)	4.6 (1.1)	4.2 (1.3)	4.3 (1.3)	4.2 (1.3)
Social support 1: no – 7: yes	5.8 (1.3)	5.3 (1.5)	5.6 (1.4)	5.1 (1.6)	5.5 (1.4)	4.5 (1.8)	5.5 (1.2)	4.9 (1.5)	5.5 (1.3)	4.9 (1.4)	5.7 (1.4)	5.2 (1.3)

SD=standard deviation

Table 2. Logistic regression with average marginal effects demonstrating the relationship between independent variables and dropout. The results for men and women are calculated in separate models.

	AMEs for dropout (SE)	
	Women	Men
Study programme's gender type, ref. gender typical		
Gender-balanced	0.116*** (0.118)	-0.002 (0.010)
Gender-atypical	0.060*** (0.016)	-0.016 (0.024)
Difference in AMEs		
Gender-balanced – gender-atypical	0.055** (0.017)	0.014 (0.025)
Peer integration, ref. non-integrated		
Integrated	-0.004 (0.026)	-0.041*** (0.011)
Support from student counsellor		
1: no support – 7: high support	-0.021*** (0.004)	0.014*** (0.004)
Time spent in contact teaching		
1: none – 8: more than 30h	-0.009** (0.003)	-0.008*** (0.002)
Studies' perceived difficulty		
1: studies hard – 7: studies easy	-0.0048*** (0.005)	-0.030*** (0.004)
Father's degree, ref. elementary		
Secondary	-0.048** (0.015)	-0.002 (0.013)
Tertiary or higher	-0.001 (0.021)	0.016 (0.016)
Mother's degree, ref. elementary		
Secondary	-0.014 (0.018)	-0.018 (0.017)
Tertiary or higher	-0.034 (0.021)	-0.039* (0.018)
Migration background, ref. no		
Yes	0.041 (0.031)	0.058* (0.029)
Social support		
1: no – 7: yes	-0.022*** (0.004)	-0.017*** (0.003)
Financial stress, ref. no		
Yes	0.029* (0.013)	0.042** (0.021)

AME=Average marginal effect, SE=standard error, $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Social and academic integration

Logistic regression with AMEs predict female students in gender-balanced fields are 17 and in gender-atypical fields 6 percentage points more likely to be uninterested in their studies, compared to female students in gender-typical fields of education. In turn, men in gender-balanced and gender-atypical VET are 0.2 and 2 percentage points, respectively, less likely to have interest in their studies, compared to men in gender-typical VET. The differences in dropout are statistically significant in women but not in men. Hence, female students in gender-balanced and atypical VET might have a higher dropout likelihood than their counterparts in gender-typical VET. In addition, female students' dropout behavior between gender-balanced and atypical fields might differ. A similar association was not detected among men. Logistic regressions of men and women are represented in Table 2 (p. 15).

The fewer time students spend in contact teaching or the higher their studies perceived difficulty is, the more likely they are to be uninterested in their studies. In addition, inadequate support from student counsellors is statistically significantly associated with dropout among women, for men the relationship is inverse. Furthermore, non-peer-integrated male students are statistically significantly more likely to dislike their studies compared to their well-peer-integrated counterparts. The level of peer integration is not statistically significantly associated with dropout among women.

Low levels of social support and financial stress have a statistically significant association with dropout both among men and women. However, student's socioeconomic status measured with parents' highest level of education is not strongly associated with dropout. Male students with a migration background might also be more likely to be uninterested in their studies compared to their counterparts who have always lived in Finland.

Interaction effects, women

When all variables are considered, peer-integrated students in gender-typical and balanced fields are 4 and 6 percentage points, respectively, less likely to drop out from their studies compared to their poorly peer-integrated counterparts (table 3). The association is inverse for students in the fields atypical for their gender. However, none of the interactions is statistically significant. Hence, we may assume the level of peer integration is not associated with female students' dropout likelihood, and that the effect does not differ between the gender composition of one's VET.

In all three groups, female students with insufficient support provided by student counsellors are more likely to drop out compared to their counterparts receiving sufficient support (table 3). One point increase in receiving guidance from a student counsellor decreases student's dropout likelihood in gender-typical, balanced, and atypical fields by 17, 25, and 19 percentage points, respectively. The relationship is statistically significant for students in a field typical or neutral for their gender.

The moderating effect of the participant's study program seems to be the strongest among students in gender-balanced fields, yet the difference is not statistically significant between any of the groups. Insufficient support from student counsellor might pose an increased dropout risk, at least for students in fields typical or neutral for their gender.

Table 3. Interactions between social integration and study program's gender type with differences between groups. The results are for women and based on the model in table 2, with one interaction added at a time.

	AME (SE)		AME (SE)
Peer integration		*Support from student counsellor*	
Gender-typical	-0.004 (0.017)	Gender-typical	-0.017** (0.006)
Gender-balanced	-0.006 (0.020)	Gender-balanced	-0.025*** (0.007)
Gender-atypical	0.005 (0.031)	Gender-atypical	-0.019 (0.012)
Difference in AMEs		*Difference in AMEs*	
Gender-atypical – gender typical	0.010 (0.036)	Gender-atypical – gender-typical	-0.001 (0.013)
Gender-atypical – gender balanced	0.011 (0.037)	Gender-atypical – gender-balanced	0.007 (0.014)
Gender-balanced – gender typical	-0.001 (0.027)	Gender-balanced – gender-typical	-0.008 (0.009)

AME=Average marginal effect, SE=standard error, $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Female students in all three groups are more likely to drop out compared to their counterparts if their studies perceived difficulty is high (table 4). One point increase in studies' perceived difficulty decreases students' dropout in gender-typical, -balanced, and -atypical fields by 33, 60, and 23 percentage points, respectively. The relationship is statistically very significant for students in a field typical or neutral for their gender.

Studies perceived difficulty's effect on students' dropout might differ between students in gender-atypical and -balanced, and gender-balanced and -typical study programs. Hence, we may assume that the association between studies' perceived difficulty and dropout differs between the groups.

Female students in all three groups are more likely to have an increased dropout risk if their time spent in contact teaching is low, compared to their counterparts who are more often present in on-campus teaching (table 4). One point increase in time spent in contact teaching decreases student's dropout likelihood in gender-typical, -balanced, and -atypical fields by 10, 6, and 16 percentage points, respectively. The relationship is statistically significant among students attending a study program typical or atypical for their gender.

The moderating effect of class attendance seems to be the strongest among students in gender-atypical fields, yet the differences between groups are not statistically significant. However, the number of hours spent in on-campus teaching might indicate students' dropout risk, especially among students in VET programs typical or atypical for their gender.

Table 4. Interactions between academic integration and study program’s gender type with differences between groups. The results are for women and based on the model in table 2, with one interaction added at a time.

	AME (SE)		AME (SE)
Studies' perceived difficulty		*Time spent in contact teaching*	
Gender-typical	-0.033*** (0.007)	Gender-typical	-0.010* (0.003)
Gender-balanced	-0.060*** (0.009)	Gender-balanced	-0.006 (0.004)
Gender-atypical	-0.023 (0.015)	Gender-atypical	-0.016* (0.007)
Difference in AMEs		*Difference in AMEs*	
Gender-atypical – gender-typical	0.010 (0.036)	Gender-atypical – gender-typical	-0.006 (0.007)
Gender-atypical – gender-balanced	0.011 (0.037)	Gender-atypical – gender-balanced	-0.010 (0.008)
Gender-balanced – gender-typical	-0.001 (0.027)	Gender-balanced – gender-typical	0.005 (0.005)

AME=Average marginal effect, SE=standard error, $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Interaction effects, men

Peer-integrated male students in gender-typical, -balanced, and -atypical fields are 51, 25, and 9 percentage points, respectively, less likely to have an increased dropout risk compared to their poorly peer-integrated counterparts (table 5). Students in a field atypical for their gender seem to have the weakest relationship between peer integration and dropout. However, the relationship is statistically significant only among students in gender-typical fields.

The largest dissimilarity in the effect of study programs' gender type is between students in gender-atypical and -typical fields, but the difference does not reach statistical significance. Nevertheless, peer integration might be the most strongly associated with dropout in students in gender-typical programs when compared to students in gender-balanced and -atypical VET.

In all three groups, male students with insufficient support provided by a student counsellor are more likely to drop out compared to their counterparts receiving sufficient support (table 5). One point increase in receiving guidance from a student counsellor decreases student’s dropout risk in gender-typical, -balanced, and -atypical fields by 17, 6, and 7 percentage points, respectively. The relationship is statistically significant only for students attending a field typical for their gender.

The moderating effect of student’s VET may be the strongest among students in gender-typical fields, but the difference is not statistically significant between any of the groups. However, insufficient support from student counsellors might pose an increased dropout likelihood at least for students in fields typical for their gender.

Table 5. Interactions between social integration and study program's gender type with differences between groups. The results are for men and based on the model in table 2, with one interaction added at a time.

	AME (SE)		AME (SE)
Peer integration		*Support from student counsellor*	
Gender-typical	-0.051*** (0.014)	Gender-typical	-0.017*** (0.004)
Gender-balanced	-0.025 (0.020)	Gender-balanced	-0.006 (0.007)
Gender-atypical	-0.009 (0.054)	Gender-atypical	-0.007 (0.014)
Difference in AMEs		*Difference in AMEs*	
Gender-atypical – gender-typical	0.043 (0.056)	Gender-atypical – gender-typical	0.010 (0.014)
Gender-atypical – gender-balanced	0.016 (0.058)	Gender-atypical – gender-balanced	-0.001 (0.015)
Gender-balanced – gender-typical	0.027 (0.024)	Gender-balanced – gender-typical	0.011 (0.008)

AME=Average marginal effect, SE=standard error, $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Male students in all three groups are more likely to have an increased dropout likelihood compared to their counterparts when their studies perceived difficulty is high (table 6). One point increase in studies' perceived difficulty decreases students' dropout in gender-typical, -balanced fields by 36 and 22 percentage points, respectively. The relationship is statistically significant for students in a field typical or neutral for their gender. Studies' perceived difficulty is not association with a dropout on students in gender-atypical fields of education.

The strength of the relationship between difficulty and dropout does not statistically significantly vary between groups, but the difference is the largest between students in gender-atypical and -typical fields. Thus, studies' high perceived difficulty might be associated with increased dropout likelihood among male students in gender-typical fields.

Male students are more likely to have an increased dropout risk in all three groups if their time spent in contact teaching is low, compared to their counterparts who attend more in on-campus teaching (table 6). One point increase in time spent in contact teaching decreases student's dropout in gender-typical, -balanced, and -atypical fields by 9, 3, and 13 percentage points, respectively. The relationship is statistically significant only for students in gender-typical VET.

Class attendance's moderating effect does not differ statistically significantly between groups. However, the hours spent in on-campus teaching might indicate student dropout risk among students in VET programs typical of their gender.

Table 6. Interactions between academic integration and study program's gender type with differences between groups. The results are for men and based on the model in table 2, with one interaction added at a time.

	AME (SE)		AME (SE)
Studies' perceived difficulty		*Time spent in contact teaching*	
Gender-typical	-0.036*** (0.005)	Gender-typical	-0.009*** (0.002)
Gender-balanced	-0.022* (0.008)	Gender-balanced	-0.003 (0.004)
Gender-atypical	0.000 (0.019)	Gender-atypical	-0.013 (0.010)
Difference in AMEs		*Difference in AMEs*	
Gender-atypical – gender-typical	0.036 (0.020)	Gender-atypical – gender-typical	-0.004 (0.011)
Gender-atypical – gender-balanced	0.022 (0.021)	Gender-atypical – gender-balanced	-0.10 (0.011)
Gender-balanced – gender-typical	0.014 (0.009)	Gender-balanced – gender-typical	0.006 (0.004)

AME=Average marginal effect, SE=standard error, p < 0.05, ** p < 0.01, *** p < 0.001

7. Discussion and conclusions

The aim of this study was to examine if students in gender-atypical study programs have a higher dropout risk than students in gender-typical and -balanced fields. Each analysis was separately carried out for men and women to compare the possible differences in dropout behaviour within genders. In this study, interest in studies was used as a predictor of students' dropout likelihood. I used Tinto's (1975) social integration to theory to analyse if social and academic integration's moderating effect on dropout likelihood would differ between gender-typical, -balanced, and -atypical students. The results partly aligned with earlier research.

Female students in the fields neutral and atypical for their gender showed a higher dropout rate than students in gender-typical fields. Previous research has argued that both male and female students in gender-atypical fields of study would have an increased dropout risk (Beckamann, 2023 & (Meyer & Strauß, 2019). Contrary to Kanter's (1977) theory, men's dropout behaviour did not differ between students in gender-typical, -balanced, and -atypical fields. Findings of this study suggest that association between gender-atypical studies and dropout might be stronger among women than men, which aligns with earlier research (Meyer & Strauß, 2019).

Men generally assess their suitability for female-dominated study programs higher than women assess their capabilities to succeed in a male-dominated fields (Meyer & Strauß, 2019). Low self-efficacy explains non-commitment into studies which might lead to dropout (Rautopuro & Korhonen, 2011, p. 46-47). This could explain why women in gender atypical subjects might face an increased dropout risk. Empirical findings have also suggested that male students might receive favourable treatment in female-dominated occupations (Williams, 1992) which could have an association with gender-atypical male students low dropout rates.

Students' overall dropout risk stays moderate since most students are likely to graduate. However, this study did not measure the realized dropouts but predicted them through students' interest in studies which may distort the results. During the school term 2019-2020 (Official Statistics of Finland, 2022) the realized drop out among students in VET was 13.4% on women and 13.3% on men, whereas the respective rates predicting interest in studies in this study were 15.8% and 11.4%. Although this study slightly overestimated women's dropout rate and underestimated men's, interest in studies seems successfully predict students' dropout behaviour. However, the data does not represent the overall dropout during studies as it is a combined dataset from two school terms.

Contrary to Beckmann's (2023) findings, the level of peer integration was not associated with women's drop out from gender-atypical study programs. Poor peer integration was neither associated with increased dropout among male students in female-dominated VET. The result partly aligns with previous findings since only men in highly female-dominated subjects have shown an increased dropout risk associated to low peer integration (Beckamann 2023). Support from student counsellor was neither statistically significantly associated to dropout behaviour among male nor female students in gender-atypical VET, despite Meyer and Strauß (2019) found contact with faculty members a protective factor against dropout for men and women in gender-atypical studies. In conclusion, these factors of social integration might not be related with gender-atypical female students increased dropout risk.

Time spent contact teaching measured intellectual development which is part of academic integration in Tinto's (1975) theory of integration. As predicted, low presence in on-campus teaching predicted higher dropout likelihood. The relationship was significant among male and female students in gender-typical and females in gender-atypical study programs. Studies' high perceived difficulty was associated with increased dropout likelihood especially among male and female students in gender-balanced and -typical fields. As a result, difficulties in academic integration might be associated to increased dropout risk especially on women and men in gender-typical subjects. However, female students in gender-atypical VET showed a slightly higher interaction effect with time spent in on-campus teaching than their counterparts in gender-typical studies.

None of the interaction effects differed statistically significantly between female nor male students in gender-typical, -balanced, or -atypical subjects. However, men in gender-atypical VET showed systematically weaker interaction effects compared to males in gender-typical and -balanced fields. This could indicate that gender-atypical male students are on average more interested in their studies than their counterparts in gender-typical and -balanced fields of study.

Overall, the underlying factors associated to atypical female student's higher dropout risk might not be as strongly connected to social and academic integration as this study anticipated. Male students in study programmes atypical for their gender did not have an increased dropout risk compared to their counterparts in gender-typical or -balanced subjects. Dropout is seldom caused by one factor but accumulated disadvantages (Behr et al., 2021; Tinto, 1975). Therefore, a single factor might be associated to an increased dropout risk, but it does not result in dropout if there are no other risk factors. Thus, it is possible that the results do not comprehensively reflect social or academic integration's association with dropout.

Finally, this study practices a binary perspective of gender. A small number of non-binary students had also answered the questionnaire, but the sample was not big enough to acquire scientifically meaningful results. Furthermore, defining gender typical, balanced, and atypical field of study is complex when gender typicality in education is defined in a binary manner. The variables influencing non-binary students' dropout might also differ from men and women. However, excluding non-binary respondents should not be a default practice as it influences the generalizability of the results and discriminates a societally significant minority – according to the Finnish Institute for Health and Welfare (2023), 5% of youth in Finland define themselves as non-binary.

These results give an insight into students' dropout behaviour in gender-typical, -balanced, and -atypical study programs. One must be careful with the generalization of the results. The results can only be generalized on the population level, not on specific demographic groups. In line with previous findings, this study showed that female students in gender-atypical VET might have an increased dropout risk compared to their counterparts in gender-typical education. Nevertheless, the indicators of social and academic integration did not show the underlying reasons behind this trend. However, considering earlier research, the statement needs more research to strengthen the argument. Research on dropout has largely focused on students in tertiary education which does not account for the characteristics of VET students. Tackling the dropout issue requires broad, nationwide policies and interventions, not only in education, but also, for instance, in social welfare. Thus, studies focusing on these issues and recognizing the characters leading to dropout especially among female students in VET could be beneficial.

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