



## Class size as a means of three-tiered support in Finnish primary schools



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### ARTICLE INFO

#### Keywords:

Class size  
Thinking skills  
Support needs  
Tiered support model  
Longitudinal study

### ABSTRACT

In Finland, class size is used as a means of support by placing students with milder support needs in slightly smaller classes. This study tests the scientific basis of this practice by following the development of 869 students' performance from the fourth grade to the sixth grade, analyzing the effects of class size on performance and the patterns of performance in the groups of students receiving tier 2 ( $n = 69$ ) and tier 3 ( $n = 36$ ) support. The results confirmed that on average larger classes perform better and that students receiving support study in slightly smaller classes. At the individual level, receiving support was related to lower initial performance and the gap increased during the follow-up. However, at the class level, the proportion of students receiving support in the class predicted later performance positively. Class size was only related to initial differences and not to the development of performance.

### 1. Introduction

Class size is one of the most controversial topics in the politics of education. Teachers and parents exert great pressure to diminish class sizes and in Finland the Ministry of Education and Culture has recently provided the organizers of education with considerable amounts of extra funding for this purpose (Ministry of Education and Culture, 2014). The common understanding in the field is that especially students with support needs would benefit from studying in smaller classes as they would have more opportunities for interaction with the adults in the class. However, there is little sound evidence about the effectiveness of regulating the class size in general and hardly any research on how the regulation of class size functions as a means of support even if it is commonly practiced in Finland. Therefore, the aim of the present study is to test these assumptions by following the development of 869 students' thinking skills from the beginning of the fourth grade to the end of the sixth grade. We analyze whether class size affects the development of performance when initial differences are controlled for and whether the pattern is similar for students receiving tier 2 or tier 3 support.

#### 1.1. Class size and academic performance

One main challenge when investigating the relationship between class size and student achievement is that students are seldom distributed to classes randomly; hence, there is a positive correlation between class size and performance (Akerhielm, 1995; Kupiainen & Hienonen, 2016). Some

well-designed experimental studies have attempted to investigate the effects of class size in randomized settings. The most notable of them has been the Student-Teacher Achievement Ratio (STAR) project, which was a four-year, large-scale randomized experiment based in Tennessee in the mid-1980s. In the experiment, both students and teachers were randomly assigned to smaller or larger classes within schools (Finn & Achilles, 1990; Krueger & Whitmore, 2001). The first results indicated the positive effects of small classes and also indicated more benefits for low-performers and minority students (Finn & Achilles, 1990; Krueger, 1999). However, in more recent analyses of the data, Konstantopoulos (2007) found that although all types of students benefited from being in small classes, reductions in class size did not reduce the achievement gap between low and high performers. On the contrary, high-achieving students may have benefited even more (see also Rice, 1999). Konstantopoulos and Traynor (2014) later used Progress in International Reading Literacy Study (PIRLS) data and found an opposite effect of a positive association between class size and achievement. However, the relation was statistically insignificant when teacher, classroom and school variables were taken into account. When investigating the effects of class size, there are naturally many classroom processes that should be taken into account (Pedder, 2006). The effects of class size are often related to teacher-student interaction, (i.e., Konstantopoulos & Sun, 2013), student on-task behavior and student-student relations that may or may not result in learning outcomes (Hattie, 2005). Blatchford, Edmonds and Martin (2003) found that there were more individualized task-related contacts between teacher and student in small classes, but the diminished class size did not affect student on-task behavior or peer interaction (see also

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Blatchford, Edmonds, & Martin, 2003).

The explanations for low performers benefiting from smaller classes are most often related to the teacher. Some studies suggest that teachers in smaller classes are more likely to focus their attention on specific students and provide individualized instruction and feedback (Blatchford, Basset, Goldstein, & Martin, 2003; Blatchford & Martin, 1998; Hargreaves, Galton, & Pell, 1998; Molnar et al., 1999), whereas other studies have shown that teachers seldom change their teaching or instructional practices according to the class size (Hattie, 2005; Hoxby, 2000). According to Betts and Shkolnik (1999), teachers react more strongly to class size changes when teaching below-average students. The focus of the present study is mainly on students receiving support who usually perform below average.

### 1.2. The Finnish support model

In Finland, supporting the weakest learners has been considered to be extremely important ever since the implementation of comprehensive school in 1970s (Graham & Jahnukainen, 2011; Sabel, Saxenian, Miettinen, Kristensen, & Hautamäki, 2011). The effectiveness of the support system has been proved in international comparisons, in which the weakest Finnish students have usually outperformed their comparison groups in other countries (e.g., OECD, 2013). However, the share of low-performing students has increased since 2003 (OECD, 2016).

The current three-tiered support model (National Board of Education, 2016; see also Thuneberg et al., 2013, 2014) emphasizes early identification and preventative actions. To a certain extent, this multi-tier model is functionally equivalent to Response-to-Intervention (RTI) service delivery model in the United States (Jahnukainen & Itkonen, 2015; see also, Björn, Aro, Koponen, Fuchs, & Fuchs, 2015 for a slightly different view). The starting point of the Finnish model is that with some exceptions, moving to the next tier is possible only when the previous tier has proven to be insufficient. Tier 1, *general support*, should be provided immediately when any concern is raised and support can be only temporary. Tier 1 interventions can be conducted at a school or class level or they can be individually designed for specific students. The most common means of support at this tier are differentiation, remedial instruction and part-time special education either as co-teaching or in a smaller group (Thuneberg et al., 2013). Receiving general support does not require any decisions or official documents, and therefore it is difficult to evaluate the effectiveness of the support in quantitative studies like the present one.

If general support is concluded to be insufficient, a *pedagogical assessment* is conducted in multiprofessional collaboration (Vainikainen, Thuneberg, Greiff, & Hautamäki, 2015). According to the assessment, an *individual learning plan* is created and tier 2 *intensified support* is organized. Intensified support consists largely of the same means as *general support*, but the intensity increases and multiple types of interventions are typically implemented simultaneously. Even though regulating class size is not officially tied to the support system, it seems to be common to place students with this kind of milder support needs in slightly smaller classes so that they can receive more attention from the pedagogical staff.

When intensified support fails to provide sufficient support for the student, a *pedagogical evaluation* is conducted in multiprofessional collaboration and an *individual education plan* is done accordingly. Tier 3 always requires the official decision and only at tier 3 level full-time special education can be provided and a student can more or less permanently be placed in a clearly smaller special education class. One aim of the present study is to deepen the understanding of how class size and intensity of support are related during tier 2 and tier 3 support and to analyze whether these students benefit from studying in smaller classes.

### 1.3. Assigning students into classrooms in Finland

In Finland, classes are often reorganized after the second grade. Since then, class placements are quite permanent to the end of the sixth

grade. The average class size of the first and the second grade classes is smaller than in the higher grades: in 2012, the average class size for grades 1–2 was 18.7, whereas for grades 3–6 it was 20.2 (Karjalainen & Lamberg, 2014). The first foreign language choices are made after the second grade and students are likely to be divided across classes according to the chosen language. In other words, students who have chosen more exceptional languages will probably end up in the same classes (e.g., Kosunen, 2016). In general, students studying exceptional languages are performing better as they tend to come from homes with higher educational level of parents (e.g., Kalalahti & Varjo, 2016). Moreover, at least in larger cities, there are other types of selective classes with a special emphasis (e.g., music, science). Their student admission is based on application and selection via aptitude tests in the emphasized subject area (Kosunen, 2016). There are some indications that students receiving tier 2 or tier 3 support only seldom study in these emphasized classes, though this needs to be investigated further. These aforementioned practices are among the main reasons for the positive correlation between class size and student performance.

Tier 2 support is provided as part of mainstream education. At tier 3 level, students in the first place stay in the regular classes and only if it is not possible to respond to their needs there, part-time or full-time small group can be used as an alternative. Tier 3 student's primary teaching group shall be stated in the decision on special support. Under the *Basic Education Decree (852/1998)*, in education given to students receiving tier 3 support, the teaching group may consist of a maximum of ten pupils, though it can be exceeded when justified. In 80% of general education classes in primary schools in Finland, there are students receiving tier 2 or tier 3 support (Kupiainen & Hienonen, 2016). Also, it seems that students at tier 2 or tier 3 level are distributed to classes of very different sizes. Approximately two thirds of tier 2 level students study in regular size classes (with 16 to 29 students) whereas half of the students at tier 3 level study in smaller classes (with < 16 students). In the present study it is investigated whether students receiving support are placed in smaller classes and whether they seem to benefit from studying smaller classes.

### 1.4. The development of thinking skills during primary school

There is a relatively common agreement that in addition to subject matter-specific knowledge, education should enhance more general skills needed in all learning (e.g., *Recommendation 2006/962/EC of the European Parliament and of the Council of 18 December 2006*). The importance of developing thinking skills as a general goal of education has been understood for decades (Resnick, 1987); nowadays, they are often the focus of curricula as well as national and international educational assessment frameworks (see Adey & Csapó, 2011; Moseley, Elliott, Gregson, & Higgins, 2005; Vainikainen, Hautamäki, Hotulainen, & Kupiainen, 2015). In the 1990s, Finland had already defined *learning to learn* (Hautamäki et al., 2002) as a measurable outcome of education (National Board of Education, 1999) and the assessment of thinking skills forms an important part of the measurement of it. This study utilizes the data of one of the ongoing longitudinal Finnish studies focusing on the development of learning to learn (first reported by Vainikainen, Wüstenberg, Kupiainen, Hotulainen, & Hautamäki, 2015). The thinking skills tasks used in this study are related to curricular contents but they require the application of higher-order thinking skills instead of just the repetition of subject-specific knowledge. The tasks of the instrument can roughly be grouped into the categories of general reasoning, mathematical thinking and reading comprehension skills (see Vainikainen, Wüstenberg et al., 2015, for further details). They can be interpreted through the theory developed by Demetriou, Spanoudis, and Mouyi (2011) on the architecture, development and education of the human mind as they measured the functioning of the *inference system* and *problem solving* in the contexts of categorical, quantitative, spatial, causal and verbal *structural systems*.

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