JOURNAL OF SCHOOL HEALTH

HEALTH Association Connecting Health & Learning www.ashaweb.org

RESEARCH ARTICLE

Selective Classes and Early Health Inequalities in Comprehensive Schools in Finland

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ABSTRACT

BACKGROUND: The origin of inequalities in health outcomes has been explained by health selection and social causation models. Health selection processes operate particularly at school age. We study, if student allocation to teaching groups with aptitude tests (selective vs general class) differentiates adolescents by health behaviors and mental health.

METHODS: Finnish schoolchildren 12-13 years from 12 selective classes, n = 248; 41 general classes, n = 703 answered a questionnaire on addictive products (tobacco, snus, alcohol, and energy drinks), digital media use, and mental health (health complaints, anxiety, and depression). Structural equation modeling was conducted to identify structures between outcomes, SEP (socioeconomic position), class type, and academic performance.

RESULTS: Students in the selective classes reported less addictive digital media and addictive products use than students in the general classes. Differences in academic performance or SEP between the class types did not solely explain these differences. Mental health was not related to the class type. SEP was indirectly associated with health behaviors via the class type and academic performance.

CONCLUSIONS: Selecting students to permanent teaching groups with aptitude tests differentiates students according to risky health behaviors. The impact of education policies using student grouping should also be evaluated in terms of students' health.

Keywords: student grouping; selective class; comprehensive schooling; health inequality; adolescence.

Citation: Kesanto-Jokipolvi H, Seppänen P, Koivuhovi S, Siipola M, Autio R, Rimpelä A. Selective classes in early health inequalities in comprehensive schools in Finland. J Sch Health. 2024. https://doi.org/10.1111/josh.13488.

Received on June 29, 2023
Accepted on May 24, 2024

Inequalities in health are universal and found over the lifespan; low education and low socio-economic position are related to poorer health.[1,2] The origin of health inequalities has been explained by 2 models, namely health selection and social causation. The model of social causation states that circumstances for health are more beneficial in higher socioeconomic positions and in families with higher education while the model of health selection assumes that it is health which, at various stages of life, affects education, and socio-economic position.[2-4] It has been suggested that health selection processes operate particularly during the period between childhood and adulthood,[5] when the school and education system are the main sociocultural environments alongside the family. Education policies, including student grouping may affect health and be a part in health selection processes. A child's poorer mental or physical health may be a constraint for good school performance and thus an obstacle for higher education, or poor performers may

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The study was financially supported by The Turku Urban Research Programme (in 2022-2023), Tampere University Hospital (grants 9AB061, 9AC081), Juho Vainio Foundation (8 December 2021), and Nordforsk (project 156778 YoungEqual).

adopt health-compromising behaviors like smoking and thus increasing the risk for deterioration of health and low education in later life.

Finland has a long tradition of a comprehensive school system aimed to give equal educational opportunities for each child regardless of gender, social background, or place of residence. Finnish basic education (grades 1-9) is formally uniform, including no official tracking or ability grouping of students until upper secondary education. Differences in students' academic performance between schools have been small when compared internationally while academic differences between school classes have been relatively large.[6]

Based on modifications of the Finnish education legislation during 1990s, growing number of comprehensive schools in cities have offered so-called emphasized teaching in particular school subjects, most typically in music, sports, bilingual education, or science. In practice, schools have established *selective classes* where aptitude tests are used for the enrollment of students. The magnitude of the provision of these selective routes varies across cities.[7] Students in these selective classes are more often well-performing students,[8] come from better-off neighborhoods,[9] and have a high socio-economic background.[7] This has created a ''hidden ability grouping'' practice because of differences in educational outcomes in relation to other students' study groups.[8]

Mechanisms allocating students to selective classes change student composition of schools and classes which in turn is known to influence learning outcomes.[10-13] A prior Finnish study of selective classes showed that the internationally examined Big-Fish-In-A-Little-Pond-effect[14] applies also to Finnish schools; studying in a selective class with a high achievement level, may have detrimental effects on a student's academic self-concept.[15] Whether these student grouping mechanisms affect students' health, too, is poorly known. One study on health-related factors in selective classes has been published; heavy episodic drinking was less common among students in selective than in general classes at the age of 15-16.[16]

In general, students with low school performance smoke and use alcohol more often than their classmates with good performance.[17-19] When comparing several indicators of socioeconomic positions, low school performance is strongly associated to smoking and poor self-rated health.[17] Further, intensive, and problematic social media use[20,21] and video gaming[22] have been more often among poor performers. On the other hand, health-enhancing behaviors like intensive physical activity and frequent toothbrushing have been related to higher academic achievement.[19] Depression[23,24] and psychosomatic complaints[25] are more often reported among poor school performers while general wellbeing is related to better school performance.[26,27]

There is some evidence that class composition may affect students' health. Students with lower achievement attending classes with a high proportion of high-performing students have reported more psychosomatic complaints than their classmates with good achievement, Small-Fish-in-a-Big-Pond-effect,[25] corresponding the well-known Big-Fish-in-a-Little-Bond-effect.[14] International studies have shown class differences in perceived health indicators. In a Swedish study, a substantial variation in students' health complaints between school classes was partly explained by perceived school demands[28] and in a Norwegian study psychosocial environment explained class variation in health complaints.[29] In a longitudinal Finnish study, internalizing and externalizing problems at class level predicted poorer academic achievement.[30]

Children from families with high education and high social position have more often good academic achievement and educational trajectories leading to higher adult education.[1,19,27,31,32] Family background is related to the child's health and health behaviors, too. Poor family resources, low family education, and low socio-economic position have been associated with poorer health and health-compromising behaviors, for example, with higher level of psychological and physiological symptoms, lower life-satisfaction, low physical activity,[33] smoking,[17] lifetime alcohol use,[34] and drunkenness.[35]

Figure 1 shows the conceptual model of our study. Family socioeconomic position (family SEP) is associated with student's academic performance, class type (selective vs general), and health-related variables. The class type has a direct association to the student's academic performance and health, and an indirect association to health via academic performance. The direct association between the class type and health means that the selective classes differentiate students according to health, while the indirect association means that better academic performance in the selective classes explains health differences between the class types

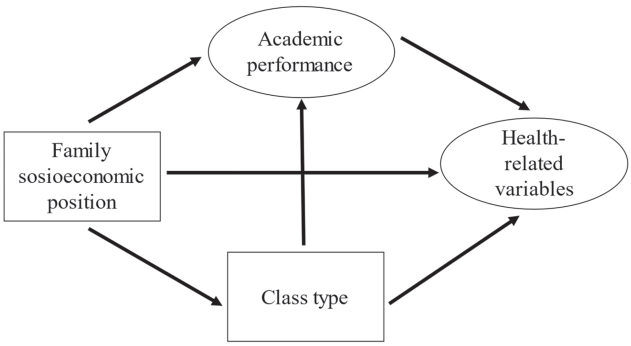
Our aim is to study if student allocation to class types in schools differentiates children according to health. We study if students' health in the selective classes differs from the health of students in the classes with general teaching and if differences in academic performance between the class types explain these health differences. Further, we study what is the role of SEP in the above relationships.

METHOD

Participants

Our target population was the sixth graders (12-13-year-olds) from Turku, the sixth largest city in Finland, with a population of about 200,000.

Figure 1. **The Conceptual Model for the Pathways Between Class Type (Selective vs General), Academic Performance, Family SEP, and Health-related Variables**



The official languages are Finnish (about 95%) and Swedish (5%). Only Finnish-speaking schools were invited. The total number of students was 1301 of which 951 (73%) participated; 12 selective classes n = 248 (response rate 84%) and 41 general classes n = 703 (response rate 70%). The participation was voluntary. Of 25 schools, 23 accepted the invitation, 1 was not able to participate because the school was moving to other premises, and 1 did not want to participate. Both had only general classes.

Instrumentation

Outcome variables. *Weekly health complaints*. The following health complaints during the last 6 months were asked: neck or shoulder pain, lower back pain, headache, difficulties in falling asleep or waking up during the night-time, tiredness or exhaustion, low mood or depression, and concentration difficulties. These symptoms have been widely used and their validity has been shown adequate and the test-retest reliability good.[36] The options were: ''seldom or not at all,'' ''approximately once a month,'' ''approximately weekly,'' and ''daily.'' If a participant had answered at least 1 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. Cronbach's alpha of the 7 health complaints was .835. Further, we computed weekly health complaints a sum variable that was number of complaints occurring weekly or more often (range 0-6).

Anxiety was measured with a Generalized Anxiety Disorder scale (GAD-7).[37] Its validity among Finnish adolescents has been good.[38] The items were feeling nervous, anxious, or on edge, not being able to stop or control worrying, worrying too much about different things, trouble with relaxing, being so restless that it is hard to sit still, becoming easily annoyed or irritable, feeling afraid as if something awful might happen. The answer options were 'not at all' (0 points), ''on several days'' (1 point), ''on most of the days'' (2 points), ''nearly every day'' (3 points), which were summarized to a score of 0-21. Missing items in the scale were replaced by the option ''not at all'' if the participant had answered at least 1 item. A clinical cut-off point for moderate/severe anxiety was used, too (yes 10≥; no <10).[37]

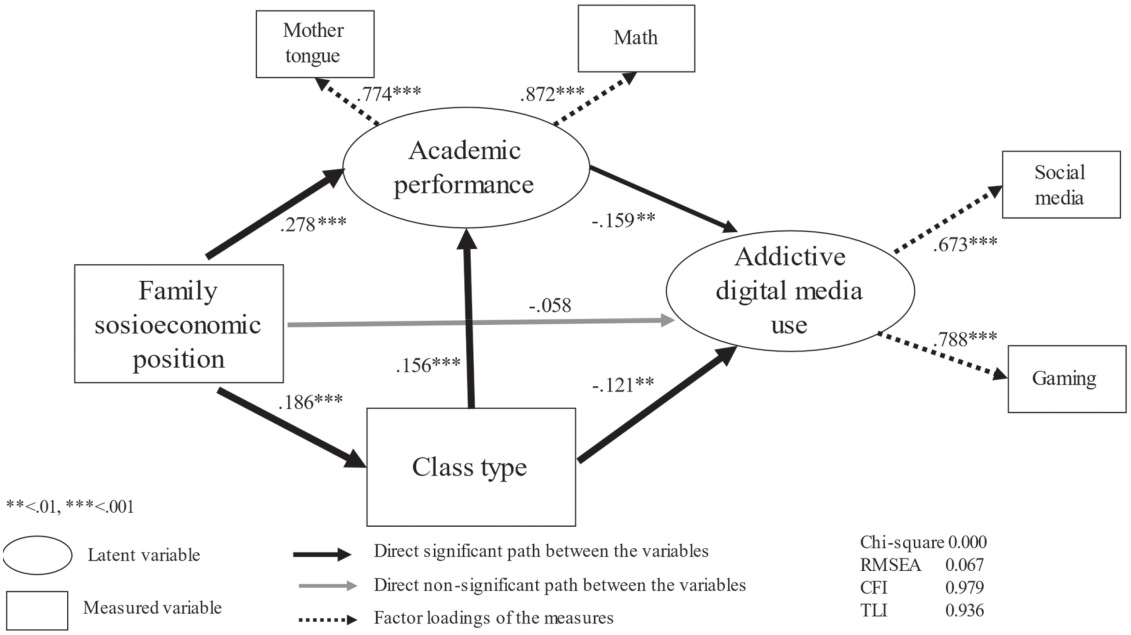
Depressed mood was measured with Patient Health Questionnaire 2 (PHQ-2), which is a reliable method for screening depression,[39] including adolescents:[40] during the past 2 weeks, how often have you been ''bothered by feeling down, depressed, or hopeless'' and ''had little interest or pleasure in doing things.'' Response options were ''not at all (0),'' ''for several days (1),'' ''for more than half the days (2),'' and ''nearly every day (3),'' summing up 0-6. If 1 answer was missing, this was replaced with ''not at all.'' We used also the cut-off point for clinical screening, the sum ≥3.[39]

Addictive product use covered: tried or used cigarettes, Swedish snus, alcohol, or energy drinks (contains caffeine). Items options were ''no,'' ''once or twice,'' ''3-5 times,'' ''6-19 times,'' ''more than 20 times.'' If the participant had answered at least 1 item, the missing answers were coded ''no.'' Because of low numbers, each variable was classified dichotomous (never/tried or used once or more often).

Addictive social media use was assessed by Bergen's Social Media Addiction Scale (BSMAS).[41] The questionnaire concerned the past year with 6 items[42] on a 5-point Likert scale from very rarely (1) to very often (5) and summed up (the range was 0-30).[41] Missing answers were replaced with the option ''very rarely'' if the participant had answered at least 1 item.

Addictive gaming was measured with Lemmens'[43] Game Addiction Scale (GAS), which uses 7 items (salience, conflict, mood modification, withdrawal, tolerance, relapse, and problems during the last half-year[43]). The items were rated on a 5-point Likert scale from very rarely (1) to very often (5) which were summed up (range 0-35). Missing answers were coded as above for BSMAS.

Figure 2. **Structural Equation Model for Addictive Digital Media Use (Standardized Regression Coefficients and Factor Loadings of the Measured Variables)**



Explanatory variables. *Class type* was a binary variable: general (0) and selective class (1). Both followed the same national curriculum, but the selective classes had additional hours each week in the emphasized teaching subject (foreign language, arts, math, or science). Aptitude tests were used to get a place in a selective class.

Academic performance. The school marks in mother tongue and mathematics for each student at the end of the 6th grade were obtained from the student registry of the city.

Family SEP was based on students' reports of mother's occupation (father's occupation if mother's occupation was missing). SEP was classified according to the official Classification of Occupations 2010, Statistics Finland. In the analysis, a binary was used (1 = high; low or middle = 0).

Procedure

Students answered questions about health and wellbeing, family background, learning attitudes, and made cognitive tests measuring reading and mathematics on a digital assessment platform at school during 2 lessons.[44] For those students who denied their participation or whose parents had denied the participation, the teacher gave other tasks.

Data Analysis

Differences in outcomes by the class type were assessed with means and standard deviations, and relative proportions. Relative proportions were tested using chi-square test, means with student's *t*-test for independent samples. p-Values <.05 were considered statistically significant.

Structural equation modeling (SEM) was used.[45] SEM is designed to reveal the structure (direct and indirect paths) of the conceptual model. We examine the indirect and direct paths between family SEP, academic performance, class type, and the outcomes. The conceptual model is presented in Figure 1. In SEM, it is possible to use and analyze latent variables which combine several measured variables into 1 variable describing the concept of interest. In Figures 2-4, the dashed lines show the variables combined to latent variables. Maximum likelihood linear regression with missing values was used as an estimation method. Latent variable factor loadings were calculated with confirmatory factor analysis.[45] The statistically significant outcomes by the class type in the chi-square test were analyzed in SEM. Because depressive mood was significantly higher in the general classes (Table 1) when using the clinical cut-off point, we made SEM analyses for the 2 PHQ-2 scale measures, too, even though the single items were not significant. To analyze a possible group effect of the hierarchical school data, intraclass correlations (ICC) were calculated for each of the outcome latent variables, using school as a grouping variable. The ICC values for schools were low (2.00-2.04%) and thus the school effect was omitted from the analyses.[46,47]

Figure 3. **Structural Equation Model for Addictive Product Use (Standardized Regression Coefficients and Factor Loadings of the Measured Variables)**

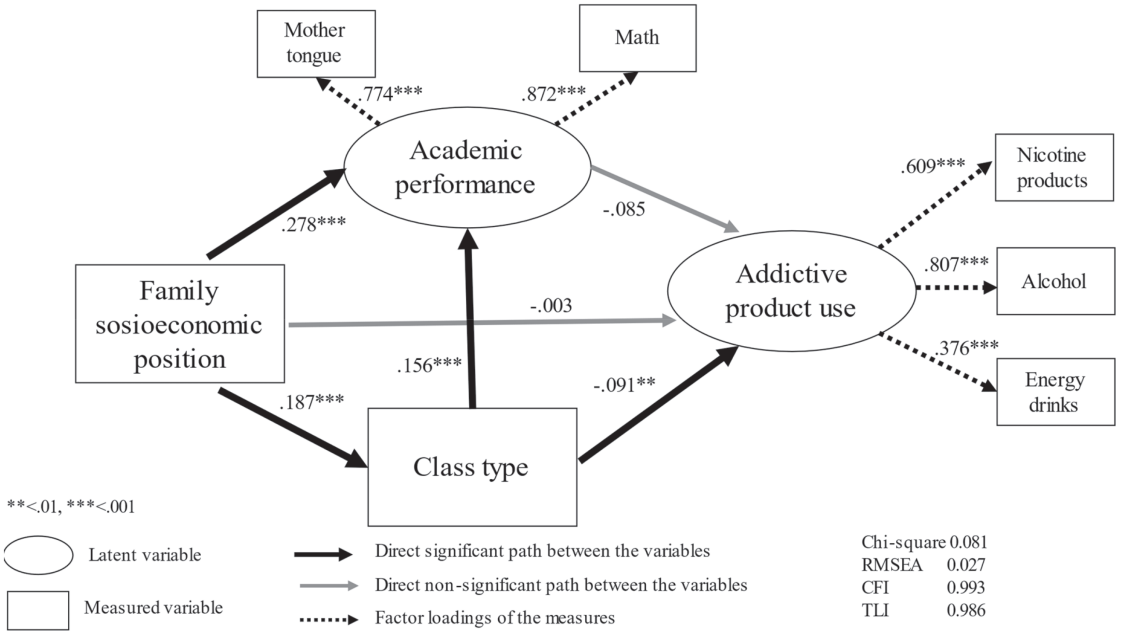
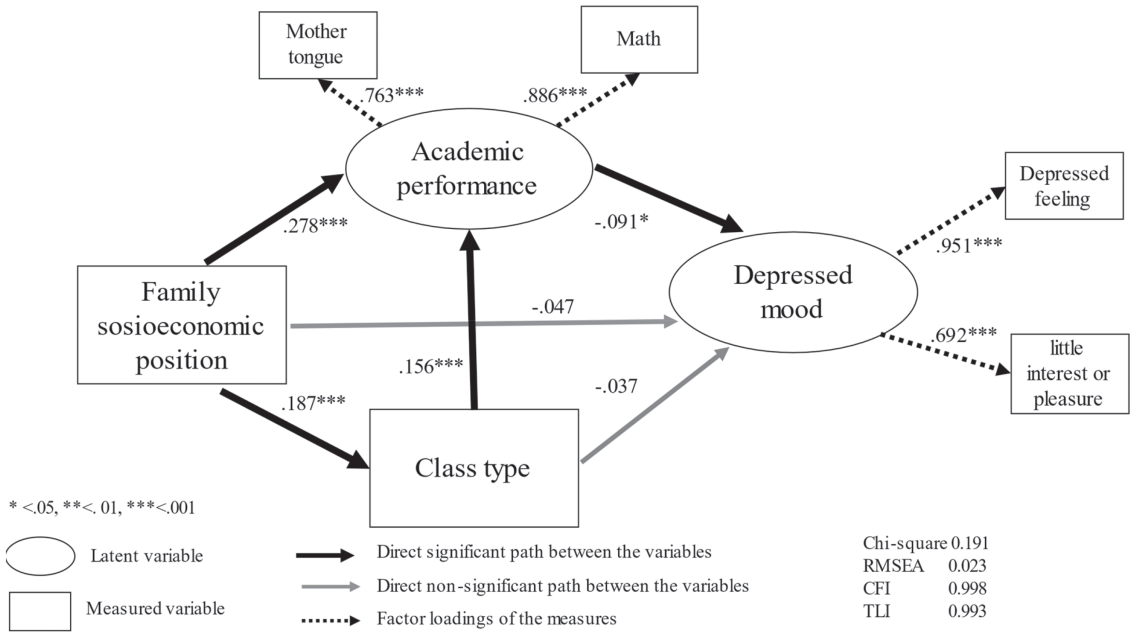


Figure 4. **Structural Equation Model for Depressed Mood (Standardized Regression Coefficients and Factor Loadings of the Measured Variables)**



In the SEM, class type (measured variable), family SEP (measured variable), and academic performance (latent variable) were exogenous variables. The latent variables of addictive digital media use, addictive products use, and depressed mood were endogenous variables. For addictive products use, cigarette and snus were combined because they contain highly addictive nicotine.

The goodness of fit of the SEM models was evaluated by chi-square, RMSEA, CFI, TLI. Acceptable values for the models are chi-square <.05, RMSEA <.07,[48] CFI >.95,[49] and TLI >.90.[50] Data were analyzed

Table 1. **The Descriptive Statistics (Proportions, Means, SD) and the Differences in Health and Health Behavior Indicators by the Class Type**

	General Class		Selective Class		
	%	n	%	n	p*
Sex					.217
Boy	48.50	341	44.00	109	
Girl	51.50	362	56.00	139	
Family SEP					
High	30.70	187	51.40	113	**<.001**
Cigarettes					
Tried or use	6.00	35	2.20	5	**.025**
Swedish snus					
Tried or use	3.80	23	1.80	4	.136
Alcohol					
Tried or use	15.90	96	10.10	23	**.033**
Energy drink					
Tried or use	57.30	346	47.80	109	**.014**
Moderate or severe anxiety (10 ≥ points out of 21)	21.50	117	18.80	40	.42
Depressed mood (PHQ-2) clinical cut-off point (3 ≥ out of 6)	24.00	130	16.50	35	**.024**
	Mean (SD)	**n**	**Mean (SD)**	**n**	**p†**
Depressed mood (PHQ-2) (range 0-3)					
Depressed feeling	.8 (.9)	542	.6 (.9)	213	.086
Little interest or pleasure	.7 (1.0)	542	.5 (.9)	213	.085
Number of weekly health complaints (range 0-6)	1.3 (1.3)	626	1.3 (1.3)	234	.969
Addictive social media use (range 0-30)	13.5 (5.7)	590	12.1 (5.4)	222	**.002**
Addictive digital gaming (range 0-35)	11.0 (5.3)	586	9.4 (4.2)	223	**<.001**
School mark in mother tongue (range 4-10)	8.2 (1.0)	689	8.5 (.9)	246	**<.001**
School mark in mathematics (range 4-10)	8.2 (1.2)	690	8.7 (1.0)	246	**<.001**

*Chi-square test statistically significant is in bold.

† Student's *t*-test for independent samples (2-sided) statistically significant is in bold.

using SPSS (version 28.0) and Stata (version 17.0) for Windows.

RESULTS

Table 1 presents the measured variables by the class types. Students in the general classes had more often used cigarettes, alcohol, and energy drinks compared to selective class students. Correspondingly, addictive social media use and addictive digital gaming were more common in the general classes. The clinical screening score for depressed mood was exceeded more often students in general classes than in selective classes ($p = .021$). Health complaints and anxiety did not vary by the class type. Compared to the general classes, students in the selective classes on average had higher family SEP and higher school marks in mother tongue and mathematics.

Addictive digital media use. The class type ($\beta = -.121$, $p = .005$) and students' academic performance ($\beta = -.159$, $p = .002$) had a direct and statistically significant association with addictive digital media use; students in selective classes and students with higher academic performance used digital media in an addictive way less often than students in general classes or weaker performers (Figure 2). In addition, the type of class was indirectly associated with addictive digital media use through academic performance ($\beta = -.025$, $p = .011$, Table 2). SEP had no direct association to addictive media use but an indirect association via the class type and school performance ($\beta = -.072$, $p < .001$, Table 2).

The confirmatory factor analysis showed that the school marks in mother tongue (.774) and mathematics (.872) had a large factor load on the latent variable of academic performance. The factor loads for the social media use and gaming were .673 and .788 in the latent variable of addictive digital media use (Figure 2).

Addictive products use. The SEM analysis showed a direct association between the class type and addictive products use ($\beta = -.091$, $p = .027$), but no association between school performance and product use ($\beta = -.085$, $p = .085$). Students in selective classes less likely had used addictive products (Figure 3). Family SEP had no direct association with addictive products use but an indirect association via the type of class and school performance ($\beta = -.043$, $p = .015$) (Table 2). In the latent variable of addictive products use, the factor loads varied between the variables: energy drinks .376; alcohol .807; nicotine products .609 (Figure 3).

Table 2. **The Standardized Regression Coefficients of the Direct, and Indirect Effects for Addictive Media Use (Figure 2), for Addictive Products Use (Figure 3), and Depressed Mood (Figure 4)**

Direct Effects	Coefficients	p*	Indirect Effects	Coefficients	p*
Addictive digital media use					
Type of class → addictive digital media use	−.121	**.005**	Type of class → academic performance → addictive digital media use	.025	**.011**
Academic performance → addictive digital media use	−159	**.002**	No indirect path	NA†	NA†
Family SEP → addictive digital media use	−.058	.213	Family SEP → academic performance → class type → addictive digital media use	−.072	**<.001**
Addictive products use					
Type of class → addictive product use	−.091	**.027**	Type of class → academic performance → addictive product use	−.013	.199
Academic performance → addictive product use	−.085	.085	No indirect path	NA†	NA†
Family SEP → addictive product use	−.003	.941	Family SEP → academic performance → class type → addictive product use	−.043	**.015**
Depressed mood					
Type of class → depressed mood	−.037	.344	Type of class → academic performance → depressed mood	−.014	.067
Academic performance → depressed mood	−.091	**.048**	No indirect path	NA*	NA*
Family SEP → depressed mood	−.047	.277	Family SEP → academic performance → class type → depressed mood	−.034	.019

*Statistically significant is in bold.
†Not available.

Depressed mood model. In the SEM, the class type differences in depressed mood were explained by a direct association between academic performance and depressed mood. The association did not depend on the class type. Better performers had less likely depressed mood, but an indirect association between academic performance and depressed mood via the class type was not statistically significant. Family SEP and depressed mood had an indirect association through academic performance and the class type, but no direct path (Figure 4). The factor loads for the latent variable of depressed mood were .951 (depressed feeling) and .692 (little interest or pleasure).

DISCUSSION

Our results showed that mechanisms allocating students to permanent teaching groups according to aptitude tests, separates students also according to risky health behaviors already in early adolescence. Compared to the general classes, students in the selective classes used less often addictive products and their digital media use was less frequently of addictive style. Students' academic performance was better in the selective classes, but academic performance did not solely explain differences in the addictive behaviors between the class types. Family SEP was on average higher in the selective classes, but it associated only indirectly with the addictive behaviors via the class type and school performance. Depressive mood was slightly less common in the selective classes, but higher academic performance explained this difference.

The student grouping policy affected the student composition so that well-performing students and children from well-off families were overrepresented in the selective classes, which has been noticed also in earlier studies in Finland (eg, 7-8). However, the differences of the academic performance or family background between the classes could not solely explain the differences in addictive behaviors, but the class type as such contributed to the adoption of addictive behaviors. Corresponding results were obtained in another Finnish study concerning heavy episodic drinking among 15-16-year-olds.[16] Drinking was less common in selective classes and the association persisted, although diminished, after controlling academic performance and family background.

The sixth-graders of our research were 12 to 13 years old and had studied in the same class from the first grade (general classes and selective classes with bilingual teaching), that is, 6 years or from the third class (selective classes with emphasis on music, visual arts, math, and science), that is, 4 years, so trials and use of addictive products and addictive use of digital media were for most adopted while studying in the present class. Factors explaining the differences in the adoption of behaviors were not studied here, but social processes associated with health behaviors as well as learning and teaching environments are known from earlier studies.

Peer influence is known to be an essential element in adolescent behavior,[51] including alcohol use and smoking.[52-54] A recent review looked more deeply at social processes in the adoption of alcohol and tobacco use in social networks.[55] Health behavior similarity and network popularity were identified most important. Health behavior similarity is due to homophilic social selection, friends are selected on the basis of similar behavioral patterns, or due to peers' influence on adolescents' behavior change. It has been shown that friendship networks can be patterned even on both smoking and academic performance.[56] Concerning network popularity, health behaviors may affect adolescents' social status and popularity in their peer groups. Smoking and alcohol use may increase adolescents' popularity, or being popular may increase these behaviors.[55] Concerning our results, social processes of engaging in health behaviors are likely to work in our sample, too, but for example, criteria for peer popularity can differ in selective and general classes and thus explain different behavior patterns.

Different grouping policies in comprehensive schooling create different learning environments and social realities for students in many ways but very little is known how these affect health behaviors. The higher perceived peer group status (eg, prestige reputation and high academic standard) has a positive effect on student self-concept in academic achievement, that is, The Reflected Glory-Effect.[57] Social comparison processes between classes within the same school may shape also adolescent health behaviors, if healthy or unhealthy behaviors become part of the identity of students studying in the same permanent school class. In further research, investigating peer group effects in relation to health behavior and health is needed.

Health complaints and anxiety did not vary between the class types and the small difference in depressive mood was due to higher school performance in the selective classes. The association of school performance with depression has been noticed in earlier studies, too.[23,24] The results on the contagious effects for depression are inconsistent, particularly peer influence seems to be low in early adolescence.[58,59] The participants in this study were relatively young, and it is known that adolescent health weakens with age.[60,61] Thus, in the future it is needed to study do the differences in health complaints, anxiety, or depressive mood exceed once the adolescents get older.

Our results show that roots for health inequalities can be seen already in early adolescence when students' risky health behaviors are differentiated between selective and general classes. Risky health behaviors in adolescence predict lower educational level in adulthood and this association has run through school career[19] when tracking of students to vocational and academic upper secondary schools, mainly according to school performance, takes place after the compulsory education at the age of 16 years. School career is a strong determinant of how adolescents adopt health-compromising and health-enhancing behavior.[19] Thus, student allocation based on selection at an earlier age needs to be considered in terms of its health effects.

Family SEP was indirectly associated with addictive behavior via the type of class. Family SEP has had a crucial role in selecting which track (vocational vs academic school) children continue after the compulsory education[19] and in the allocation of students to selective classes.[7,16] Even though family SEP did not have a direct relationship with the addictive behavior here, the indirect relationship suggests that there may be intergenerational health selection.

Limitations

Our study was cross-sectional, which is why we cannot conclude that the differences between the selective and general classes in health and health behavior outcomes were solely due to studying in a particular class. Longitudinal studies are needed to show the directions of the associations and to identify potential causal mechanisms inside the classes or schools that create health differences between classes. The response rate was somewhat lower in general classes. We cannot exclude the possibility that risky health behaviors were more likely among the non-respondents meaning higher differences between the class types. Absenteeism was not asked in the survey. The number of selective classes was too small to analyze separately classes with different emphasized school subjects.

IMPLICATIONS FOR SCHOOL HEALTH POLICY, PRACTICE, AND EQUITY

Allocation of students to permanent teaching groups according to aptitude tests inside formally uniform comprehensive schooling of Finland differentiates students also according to risky health behaviors already at age 12 to 13 years. When children in general classes adopt risky health behaviors like smoking more often than children in selective classes, their health is likely to be lower in adulthood. And considering their lower academic performance and that they come from lower socio-economic families, their education level in adulthood is likely to be lower, too. So, we recommend education policy makers to be aware of the possible health consequences and inequity and evaluate student grouping also in terms of students' health behaviors, not only according to academic performance. The use of permanent study groups based on student selection via aptitude tests in

emphasized subjects should be reconsidered by schools and cities.

Conclusions

Our study contributes to the existing literature by showing how allocation of students by aptitude tests to permanent teaching groups may contribute to health inequalities already at age 12 to 13 years. Roots for health inequalities are seen in risky health behaviors that are more common among students in general classes than in selective classes. The results showed that educational policies, such as the permanent student grouping by aptitude test, may influence the accumulation of direct (risky health behavior) and indirect (family SEP) risk factors for health among students.

Human Subjects Approval Statement. Ethics approval for the study was granted by the Ethics Committee for Human Science at the University of Turku, Humanities and Social Sciences Division (13 April 2022). In a separate information letter and in the question and task package students were informed that the participation was voluntary and that no consequences will follow if they deny. Parents were informed of the study and the possibility to deny their child's participation through the school's digital information system.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

1. Marmot M, Friel S, Bell R, Houweling TA, Taylor S. Closing the gap in a generation: health equity through action on the social determinants of health. *Lancet*. 2008;372(9650):1661-1669.
2. Mackenbach JP, Valverde JR, Bopp M, et al. Progress against inequalities in mortality: register-based study of 15 European countries between 1990 and 2015. *Eur J Epidemiol*. 2019;34(12):1131-1142.
3. Macintyre S. The black report and beyond what are the issues? *Soc Sci Med*. 1997;44(6):723-745.
4. Goldman N. Social factors and health: the causation-selection issue revisited. *Proc Natl Acad Sci USA*. 1994;91(4):1251-1255.
5. Hoffmann R, Kröger H, Geyer S. Social causation versus health selection in the life course: does their relative importance differ by dimension of SES? *Soc Indic Res*. 2019;141(3):1341-1367.
6. Yang HK, Gustafsson J, Rosen M. School performance differences and policy variations in Finland, Norway and Sweden. In: Hansen KY, Gustafsson JE, Rosén M, Sulkunen S, Nissinen K, Kupari P, et al., eds. *Northern Lights on TIMSS and PIRLS 2011: Differences and Similarities in the Nordic Countries*. Norway: Nordisk Ministerråd; 2014:25-48.
7. Seppänen P, Pasu T, Kosunen S. Pupil selection and enrolment in comprehensive schools in urban Finland. In: Thrupp M, Seppänen P, Kauko J, Kosunen S, eds. *Finland's Famous Education System Unvarnished Insights into Finnish Schooling*. Singapore: Springer Nature; 2023:193-210.
8. Berisha AK, Seppänen P. Pupil selection segments urban comprehensive schooling in Finland: composition of school classes in pupils' school performance, gender, and ethnicity. *Scand J Educ Res*. 2017;61(2):240-254.
9. Kosunen S, Bernelius V, Seppänen P, Porkka M. School choice to lower secondary schools and mechanisms of segregation in urban Finland. *Urban Educ*. 2020;55(10):1461-1488.
10. Peetsma T, van der Veen I, Koopman P, van Schooten E. Class composition influences on pupils' cognitive development 1. *Sch Eff Sch Improv*. 2006;17(3):275-302.
11. van Ewijk R, Sleegers P. The effect of peer socioeconomic status on student achievement: a meta-analysis. *Educ Res Rev*. 2010;5(2):134-150.
12. de Fraine B, Van Damme J, Van Landeghem G, Opdenakker MC, Onghena P. The effect of schools and classes on language achievement. *Br Educ Res J*. 2003;29(6):841-859.
13. Hienonen N, Lintuvuori M, Jahnukainen M, Hotulainen R, Vainikainen MP. The effect of class composition on cross-curricular competences - students with special educational needs in regular classes in lower secondary education. *Learn Instr*. 2018;58:80-87.
14. Marsh HW, Seaton M. The big-fish-little-pond effect, competence self-perceptions, and relativity: substantive advances and methodological innovation. In: Elliot AJ, ed. *Advances in Motivation Science*, Vol. 2. San Diego: Elsevier; 2015:127-184. https://doi.org/10.1016/bs.adms.2015.05.002.
15. Koivuhovi S, Marsh HW, Dicke T, et al. Academic self-concept formation and peer-group contagion: development of the big-fish-little-pond effect in primary-school classrooms and peer groups. *J Educ Psychol*. 2022;114(1):198-213.
16. Luukkonen J, Bernelius V, Palmqvist R, Raitasalo K. School segregation, selective education, and adolescents' alcohol use - is there a connection? *Scand J Educ Res*. 2023;68:702-716. https://doi.org/10.1080/00313831.2023.2175251.
17. Moor I, Kuipers MAG, Lorant V, et al. Inequalities in adolescent self-rated health and smoking in Europe: comparing different indicators of socioeconomic status. *J Epidemiol Community Health*. 2019;73(10):963-970.
18. Latvala A, Rose RJ, Pulkkinen L, Dick DM, Korhonen T, Kaprio J. Drinking, smoking, and educational achievement: cross-lagged associations from adolescence to adulthood. *Drug Alcohol Depend*. 2014;137(1):106-113.
19. Koivusilta L, West P, Saaristo V, Nummi T, Rimpelä A. From childhood socio-economic position to adult educational level - do health behaviours in adolescence matter? A longitudinal study. *BMC Public Health*. 2013;13(1):711.
20. Liu D, Kirschner PA, Karpinski AC. A meta-analysis of the relationship of academic performance and social network site use among adolescents and young adults. *Comput Hum Behav*. 2017;77:148-157.
21. Paakkari L, Tynjälä J, Lahti H, Ojala K, Lyyra N. Problematic social media use and health among adolescents. *J Environ Public Health*. 2021;18(4):1-11.
22. Adelantado-Renau M, Moliner-Urdiales D, Cavero-Redondo I, Beltran-Valls MR, Martínez-Vizcaíno V, Álvarez-Bueno C. Association between screen media use and academic performance among children and adolescents: a systematic review and meta-analysis. *Arch Pediatr Adolesc Med*. 2019;173(11):1058-1067.
23. Fröjd SA, Nissinen ES, Pelkonen MU, Marttunen MJ, Koivisto AM, Kaltiala-Heino R. Depression and school performance in middle adolescent boys and girls. *J Adolesc*. 2008;31(4):485-498.
24. Agnafors S, Barmark M, Sydsjö G. Mental health and academic performance: a study on selection and causation effects from childhood to early adulthood. *Soc Psychiatry Psychiatr Epidemiol*. 2021;56(5):857-866.
25. Rathmann K, Herke M, Bilz L, Rimpelä A, Hurrelmann K, Richter M. Class-level school performance and life satisfaction: differential sensitivity for low-and high-performing school-aged

children. *Int J Environ Res Public Health*. 2018;15(12):2750. https://doi.org/10.3390/ijerph15122750.
26. Nordlander E, Stensöta HO. Grades - for better or worse? The interplay of school performance and subjective well-being among boys and girls. *Child Indic Res*. 2014;7(4):861-879.
27. OECD. Educational mobility and school-to-work transitions among disadvantaged students. In: *Equity in Education: Breaking Down Barriers to Social Mobility*. Paris: OECD Publishing; 2018. https://doi.org/10.1787/9789264073234-8-en.
28. Eriksson U, Sellström E. School demands and subjective health complaints among Swedish schoolchildren: a multilevel study. *Scand J Public Health*. 2010;38(4):344-350.
29. Torsheim T, Wold B. School-related stress, support, and subjective health complaints among early adolescents: a multilevel approach. *J Adolesc*. 2001;24(6):701-713.
30. Minkkinen J, Lindfors P, Kinnunen J, et al. Health as a predictor of students' academic achievement: a 3-level longitudinal study of Finnish adolescents. *J Sch Health*. 2017;87:902-910.
31. Howe LD, Lawlor DA, Propper C. Trajectories of socioeconomic inequalities in health, behaviours and academic achievement across childhood and adolescence. *J Community Health*. 2013;67(4):358-364.
32. Loft L, Waldfogel J. Socioeconomic status gradients in young children's well-being at school. *Child Dev*. 2021;92(1):e91-e105. https://doi.org/10.1111/cdev.13453.
33. Elgar FJ, Pförtner TK, Moor I, De Clercq B, Stevens GWJM, Currie C. Socioeconomic inequalities in adolescent health 2002-2010: a time-series analysis of 34 countries participating in the Health Behaviour in School-aged Children study. *Lancet*. 2015;385(9982):2088-2095.
34. Gomes de Matos E, Kraus L, Hannemann T, Soellner R, Piontek D. Cross-cultural variation in the association between family's socioeconomic status and adolescent alcohol use. *Drug Alcohol Rev*. 2017;36(6):797-804.
35. Torikka A, Kaltiala-Heino R, Luukkaala T, Rimpelä A. Trends in alcohol use among adolescents from 2000 to 2011: the role of socioeconomic status and depression. *Alcohol Alcohol*. 2017;52(1):95-103.
36. Haugland S, Wold B. Subjective health complaints in adolescence—reliability and validity of survey methods. *J Adolesc*. 2001;24(5):611-624.
37. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med*. 2006;166(10):1092-1097.
38. Tiirikainen K, Haravuori H, Ranta K, Kaltiala-Heino R, Marttunen M. Psychometric properties of the 7-item Generalized Anxiety Disorder Scale (GAD-7) in a large representative sample of Finnish adolescents. *Psychiatry Res*. 2019;272:30-35.
39. Kroenke K, Spitzer RL, Williams JBW. The patient health questionnaire-2: validity of a two-item depression screener. *Med Care*. 2003;41(11):1284-1292.
40. Richardson LP, Rockhill C, Russo JE, et al. Evaluation of the PHQ-2 as a brief screen for detecting major depression among adolescents. *J Pediatr*. 2010;125(5):e1097-e1103. https://doi.org/10.1542/peds.2009-2712.
41. Andreassen CS, Billieux J, Griffiths MD, et al. The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: a large-scale cross-sectional study. *Psychol Addict Behav*. 2016;30(2):252-262.
42. Griffiths M. A ''components'' model of addiction within a biopsychosocial framework. *J Subst Use*. 2005;10(4):191-197.
43. Lemmens JS, Valkenburg PM, Peter J. Development and validation of a game addiction scale for adolescents. *Media Psychol*. 2009;12(1):77-95.
44. Vainikainen MP, Hautamäki J. Three studies on learning to learn in Finland: anti-Flynn effects 2001-2017. *Scand J Educ Res*. 2022;66(1):43-58.
45. Kline RB. *Principles and Practice of Structural Equation Modeling*. 4th ed. New York: The Guilford Press; 2016.
46. Peugh JL. A practical guide to multilevel modeling. *J Sch Psychol*. 2010;48(1):85-112.
47. Hayes AF. A primer on multilevel modeling. *Hum Commun Res*. 2006;32(4):385-410.
48. Schermelleh-Engel K, Moosbrugger H, Müller H. Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures. *Methods Psychol Res*. 2003;8:23-74.
49. Tabachnick BG, Fidell LS. *Using Multivariate Statistics*. New York: Pearson; 1996.
50. Bentler PM, Bonett DG. Significance tests and goodness of fit in the analysis of covariance structures. *Psychol Bull*. 1980;88(3):588-606.
51. Dishion TJ, Dodge KA. Peer contagion in interventions for children and adolescents: moving towards an understanding of the ecology and dynamics of change. *J Abnorm Child Psychol*. 2005;33(3):395-400.
52. Mercken L, Steglich C, Knibbe CA, De Vries H. Dynamics of friendship networks and alcohol use in early and mid adolescence. *J Stud Alcohol Drugs*. 2012;73(1):99-110.
53. Henneberger AK, Mushonga DR, Preston AM. Peer influence and adolescent substance use: a systematic review of dynamic social network research. *Adolesc Res Rev*. 2021;6(1):57-73.
54. Huang GC, Unger JB, Soto D, et al. Peer influences: the impact of online and offline friendship networks on adolescent smoking and alcohol use. *J Adolesc Health*. 2014;54(5):508-514.
55. Montgomery SC, Donnelly M, Bhatnagar P, Carlin A, Kee F, Hunter RF. Peer social network processes and adolescent health behaviors: a systematic review. *Prev Med*. 2020;130:105900. https://doi.org/10.1016/j.ypmed.2019.105900.
56. Robert PO, Kuipers M, Rathmann K, et al. Academic performance and adolescent smoking in 6 European cities: the role of friendship ties. *Int J Adolesc Youth*. 2019;24(1):125-135.
57. Marsh HW, Kong CK, Hau KT. Longitudinal multilevel models of the big-fish-little-pond effect on academic self-concept: counterbalancing contrast and reflected-glory effects in Hong Kong schools. *J Pers Soc Psychol*. 2000;78(2):337-349.
58. Neal JW, Veenstra R. Network selection and influence effects on children's and adolescents' internalizing behaviors and peer victimization: a systematic review. *Dev Rev*. 2021;59:100944. https://doi.org/10.1016/j.dr.2020.100944.
59. Bernasco EL, van der Graaff J, Nelemans SA, Kaufman TML, Branje S. Depression socialization in early adolescent friendships: the role of baseline depressive symptoms and autonomous functioning. *J Youth Adolesc*. 2023;52(7):1417-1432.
60. Cavallo F, Dalmasso P, Ottová-Jordan V, et al. Trends in self-rated health in European and north-American adolescents from 2002 to 2010 in 32 countries. *Eur J Public Health*. 2015;25(2):13-15.
61. Haugland S, Wold B, Stevenson J, Aaroe LE, Woynarowska B. Subjective health complaints in adolescence: a cross-national comparison of prevalence and dimensionality. *Eur J Public Health*. 2001;11(1):4-10.