Chapter 2
School Size Effects: Review and Conceptual Analysis

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2.1 Introduction

In this chapter, a review of international review studies on school size effects is presented. Next, ingredients of a more contextualized and tentative causal mediation model of school size effects are discussed. The chapter is completed by a short overview of school size effects as found in international comparative assessment studies and by a synthesis of Dutch empirical studies that have addressed school size effects, in terms of achievement and attainment outcomes, costs, social outcomes, and good teaching practice.

2.2 Review Studies

Early reviews are those by Lee (2000), Cotton (2001), and Andrews et al. (2002).

2.2.1 Lee (2000)

The review study by Lee commented on earlier conceptual literature concerning school size effects. Studies by Conant (1959) and Goodlad (1984) provided no evidence for their recommended optimal number of students for high schools, namely 500. Bryk et al. (1993) found that school size had more influence on social equity than on achievement. This corresponds to other results, to be shown in the sequel, that school size affects students from lower socioeconomic backgrounds more than students from more affluent homes. Still other studies recommended that very large secondary schools ought to be broken up in units of no more than 600, "so that teachers and students can get to know each other" (National

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Association of Secondary School Principals 1996, p. 5). Of this and other studies Lee stated that "reformers are out in front of researchers." The tendency from American reviews and conceptual articles went strongly in the direction of "small is beautiful." She then continued in reporting on two empirical studies of her own, in which she did not just look for direct effects of school size on student achievement, but also for indirect effects. From a study in secondary schools Lee and Smith (1997), it was concluded that students learned more in middle-sized secondary schools (600–900), as compared to smaller, but particularly to larger high schools. The size effect was stronger for schools with a large contingent of lower SES students. The overall tendency in a study on 254 elementary schools was that small schools did better, both in terms of direct and indirect effects. The intermediary variable that was used in the elementary school study by Lee and Loeb (2000) was the willingness for teachers to take responsibility for students' learning, and this attitude was more frequently found in smaller schools. Lee offers the following hypotheses for intermediary conditions explaining the effects of school size:

- Less learning in large schools in basic subjects, as a consequence of (perhaps a too broad) offering of curricular options in large schools;
- Teachers less willing to take responsibility for students' learning in large schools;
- More formalized and impersonal social relationships in large schools.

Problems with very small schools could be caused by:

- Disjointed educational experiences, very small schools prone to suffer from just one or two disfunctioning teachers;
- Schools being not large enough to offer a reasonable curriculum.

Lee concluded that there exists no strong research base on school size effects (ibid, 341).

2.2.2 Cotton (2001)

The overview by Cotton (2001) is more like an ideological plea for small schools than a systematic and impartial review of the research evidence. The conclusion is already presented on page 5 of the report: "Research evidence supports decreasing the size of schools to improve student outcomes, school safety and equity, and teacher and parent attitudes." The report only provides references that are supportive of decreasing school size. If one looks at the summary of the report, the long list of favorable assets, ranging from better achievement to "functional

accountability," more inspired staff and better parent and community involvement small schools appear to be the remedy for all educational evils.

Andrews et al. (2002) reviewed the mostly economic literature on economies of size of school districts and schools. Economies of size are defined as the percent change in output resulting from a 1 % increase in all input.

Among the studies on school districts 10 out of 12 empirical studies reported some degree of economies of size. From seven school studies, it appeared that increasing school size from 200 up to 400–600 had little impact on student performance in elementary school. With respect to secondary school studies, Andrews et al. (ibid) repeated the already reported conclusion by Lee and Smith of an optimal size for high schools in the range of 600–900 students. Increasing secondary school size over 1,000 indicates a strong decline in the performance of low SES students.

More fully fledged research reviews are the studies by Newman et al. (2006), Leithwood and Jantzi (2009), and Hendriks et al. (2008).

2.2.3 Newman et al. (2006)

The study by Newman et al. (2006) starts out with listing the most important expectations with respect to the effects of a school being larger or smaller. Large schools are expected to offer wider curricular and extracurricular opportunities, and increased teacher specialization. Smaller schools, on the other hand, are seen as creating a more personalized learning environment, and greater interaction and participation by students and teachers.

Costs are also an important issue as "economies" of scale are expected to occur for larger schools.

Environmental conditions that are associated with the school size issue are the way quasi-market forces impact on schools getting bigger or smaller; with possible implications of discouragement of schools loosing students, and schools as centers of community networks, particularly in rural areas.

In the preparation of his review study, Newman et al. speak of a huge literature, yet from the hundreds of sources that were consulted only 31 studies on secondary schools remained that met basic quality requirements of scientific research. Of these 31 studies 21 originate from the USA and 6 from the UK. Student achievement and attainment was the dependent variable in 19 cases, dropout rate occurred 5 times, student violence 6 times, school climate 5 times, economic outcomes 5 times, and organizational characteristics 2 times. Newman et al. study found the material too diverse and limited to carry out a meta-analyses; the study is described as a narrative review, applying a structured set of rating categories and several raters.

The main conclusions were as follows:

High quality studies, usually focused at student attainment, tended to find quadratic relationships, indicating increase in effects up to a certain size and decline when the schools became still bigger.

Positive effects of school size were more often found when the students were in a higher age category and negative effects were more often found with younger students.

With respect to student behavior and violence as the dependent variables, the results were mixed to a degree that it appeared to be difficult to draw strong conclusions.

Perceptions on school climate appeared to be more positive in smaller schools.

In one study that addressed the relationship between school size and class size, it was found that these are positively related, in bigger schools the average class size tended to be higher.

Finally, the costs per student appeared to be lower in bigger schools.

The author summarized the conclusions by stating that: "The findings of this review would seem to refute some of the more prevalent myths regarding the advantages and disadvantages of smaller and larger school. For example the view that student attainment is universally higher in smaller schools and student behavior is universally worse in larger schools is inconsistent with the current evidence." (ibid, p. 54)

2.2.4 Leithwood and Jantzi (2009)

Leithwood and Jantzi (2009) reviewed 57 "post-1990" studies of school size effects on a variety of student outcomes.

The authors explain the continuing interest in the theme of school size effects by the dynamics of educational systems, where school districts continue to grow or shrink. In their review process, the authors started out with 280 papers of which 57 reported on studies that were selected as useable. Of these 57 studies 40 were targeted at secondary schools and 11 at primary schools, while 6 studies addressed secondary and elementary school size effects. The authors considered the nature of the data reported such that, according to them, a meta-analysis would not be permitted "without eliminating a significant number of studies." So what they did is present a systematic narrative review which included indications on the significance and direction of the results (i.e., associations between school size, and a range of dependent variables). The results are summarized according to the categories of studies used by the authors.

2.2.5 Elementary Schools, Student Achievement

Ten elementary school size effect studies were reviewed. Of these 10 studies 6 reported a negative relationship between school sizes and student achievement (implying that small schools did better), 3 found a nonsignificant relationship, whereas the reader is left wondering what happened to the remaining study.

2.2.6 Secondary Schools, Student Achievement

The number of studies in this category amounted to 19 studies, 15 from the USA, and 3 from the UK. Of these 18 studies, 5 reported a positive relationship, 6 came up with an inverted U shaped distribution of effects, 8 studies found negative associations (small being better). The three studies from the UK were among the ones that reported positive associations. The explanations that were offered for the positive effects (large schools doing better) were "greater opportunities for both instructional and curriculum specialization in larger schools," and the expectation that large schools are likely to have more teachers with specialized skills. Leithwood and Jantzi wondered whether the positive effects of larger schools might perhaps be due to increased dropout rates found in these schools, thus leaving them with a relatively better performing school population. Mentioning possible alternative explanations for positive outcomes (large schools doing better) is one of the instances in this article, where the authors are more critical of studies that find positive effects than of studies which show that small schools do better. Quoting Andrews et al. (2002), the authors say that decreasing returns to size may begin to emerge for high schools above 1,000 students. The authors summarize the results of the studies that had looked into school size effects on student achievement in secondary schools as follows: "While evidence about secondary school size effects on academic achievement is mixed, the most defensible conclusion favors smaller to midsize schools. This conclusion is most accurately portrayed in studies reporting nonlinear relationships between school size and achievement. Lack of attention to dropout rates in studies favoring large schools seriously undermines the confidence we can have in the results." This appears a somewhat partial summary of the evidence, although more negative than positive effects were found. First of all, the fact that studies that established nonlinear relationships do not favor very small schools is neglected in the conclusion. Second, no evidence is reported on the alleged effects of higher dropout in larger schools.

2.2.7 Equity

The authors cite earlier review studies (Lee and Smith 1995; Lee and Loeb 2000; Bickel and Howley 2000) in making the point that many studies find relatively better outcomes for disadvantaged students in smaller schools. Bickel and Howley (ibid) state that "smaller schools would improve schooling in impoverished communities." At the same time, smaller schools do not seem to harm the learning of more advantaged students. Explanatory interpretations on why such outcomes would occur are: the nature of command environments in small schools, less complex subject matter that is learned well, and more attention for disadvantaged students in small schools. Interestingly, the likely fact that smaller schools have smaller classes (due to imperfect matching of number of teachers and number of students in small schools) is not mentioned as a possible explanation.

2.2.8 Attendance, Truancy, and Dropping Out

Leithwood and Jantzi (2009) reviewed 13 studies on school size that used these types of variables as the dependent variable. Two were studies conducted in elementary and 11 were secondary school studies. One studies found a positive effect of school size (large schools doing better), 5 found negative effects (large schools doing worse than small schools on these indicators); 3 studies favored mid-sized schools and 4 studies showed nonsignificant associations. These results are interpreted as strongly favoring small schools. For this category of studies, the authors underline that the studies that found negative relationships were methodologically quite robust. Explanations for the superiority of small schools to foster these kinds of noncognitive outcomes are, firstly that large schools tend to have higher pupil–teacher ratios and that small school advantages are due to how students and teachers relate to each other. "Organizational trust, member commitment to a common purpose, and more frequent contact with people with whom members share their difficulties, uncertainties and ambitions" (Lee and Burkam 2003, p. 385, cited by Leithwood and Jantzi 2009), are considered as assets of small schools.

2.2.9 Participation, Identification, and Commitment to School

For these kinds of outcomes, related to student engagement Leithwood and Jantzi sum up their findings as follows: "Though only 6 studies were located for our review of school size effects on student engagement, they are of quite good quality

and provide entirely consistent evidence in support of the claim that smaller schools are associated with greater student engagement conceived of in several different ways."

2.2.10 Course Taking Patterns

Leithwood and Jantzi (ibid) cite Lee and Smith (1995) who noted that more within school variability in course taking, as is more often the case in large, as compared to small schools, was negatively related to their measures of student performance. Smaller secondary schools show more restrained variability with greater academic emphasis.

2.2.11 Extracurricular Participation

All four studies that Leithwood and Jantzi's (2009) review looked into, indicated that extracurricular participation decreases as school size increases (as a simple linear function). Again these studies are praised for their extremely good quality. The favorable results of small schools are explained by assumed "more pressure on students in smaller schools to participate."

2.2.12 Other Outcomes

Among these other outcomes are student self-esteem, physical safety, and social behavior. The evidence on these outcomes is meager, but always in favor of smaller schools.

2.2.13 Costs and Cost Efficiency

Only five studies looked at these kinds of organizational outcomes of school size, four from the USA and one from Northern Ireland. Two favored large schools, two favored small schools, and one favored midsized schools. Leithwood and Jantzi (ibid) conclude that these five studies offer a clear indication of the most cost-efficient sizes of secondary schools. The authors appear quite interested in the phenomenon of diseconomies of scale, yet, the evidence and explanation on why small schools could be more efficient is quite meager.

2.2.14 Teacher Turnover

On the basis of evidence from two studies, the authors conclude that midsize elementary schools, those in the range of 300 students, may be an optimum size for retaining teachers.

2.2.15 Teacher Attitudes

Out of a total of 10 studies, 7 conducted in elementary schools, and 3 in secondary schools, 7 studies favored smaller schools, 1 study showed a nonlinear relationship and 2 studies showed nonsignificant results. The authors conclude as follows: "While not a unanimous finding, the combined weight of these results seem to indicate that smaller school size enhances the chances that teachers will hold positive work-related attitudes."

The main conclusions that the authors draw are:

"Smaller schools are generally better for most purposes. The weight of evidence provided by the review clearly favors smaller schools for a wide array of student outcomes and most organizational outcomes as well."

"Disadvantaged students are the main benefactors of smaller schools"

"Breath of curriculum is no longer a justification for large schools."

"Cost effectiveness is no longer a justification for large schools, because of higher dropout rates in larger schools."

Next they offer some explanations for the positive balance with respect to smaller schools:

1. A greater sense of community in smaller schools, among students and teachers.
2. A greater sense of identification with the school.
3. More personalized relationships.
4. Teachers knowing their students well.

Next they suggest that school characteristics known from the larger educational effectiveness research literature may be better represented in smaller schools, namely academic press, school disciplinary climate, use of instructional time, teacherś sense of efficacy and teacher quality.

The review ends with clear recommendations to policy makers about optimal school size at elementary and secondary school level, namely 500 and 1,000, respectively. When schools have high proportions of disadvantaged students these numbers should be reduced to 300 for elementary schools and 600 for secondary schools.

Throughout the paper the authors shed doubt on the findings of positive school size effects (large schools having better performance), because the studies in question might have insufficiently controlled for student's dropout. The motivation for this allegation is based on a reference to a study by Rumberger and Palardy

(2005). Leithwood and Jantzi's claim is that larger schools "typically" have larger dropout rates, and that "only few" of the studies that found positive school size effects adequately controlled for dropout. A more precise support of this claim, however, is not provided, and as such it should be seen as a relatively subjective opinion. No figures are presented that compare absolute and relative student's dropout between small and large schools, nor is further information on the supposed selectivity of dropout, namely that it is particularly the low performing students that are dropping out from large schools.

Another one-sidedness in the reporting are repeated remarks about the high quality of the studies that found negative school size effects, while criticizing studies that found positive school size effects. Again these appreciations are not motivated explicitly. The authors do not credibly argue why studies that favor large schools are methodologically weaker.

The review is very limited on the issue of cost-effects. The study by Andrews et al. (2002) is reviewed in a very selective way, underling the occurrence of decreased returns to size, beginning to emerge for high schools above 1,000 students, but omitting the original authors' conclusion that 10 out of the 12 studies that were analyzed found some degree of economies of size.

The paper is also partial in its conclusions when it is stated that positive scale effects are not due to size in itself, but rather to the greater likelihood of more specialized staff. This is a meaningless argument because superiority of small schools, found in other studies, is also explained by making reference to teacher and other intermediary school conditions, associated with size.

One of the more interesting yields of this review is the discussion about the advantages of diversified curriculum offerings, more likely to occur in large schools, as compared to more concentrated curricula associated with smaller schools. Referring back to the article by Lee and Smith (1995), the argument is that the more concentrated curricula have a stronger academic core, which might explain better performance in small American high schools. The fact that in their review of secondary school size effects on student achievement the three UK studies all found positive size effects and the American studies negative school size effects, might be explained by less academically oriented "cafeteria" type curricula in large American high schools, not paralleled in the UK schools. The reader is left wondering what it is about large American high schools that make them less effective than smaller ones, apart from the issue of curriculum emphasis, school composition might be considered as an additional potential explanatory condition, which ideally should be controlled for in size effect studies.

2.2.16 Hendriks, Scheerens, and Steen (2008)

Hendriks et al. (2008) carried out a meta-analysis of the vote-count type, which means that an overview is given of studies that showed significant positive, significant negative or insignificant associations of school size and outcome

Table 2.1 Directions of effects of school size on various dependent variables

	Direction of the effect				Number of	
	−	ns	∩	+	Replications	Publications
Subject						
Achievement	13	23	8	7	51	23
Math	4	7	1	4	16	11
Reading	3	6	1	1	11	8
Science	1	2	0	0	3	3
Other	5	8	6	2	21	15
Social cohesion	12	5	0	2	19	12
Safety	9	9	0	8	26	10
Involvement	10	3	0	1	14	11
Students	8	2	0	0	10	8
Parents	2	1	0	0	3	2
Teachers	0	0	0	1	1	1
Totals*					110	46

− negatively related with school size
ns no significant relation with school size
∩ optimal school size found
+ positively related with school size
*Because publications may refer to more than one dependent variable, the total number of publications is lower than the sum of publications

indicators. Out of a total of 194 originally selected publications, 46 appeared to be useful for this type of analysis.

The results are summarized in Table 2.1.

The results show that the picture of school size effects on student achievement outcomes is quite mixed; a large proportion of the associations is nonsignificant, and about as many of the significant associations are positive as are negative. Results for noncognitive outcomes are different, here negative associations predominate, which means that smaller school size is associated with better results on these indicators.

2.2.17 Conclusions Based on Review Studies

When making up the balance of this review of review studies of the following conclusions can be drawn:

(1) Given the balance in studies that show positive and negative significant associations of school size and cognitive learning outcomes, paired with the large quantity of studies that showed nonsignificant associations, one would be tempted to conclude that school size does not matter for cognitive outcomes.
(2) Further nuance of this conclusion is in place, when one considers the (somewhat limited) number of studies that established nonlinear association,

resulting in estimates of optimal school size. Although these optima are often specified as rather broad intervals, there appears to be a fair degree of consensus on optimal school size ranges for primary and secondary school. The estimates by Leithwood and Jantzi (2009) express this consensus well when they claim that optimal school sizes at elementary and secondary school levels are 500 and 1,000, respectively.

(3) Also, school size seems to matter more for noncognitive outcomes, such as social cohesions, safety, well-being, and involvement.

(4) In the review studies that were analyzed there was a tendency for American studies to show results that favored smaller schools, whereas studies from other countries more frequently found that larger schools did better. Hattie (2009), p. 79 refers to one meta-analysis by Stekelenburg (1991) conducted on the basis of 21 studies on American high schools. The mean effect size was .43, which is substantial. From Hattie's interpretation of these results it becomes clear that the direction of the effect was negative, with smaller schools showing higher student outcomes.

(5) Several reviews confirm the conclusion that school size matters more for disadvantaged than for average students; with disadvantaged students doing better in smaller schools. Leihtwood and Jantzi (2009) propose smaller optimum school sizes, when schools have a large proportion of disadvantaged students (300 for elementary schools and 600 for secondary schools). Most studies establish that smaller size is more important for lower age groups (elementary versus secondary) and early as compared to later grades of secondary schools.

(6) Some reviews are explicitly focused at small schools in rural areas. Social and community outcomes for the school as a center of social activity are counted among the benefits of maintaining small schools in rural communities.

(7) Among the review studies that were analyzed, only two reviews, the ones by Andrews et al. (2002) and Newman et al. (2006) addressed cost issues in relation to school size. Andrews et al. found evidence for economies of scale in 10 out of 12 studies, but suggested that diseconomies of scale may start to occur after the size of secondary schools rises above 1,000 students. Newman et al. found that the cost per students appeared to be generally lower in large schools. A few illustrative studies that we reviewed to follow up these limited results are those by Bickel et al. (2001) and Bowles and Bosworth (2002). Bickel et al. (2002) established that school size has a statistically significant and negative relationship with expenditure per pupil, and noted that cost reduction diminishes as schools grow larger. Bowles and Bosworth (2002), p. 299 summarize the results of their study on seventeen school districts in Wyoming, with the conclusion that: "…averaging across school type, an increase of 10 percent in school size decreases cost per student by approximately 2 percent." In a subsequent section some additional Dutch studies that looked at cost effects of school size will be reviewed. Merkies (2000) used data on Dutch primary schools from the 1986/1987 school year to establish

Preliminary conceptual map

Environment	**School size**	**School organisation; teaching and learning**	**Cognitive and non-cognitive outcomes**
Urban/rural		Class size; school organization; teacher quality; Number of fte management	Reading, mathematics, science; Drop-out rates
SES/ability composition of the school		Climate aspects, discipline, safety	Attitudes towards school, truancy, violence
Age categories of students, elementary and secondary school		Instructional strategies	Attitudes towards learning; academic orientation

Fig. 2.1 A contextualized indirect effect model of school size effects

the relationship between costs and school size. His conclusion is that considerable economies of scale can be acquired by small schools, and that these benefits dissipate as schools grow larger. He also concludes that, from a cost perspective the optimal school size is around 450 pupils and that the costs remain virtually constant from the average school (200 pupils) onwards.

2.3 Toward a Conceptual Model of School Size Effects

School size effects can be studied as direct effects on student outcomes. In that case all likely intermediary variables "between" school size variation and student outcomes are treated as a black box. This is a perfectly legitimate approach, yet, when it comes to explaining school effects, authors cannot do other than to refer to either environmental conditions or intermediary conditions, which are directly affected by changes in school size, and which, in their term may co-vary with educational outcomes. Figure 2.1 sketches a preliminary conceptual map, including types of environmental conditions, types of intermediary variables, and different outcome variables.

2.3.1 Preliminary Conceptual Map

As a next step in this introductory chapter, illustrative research studies will be reviewed that shed light on some of the environmental and intermediary conditions referred to in Fig. 2.1.

2.3.2 Environment

2.3.2.1 Small Schools in Rural Areas

Hargreaves et al. (2009) provide a comprehensive overview of the challenges surrounding small schools in rural areas. On the negative side of small schools are relatively high costs, as well as doubts about the quality of education in small schools. These doubts are persistent but not always supported by the facts, as the authors illustrate in their paper, when referring to urban schools in Scotland, England, and Sweden. They conclude that "there is little research on teaching and learning processes that might account for differential levels of performance, or on how or whether rural schools optimize the resources they have available to them" (ibid, p. 82). On the positive side are all generally accepted advantages of small schools, such as people knowing each other better, more personalized relationships, and easier connections with the local environment. What is also brought into the balance are social benefits for the local community, as the school is sometimes seen as the heart of small rural communities. In a subsequent review of mostly British studies on small rural schools, Hargreaves et al. (2009) provide further details about benefits and challenges of small rural schools. On the positive side they refer to high levels of mutual involvement and collegiality among staff, strong parental involvement and "voice" and the positive esteem for teachers as professionals in rural communities. In the British studies small schools generally came out as being innovative, and show examples of positive effects of multiage classes. Despite this general innovativeness, small schools were somewhat behind in making good benefit of ICT provisions, and showed slow take-up of participation in national headship courses. All in all the review studies by Hargreaves et al. indicate more benefits for small schools than problems. Yet, negative scale effects on costs of very small schools are hard to neglect. Far less convincing is the criticism of lower school organizational and teaching quality in small rural schools. What one might expect is more variance in performance among small schools, as the quality would depend on fewer individuals, offering less opportunity for the leveling out of outlying cases (either very good or very bad teachers) than is the case in larger schools.

2.3.2.2 SES Composition and School Size

Marks (2002) compared the school size issue to the dispute about the effectiveness of catholic versus public schools in the United States. The tendency of American studies is to favor catholic high schools, both with respect to level of achievement outcomes as with respect to equity. Similar results are reviewed with respect to the school size issue (reference to the work of Lee and Smith 1995), emphasizing that small schools reduce the SES achievement relationship, while large schools augment it. Students from disadvantaged and minority background tend to do worse in

large schools. These authors hypothesize measures of social cohesion as intermediary variables between school size and school outcomes, and in this sense they say that small schools may be like catholic schools. A study by Stiefel et al. (2006) found that race-gaps in achievement were negatively related with small schools, in other words, there were smaller race-gaps in smaller schools.

Opdenakker and Van Damme (2007), in a study of Belgium secondary schools, found that school size affects school outcomes positively and that its effect is mediated by school practice characteristics like the amount of collaboration between teachers, which in its turn affected climate and student outcomes. On the basis of structural equation modeling they found that about 25 % of the variance in teacher cooperation could be explained by a joint effect of school size and school composition. Such a joint effect might be interpreted as the effect of school size being "boosted" by school composition (average student ability in the case of this study); and is close to a positive interaction effect of school size and the average ability (or SES) level of the students. In more practical terms; good students tend to do well in large schools.

2.3.2.3 School Size and Age Categories

All studies that compare school size effects between primary and secondary schools (e.g., Lee and Smith 1997; Andrews et al. 2002; Leithwood and Jantzi 2009; Blank et al. 2011) conclude that optimal class size for elementary schools is much smaller than for secondary schools. Blank et al., for example, indicates an optimum size for elementary schools in the range from 440 to 550 students, and for secondary schools 600–1,000. Newman et al. (2006) suggest that in the overall 11–18 age range of secondary schools, the higher age category tolerates larger school size better (ibid, p. 50).

2.3.2.4 Parental Involvement

Involvement of the community with a school, including particularly parental involvement, could be seen as an environmental condition to the school. High community involvement is generally associated with better school performance, although authors like Teddlie et al. (1987) argue that disadvantaged communities would be expected to have a negative influence on school performance. The literature on school size tends to indicate a negative correlation between school size and parental involvement, which implies that small schools tend to have higher parental involvement. This conclusion is confirmed in a study by Dee et al. (2007, cited by Loveless and Hess 2007), who concluded that "the findings provided some tentative evidence that small schools are more effective in promoting parental involvement in schools as well as engagement by the local community." However, they were unable to prove that this conclusion applied to other than rural communities. Walsh (2010) found evidence that the causal direction is from small

schools to parental involvement, and not the other way around, as when involved parents self-select themselves to smaller schools. For parents actually volunteering for certain tasks at schools these self-selection hypotheses could not be rejected. The overall explanation for a decline of parental involvement when schools become larger is the free-rider principle. But, in addition, evidence was found for volunteering parents self-selecting into smaller schools. Finally, Walsh notes that there is evidence that parents see their involvement as a substitute, rather than a complement, for perceived school quality.

2.3.3 School Organization and Teaching/Learning Processes

2.3.3.1 School Size and Class Size

Small classes tend to be clustered in small schools, and average class size is larger in large as compared to small schools (Loveless and Hess 2007). In this way school size effects might "work" indirectly through smaller classes, as intermediary condition. Ready and Lee (2008), cited by Loveless and Hess (2007), found that both smaller schools and smaller classes showed better results in terms of more learning, but the results for small classes were stronger than those for small schools. Part of the reason why small schools may tend to have smaller classes is a sub-optimal match between the number of teachers and the number of classes in smaller schools. Another way to express this would be to say that in smaller schools the optimal or officially allowed class size would be further away from the actual average class size because of the fact that full-time equivalent teachers are undividable. This would provide a clear trade-off between assumed quality enhancement and costs ("involuntary" smaller classes stimulating quality, but raising costs).

2.3.3.2 Bureaucracy and Managerial Overhead

Similar problems of full-time employees being "undividable" would apply to small schools having relatively more managerial overhead than small schools. Blank et al. (2007) established that in Dutch secondary education large schools had relatively less management than small schools. They found no evidence for large schools operating more "bureaucratic" than small schools.

2.3.3.3 Climate Aspects

In the American literature, more personalized relationships and a safe climate are described as some of the major advantages of smaller schools (e.g., Cotton 2001). Such more personalized relationships might be seen as leading to improved

cognitive achievement, but, perhaps more convincingly, to better noncognitive outcomes, in terms of better attendance, less violence and positive attitudes toward school (Newman et al. 2006). Hendriks et al. (2008) found predominantly negative effects of schools size, when social cohesion, safety and school involvement were used as the dependent variable. The Dutch Educational Inspectorate (Inspectie van het Onderwijs 2003) found that students appreciated their (secondary) school better, when it was small as compared to large.

Garrett et al. (2004) on the basis of a review of 31 studies from the USA and the UK found that teachers in smaller schools tended to have more positive perceptions of school climate, of their abilities to influence school policies and school norms, and to control their classrooms; teachers in small school also perceived greater co-operation and resource availability.

Bokdam and Van der Linden (2010) found that secondary school students in the Netherlands found they had better oversight over how their school operated, when the school was below 1000 students in size, and were also more positive over their relationships with teachers.

2.3.3.4 School Size and Curriculum and Instruction

In the American literature, a broader curriculum and more specialized teachers are seen as an advantage of larger schools. At the same time, it may be the case that these broad secondary school curricula, are less academically focused, and offer more opportunities for students opting for a "fun package." The Dutch Inspectorate (2003) reports some differences between strong and weak points of smaller and larger secondary schools in instructional approach. Smaller schools tended to do better in providing structure during lessons and providing clear explanations; small schools did also better in differentiating and providing adaptive instruction. A positive note on larger schools was that, in this study, students thought that larger schools made a better organized impression than smaller schools. In the earlier cited study by Opdenakker and Van Damme (2007), the positive effect of large schools was mediated by better teacher cooperation and classroom climate in larger schools. In the theoretical conjectures put forward by Leithwood and Jantzi (2009) that were cited in a previous section, all kinds of school effectiveness enhancing conditions are associated with smaller schools, but without empirical evidence so far, and meager credibility. Form this preliminary overview of the school size literature, specifying intermediary conditions, the classroom level appears to be a sparsely addressed issue.

2.3.3.5 Conclusion: Partial Evidence on Contextualized Indirect Effect Models of School Size

When venturing a comparison between studies on school leadership effects and school size effects, indirect effect models are even more rarely applied and studied

empirically for school size, than is the case for school leadership (Scheerens 2012). Studying school size effects is simpler on the side of the independent variable specification than studying leadership effects, but school size effectiveness is more complex with respect to the choice of dependent variables and practically unexplored territory as far as intermediary variables are concerned. Next, school size effects appear to depend strongly on modifying conditions, like the age level of students and student background composition, and moreover vary with respect to cognitive and noncognitive outcomes. Finally, the analysis of nonlinear relationships and quadratic functions in school size effects research, is not combined (or combinable) with structural equation modeling of indirect causation models, which is based on the general linear model. The review on potential intermediary conditions in school size effectiveness research has shown very little, in terms of empirical studies actually addressing indirect effect models with the study by Opdenakker and Van Damme (2007) as the only exception.

What remains to be said is to suggest some hypothetical conjectures on plausible variables that might mediate the effect of school size.

2.3.4 Class Size

As a consequence of imperfect matches of full-time teachers to groups of students, average class size is likely to be smaller in small schools. Yet, the degree of class size reduction is not expected to be sizeable, so that the potential explanatory power of this phenomenon is not expected to be strong.

2.3.5 A More Personalized School Climate in Smaller Schools

There is considerable consensus on smaller schools having a more personalized atmosphere with students and teachers knowing each other better. A good relational climate at school is sometimes found to affect cognitive achievement, for example in secondary analyses of the PISA data bases (e.g., Luyten et al. 2005), and there is even stronger evidence that this is also the case for a safe, orderly climate. A more personalized school climate might therefore be a plausible intermediary condition in studies showing better cognitive achievement in smaller schools. Next, this indirect effect would be expected stronger for low SES students and younger students, and be more prominent for noncognitive outcomes such as well-being, involvement and safety.

2.3.6 A More Focused Academic Curriculum in Small Schools

Some of the American studies suggest that small high schools have a more focused academic curriculum than large schools, and that this might be one of the explanations of the often found negative school size effects in the USA. Paradoxically, a more specialized and diversified curriculum is often used as an argument to make schools larger. As suggested earlier, the negative outcomes on large American high schools might be caused by less academic focus in diversified curricular offerings. In the European context, diversified curricula might still be academically focused and this might be a potential explanation for the more frequent positive school size effects in secondary schools.

2.3.7 More Organizational "Modernization" in Larger Schools

In one of the studies that was reviewed, Hargreaves et al. (2009) found that small schools were somewhat slow in picking up ICT applications and leadership courses. Opdenakker and Van Damme (2007) found more teacher cooperation in larger schools. It is not implausible that larger schools invest more in secondary organizational conditions, such as professional development, teacher cooperation, more pronounced and differentiated leadership and technology provisions. To this should be added that the superiority of modernization in secondary organizational processes over more traditional schooling is not a run race, and somewhat more is to be expected of improvements in the primary process of teaching and learning. On this latter issue, association of school size variation and effective teaching, hardly any material was found in the review studies.

2.4 Results from Internationally Comparative Studies

2.4.1 Cross-National Differences in School Size

Data from international comparative assessment studies like PISA and TIMSS show considerable variation in school size between countries. Table 2.2 lists the average school size in 33 OECD countries. The data derive from the PISA 2009 survey,[1] which also includes 40 non-OECD countries. Table 2.2 reports the same figures for these countries. The PISA survey is based on data from 15-year-old

[1] See http://pisa2009.acer.edu.au/downloads.php.

Table 2.2 School size per country in PISA (secondary education)

Country	Mean	Median
OECD (33 countries)		
Australia	761.5	720
Austria	299.0	227
Belgium	553.6	522
Canada	541.9	390
Switzerland	409.0	268
Chile	610.7	470
Czech Republic	362.7	343
Germany	499.0	367
Denmark	403.9	415
Spain	588.8	519
Estonia	412.5	299
Finland	539.1	350
United Kingdom	883.4	869
Greece	205.8	189
Hungary	416.5	337
Ireland	480.7	443
Iceland	274.8	244
Israel	507.3	476
Italy	438.4	343
Japan	500.6	471
Korea	864.4	760
Luxembourg	1104.8	1,022
Mexico	225.5	93
Netherlands	767.3	623
Norway	258.7	238
New Zealand	722.5	583
Poland	297.3	224
Portugal	647.2	603
Slovak Republic	346.8	289
Slovenia	309.5	262
Sweden	430.3	355
Turkey	660.7	474
United States	623.8	366
OECD average (equal weight per country)	**513.6**	
OECD median		**367**
Non-OECD (40 countries)		
Albania	332.9	207
United Arab Emirates	943.9	589
Argentina	327.5	245
Azerbaijan	428.6	319
Bulgaria	398.8	346
Brazil	636.8	507
Colombia	952.9	717
Costa Rica	479.7	313

(continued)

Table 2.2 (continued)

Country	Mean	Median
Georgia	283.0	167
Hong Kong-China	960.7	1,028
Croatia	486.9	457
Indonesia	330.1	201
Jordan	521.9	450
Kazakhstan	405.4	254
Kyrgyzstan	518.8	411
Liechtenstein	192.7	139
Lithuania	398.1	283
Latvia	290.7	181
Macao-China	1318.9	1,359
Republic of Moldova	290.8	222
Malta	488.9	406
Montenegro	738.5	644
Mauritius	657.6	699
Malaysia	1018.9	947
Panama	698.8	476
Peru	272.9	134
Qatar	832.5	571
Shanghai-China	1027.3	851
Himachal Pradesh-India	325.7	298
Tamil Nadu-India	842.9	630
Miranda-Venezuela	565.4	486
Romania	584.7	430
Russian Federation	294.7	188
Singapore	1285.3	1,327
Serbia	619.3	601
Chinese Taipei	1474.2	1,258
Thailand	640.6	375
Trinidad and Tobago	588.9	587
Tunisia	676.5	620
Uruguay	554.1	421
Non-OECD average (equal weight per country)	**617.2**	
Non-OECD median		**440**

students and the findings report the average size of secondary schools. As the distribution of school sizes is rather skewed in most countries (with a bottom effect at the lower end and a long tail at the higher end), the median school size is reported for each country as well. School size is measured as the total number of students enrolled in a school.

On average, the schools in secondary education appear to be somewhat larger in non-OECD countries as compared to OECD countries (617.2 vs. 513.6). In addition, the tables reveal large differences between countries, especially among non-OECD countries. Within the OECD the lowest average school size is reported for Greece

(205.8) and the highest for Luxembourg (1104.8). The average across OECD-countries is 513.6. The average school size in the Netherlands (767.3) clearly exceeds this number. The reported school sizes relate to the numbers of students per location. In the Netherlands, a single school often comprises multiple locations. The average school size for the Netherlands would be about twice as large if entire schools instead of location had been the focus of attention. For only three other OECD countries (Luxembourg, Korea, and the United Kingdom) a mean school size is reported that exceeds the Dutch average. For non-OECD countries the national averages range from 192.7 (Liechtenstein) to 1474.2 (Chinese Taipei).

Table 2.3 lists the per country average school sizes as reported in the TIMSS 2011 survey for 26 OECD countries and Table 2.3 lists the national averages for 24 non-OECD countries.[2] These figures refer to primary schools. On average, the mean school sizes are below those reported for secondary education in PISA. The average school size in primary education across countries in the OECD is 433.5. In the non-OECD countries, it is 744.0. Again, a substantial amount of variation between countries can be observed. The national averages range from 176.8 (Austria) to 1054.0 (Turkey) within the OECD. For non-OECD countries, the range of variation is from 267.4 (Iran) to 1,774 (Qatar).

It should be noted that for OECD countries the average school size in secondary education generally exceeds the size in primary education, whereas this does not apply to non-OECD countries.

The average school size in primary education for the Netherlands (291.3) clearly falls below the cross-national average among OECD-countries. According to figures reported in Dutch sources the number of students per school is even somewhat smaller (Onderwijsraad 2005, 2008; Blank and Haelermans 2008; Ministerie van Onderwijs, Cultuur en Wetenschap 2011). Secondary schools in the Netherlands are relatively large when compared to other OECD countries, but primary schools are particularly small. Only in a small number of other OECD countries (Austria, Germany, Portugal, Ireland, and Northern Ireland) does the average school size in primary education fall below the Dutch average. Figures 2.2 and 2.3 provide a graphical display of the international distribution of school size among OECD countries.

2.4.2 The Effect of School Size on Reading Achievement in PISA

Based on the PISA 2009, data several analyses have been reported that provide information on the relation between school size and reading performance in secondary education across dozens of countries (OECD 2010; pp. 163–188). These

[2] The data are derived from the TIMSS and PIRLS international database, see http://timssandpirls.bc.edu/timss2011/international-database.html.

Table 2.3 School size per country in TIMSS (primary education)

Country	Mean	Median
OECD (26 countries)		
Australia	487.9	433
Austria	176.8	181
Belgium (Flemish)	337.0	311
Chile	740.5	616
Czech Republic	376.0	395
Germany	264.1	246
Denmark	491.0	509
England	333.4	307
Spain	582.5	446
Finland	294.9	283
Hungary	394.9	385
Ireland	279.4	240
Italy	508.7	505
Japan	519.2	528
Korea	1002.0	1,019
Netherlands	291.3	260
Norway	295.9	274
Northern Ireland	288.2	253
New Zealand	357.9	320
Poland	343.4	320
Portugal	219.7	196
Slovak Republic	378.3	356
Slovenia	389.8	383
Sweden	317.9	271
Turkey	1054.0	819
United States	546.4	509
OECD average (equal weight per country)	**433.5**	
OECD median		**338**
Non-OECD (24 countries)		
Armenia	496.4	411
United Arab Emirates	1488.0	854
Azerbaijan	671.0	505
Bahrain	830.5	668
Hong Kong-China	765.4	782
Croatia	607.3	582
Georgia	612.9	491
Iran	267.4	230
Kazakhstan	752.5	650
Kuwait	620.7	609
Lithuania	529.6	450
Malta	378.0	330
Morocco	565.6	516
Oman	548.2	563
Qatar	1774.0	738
Romania	478.8	350

(continued)

Table 2.3 (continued)

Country	Mean	Median
Russian Federation	630.1	616
Saudi Arabia	363.2	314
Singapore	1645.0	1,630
Serbia	730.7	716
Chinese Taipei	1335.0	1,177
Thailand	754.5	333
Tunisia	394.0	353
Yemen	617.7	385
Non-OECD average (equal weight per country)	**744.0**	
Non-OECD median		**539,5**

multilevel regression analyses separately focus on the effect of the five following policy relevant variables:

- School policies on selecting and grouping students
- School governance (e.g., responsibilities for curriculum and assessment)
- School's assessment and accountability policies
- Learning environment (e.g., student–teacher relations, disciplinary climate)
- Resources invested in education (e.g., learning time, class size)

A number of control variables are included in each analysis. These include individual student socioeconomic and demographic background, the school average of the students' economic, social, and cultural status, urban city and school size. The relation between school size and reading performance is modeled as a quadratic function (i.e., both a linear and quadratic term is included in the statistical analysis). In the majority of the per country analyses, the effect of school size is not found to be statistically significant. The average effect across OECD countries is slightly positive in the analyses that focus on the first four variables from the above list. This might point to a somewhat higher level of reading performance in larger schools. However, when controlling for resources, the analysis fails to show an independent effect of school size on average across OECD countries. This seems to imply that across OECD countries reading performance tends to be somewhat higher in larger schools, but that this can be accounted for by the way resources are invested. The following aspects of resource investment are included in the analyses:

- Pre-primary education
- Class size
- Library use
- Extracurricular activities
- Human resources (teacher shortage)
- Quality of educational resources

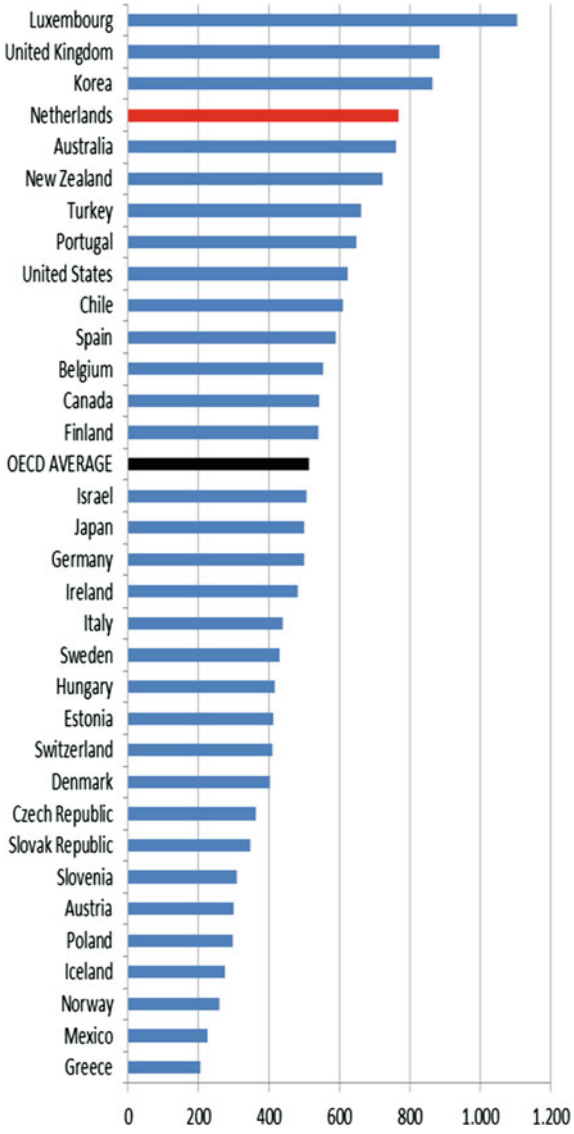

Fig. 2.2 Average school size per country—OECD secondary education. *Source* PISA 2009 dataset

Four OECD countries out of 33 show a significant (and positive) effect of school size in all five analyses (Austria, Belgium, Germany, and Italy). This means that in these four countries the positive trend of higher reading performance in larger schools persists even when student background characteristics, school context, and the aforementioned policy variables are controlled for. In most cases, the effect of the linear term is positive and the effect of the quadratic term is negative. This indicates that the positive effect declines as school size increases.

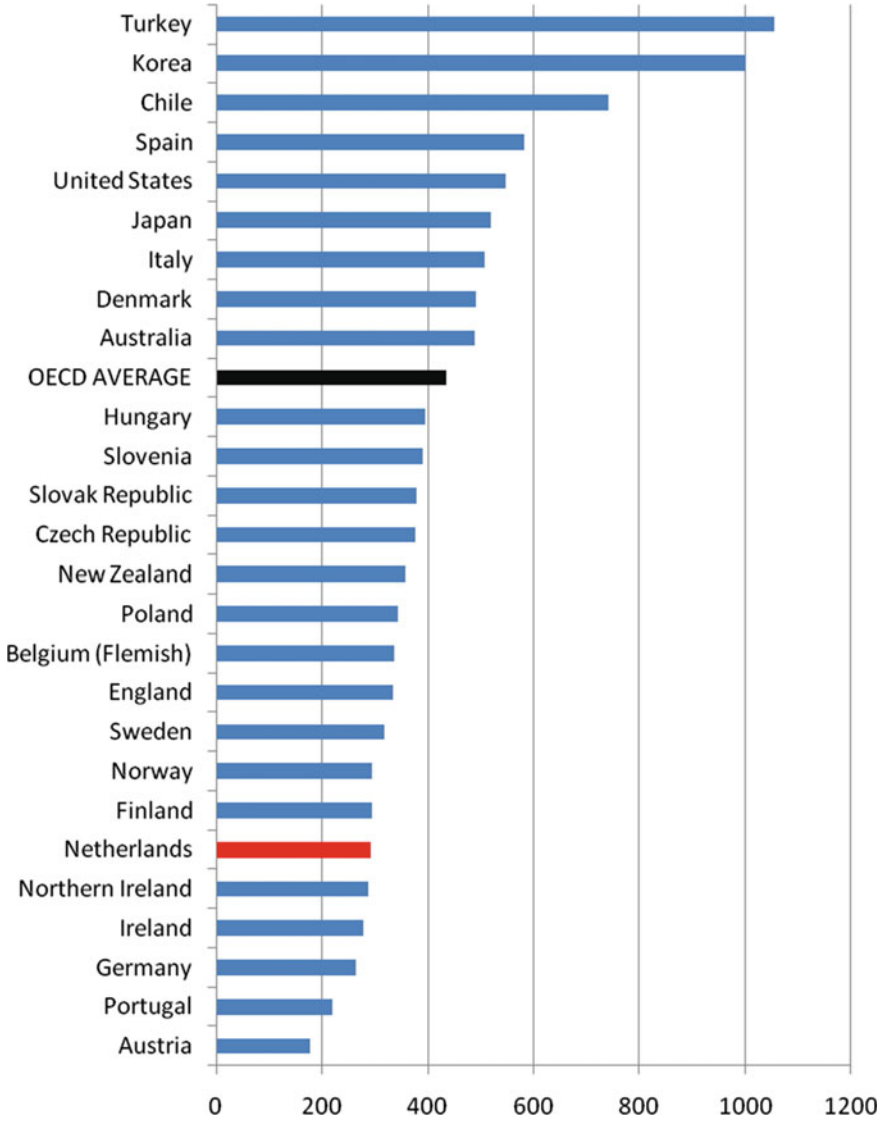

Fig. 2.3 Average school size per country—OECD primary education. *Source* TIMSS 2011 dataset

The effect of school size on reading performance in the Netherlands is found to be stronger than the OECD average in four out of five analyses. However, also in the Dutch case it is found that the effect of school size is reduced to nearly zero (and as a result no longer statistically significant) when taking into account the variables that relate to resources invested.

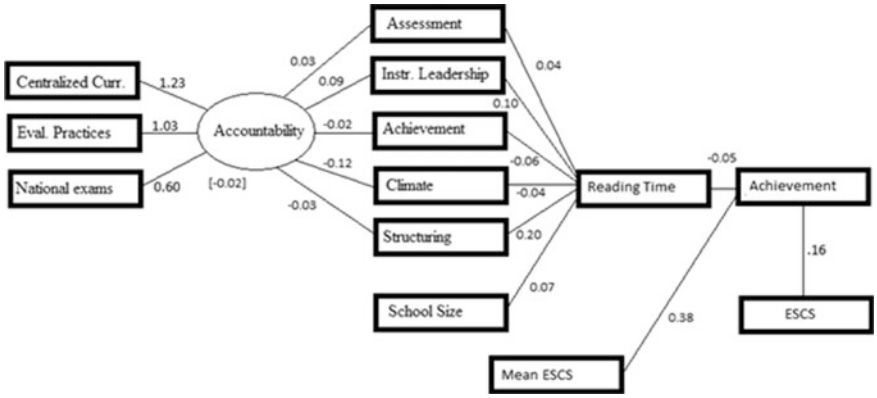

Fig. 2.4 Estimates of the accountability scenario with ESCS. The number in *brackets* is the direct effect of accountability on achievement; cited from Scheerens et al. (2013)

2.4.3 A Closer Look at School Size and Reading Achievement in PISA 2009

As a part of a thematic report on PISA 2009, several multilevel scenarios were analyzed by means of multilevel structural equation modeling (Scheerens et al. 2013). The scenarios included policy amenable variables defined at system level as well as school characteristics and control variables, like student level and school average socioeconomic status of the students. In one of the scenarios, the one that was focused at accountability as the central system level policy amenable condition, school size was included among the school level variables. By way of presenting a schematic overview of the results, the path diagram on the accountability scenario is reprinted as Fig. 2.4. The analyses were conducted on the whole PISA international data base, which, for this scenario had full data on 32 countries.

School size appeared to have a very small positive effect (0.07) on reading time. The indirect effect of time on achievement was negligible. For a more complete discussion of this analysis, the reader is referred to the original report. For the subject at hand, school size appears to have a negligible effect on reading literacy achievement across countries.

2.4.4 Conclusion Based on the Overview of School Size in Internationally Comparative Studies

The descriptive information from the international studies shows considerable variation between country average school sizes. The Netherlands is above the OECD average as far as secondary schools are concerned (744 in the Netherlands

versus 531.6 as the OECD average. With regard to primary schools, the Netherlands is below the OECD average (231.3 as compared to the OECD average of 433.5).

Results from PISA and TIMSS show little relationship between school size and educational achievement. To the extent that a relationship is suggested, this is a small positive rather than a negative effect (better achievement in larger schools). More advanced analyses on the PISA 2009 data set confirmed these results.

2.5 A Closer Look at Dutch Studies on School Size Effects

Of the Dutch studies that were analyzed, three studies looked at achievement outcomes, one study looked at early school leaving as an outcome, three studies investigated cost aspects, six analyzed social outcomes, and one study looked at good teaching practice (the study that was carried out by the Inspectorate.

2.5.1 Achievement and Attainment Outcomes

2.5.1.1 Achievement and School Climate

Dijkgraaf and Van der Geest (2008) and Dijkgraaf and De Jong (2009) used different measures for school size (school district, school, school site, and school track). Using linear and nonlinear models, they found inconsistent effects on student achievement and school climate. Effect sizes were small, often insignificant and if statistically significant, showed a mixed pattern of positive and negative effects. The authors note that if effects were found, this was usually the case when school size was defined in terms of school track (the smallest unit closest to the actual environment where students are taught).

The authors conclude that there is no straightforward, unequivocal relationship between scale and quality in education, which implies that there is insufficient scientific evidence for active educational policy aimed at changing increase or decrease of scale in education.

2.5.1.2 Student Achievement in Math and Science

Luyten (1994) did a study on "School Size Effects on Achievement in Secondary Education" based on evidence from the Netherlands, Sweden, and the USA. The relationship between school size and math and science achievement in the Netherlands was not significant.

2.5.1.3 Achievement (Cito Test Scores)

De Haan et al. (2011), in a study of Dutch primary schools, found that "scale effects can offset the benefits of competition." Changes in the required number of students per schools, decreased competition with 10 %. Contrary to expectations an increase in educational outcomes was found (as, according to economic theory less choice and competition would be expected to lead to a decline in school performance). This outcome was explained by the implication of the policy measure, namely that on average students attended larger schools after the change in required school size, assuming that the decrease in small schools had a positive effect on student performance.

2.5.1.4 Drop Out

Herweijer (2008) starts out by presenting an overview of earlier results that looked into early school leaving (drop) out in secondary educations in relation to school size. The general expectation that larger schools, because of a less personalized atmosphere, would show more early school leaving, is not supported by research.

De Winter (2003) concluded that an optimal size, as far as student well-being is concerned is a school that is neither too big nor too small. Other studies, notably those by Bronneman-Helmers et al. (2002) and by Neuvel (2005) showed no relationship between school size and variables like student well-being and social safety, and studies by van de Venne (2006), and the Educational Inspectorate (Inspectie van het Onderwijs 2003) indicated that there is no relationship between school size and educational achievement of students.

Their own results for Dutch secondary schools show that the bigger the school site is, the smaller the percentage of student that drops out. The authors conclude that their results do not support the supposition that larger schools have more early school leaving.

2.5.2 Costs

Merkies (2000) used data on Dutch primary schools from the 1986/1987 school year to establish the relationship between costs and school size. His conclusion is that considerable economies of scale can be acquired by small schools, and that these benefits dissipate as schools grow larger. He also concludes that, from a cost perspective the optimal school size is around 450 pupils and that the costs remain virtually constant from the average school (200 pupils) onwards.

Blank et al. (2007), in a study of Dutch primary schools, found that the efficiency in terms of the productivity per unit costs of very small schools might be half of that of a larger school. Up to a school size of 300 pupils cost advantages of scaling up occur, after that level cost advantages become gradually smaller, while from a school size that exceeds 550 pupils disadvantages of scale occur.

Blank and Haelermans (2008) document the increase of school size, in all education sectors in the Netherlands in the period between 1990 and 2006. In vocational education, the average school size even became ten times larger.

Changes in school size had implications for the means that are deployed, such as the budget shares for teachers, management, support staff, material costs, and housing. For example, in primary education increased school size led to a larger share of support personnel, but a smaller share of management costs. In secondary education increased school size led to higher cost shares for teachers and material resources, and significantly lower cost shares for management, support staff and housing. In vocational and adult education increase in scale has led to lower cost shares for teachers, support staff and management (taken together) as compared to significant increase in the cost share for material resources and housing.

In all school sectors, except vocational and adult education, economies of scale on expenditure occur. In vocational and adult education, diseconomies of scales were found.

A result of the study, highlighted by the authors, is that despite considerable increase in school size, the share of costs for management and support staff has declined, contrary to expectation of more managerial overhead and bureaucracy in larger schools.

2.5.3 Social Outcomes

2.5.3.1 Student Well-Being

The study by Bokdam and Van der Linden (2010) looked at the way students experienced scale differences in secondary schools. They found that school size is relevant for the degree to which students find their school clearly organized and transparent, and for the quality of the contact with teachers. When school size exceeded 1,000, these two issues appear to suffer, and lead to less quality as perceived by students.

2.5.3.2 Truancy

Bos et al. (1990) found a positive correlation between increase in school size and truancy, implying that truancy becomes more of a problem if school size increases

2.5.3.3 Well-Being and Commitment of Teachers, and Student Teacher Relationships

Feenstra and Gemmeke (2008) carried out a study in Dutch secondary schools in which the relationship between the size of schools or tracks and various facets of

teacher commitment were investigated (commitment of teachers with colleagues and students). The results of their study did not show significant associations of school size with any of these teacher commitment variables.

2.5.3.4 Safety

Mooij et al. (2011) studied multilevel aspects of social cohesion of secondary schools and pupils' feelings of safety. Their main outcome with respect to school size was that students felt safer in larger secondary schools, particularly student who had a background of being bothered by "social violence" (ignoring, excluding, threatening, intimidating, blackmailing, spreading false rumors).

2.5.3.5 Well-Being at School and Safety

van der Vegt et al. (2005) used data from the national school monitor, to study aspects of student well-being and safety in Dutch secondary schools. School size appeared to be not significantly associated with feelings of safety and feelings connected to the school. A significant positive association of school size and safety (bigger schools doing better), was found with respect to the being in place of safety policies. On several other variables bigger schools did worse than smaller schools, namely: more fighting in larger schools, better relationships with peers in smaller schools and more vandalism in larger schools.

2.5.3.6 Teacher Satisfaction

Van der Vegt et al. (2005) studied the effect of school size on teacher satisfaction. They found that the effect of school size was negligible and statistically not significant.

2.5.4 Good Practice in Teaching and Student Attainment

2.5.4.1 Achievement Outcomes, Pedagogical and Didactic Strategies, School Climate, Quality Care at School and Counseling of Individual Students

The Dutch Inspectorate (Inspectie van het Onderwijs 2003) conducted a study about school size and educational quality in 378 secondary schools. The main results were as follows:

– No differences in achievement and attainment results could be attributed to differences in school size.
– Neither could differences in didactic and pedagogical approach, quality care, student support and counseling and school climate be attributed to differences in school size.

2.5.4.2 Conclusions Based on the Dutch Studies

The overview of Dutch studies provides little evidence for scale effects on educational quality, as far as student achievement outcomes, social outcomes (cohesion, well-being, and safety) and even desirable school organizational conditions (teacher satisfaction) are concerned. If significant effects are found, they tend to favor large rather than small schools. See also the review studies by Stoel (1992) and (van de Venne 2006).

With respect to cost efficiency, most authors found a U-shaped development of costs as the size of school increases. Up to a certain level increase in size leads to a decrease in costs, until a certain optimum is reached, beyond this level increase in size leads to increases in average costs.

According to Blank et al. (2011) certain trade-offs can be discerned with respect to scale and quality. The "human measure" may get lost as school size go up, leading to a less personalized school climate. On the other hand, larger schools standardize their production process, by means of tests, quality care systems, and school plans, developed according to standardized formats. Such standardization may have a positive effect on (outcome) quality.

On the basis of these results of Dutch studies, the quality argument might well be put aside in considerations of optimizing school size. Crudely stated: "size does hardly matter for educational quality." Although the gradual trend of cost effects of changes in school size is fairly clear as well, more empirical and analytic work would be useful in the domain of cost effectiveness analyses.

2.6 Overall Conclusions

Review studies show sometimes positive and sometimes negative results. There is a striking difference between US studies as compared to studies in other parts of the world, with studies from the USA indicating more often better outcomes for smaller schools. In terms of expenditure large schools are more efficient, up to a certain threshold.

There is just tentative evidence on the modeling of causal mediation, with school size as the independent and educational outcomes as the dependent variables. Relevant contextual variables that were discussed are: urbanity, SES composition, age category of the school (primary/secondary), and parental

involvement. Variables that might mediate the effect of school size on student performance, which were considered are: class size, managerial overhead, school climate, and facets of curriculum and instruction.

International comparative assessment studies do not show school size as a strong correlate of educational achievement. The very small, usually positive effects (the larger the average school size in a country the better the achievement outcomes) usually disappear when other resources related variables are added in the analyses.

Dutch studies overwhelmingly show that school size does not matter much for educational achievement and social outcomes. The conclusions on costs from Dutch studies are in line with the international state of the art.

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