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# The Effect of Studying in Selective Classes on the Change in Pupils' Action-Control Beliefs During Lower Secondary School in Finland

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## ABSTRACT

Tracking pupils based on their abilities or other aptitudes is a common practice in many countries. In Finland, selective classes with a special emphasis have become popular. The societal and individual effects of tracking are a topic of ongoing educational discussion. Tracking has been seen to increase educational inequality, but still it has been defended as an important practice enabling individualised and adjusted teaching. This study examined whether studying in a selective class with a special emphasis has an effect on the development of pupils' action-control beliefs from grade seven to nine. Results showed that pupils who studied in classes with a special emphasis showed greater achievement and were more likely to have highly-educated mothers than pupils in classes without an emphasis. This selectivity explained most of the differences found in action-control beliefs between classes. Pairwise comparisons showed small differences in the change of certain action-control beliefs between classes.

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## KEYWORDS

Action-control beliefs; longitudinal study; classes with a special emphasis; selective classes; lower secondary school; tracking; tracking effects

## Introduction

Choosing a selective class with a special emphasis has become popular in urban Finland (Varjo & Kalalahti, 2019). An increasing number of pupils study in these classes since their introduction in the 1990s. Classes with a special emphasis provide more lessons in a certain domain (e.g., music, languages etc.) and admission to these classes require passing an aptitude test (Berisha & Seppänen, 2016). The individual and societal effects of ability-based grouping and studying in selective classes have been widely discussed among Finnish educational researchers (Varjo & Kalalahti, 2019). Selectivity, based on pupils' own interests, and an opportunity to study in a selective peer group have been assumed to boost pupils' motivation and increase achievement (Kosunen & Seppänen, 2016). On the other hand, these selective classes have been shown to increase the inequality of the Finnish comprehensive school (Kosunen et al., 2016; Varjo & Kalalahti, 2019). Researchers have been worried about the so-called cream-skimming effect of these classes and argued that they endanger the equality of educational opportunities as they differentiate the school paths (Berisha & Seppänen, 2016). Prior studies have shown that classes with a special emphasis

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appeal especially to high-achieving children with an affluent family background (Kalalahti et al., 2015) and therefore the expressed concerns are well-grounded. Despite wide speculations about the topic, empirical studies analysing the effects of these selective classes on pupils' learning or educational achievements are scarce. Therefore, the aim of this study is to determine whether studying in a class with a special emphasis affects pupils' motivation, more precisely their action-control beliefs (Skinner et al., 1988). Using longitudinal assessment data of 1839 pupils in 150 classes, we identified four different types of classes with a special emphasis – arts or music, science, sports, and languages – that we compared to classes without a special emphasis.

## Theory

### *Action-control Theory as a Measurement of Motivation*

Motivation is a concept that can be measured and conceptualised in numerous ways. In this study, we approach motivation according to the action-control theory of Skinner and her colleagues (Skinner et al., 1990). In their theory, action is seen as a threefold construct, which comprises the agent, aims and means of the action. The individual, the agent, has different kinds of beliefs (i.e., means-ends beliefs, agency beliefs and control expectancy) concerning each part of the action and these beliefs are central to shaping individuals' actions and strivings. In the context of school, action-control beliefs influence the way that pupils act in school, what kind of goals they set, and in which ways and how hard they strive to achieve those goals. Many studies have also confirmed the positive relation between action-control beliefs and school achievement (e.g., Little et al., 1999).

*Means-ends beliefs* (Skinner et al., 1998) refer to the beliefs that individuals have about the relation between goals and how to achieve them. At school, the desired goals could be, for example, learning or obtaining good grades whereas ways to achieve these include means like effort, ability, and luck (Little et al., 1999). *Agency beliefs* are beliefs that the individual has about him/herself as an agent in relation to the possible means (Skinner et al., 1988; 1990). Thus, agency beliefs refer to beliefs that the pupil has of him/herself as a learner (Little et al., 2001). The last set of beliefs, *control expectancy*, refer to the relation between the agent and the desired goals without a reference to specific means (Skinner et al., 1988; 1990). Therefore, they comprise expectations of how likely individuals are to reach desired goals such as succeeding in school or getting good grades.

During childhood and youth, there is significant change and development in the way children understand action and themselves as agents (Geldhof & Little, 2011). Children's ability to evaluate themselves becomes more realistic during the elementary school years, which is usually seen as a decline in children's self-beliefs during this time (Pintrich & Schunk, 1996). However, the developmental trajectories for specific beliefs can vary even though the mean level of self-beliefs would show a decrease (Geldhof & Little, 2011).

### *Practices and Effects of Tracking and Grouping*

Different educational systems address the practical question of how to allocate pupils to schools and teaching groups in a variety of ways (Dupriez et al., 2008; Hanushek & Wößmann, 2006). Teaching all children in the same comprehensive schools or sorting them into different groups within schools or between schools – into specific tracks or streams – is a choice that can either promote or hinder educational equality (Hanushek & Wößmann, 2006; Hattie, 2009). However, from the educational psychological view, sorting pupils into different kinds of teaching groups can also be seen as an issue of managing diversity and individual differences in school (Dupriez et al., 2008).

Trautwein et al. (2005) have created a three-category classification scheme that enables the comparison of different tracking practices. The first element to consider is the institutional level where tracking takes place; in other words, whether the tracking is occurring at the school level (i.e., pupils are allocated to different schools based on, for example, achievement) or within the school (i.e.,

teaching groups inside schools are sorted based on, for example, achievement). A second important feature is the role of achievement in the process of allocating pupils to different tracks. Achievement can be the only factor distributing pupils into tracks, but tracks can also be based on other aspects such as pupils' interests or financial resources. If prior achievement is the main factor determining the track, then Trautwein et al. (2005) suggest that the term achievement grouping is the best term to use, whereas they propose the term opt-in tracking in situations where other factors influence the placement. The third aspect in Trautwein's et al. classification is the role of tracking in determining individuals' future career. In other words, the question is whether placement in a certain track limits pupils' future educational choices or whether all possibilities remain open regardless of pupils' tracks.

Arguments against tracking or streaming claim that it produces educational inequality (Hanushek & Wößmann, 2006) and reinforces the impact of pupils' family background on their achievement (Schuetz et al., 2008). It has also been argued that the consequences of tracking can be harmful, especially for those who end up in lower, for instance, low ability or vocational, tracks (Saleh et al., 2005; Van Houtte & Stevens, 2015). Arguments favouring tracking highlight the importance of individuality in education and claim that sorting pupils into more homogenous groups considers their individual differences, making it possible to adjust teaching for everybody's benefit (Tieso, 2003).

Research on the effects of tracking has supported each side of the argument. There are studies claiming that tracking is beneficial for all pupils (e.g., Duflo et al., 2011), but most studies seem to actually indicate that the effects of tracking on achievement can be different according to pupils' achievement level (Duru-Bellat & Mingat, 1998; Saleh et al., 2005). While tracking can be beneficial for children who perform well or at least at the average level (Lou et al., 1996), the effects can even be harmful for children below the average. Studies have also shown that low-achieving pupils would benefit more from heterogeneity than homogeneity in the classroom (Duru-Bellat & Mingat, 1998) and thus, the effects of tracking can be negative for them. Saleh and colleagues (2005) explain this by the differences in the social interaction between different kinds of classes. Low-ability pupils benefit from the presence of dissimilar, in other words higher achieving, peers who can help them with difficulties they face. These peers can provide more elaborate explanations and discussions on topics learned in school. Then again, for higher achieving children, homogenous classrooms can provide an environment where all participants are considered equal, which might lead to fruitful argumentations and improved thinking skills.

Although research on peer influence has shown that pupils' learning and attitudes towards school can be significantly influenced by their peers (Wentzel, 2005), the exact mechanisms of peer group effects are not yet clear. It is uncertain whether the findings of peer effects tell us more about similar learners seeking each other's company or pupils starting to resemble their peers when spending time together (Rodkin & Ryan, 2012). In addition to this, so-called assimilation hypothesis (i.e., individuals' performances or attitudes start to resemble those around them) studies made in the field of academic self-concept have revealed that peer effects can also be negative (Lüdtke et al., 2005). The core hypothesis in the so-called Big-Fish-Little-Pond phenomenon (Marsh et al., 2008) is that equally able pupils possess a lower academic self-concept in a group in which the average ability level is high compared to in a group of low average ability. Studies on high-achieving pupils (Tieso, 2003) seem to assume that the effects of tracking are always either positive or insignificant, but research on academic self-concept shows that studying in a high-achieving peer group can be demanding and even have detrimental effects on the beliefs of oneself as a learner.

### ***Finnish Classes with a Special Emphasis as Implicit Tracks***

The Finnish education system is grounded in uniform comprehensive school and the idea of equal educational opportunities. This goal seems to be well achieved and international assessments (PISA,

TIMMS) have shown that differences between schools and pupils' performance have been small in Finland (Sulkunen et al., 2010). However, recent assessments (Bernelius & Vaattovaara, 2016) have shown some alarming signs of growing differences between classes, schools, pupils, and geographic areas. In addition, the impact of parents' education on pupils' achievement has grown (Vettenranta et al., 2016). It has been argued that one of the reasons for these increasing differences would be novel school choice opportunities and selective classes with a special emphasis, which have been seen to accelerate the differentiation process (Bernelius & Vaattovaara, 2016).

These so-called *emphasised* classes provide more lessons in a certain domain (e.g., music, languages etc.) and admission to the classes require passing an aptitude tests (Berisha & Seppänen, 2016). It has been argued that classes with a special emphasis act as implicit streams within the Finnish comprehensive school (Varjo & Kalalahti, 2019) because they influence the composition of schools and especially classes within schools. Choosing a class with a special emphasis has been seen to be typical of children whose grade point average (GPA) is high (Kalalahti et al., 2015) and whose parents are highly educated (Kosunen et al., 2016). Classes with a special emphasis have also shown to be very much gendered, as different emphasised subjects attract boys and girls differently (Berisha & Seppänen, 2016).

However, the Finnish "tracking system" has unique characteristics given that selection into classes with a special emphasis is not done on the basis of pupils' prior achievement, but on other aptitudes, which vary regarding the emphasised subject (Berisha & Seppänen, 2016). Thus, the term opt-in tracking within schools, which Trautwein and colleagues (2005) proposed in their classification, corresponds best to the Finnish system. Moreover, in the Finnish system, there are no educational dead-ends and each class type offers the same upper-secondary education opportunities.

Choosing a class with a special emphasis is possible at the beginning of the comprehensive school, at the beginning of the third grade or at the beginning of the seventh grade. Classes with a special emphasis cover both academic (e.g., science and mathematics) and non-academic (e.g., music and sports) subjects and the choices vary between municipalities; the best choices are in large cities. Thus, it can be said that classes with a special emphasis are mainly an urban phenomenon, although the number of pupils attending classes with a special emphasis vary (Berisha & Seppänen, 2016).

## Present Study

The aim of the present study is to determine how children's action-control beliefs change from grade seven to nine in different types of classes.

In our prior study (Koivuhovi et al., 2019), we found no class-type effect on the change in pupils' action-control beliefs during primary school when achievement level and mother's education were considered. Yet, prior studies on peer effects show that classroom composition can influence pupils' achievement and motivation (Hattie, 2009; Wentzel, 2005). A major limitation of our prior study (Koivuhovi et al., 2019) was that we could not separate different kinds of classes with a special emphasis from each other and therefore compared only classes with a special emphasis to those without an emphasis. However, in this study, we separate the different class types (class without a special emphasis, class with a language emphasis, class with emphasis on arts, class with a science emphasis and class with emphasis on sports) and examine pupils' action-control beliefs in different types of classes.

In our analyses, we will first examine how different types of classes differ from each other in terms of certain background variables (i.e., mother's education level, pupil's prior achievement, and gender). Based on findings of prior research (Berisha & Seppänen, 2016), we expect that pupils studying in classes with a special emphasis differ from pupils' on classes without a special emphasis in terms of mother's education level, pupil's prior achievement and, gender (hypothesis 1). Secondly, we examine the level differences and change in pupils' action-control beliefs in different types of classes. We expect to find overall level differences in pupils' action-control beliefs between

different types of classes both in seventh and ninth grade (hypothesis 2). However, we expect that these differences relate to the differing background of pupils and therefore will not appear after the confounding effects of background variables have been taken into account (Koivuhovi et al., 2019). Regarding the change in action-control beliefs from grade seven to nine, we expect to detect an overall decline in positive action-control beliefs (Little et al., 1999; Pintrich & Schunk, 1996), but we do not set any hypothesis about the effects of class type on this change.

## Methods

### Participants

The data were drawn from a nine-year longitudinal study<sup>1</sup> in which pupils' learning-to-learn skills were assessed from the beginning to the end of comprehensive school. In the first phase of the study (autumn 2007), 16 schools in a large municipality in Finland were randomly selected. The sample consisted of all pupils [ $N = 744$ ] in all first-grade classes [ $N = 40$ ] of the selected schools. The sample was complemented with new schools and classes at the beginning of third, seventh and ninth grade because some pupils changed schools (see Lönnqvist et al., 2011; Vainikainen et al., 2015).

In this study, we focused only on the lower-secondary school years (grade seven to nine). The participants ( $N=1839$ ; 51% girls; mean age in grade seven = 12.97, standard deviation [ $SD$ ] = 1.215) came from 30 schools and 150 classes (60% of all lower-secondary schools in the municipality). 58% of pupils studied in classes without a special emphasis and the rest in classes with a special emphasis (14% languages, 11% arts, 9% sciences, and 9% sports).

### Measures

Pupils' action-control beliefs were measured using self-reported scales based on Skinner et al.'s (1988) action-control theory. Scales that were used for assessing agency beliefs were agency beliefs of ability (e.g., "I am a clever and able pupil") and agency beliefs of effort (e.g., "I work hard to do well at school"). For control expectancy, the scales that were used were control expectancy of success (e.g., "I can get good marks at school if I want to") and control expectancy of learning (e.g., "I can learn things taught at school, if I want"). For means-ends beliefs, the scales were means-ends belief of luck (e.g., "Success at school is a matter of luck") and means-ends belief of abilities (e.g., "Poor marks are due to lack of ability"). Each scale consisted of three items, which were answered on a Likert scale ranging from one (not true at all) to seven (very true).

The class type variable was coded for each pupil accordingly: (1) class without a special emphasis (2) arts (music or visual arts) (3) language (with different language options) (4) science, and (5) sports. All classes that were analysed were organised so that pupils studied most of the lessons in the same group, not only the emphasised subjects.

Mother's education level<sup>2</sup> and gender (girl/boy) were collected from pupils in the seventh grade. Mother's education level was assessed using a scale with five options: (1) comprehensive school (2) vocational upper secondary school, (3) general upper secondary school, (4) postsecondary education or higher vocational level, polytechnic education or bachelor's degree, and (5) Master's degree or higher.

The achievement variable was a sum score of two achievement tests that pupils took in the seventh grade. The first consisted of eight items from the Missing Premises task of the Ross Test

<sup>1</sup>During the research process, ethical standards described by Finnish Advisory Board on Research Integrity were met. At the beginning of the study, municipal school authorities reviewed the research proposal and granted permission for data collection. Families received information about the study and participation was voluntary. Anonymity of responses was maintained at all stages and only data managers have had access to a separate database in which personal details have been stored.

<sup>2</sup>Mother's education level was chosen as a measurement for parent's educational background as prior studies have found it to strongly and consistently be associated with children's school choices (Kalalahti et al., 2015).

of Higher Cognitive Processes (Ross & Ross, 1979). One premise and the conclusion were given (e.g., Conclusion: Lake Saimaa is too cold for swimming. First fact: The temperature of Lake Saimaa is 5 centigrade) and the pupils had to choose the second premise that would make the conclusion valid from five options (e.g., Most lakes are too cold for swimming; It is wintertime; Five degree water is too cold for swimming; Lake Saimaa is always cold; Swimming in cold water is no fun.). The items were scored as correct or incorrect. The second test was an adaptation of the Hidden Arithmetical Operators task by Demetriou and colleagues (Demetriou et al., 1991). In each item, there were one to four letters that the pupils had to replace with operators, using each operator only once (e.g., Which operator do a and b stand for in  $(5 \ a \ 3) \ b \ 4 = 6?$ ). The six items were coded as correct or incorrect for the whole equation. The number of correct answers in both tests were summarised in order to control achievement differences. The reliability of the test was reasonable (Cronbach's  $\alpha = .66$ ) (Metsämuuronen, 2005).

### Data Analysis

Descriptive statistics for participants' background information in different types of classes were calculated in SPSS 24.0 with crosstabs including test of chi square (class-type differences regarding mother's education level and gender) and with one-way ANOVA (differences in achievement between classes). These results are presented in the beginning of the results section and tables of the results are in Appendix A.

Measurement invariance of the dependent variables at different time points was tested in Mplus statistical package version 7.1 (Muthén & Muthén, 2010). Testing of measurement invariance was conducted by hierarchically imposing restrictions on the model parameters, then comparing different models (Widaman et al., 2010). Analysis proceeded from an unrestricted baseline model to constraining the factor loadings (i.e., metric invariance) followed by intercepts (i.e., scalar invariance). Comparisons between different models were made by comparing fit indices of different models. The cut values used were: Comparative Fit Index (CFI)  $>.95$ , the root mean square error of approximation (RMSEA)  $<.06$ , and the standardised root mean square residual (SRMR)  $<.08$  (Kline, 2005). As can be seen in Table A4 in Appendix B, a sufficient level of invariance was achieved in each pair of variables.

After measurement invariance was tested, the factor scores of the dependent variables were transferred to SPSS. The actual analyses were conducted in SPSS with GLM (generalised linear model) style of repeated measures analysis of variance (ANOVA). The first model included only class type as a classifying variable (between-subjects factor) and one of the action-control beliefs as a dependent variable (within-subjects variable) at two different time points (grade seven and nine). After that, other independent variables (gender and mother's education level as between-subjects factors and pupil's prior achievement as a covariate) were included in the model. This enabled us to study whether the detected differences were explained by the selection to classes with a special emphasis or if the effects were "real" value-added effects of class type. Repeated measures style of anova takes into account the nonindependency of error terms between different time points, but other general assumptions of variance analysis (i.e., normality and homogeneity of variance) should be met (Field, 2017). Analyses of residuals showed that the normality assumption was met, but homogeneity tests revealed that variances between groups were not similar for all variables. As unequal variances can violate  $p$ -values when group sizes are unequal, group sizes were equalized by taking a random sample of the biggest group (i.e., class without a special emphasis) (see Field, 2017; Zimmerman, 2004).<sup>3</sup> Random sampling was done at class level in order to get a comparable group for the analyses and 20% of all classes without a special emphasis were drawn from the original sample to this new sample. The number of pupils in classes without a special emphasis in the new sample was 248 (the number was 1026 in the original sample).

<sup>3</sup>Other groups were already of relatively similar sizes and therefore only the class without a special emphasis group underwent random sampling.

## Results

Differences between classes were examined in terms of background variables (mother's education level, pupil's achievement, and gender).<sup>4</sup> These examinations made the selective nature of classes with a special emphasis explicit and therefore confirmed our first hypothesis. Classes differed from each other by mother's education level ( $\chi^2 = 125.785$ ;  $df = 16$ ;  $p < .000$ ; See Table A3(b) in Appendix A). Pupils who studied in classes without a special emphasis were more likely to have a mother with a lower level of education than pupils who studied in classes with a special emphasis. Classes with a special emphasis, especially language classes, seemed to attract pupils with highly-educated mothers. There were also significant gender differences between classes ( $\chi^2 = 72.919$ ;  $df = 4$ ;  $p < .000$ ; See Table A2(b) in Appendix A). Arts classes appealed to girls in particular, as there were significantly more girls than expected. Boys seemed to be especially interested in sciences, in which there were more boys than expected. Classes also differed from each other regarding achievement ( $F = 35.333$   $p < .000$ ; See Table A1(b) in Appendix A). Pupils studying in classes without a special emphasis had the lowest achievement test scores in the seventh grade and the difference was significant compared to all other classes. Pupils who studied in language, science, and arts classes had the highest achievement level in the seventh grade, respectively.

Results regarding differences in the level of and change in pupils' action-control beliefs in different types of classes are illustrated in Figure 1.

### Agency Beliefs of Ability

Children's agency beliefs of ability slightly declined from grade seven to nine and the decline was statistically significant both in the model without background variables (Wilks' Lambda = .983;  $F = 17.375$ ;  $df = 1$ ;  $p < .000$ , *partial eta square* = .017) and with them (Wilks' Lambda = .988;  $F = 11.136$ ;  $df = 1$ ;  $p < .001$ , *partial eta square* = .012). However, when background variables were taken into account, pairwise comparisons showed that the decline was statistically significant only in language and arts classes (see M1b in Table A5 Appendix C). Despite that, the interaction effect between time and classes was not statistically significant in either of the models (model without background variables: Wilks' Lambda = .998;  $F = .917$ ;  $df = 4$ ;  $p = .453$ ; model with background variables: Wilks' Lambda = .995;  $F = 1.942$ ;  $df = 4$ ;  $p = .101$ ).

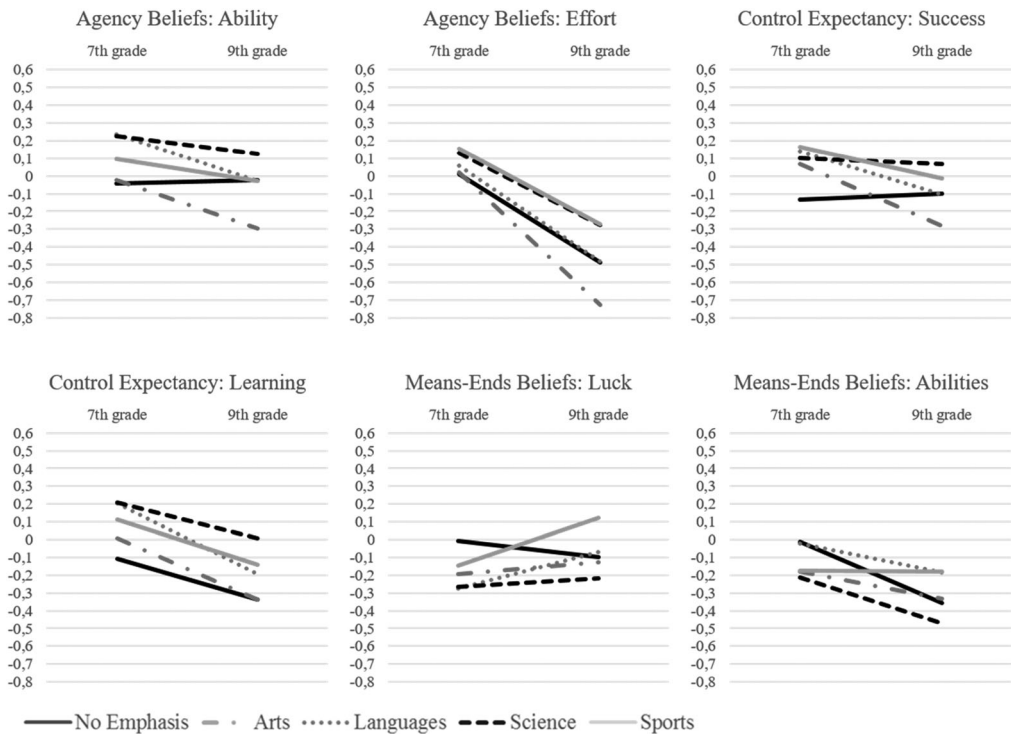
As we expected in our second hypothesis, there were statistically significant differences between classes ( $F = 13.920$ ,  $p < .000$ ) in the level of pupils' agency beliefs of ability both in the seventh and ninth grade (see M1c and M1d, Table A6 Appendix D), but those differences disappeared when background variables (prior achievement, gender and mother's education level) were included in the model. Mother's education level ( $F = 2.874$ ,  $p = .022$ ) and pupil's prior achievement ( $F = 70.857$ ,  $p < .000$ ) were significant variables explaining the differences in children's agency beliefs of ability.

### Agency Beliefs of Effort

Children's agency beliefs of effort declined from grade seven to nine and the decline was statistically significant in all class types (see M2a and M2b, Table A5 Appendix C). The decline was statistically significant both in the model without background variables (Wilks' Lambda = .781;  $F = 280.778$ ;  $df = 1$ ;  $p < .000$ , *partial eta square* = .017) and in the model with them (Wilks' Lambda = .976;  $F =$

<sup>4</sup>Data with equalized group sizes was representative in terms of background variables compared to the original sample. Regarding background factors, results remained similar except that, in terms of achievement in the original sample, pupils in classes without a special emphasis [ $n = 1026$ ] had a higher achievement level (mean 5.08 compared to 4.68 in the new sample). Therefore, in the original sample classes without a special emphasis did not differ from sports classes, whereas the difference was significant in the equalized sample. Regarding gender and mother's education level, both samples produced virtually similar results.





**Figure 1.** Changes in pupils' action-control beliefs from grade seven to nine (models with background variables).

22.559;  $df = 1$ ;  $p < .000$ , *partial eta square* = .024). Thus, the interaction of time and classes was not statistically significant in either of the models (model without background variables: Wilks' Lambda = .996;  $F = .886$ ;  $df = 4$ ;  $p = .472$ ; model with background variables: Wilks' Lambda = .993;  $F = 1.582$ ;  $df = 4$ ;  $p = .177$ ).

According to our expectations, there were statistically significant differences between classes ( $F = 3.556$ ,  $p = .007$ ; for pairwise comparisons see M2c and M2d, Table A6 Appendix D) in the level of pupils' agency beliefs of effort. However, when background variables were included in the model, the level differences between classes disappeared. Pupils' prior achievement ( $F = 14.539$ ,  $p < .000$ ) was the only variable that significantly explained the differences in children's agency beliefs of effort.

### **Control Expectancy of Success**

Children's control expectancy beliefs of success declined from grade seven to nine and the decline was significant both in the model without background variables (Wilks' Lambda = .987;  $F = 13.370$ ;  $df = 1$ ;  $p < .000$ , *partial eta square* = .013) and in the model with background variables (Wilks' Lambda = .985;  $F = 13.873$ ;  $df = 1$ ;  $p < .000$ , *partial eta square* = .015). However, pairwise comparisons of classes showed that the decline was significant in all class types except science classes and classes without a special emphasis. In those classes, children's control expectancy beliefs of success remained stable from grade seven to nine. The result was similar both in the model without background variables (see M3a, Table A5 Appendix C) and with background variables (see M3b, Table A5 Appendix C), partially supporting our second hypothesis about the differential effect of class type on the development of action-control beliefs. Additionally, the interaction of time and class was significant in both of the models (model without background variables: Wilks' Lambda

= .990;  $F = 2.525$ ;  $df = 4$ ;  $p = .039$ , *partial eta square* = .010; model with background variables: Wilks' Lambda = .987;  $F = 3.015$ ;  $df = 4$ ;  $p = .017$ , *partial eta square* = .013).

As expected, classes differed in the level of control expectancy beliefs ( $F = 10.353$   $p < .001$ ; see M3c and M3d, Table A6 Appendix D), but the differences disappeared when background variables were included in the model. Pupil's prior achievement ( $F = 39.630$ ,  $p < .000$ ) explained the differences in children's control expectancy beliefs of success.

### **Control Expectancy of Learning**

Children's control expectancy beliefs of learning declined from grade seven to nine in all class types (see M4a and M4b, Table A5 Appendix C). The decline was significant both in the model without background variables (Wilks' Lambda = .933;  $F = 72.416$ ;  $df = 1$ ;  $p < .000$ , *partial eta square* = .067) and in the model with them (Wilks' Lambda = .968;  $F = 30.306$ ;  $df = 1$ ;  $p < .000$ , *partial eta square* = .032). Once again, the interaction of time and classes was not statistically significant in either of the models (model without background variables: Wilks' Lambda = .998;  $F = .608$ ;  $df = 4$ ;  $p = .657$ , *partial eta square* = .002; model with background variables: Wilks' Lambda = .996;  $F = 1.021$ ;  $df = 4$ ;  $p = .395$ , *partial eta square* = .004).

There were significant differences between classes at both measurement points (see M4 c and M4d, Table A6 Appendix D) in the control expectancy beliefs of learning ( $F = 12.355$ ,  $p < .000$ ; *partial eta square* = .047) in the model without background variables. When background variables were included, the overall difference between classes remained significant ( $F = 3.852$ ,  $p = .004$ ; *partial eta square* = .017), supporting our hypothesis. Pairwise comparisons (see M4e and M4f, Table A6 Appendix D) showed that after background variables were included, pupils studying in science and language classes had significantly stronger control expectancies of learning than pupils in classes without a special emphasis in grade seven. However, in grade nine, only science classes differed from classes without a special emphasis and the difference between language classes and classes without a special emphasis was not significant anymore. This indicated that the decrease in childrens' control expectancies of learning was slightly greater in language classes than in other classes, even though the interaction between time and class was not significant, as already mentioned. In addition to class type, pupil's prior achievement ( $F = 30.332$ ,  $p < .000$ ) explained the differences in pupils' control expectancy beliefs of learning.

### **Means-Ends Beliefs of Luck**

In the model without background variables, pupils' means-ends beliefs of luck slightly increased from grade seven to nine (Wilks' Lambda = .995;  $F = 4.776$ ;  $df = 1$ ;  $p = .029$ , *partial eta square* = .005). However, the change was different in different classes and the interaction effect of time and classes was statistically significant (Wilks' Lambda = .979;  $F = 5.430$ ;  $df = 4$ ;  $p < .000$ , *partial eta square* = .021). Pairwise comparisons between different time points showed that in classes without a special emphasis, pupils' means-ends beliefs of luck weakened from the seventh to the ninth grade, whereas in language and sports classes these detrimental beliefs became stronger (see M5a, Table A5 Appendix C). When background variables were included in the model, both the overall change in pupils' means-ends beliefs of luck (Wilks' Lambda = .997;  $F = 2.453$ ;  $df = 1$ ;  $p = .118$ , *partial eta square* = .003) and the interaction became insignificant (Wilks' Lambda = .992;  $F = 1.806$ ;  $df = 4$ ;  $p = .125$ , *partial eta square* = .008). Multivariate tests of classes gave some support to our hypothesis about differences in the change of means-ends beliefs of luck between classes; however, the effects were very small. In sports classes, pupils' means-ends belief of luck became stronger from grade seven to nine, whereas in other classes the strength of those beliefs remained consistent throughout lower-secondary school (see M5b, Table A5 Appendix C).

In the model without background variables, there were significant differences between classes ( $F = 11.688$ ;  $p < .000$ ) in the strength of means-ends beliefs of luck in both grade seven and nine (see

M5c and M5d, Table A6 Appendix D), but as expected those differences disappeared when background variables were included in the model. Gender ( $F = 19.414$ ,  $p < .000$ ) and prior achievement ( $F = 73.561$ ,  $p < .000$ ) explained the level differences in pupils' means-ends beliefs of luck.

### **Means-Ends Beliefs of Abilities**

In the model without background variables, pupils' means-ends beliefs of abilities changed statistically significantly from grade seven to nine (Wilks' Lambda = .997;  $F = 23.305$ ;  $df = 1$ ;  $p < .000$ ; *partial eta square* = .023). However, the change was different in different classes and the interaction effect of time and classes was statistically significant (Wilks' Lambda = .988;  $F = 5.134$ ;  $df = 4$ ;  $p < .000$ , *partial eta square* = .020). Children's means-ends beliefs of abilities weakened in classes without a special emphasis and science classes, whereas in other classes these detrimental beliefs remained consistent throughout lower-secondary school (see M6a, Table A5 Appendix C). When background variables were included in the model, the overall change in pupils' means-ends beliefs of abilities remained significant (Wilks' Lambda = .965;  $F = 33.419$ ;  $df = 1$ ;  $p < .000$ ; *partial eta square* = .035), but the interaction between time and classes became insignificant (Wilks' Lambda = .992;  $F = 1.869$ ;  $df = 4$ ;  $p = .114$ ). However, multivariate tests of classes showed that, also in this model, the change in means-ends beliefs of abilities was significant in classes without a special emphasis and science classes where children's means-ends beliefs of abilities declined (see M6b, Table A5 Appendix C). This partially supported our second hypothesis.

There were significant differences between seventh grade classes in the level of pupils' means-ends beliefs of abilities ( $F = 4.913$ ,  $p < .001$ ) (see M6c, Table A6 Appendix D), but as expected, the effect disappeared when background variables were added to the model. Gender ( $F = 33.001$ ,  $p < .000$ ) and prior achievement ( $F = 48.112$ ,  $p < .000$ ) explained the level differences in pupils' means-ends beliefs of abilities.

### **Conclusions and Discussion**

As prior studies (Kalalahti et al., 2015; Kosunen et al., 2016) on school choices and classes with a special emphasis have noted, classes with a special emphasis are clearly selective by nature. This selectivity was visible also in this study. Pupils who studied in classes with a special emphasis showed greater achievement and were more likely to have highly-educated mothers than pupils in classes without a special emphasis. The selectivity explained all level differences, except for one (i.e., regarding control expectancy of learning), in action-control beliefs between classes in grade seven and nine. In other words, most of the differences in children's action-control beliefs disappeared when background variables (mother's education level, children's prior achievement, and gender) were taken into account. Therefore, our results showed that high-achieving pupils with well-educated mothers held more positive action-control beliefs (i.e., agency beliefs of ability and effort, control expectancy of success and learning) and fewer negative beliefs (means-ends beliefs of ability and luck) despite the class type they were studying in.

Overall, there was a declining tendency in the change in pupils' action-control beliefs, as expected based on prior research (Little et al., 1999; Pintrich & Schunk, 1996). There were some differences between classes with and without a special emphasis regarding the change in pupils' action-control beliefs, but the differences and effects were very small. When background variables were considered, only one of the interaction effects between time and class type (i.e., regarding control expectancy of success) was statistically significant. In addition, pairwise comparisons showed some small yet detailed differences between different types of classes.

Most importantly, our results indicate that studying in a class without a special emphasis does not seem to be by any means less favourable in terms of the development of motivation. Although on average the classes without a special emphasis differed from classes with a special emphasis in terms of pupils' background and prior achievement, these differences were not reflected in the

development of the action-control beliefs. There were no signs of negative development in classes without a special emphasis; in fact, the development was generally similar to or even more positive than in classes with a special emphasis.

Our results enable us to make few careful conclusions about the contrasts between different classes with a special emphasis. *Language classes* seemed to be especially selective, as they attracted the best pupils with the most highly-educated mothers. Additionally, *science classes* attracted high-achieving pupils, especially boys, while *arts classes* seemed to especially draw girls. *Sports classes* were most similar to classes without a special emphasis, even though there were fewer pupils whose mothers had a low level of education than in classes without a special emphasis.

Interestingly, language classes differed from all other classes (except arts classes) in the development of pupils' agency beliefs of ability. Pupils' beliefs about themselves as learners declined in language and arts classes, whereas in other class types the strength of those beliefs remained stable. Similarly, regarding control expectancy of learning, pupils' beliefs weakened during the follow-up period so that the significant difference compared to classes without a special emphasis became insignificant in grade nine. These results were interesting given that pupils in language classes had the highest level of achievement. It is an uncertain question why their beliefs weakened more in comparison to other classes. One possible explanation can be found in the Big-Fish-Little-Pond studies (Marsh et al., 2008), which have shown that studying in a high-achieving peer group can have a negative effect on pupils' academic self-concept. Since language classes were the most selective of the studied classes, pupils in these classes were accustomed to being the best in the class, i.e., they hold strong beliefs about their abilities. However, when all those "big fish" are placed in the same class, they notice that they are not so "big" anymore, leading to a decline in their agency beliefs of abilities. These findings clearly call for further investigations.

Our results also give delicate support to the hypothesis of the beneficial effects of selective peer groups (Kindermann, 2007). This positive development seemed to happen in science classes where children's control expectancies of success developed more positively than in other classes with a special emphasis. At the same time, detrimental means-ends beliefs of abilities decreased. Although the effects of these changes were small, they might indicate that something happening in the science classes strengthens pupils' positive beliefs. Action-control beliefs have been shown to develop reciprocally so that earlier experiences of success or failure shape individuals' expectancies and beliefs about their future competences (Skinner et al., 1998). It could be that the challenges faced in science classes give pupils the experience of survival, which results in a stronger sense of control. This is again reflected in the means, which are seen as important in achieving success and thus, lead to a decline in the means-ends beliefs of abilities, i.e., the beliefs that inherited abilities are the main cause of success.

Overall, our results mostly confirmed our prior findings (Koivuhovi et al., 2019) in which we found no classtype effect regarding the change in children's agency and control beliefs during the last years of primary school (grade four to six). Although our findings indicate that studying in a class with a special emphasis did not seem to have major effects on the development of pupils' action-control beliefs, it is possible that class type would play a role in some other facet of learning. Therefore, future studies with broader measurements of motivation and other aspects of learning (e.g., achievement, classroom climate, and well-being) and longer follow-up periods should be conducted. The relatively narrow time gap in this study can be considered as a limitation.

A particular strength yet also a limitation of this study was the setting, which enabled us to study the differences between different types of classes with a special emphasis. In comparison to most prior studies that have focused solely on examining the differences between classes with and without a special emphasis (Kalalahti et al., 2015; Koivuhovi et al., 2019), this study enabled us to also detect differences between different emphasised subjects, which showed to be advantageous. However, due to unequal group sizes and heterogeneous variances between groups, group sizes were equalized for the analyses. Although the new sample was representative in terms of background variables, this possible bias must be taken into account when evaluating the results.<sup>5</sup> Another

limitation of this study was that information regarding mother's education level was collected from pupils instead of mothers themselves, which may cause some inaccuracy in the results.

As prior studies in the field of tracking have shown, the effects of tracking should always be evaluated from the perspective of educational equality (Hanushek & Wößmann, 2006; Hattie, 2009). Even though our analyses showed no major effects of class type on children's action-control beliefs, our findings did confirm the selective nature of classes with a special emphasis. As prior research has shown (Berisha & Seppänen, 2016), our results also indicate that, classes with a special emphasis differentiate the school paths of children and therefore affect the core idea behind the comprehensive school in Finland. If classes with a special emphasis change the basic idea of common, comprehensive school by sorting higher-achieving pupils from higher socio-economic families into separate classes, the social costs of school choice (Varjo & Kalalahti, 2019) can be multifold.

To conclude, the findings of this study imply, that contrary to the common assumptions regarding classes with a special emphasis (Kosunen & Seppänen, 2016), the results of this study gave only little evidence for the beneficial motivational effects of these classes. For the most part, the change in pupils' action-control beliefs was strikingly similar in all class types. However, pairwise comparisons showed that the development of childrens' self-beliefs was more negative in some classes with a special emphasis than in others, which may indicate a Big-Fish-Little-Pond effect on development.

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No potential conflict of interest was reported by the author(s).

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<sup>3</sup>In order to examine this, we also conducted all analyses with the original sample and the results were in line with the presented results.

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