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Inequalities in adolescent mental health and allocation of students to selective classes in comprehensive schools in Finland: a longitudinal study

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ABSTRACT

Background Lower socioeconomic positions (SEP) and poor academic achievement increase children's risk for mental health problems. The Finnish education system is officially non-selective and unified, but a part of children can be selected into emphasised teaching classes by aptitude tests, which are known to segregate students by SEP and academic achievement. We study here if allocation of students to mainstream and selective classes segregates students by mental health, too.

Methods Students from primary school (6th grade) were followed to lower secondary school (7th grade). The number in selective classes was n=209 and in mainstream classes n=551. Outcomes were depressed mood, anxiety and daily health complaints. Association between class type and the outcomes was analysed by cross-tabulation and logistic regression models. Gender, academic achievement, SEP and previous mental health were independent and confounding/moderating variables.

Results Students in selective classes had better academic achievement and higher SEP compared with students in mainstream classes. Girls reported poorer mental health than boys. Depressive mood did not vary by class type, but anxiety and daily health complaints were more common among girls in mainstream classes. When academic achievement and background factors were considered, among girls only anxiety was more common in mainstream classes, but among boys, anxiety appeared to be statistically significantly more common in selective classes.

Conclusion Grouping students by aptitude tests to different classes may select them by mental health, too. Longer follow-up and gender-specific studies would give more reliable answers for education policy makers about student grouping by aptitude test and its effects on segregation.

INTRODUCTION

Inequalities in mental health are found from childhood and adolescence to old age. In childhood and adolescence, growing in families with low socioeconomic position (SEP) increases the risk for mental health disorders.^{1,2} In adulthood, individuals' own low SEP and education are related to higher mental health morbidity.³ During school years, academic achievement along with available opportunities

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Poor mental health and low academic achievement are closely linked. Grouping students based on aptitude tests is associated with segregation between school classes in terms of academic performance and socioeconomic background, but segregation by mental health is not known.

WHAT THIS STUDY ADDS

⇒ In this study, depressive mood did not vary by class type (selective vs mainstream education), but anxiety and daily health complaints were more common among girls in mainstream classes. When academic achievement and background factors were considered, anxiety was more common in mainstream classes among girls and in selective classes among boys.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Grouping students by aptitude tests to different classes may select them by mental health, too. Longer follow-up and gender-specific studies would give more reliable answers for education policy makers about student grouping by aptitude test and its effects on segregation.

shapes children's educational path towards adulthood education and position in society (eg, ref 4). Poor mental health can deteriorate academic achievement,^{5,6} and in longitudinal studies, it has predicted school dropout and non-completion of diploma,^{7,8} thus increasing the likelihood of low educational level and SEP in adulthood.

The comprehensive schooling system in Finland (nine grades for 7–15 year-olds) aims at equal opportunity for every child regardless of social background, place of living or gender. In international comparisons, differences between schools in students' learning outcomes have been small, while differences between school classes have been relatively large.⁹ The segregation in students' socioeconomic status and learning outcomes has been smaller in Finland than in most Organisation for Economic Co-operation and Development



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countries but has increased during the recent years.¹⁰ Officially, the Finnish education system has no tracking or ability grouping, but student enrolment to so-called emphasised teaching classes that select their students is widely used in cities, and the selection criteria vary by school and municipality. Aptitude tests typically assess students' characteristics and skills (such as motivation, temperament and skills attained from hobbies), and other selection criteria (interview, teacher's recommendation) are also used in grouping students to selective classes. Selective classes emphasise one or more school domains in their local curriculum (eg, foreign language, music, science) but otherwise they follow the same national core curriculum as mainstream education classes.^{11 12}

Selective classes gather relatively more students from higher SEP families and well-off neighbourhoods,¹³ and academic achievement is better in selective than in mainstream classes.¹⁴ Allocating part of better performing students to selective classes changes student composition in classes and schools in general, which is known to influence academic performance.^{15 16} Some evidence suggests that class composition can influence students' mental health and well-being, too; a high number of students with mental disorders in the class have been associated with the later risk of mental health problems,¹⁷ the effect of class-level health on academic achievement has been as strong as the effect of student-level health,¹⁸ and psychosocial environment in class has accounted even for 40% of class-level variance in students' health complaints.¹⁹ Further, school-level socioeducational environment has been predictive of students' depressive symptoms,²⁰ and low-performing students in classes with a high proportion of well-performing students have reported more psychosomatic symptoms than other students.²¹

Gender differences in mental health and school performance are well known. School performance is lower among boys,¹⁰ while girls have more mental health problems.^{22–24} Selective classes segregate students according to socioeconomic background and academic achievement, but it is not known if there is segregation according to students' mental health or whether known gender differences in mental health and school performance follow the same pattern in mainstream and selective classes. We study here:

- ▶ If students' mental health is associated with class type (selective vs mainstream).
- ▶ If students' mental health varies according to gender, academic achievement, family SEP and previous mental health, and if the association of mental health with class type is independent of these factors.

We use three indicators of mental health: daily health complaints, depressive mood and anxiety. Our population consists of 7th graders of Finnish lower secondary school, surveyed also in the 6th grade.

METHODS

Participants

All Finnish language schools in Turku (the population about 200 000) were invited to participate. The data consist of students who participated in the 6th (12–13 years) grade and 7th (13–14 years) grade (n=760). In the 6th grade, 23 of 25 primary schools participated (14 selective classes, n=209; 41 mainstream classes, n=551). In the 7th grade, all lower secondary schools participated (15 selective classes, n=201; 44 mainstream classes, n=559). The students who did not participate after the 6th grade (n=185) reported more depressed mood and daily health complaints in the 6th grade than those who participated in both

grades, but there were no statistically significant differences in mental health between participants and non-participants either in mainstream or in selective classes.

Ethical considerations and procedure

In a separate information letter and in the question and task package, students were informed that participation was voluntary and that no consequences will follow if they deny participation. Parents were informed of the study, and they had a possibility to deny their child's participation by contacting the teacher. Students filled out the questionnaire and completed the cognitive performance tasks on a digital assessment platform at school during two lessons. The teacher gave other tasks for the students who had denied or whose parents had denied participation.

Measurements

Outcome variables

Daily health complaints. The following widely used health complaints^{25 26} during the last 6 months were asked: neck or shoulder pain, lower back pain, headache, difficulties in falling asleep or getting awake night-time, tiredness or exhaustion, low mood or depression, and concentration difficulties (Cronbach's $\alpha=0.86$). The options were: 'seldom or not at all' (0), 'approximately once a month' (1), 'approximately weekly' (2) and 'daily' (3). If the participant had answered at least one item, missing answers in the other symptoms were replaced with 'seldom or not at all'. If no items were answered, the respondent was excluded from the analyses. In the analysis, the students were classified as: no daily health complaints, or one or more daily health complaints.

Anxiety was measured with a validated 7-item Generalized Anxiety Disorder Scale.^{27 28} The answer options for seven items were 'not at all' (0), 'on several days' (1), 'on most of the days' (2) and 'nearly every day' (3). Missing items were coded 'not at all' if the student had answered at least one item. The answers were summarised to a score of 0–21 and classified according to the clinical cut-off point²⁷: yes ≥ 10 , no < 10 .

Depressed mood was measured with Patient Health Questionnaire 2. The 2-item version is a validated depression screener²⁹ that has been retested in adolescents.³⁰ Response options 'not at all' (0), 'for several days' (1), 'for more than half the days' (2) and 'nearly every day' (3) were summed to a score of 0–6. The clinical cut-off point used was ≥ 3 .²⁹ If one answer was missing, it was replaced with 'not at all'.

Explaining variables

Class type was either mainstream education or selective education. Aptitude tests and other selection criteria are used to enrol students into selective classes. Both class types followed the same national core curriculum, but the selective classes had some additional hours each week in the emphasised teaching subjects (foreign language, arts, math or science). Class type at the 7th grade is the main explaining variable, while class type at the 6th grade is used as control variable because some (10.9%) of the students changed the class type when transferring from the 6th grade to the 7th grade.

Academic performance was based on mother tongue (=evaluation of relevance of given information and reading comprehension) and mathematics (=quantitative reasoning) tasks in the test package, which has been widely used since the mid-1990s (see more, ref³¹). The scaled score (number or relative proportion) in each task describes the student's performance. The range depends on the sample. In our study, the range of mathematical

Table 1 Distributions of the variables by gender and class type

Variable	Gender		P value*	Class type, 7th grade		P value*
	Girl (%)	Boy (%)		Mainstream (%)	Selective (%)	
Class type, 7th grade (n=760)			0.555			
Selective	25.6	27.5		–	–	
Mainstream	74.4	72.5		–	–	
Family SEP (n=682)			0.029			<0.001
High	32.8	40.9		31.9	49.2	
Low	67.2	59.1		68.1	50.8	
Mathematical performance, 7th grade (n=760)			0.129			<0.001
High	28.3	26.6		23.8	37.8	
Average	30.0	24.9		27.4	28.4	
Low	24.1	31.4		28.6	24.4	
Test not completed	17.6	17.1		20.2	9.5	
Mother tongue performance, 7th grade (n=760)			0.030			<0.001
High	26.8	18.5		19.5	32.3	
Average	40.0	40.9		40.3	40.8	
Low	27.8	32.8		33.5	20.9	
Test not completed	5.5	7.8		6.8	6.0	
Depressed mood, 7th grade (n=605)			<0.001			0.154
No	66.6	82.2		72.1	77.7	
Yes	33.4	17.8		27.9	22.3	
Anxiety, 7th grade (n=608)			<0.001			0.144
No	66.2	83.5		72.4	78.1	
Yes	33.8	16.5		27.6	21.9	
Daily health complaints, 7th grade (n=688)			<0.001			0.100
No	51.2	72.0		58.8	65.7	
Yes	48.8	28.0		41.2	34.3	
Class type, 6th grade (n=760)			0.497			<0.001
Selective	28.5	26.3		8.2	81.1	
Mainstream	71.5	73.7		91.8	18.9	
Depressed mood, 6th grade (n=608)			0.015			0.049
No	76.0	84.0		77.8	84.9	
Yes	24.0	16.0		22.2	15.1	
Anxiety, 6th grade (n=616)			0.004			0.894
No	76.0	85.2		80.2	80.7	
Yes	24.0	14.8		19.8	19.3	
Daily health complaints, 6th grade (n=695)			<0.001			0.076
No	56.3	77.5		64.1	71.3	
Yes	43.7	22.5		35.9	28.7	
Gender (n=760)						0.555
Boy	–	–		46.3	48.8	
Girl	–	–		53.7	51.2	

* χ^2 test, statistically significant in bold.
SEP, socioeconomic position.

performance was 0–1094 and the range (relative proportions) of mother tongue was 0–100. Students' performance in mathematics and mother tongue was divided into four groups: (0) test not completed, (1) low performance (<33% points of the total score), (2) average performance (33.3–66.7%) and (3) high performance (>66.7%).

Family SEP was coded according to students' reports of mother and father's occupations. Mother's occupation was used, and if this was missing, father's occupation was used. Occupations were coded according to the official Classification of Occupations 2010, Statistics Finland. The SEP was analysed in two categories (1=high; 0=low or middle).

Gender was measured in binary (boy, girl).

Statistical methods

The class type and gender differences between the outcomes and the explaining variables were first tested by cross-tabulation (crosstab) and χ^2 tests. Next, univariate logistic regression analyses for each mental health outcome with each explaining variable were conducted, and an interaction term between the class type 7 and each explaining variable was also calculated to see if a stratified analysis was needed. To investigate whether class type 7 was independently associated with the mental health variables, class type 7 and statistically significant variables from the univariate models were selected into multivariate models, except the class type

Table 2 Distributions of mental health indicators by gender and class type

Mental health indicator	Girl		P value*	Boy		P value*
	Mainstream (n=300) %	Selective (n=103) %		Mainstream (n=259) %	Selective (n=98) %	
Depressed mood						
No	64.1	72.8	0.134	81.9	83.1	0.801
Yes	35.9	27.2		18.1	16.9	
Anxiety						
No	61.6	77.7	0.004	85.6	78.6	0.149
Yes	38.4	22.3		14.4	21.4	
Daily health complaints						
No	47.9	60.8	0.028	72.2	71.4	0.887
Yes	52.1	39.2		27.8	28.6	

*X² test, statistically significant in bold.

in grade 6 due to its high multicollinearity with the class type in grade 7.

A group effect of the hierarchical school data was considered by calculating intraclass correlations (ICC) for each mental health outcome, using school as a grouping variable. As the ICC values for schools were low (1%), the school effect was omitted from the analyses.³²

In the analyses, p values <0.05 were considered statistically significant. Data were analysed using SPSS (V.28.0).

RESULTS

Table 1 shows the distributions of the measured variables by gender and class type. All mental health indicators were more

Table 3 Univariate and multivariate logistic regression models for depressed mood and daily health complaints in the 7th grade

	Univariate model		Multivariate model	
	Depressed mood OR (95% CI)	Daily health complaints OR (95% CI)	Depressed mood OR (95% CI)	Daily health complaints OR (95% CI)
Class type, 7th grade				
Selective	1.00	1.00	1.00	1.00
Mainstream	1.35 (0.89 to 2.04)	1.35 (0.95 to 1.92)	1.12 (0.69 to 1.82)	1.19 (0.79 to 1.80)
Family SEP				
High	1.00	1.00		
Low	1.47 (0.99 to 2.20)	1.27 (0.91 to 1.78)		
Mathematical performance				
High	1.00	1.00	1.00	
Average	1.94 (1.21 to 3.10)	1.19 (0.79 to 1.77)	1.61 (0.95 to 2.72)	
Low	2.15 (1.33 to 3.48)	1.23 (0.82 to 1.84)	2.10 (1.19 to 3.71)	
Test not completed	1.57 (0.68 to 3.63)	1.28 (0.76 to 2.13)	1.39 (0.51 to 3.79)	
Mother tongue performance				
High	1.00	1.00		
Average	1.19 (0.75 to 1.90)	0.91 (0.62 to 1.34)		
Low	1.61 (0.98 to 2.65)	0.76 (0.50 to 1.15)		
Test not completed	0.29 (0.04 to 2.27)	1.20 (0.41 to 3.45)		
Class type, 6th grade				
Selective	1.00	1.00		
Mainstream	1.28 (0.85 to 1.94)	1.31 (0.92 to 1.86)		
Depressed mood, 6th grade				
No	1.00	–	1.00	
Yes	4.76 (3.02 to 7.50)	–	4.39 (2.75 to 7.00)	
Daily health complaints, 6th grade				
No	–	1.00		1.00
Yes	–	7.18 (4.98 to 10.34)		6.41 (4.42 to 9.28)
Gender				
Boy	1.00	1.00		
Girl	2.33 (1.58 to 3.42)	2.46 (1.78 to 3.38)	2.25 (1.44 to 3.52)	1.84 (1.27 to 2.65)

Statistically significant in bold.
SEP, socioeconomic position.

common among girls than boys in the 6th and 7th grades. Compared with boys, girls had better academic performance in mother tongue, and they more often came from low SEP families. Children in selective classes had better performance in mathematics and mother tongue and higher family SEP. In the 6th grade, students in mainstream classes reported depressed mood slightly more often than those in selective classes, otherwise mental health indicators (depressed mood, anxiety and daily health complaints) did not differ between mainstream and selective classes.

In table 2, we show class type differences in mental health outcomes for boys and girls separately in the 7th grade. Among girls, daily health complaints and anxiety were statistically significantly more common in mainstream classes while among boys there were no differences.

Depressed mood

Table 3 presents ORs and 95% CIs of the explaining variables for depressed mood in univariate and multivariate logistic regression analyses. In the univariate analyses, depressed mood was more common among those with average or low performance in mathematics, among girls and among those who had depressed mood in the 6th grade. It was not associated with the class type. In the multivariate model, all significant variables in the univariate models remained significant, but in mathematical performance, one option, 'average', lost its significance.

Daily health complaints

In the univariate models, female gender and daily health complaints in the 6th grade increased the odds for health complaints in the 7th grade. The class type was not associated

with the outcome. In the multivariate model, both female gender and health complaints in the 6th grade remained significant (table 3).

Anxiety

For anxiety, the interaction between gender and the class type 7 was significant ($p=0.004$) why a gender-specific result was calculated. The univariate model for girls showed that lower SEP, lower mathematical performance, previous anxiety and studying in mainstream class were related to higher anxiety, and among boys both school performance indicators and previous anxiety but not the class type (table 4). In the multivariate models, significant associations remained (except SEP among girls) and the class type became significant for both genders, but the association was opposite. Studying in mainstream class increased the anxiety of girls, while studying in selective class increased the anxiety of boys (table 4).

DISCUSSION

Students in selective classes had better school performance and higher family SEP compared with students in mainstream classes. Girls reported poorer mental health than boys. Academic achievement and previous mental health were related to all mental health outcomes. Depressive mood did not vary by class type. Anxiety and daily health complaints were more common among girls in mainstream classes but in the adjusted analysis only anxiety. Boys' anxiety was more common in selective classes after the association was adjusted for other explaining variables.

In previous Finnish studies, good academic performance¹⁴ and high family SEP¹³ have characterised students in selective classes when compared with students in mainstream classes. This

Table 4 Univariate and multivariate logistic regression models for anxiety by gender in the 7th grade

	Univariate model		Multivariate model	
	Girls OR (95% CI)	Boys OR (95% CI)	Girls OR (95% CI)	Boys OR (95% CI)
Class type, 7th grade				
Selective	1.00	1.00	1.00	1.00
Mainstream	2.26 (1.32 to 3.89)	0.62 (0.32 to 1.19)	3.94 (1.82 to 8.50)	0.24 (0.10 to 0.57)
Family SEP				
High	1.00	1.00	1.00	
Low	2.05 (1.23 to 3.43)	1.30 (0.64 to 2.65)	1.49 (0.79 to 2.85)	
Mathematical performance				
High	1.00	1.00	1.00	1.00
Average	1.93 (1.09 to 3.41)	2.74 (0.99 to 7.59)	2.30 (1.16 to 4.63)	2.04 (0.65 to 6.43)
Low	1.77 (0.95 to 3.29)	5.06 (1.96 to 13.07)	1.74 (0.75 to 4.03)	4.27 (1.40 to 12.98)
Test not completed	1.93 (0.75 to 4.94)	4.30 (0.93 to 19.91)	2.27 (1.12 to 4.63)	5.77 (1.01 to 32.95)
Mother tongue performance				
High	1.00	1.00		1.00
Average	1.16 (0.67 to 1.99)	3.46 (0.99 to 12.15)		2.70 (0.69 to 10.57)
Low	0.93 (0.49 to 1.74)	6.30 (1.79 to 22.19)		4.70 (1.10 to 20.02)
Test not completed	0.51 (0.06 to 4.73)	2.62 (0.24 to 28.75)		0.59 (0.05 to 7.62)
Class type, 6th grade				
Selective	1.00	1.00		
Mainstream	2.17 (1.25 to 3.76)	0.61 (0.31 to 1.20)		
Anxiety, 6th grade				
No	1.00	1.00	1.00	1.00
Yes	9.24 (4.94 to 17.27)	3.47 (1.58 to 7.63)	11.96 (5.79 to 24.69)	3.53 (1.46 to 8.56)

Statistically significant in bold.
SEP, socioeconomic position.

was observed in our study, too. A recent Finnish study showed that a high number of mental disorders among classmates may increase the later risk of mental health disorders,¹⁷ but there are no previous studies on mental health differences between students in selective and mainstream classes. We expected that better academic performance and higher family SEP in selective classes may lead to better mental health in these classes. On the other hand, it has been shown that striving for success and good grades is associated with school burnout, depressive symptoms and anxiety.^{33 34} From this point of view, students in selective classes might experience more anxiety and negative symptoms because students selected to emphasised teaching are typically high achieving and their motivation has been evaluated in aptitude tests.

In our study, depressive mood did not vary between class types. The crosstabs found more daily health complaints and anxiety among girls in mainstream classes, but only anxiety had statistically significant association with class type in the adjusted models. The 7th graders are studying for the first year in lower secondary school and they are still young, 13–14 years old. It is possible that class differences in depressed mood and daily health complaints will emerge later, when children get older and the age-related increase in mental health problems will be seen.

Gender differences were seen in all mental health indicators so that girls reported poorer mental health than boys. The corresponding gender difference has been noticed in earlier studies, too, in anxiety,²² depression²³ and health complaints.²⁴ For anxiety, we found gender-specific results; anxiety was more common among girls in mainstream classes and among boys in selective classes.

Girls' higher anxiety in mainstream classes was partly expected based on differences in family SEP and academic achievement.^{13 14} However, higher family SEP and lower academic achievement as well as previous mental problems could not solely explain the difference between mainstream and selective classes. For boys, we detected an opposite result; anxiety was higher in selective classes. Academic performance in selective classes is on average high; when academic performance was taken into account, boys' higher anxiety in selective classes became statistically significant. It is possible that the boys in selective classes aim for success and good grades more than boys in mainstream classes, and consequently their anxiety is higher.^{33 34} There is also the so-called Big-Fish-in-a-Little-Pond effect, which predicts that studying in a class with high-achieving classmates may have detrimental effects on students' academic self-concept.³⁵ Low academic self-concept is known to be associated with increased anxiety.³⁶

For both genders, the class type seems to have an independent role in explaining the difference in anxiety between mainstream and selective classes. This refers to the influence of class environment, which, inside the school class, may be different between the class types and between the genders. Our study did not include factors related to the classroom learning environment, such as the learning atmosphere or the pedagogical practices of the teacher, which may be different in selective and mainstream classes. Anyway, the variation in anxiety between the class types indicates early segregation by health. Health-based selection during the life course is one of the two main mechanisms for explaining health inequalities in later life.³⁷

Previous mental health measured in the 6th grade predicted mental health outcomes in the 7th grade. Earlier studies have shown that mental health problems from adolescence may continue even to young adulthood.^{38 39} Family socioeconomic background was related only to anxiety among girls which is different from earlier Finnish studies, where mental health

problems have been more common in low educated and low socioeconomic groups.²

Limitations

We could not separate selective classes according to emphasised teaching subject, which would have deepened the interpretation. Our SEP measure was based on children's self-report of parents' occupation and education and there was uncertainty in these reports. On the other hand, our measure of academic achievements was based on objective measures of students' abilities in mother tongue and mathematics. The sample covered one larger city which is why the representativeness may be compromised.

CONCLUSIONS

The Finnish comprehensive schooling is officially non-selective and unified. However, within comprehensive schools, a part of students is selected into emphasised teaching classes by aptitude tests and other criteria. Student grouping into selective and mainstream classes is known to be associated with segregation in academic achievement and socioeconomic background. Our study showed that grouping students by aptitude tests and other criteria may select them by certain aspects of mental health, too. Longer follow-up and gender-specific studies would give more reliable answers for education policy makers about student grouping and its influence on student segregation.

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