3: SMALL SCHOOLS

EXECUTIVE SUMMARY

SUMMARY OF RESEARCH FINDINGS

Research on school size points to several conclusions about the benefits of smaller schools. Smaller school size has been associated with higher achievement under certain conditions. Smaller schools promote substantially improved equity in achievement among all students, and smaller schools may be especially important for disadvantaged students. Many US schools are too large to serve students well, while smaller schools, especially in impoverished communities, are widely needed. The evidence favoring the benefits of small schools, however, cannot be generalized to so-called "Schools Within Schools," which to date lack a substantial research base supporting the belief that they provide benefits equivalent to smaller schools.

RECOMMENDATIONS

Policy makers should:

- Find ways to sustain existing small schools, especially in impoverished rural and urban communities.
- Acknowledge an upper limit for school size, acknowledgment that means many schools should be much smaller than the upper limit.
- Not design, build, or sustain mega-schools serving upwards of 500 to 2,000 students, depending on educational level and grade-span configuration.
- Design, build, and sustain much smaller schools in impoverished districts or districts with a mixed social-class composition. In very poor communities, design, build, and sustain the smallest schools.
- Not oversell smaller schools. Operating smaller schools in impoverished communities is good policy, but it is not a "magic bullet."
- Not believe that mega-schools serving affluent areas are necessarily excellent or even very good. Most accountability schemes obscure this fact because they do not generally take socio-economic status into account.
- Recognize that smaller schools in impoverished settings accomplish miracles even when their test scores are about average.

3: SMALL SCHOOLS

BY CRAIG HOWLEY
ERIC CLEARINGHOUSE ON RURAL EDUCATION AND SMALL SCHOOLS

> Even though the study of school effects has been a major sociological enterprise over the past two decades, empirical analyses tend to slight structural variables such as size.[1]

Matters have changed a bit since Morgan and Alwin made their observation in 1980, and, today, despite a surprisingly thin research literature, "small schools" is a concept in danger of becoming a slogan. Because slogans can impede thoughtfulness, a critical assessment of the concept is now timely.

What are "small schools"? What do different authorities mean by "small schools"? Is there a difference between "small schools" as set off by quotation marks, and schools that just happen to be small?[2] What influence does school size exert on student achievement? What do we know? What don't we know? What relationship does school size bear to the achievement of poor children? What are the points of contention? Given our inevitably limited knowledge, what are the implications for practice?

"Small schools," in short, is not so simple a topic as it might seem at first glance. This review aims to convey both the complexities and the practical applicability of research on small schools. In particular, it seeks to present the *most substantive empirical* work as the best chance for understanding this complex issue.[3]

SMALL SCHOOLS RESEARCH

Effusive praise of small schools is easily found in the education literature these days. One of the most frequently cited syntheses, for instance, portrays small schools as superior on

virtually all measures of concern.[4] Warrants for the conclusions drawn in that synthesis come from sources – magazine articles, evaluations of single projects, first-person narratives, and empirical studies (that is, actual research) – of widely varying quality, and readers are provided with no assessment of that quality. Similar reports abound.[5]

In contrast with such syntheses, this one gives most weight to studies that exhibit larger sample sizes, peer-reviewed publication, and, for one set of studies, state-level replications. Evaluations, syntheses, and anecdotal reports are used in the present review to support discussion of the focal studies. This review also takes note of the substantial number of unknowns in the area of small-schools research, and of related methodological differences in the focal studies.

DEFINING SMALL SCHOOLS

The first challenge is to examine what we really mean by "small schools." The best empirical literature has focused its efforts simply on school size.

Small schools exist everywhere, as a feature of the variability of school size. Some states, however, maintain proportionally more small schools – sometimes far more – than do others, but no agreement prevails, even among small-schools advocates, about what defines a small school. Small in rural Vermont is apt to differ sharply from small in Queens, New York, and high schools in rural Vermont are considerably larger than they are in rural Montana. This variability indicates that school size, more than class size, is an issue that requires research designs sensitive to within-state variability.[6]

In general, one can think of high schools enrolling 400 or fewer and K-8 or K-6 elementary schools enrolling 200 or fewer (on the basis of a 2:1 ratio with high schools) as small. The related positions taken in state-level policies are very wide, and all of them lack solid justification from the research literature, which has not examined possible threshold effects of

size.[7]

In cities and suburbs, "small schools" has recently become a *reform movement*.[8] Rural communities, however, struggle to *maintain* small schools in the face of states' attempts to close them on business principles based on cheap inputs.[9] These differing interpretations have practical significance because confounding *new, reformist* small schools with *extant, traditional* small schools obscures the salient structural issues that are the actual object of most research related to small schools.

Norms of Size

In contrast to many nations, the U.S. Constitution is silent about the human right to education and leaves the provisions for schooling to the discretion of the various states. The geography, history, economics, politics, and cultures of the states differ considerably, and, in consequence, school size varies substantially from state to state.

For instance, the percentage of 9-12 high schools enrolling 400 or fewer students (a small school by most definitions) ranges from 81% in Montana to 0% (none) in Hawaii, Rhode Island, and Vermont.[10] Hawaii is also the state with the largest percentage of 9-12 high schools enrolling 1,000 or more students (92%). Though there is a relationship between the rural nature of a state and the proportion of small schools it maintains, the relationship is not strong. In comparison with the urban states of California (where 78% of the state's high schools enroll 1,000 or more students), Florida (84%), Hawaii (92%), and Maryland (76%), such urbanized states as Illinois, New Jersey, and Massachusetts have only about 40% of high schools enrolling 1,000 or more students.[11] In the District of Columbia, just 22% of all 9-12 high schools enroll this many students, whereas 28% of DC high schools enroll 400 or fewer students. Thus, DC maintains proportionately more small high schools than Vermont.

There is an apparent relationship between school and district size as well. States that have retained small districts are somewhat less likely to have created large high schools, all else being equal. The data for Hawaii – which is administered as a single district – make sense in this light: as a single huge district, it operates almost all high schools with 1,000 or more students and none with 400 or fewer.

Small Versus Smaller

Although many observers of the school size issue long for a uniform definition of small and large schools,[12] *smaller* and *larger* are by far the more useful terms, since, as suggested above, school size varies so dramatically by state.[13] Look within states, rather than across states, for useful comparisons. Vermont and California, for instance, confront dramatically different circumstances, and their *de facto* approaches to school size differ accordingly. In making within-state comparisons, however, size rank (students per grade in rank order) needs to be viewed in consideration of grade-span configuration, educational level, and locale (rural, suburban, urban). A small elementary school in Vermont will not be the same size as one in California.

Enrollment Per Grade as School Size

Why should the number of students a school enrolls be of much concern? In fact, it turns out that school size is not best represented as total enrollment. Surprisingly, exactly the same total enrollment can describe schools of quite different size. This assertion is counterintuitive, but consider a 9-12 school with 800 students and a 9th grade academy enrolling 800 students. Are they really the same size? What about a 6-8 middle school with 800 students and a K-2 primary school with 800 students? It is easy to see that the 9th grade academy is really larger than a four-year high school with the same enrollment. Because it is both the expectation of the public and a professional norm that elementary schools are smaller than middle or high schools, the K-2

school is also "larger" than a middle school with the same enrollment. Thus in each case, the latter school is larger than the former, though total enrollment is the same in all four schools.

For this reason, for both research and real-world action, *enrollment per grade* is a better metric of size than total enrollment. With this measure it's easy to see that a ninth-grade academy with 1,500 students is really four times as large as a 9-12 high school with exactly the same total enrollment, just as a K-2 school enrolling 800 students is at least three times the size of a K-8 school enrolling 800 students.

If policy makers can better appreciate the role of grade span configuration in determining school size, they can avoid the misconception that merely reducing total enrollment in a school (by building new schools with narrower grade span configurations, a national trend) necessarily constitutes a reduction in school size. More likely, this trend is resulting in larger schools.[14] Reconfiguring the grade spans of schools is a time-honored tradition in American education used to make schools larger, but it could also be used to make schools smaller.[15] For instance, imagine a district with 1,200 students in separate buildings that house Grades K-2, 3-5, and 6-8. Each school houses 400 students, or 133 students per grade. If, however, the same buildings were used to house three K-8 schools, the reconfigured schools would actually be *smaller* (400/9 = 44 students per grade). Creating smaller schools, then, is probably easier than most educators and policy makers seem to realize.[16] One research team has found substantial achievement benefits for smaller schools in impoverished communities, using this definition of size.[17]

The Upper Limits of Size

The notion that some size might be absolutely too large for a school is a comparatively recent development. Most of the 20th century was required to make schools as large as they are, and the emerging popular consensus on small schools probably reflects a widely held perception

that schools have grown too large.[18] Authoritative *opinions* now exist about the upper limits of school size. Various authorities have given "informed judgments" about absolute upper limits of school size. Predictably, the opinions differ significantly. Howley[19] has advised 1,000 as the absolute upper limit for high schools and 500 as the absolute upper limit for K-8 or K-6 elementary schools. Tom Sergiovanni, on the other hand, believes that no school should enroll more than 300 students.[20] Deborah Meier clearly agrees.[21] Lawton concluded that fiscal studies point to an upper limit of 500 for a K-8 elementary school.[22] The bases of these opinions vary. Howley and Lawton claim a basis in different research literatures (student achievement and finance, respectively). Sergiovanni and Meier base their opinions on long and thoughtful practice.

Official policy has, however, also addressed the issue. Florida recently adopted legislation setting 900 as the upper limit for new high schools, 700 for new middle schools, and 500 for new elementary schools.[23] Hawaii, with the largest high schools in the nation,[24] adopted, and then scuttled, upper-limit legislation.[25] In a 1999 speech to the American Institute of Architects, former Secretary of Education Richard Riley suggested 600 as the upper limit for any school.[26] The Education Commission of the States opined that 1,000 was the boundary between "large" and "too large."[27] Finally, representing professional organizations, the National Association of Secondary School Principals proposed 600 as the upper limit for high schools.[28] Once again, all of these limits reflect the previously noted general public expectation and the professional norm that elementary schools require a lower size limit than middle or high schools.

To set an upper limit is to advise against the construction of schools larger than the limit. As has already been explained, however (see note 7), just because a school's enrollment falls under that limit does not necessarily make it small. This is an issue of logic and language, not of

research findings.

Many schools, though not all, should probably be substantially smaller than the upper limits. Additional information – aside from "authoritative opinion" – is clearly needed to make good judgments about locally appropriate size: the findings from research summarized shortly suggest how much smaller they should be, at least for the purpose of maximizing the academic achievement of impoverished students.

The School Within a School

Because of the prevalence of the school-within-a-school (SWAS) strategy for coping with the organizational challenges of mega-schools, it's worth reiterating the structural view of size adopted here. A structural view recognizes that a whole system is more than the sum of its parts; if a structure is broken apart, the advantages of the *structural* whole vanish. On this view, larger schools that adopt administrative simulations of smallness are *unlikely* to exhibit the benefits of structurally smaller size. In fact, research evidence of the effectiveness of SWAS is negligible.[29]

Educators tend to believe that a practice proven effective in one setting can be transferred to another. This belief is the assumption behind "what works" and "validated programs." When, however, the practice itself and the setting (smaller school size) are one and the same, the assumption seems more especially dubious than usual. Can one transfer a setting out of its setting? It seems illogical. Unfortunately, educators' faith that processes can be effectively abstracted from the real structures that house them has popularized SWAS as a "small schools option." In fact, separate schools housed under a single roof need to be truly autonomous. Otherwise, they will not be small schools, but just another grouping stratagem.

SCHOOL SIZE AND STUDENT ACHIEVEMENT:

THE EXTANT LITERATURE

Despite widespread interest in small schools, few large-scale studies or replications have addressed the issue.[30] Certainly, a huge professional literature does address school size, (largely a result of the 20th-century push to build larger schools), but a surprisingly small proportion of this literature constitutes the research base, and even fewer studies jointly address the issues of school size and poverty as a major contemporary concern.

The ERIC database now indexes approximately 2,750 items with the terms "small schools" or "school size." Among this very large number of resources, however, just 47 research reports have addressed the relationship of achievement, school size, and poverty in some fashion between 1966 and 2001. More surprising still, only 23 research reports – during the whole period from 1966 to 2001 – define school size, socioeconomic status, and student achievement as a major focus of investigation.[31] Within this surprisingly small literature, the studies that are conceptually related to the Matthew Project[32] are the only ones that pursue the issue systematically in multiple replications.[33]

Surprise at the thinness of the research base should be tempered by the realization that, until very recently, researchers, practitioners, and policy makers alike generally assumed that smaller schools, in general, must be academically *inferior* to larger ones, especially at the secondary level. Given this legacy, the early part of the research literature related to academic achievement and school size aimed to demonstrate that there was no significant difference between the achievement of larger and smaller schools, once statistical controls for socioeconomic status (SES) were imposed.[34] The previous literature had not deployed such controls.

Subsequent investigations, building on the work of Noah Friedkin and Juan Necochea,[35]

suggested that the interaction between size and socioeconomic status may explain the apparent absence of a significant difference at the school and district level. Another line of investigation focused not on school- or district-level test scores, but on *student-level* gains, and concluded that smaller high schools had an advantage, regardless of SES.[36]

Selecting the Best Research

Three bodies of research, contributed by three different teams of researchers, represent the best empirical work done to date examining the influence of school size on academic performance with particular attention to poverty or socioeconomic status. The work done by these teams includes prominent peer-reviewed publication, quantitative methodologies, large-scale research designs, and various replications and quasi-replications. Issues of theory, method, and ability to generalize persist within this group of studies, and it would be wrong to say that all the evidence points to a single set of clearly demarcated conclusions. Nonetheless, after presenting the evidence, the author offers a practical interpretation of the accumulated evidence for policy and administrative action.

The three bodies of work are those by:

1) Herbert Walberg and colleagues;[37]
2) Valerie Lee and colleagues;[38] and
3) Craig Howley and colleagues.[39]

The studies highlighted here all used some form of achievement test scores, not grades or GPA, as dependent variables. They all used some form of regression analysis to estimate the influence of size on achievement. The Walberg and Howley teams' studies analyzed test scores at the school and district level at single points in time. Lee and colleagues used individual students' test scores, computed as gain scores (achievement change over time) rather than scores

from a single point in time.[40]

Despite many similar qualities, then, these three bodies of work address somewhat different issues (school and district performance in the case of the Howley and Walberg teams, and growth in student learning in the case of the Lee team) and deploy different ways of looking at the issues (different regression models, national versus state data sets, and substantially different theoretical models and research questions).

SCHOOL SIZE, ACADEMIC ACHIEVEMENT, AND SOCIOECONOMIC STATUS

Circumstances influence student achievement complexly, of course, and simply comparing achievement levels in smaller versus larger schools will often show that smaller schools have *lower* achievement levels than larger schools, simply because smaller schools are often located in poorer communities in many (not all) states.

Dealing Responsively with SES

Valid comparison across schools and districts requires *at least* that the direct influence of poverty be accounted for in some legitimate fashion, since poverty (or SES) is one of the major influences on achievement; ignoring its well-documented influence is a mistake even worse than presuming that nothing can mitigate its influence.[41] The three major lines of research assessed here adopted two methods of accounting for SES: *controlling* for it (the usual method in educational studies) and theorizing about its particular *interaction* with school size.

Herbert Walberg and colleagues were among the first to control for SES in significant studies of the relationship school size and district size to achievement.[42] These studies, in effect, removed the influence of SES, leveling the playing field. Lee and Smith's studies controlled for the influence of SES in the same fashion as the Walberg team, but in a more complex fashion.[43] For both teams, the relevant SES control variables are, in effect, additional (additive) terms in a

linear equation.[44]

In contrast to the Walberg and Lee teams, the Howley team adopted a specific school- and district-size theory originated by Noah Friedkin and Juan Necochea,[45] which multiply size and SES. Friedkin and Necochea viewed the size of both schools and districts as a structural feature presenting opportunities and constraints in the realization of student achievement.[46] They postulate that schools and districts differ in their capacity to realize opportunities and to overcome restraints. If this is the case, the effects of size should vary rather than (as is assumed in other studies) remaining constant across settings. The key question is what feature of settings might make such variation regular and predictable, rather than chaotic and unpredictable. Friedkin and Necochea observed:

> Studies of the distribution of public funds ... suggest that the power of a system to extract resources from its environment, the wealth of the environment from which a system draws its resources, and the priority accorded to the delivery of high quality services all are associated with the SES of a system's client population.[47]

Hypothetically, then, affluent communities would be in a good position to maximize the opportunities and minimize the constraints of size, but the reverse would hypothetically be true in impoverished communities. In this model, the interaction is realized as a multiplicative term in the equation. SES, then, is an environmental condition hypothetically capable of regulating the effects of school and district size.

The Walberg Team

The small-schools-are-good line of evidence has been under development since the early 1980s, particularly by University of Chicago researcher Herbert Walberg in collaboration with various associates.[48] Others contributing significantly to this line of evidence include Mark Fetler.[49] Although Fetler is not part of the Walberg team, his important study on this issue is

considered here because its findings favor smaller size generally rather than differentially, and his unit of analysis is the school rather than individual students.

Walberg's investigations included a variety of influential variables such as various SES measures, expenditures, class size, teacher characteristics, and various measures of school and district size.[50] With SES controlled, the Walberg team's studies have focused on the influence of school and district size, using data sets from New Jersey.

As reported by Fowler and Walberg,[51] the influence of district size was several times as great as school size.[52] The significance of this body of work, on the whole, is that it rigorously and consistently identified school and district size as negative influences on achievement. The research established the possibility that smaller schools and districts were academically, and not just socially, advantageous regardless of SES.

In a study focusing on dropout rates, but using achievement as an independent variable, Fetler, working with data on California high schools, reported findings similar to those of Walberg and colleagues.[53] School enrollment in his study was negatively correlated to achievement without any controls for SES. [54] After controlling for size and SES, Fetler sought to determine whether schools with better aggregate achievement also exhibited higher dropout rates, which would suggest that the higher achievement was the result of lower-achieving students dropping out. His analysis showed the opposite: With SES and size controlled, higher achievement was actually associated with a lower dropout rate. This finding suggests that equity and excellence not only can be realized simultaneously but also might actually reinforce one another.[55]

The Lee Team

Lee and colleagues' principal interest was school restructuring, and included school size as one feature of interest, rather than as the key focus of research.[56] Whereas the Walberg and Howley teams studied only public schools, the Lee team's key study[57] also included Catholic schools and elite private schools, with sector an additional control variable. This body of work is based exclusively on data from the National Center for Education Statistics' National Educational Longitudinal Study of 1988 (NELS:88), and the focal study analyzes the individual achievement gains of students over the course of their time in high school.

Lee and Smith formed eight high school size categories.[58] Compared with students attending high schools of 1,201-1,500 students, those in schools enrolling 601-900 students, and those enrolling 901-1,200 students showed higher achievement gains. Students in the 301-600 student category performed somewhat better in reading and somewhat worse in mathematics than those in high schools of 1,201-1,500 students. Students in high schools enrolling fewer than 300 students performed significantly worse, however.[59]

Improvements in the *equity of achievement gains*, [60] however, were robust in high schools attended by NELS:88 students in the three smallest size categories. In other words, disparities in achievement gains based on SES were smallest in those categories of school. The improvement in the equity of gains in reading achievement was stronger than improvement in the equity of gains in math achievement and was highest in the 301-600 category.[61]

Lee and Smith derived these recommendations for policy makers:

1) many high schools should be smaller than they are;

2) high schools can be too small;

3) ideal size does not vary by type of student enrolled (i.e., low-SES or minority);

and

4) size is more important in some types of schools, because disadvantaged students suffer disproportionate achievement costs in very large or very small schools.[62]

Overall, Lee and Smith concluded that a one-size-fits-all ideal size (600-901) was the best equity and excellence compromise. The next section of this review will take exception to some of these findings and recommendations.

The Howley Team

The author and his colleagues extended the Friedkin-Necochea theory and investigations to a series of state-level replication studies.[63] Like the Lee team, this team was concerned with both achievement excellence and equity. The studies, along with the original Friedkin and Necochea study in California in 1988, show that in affluent settings, the influence of school size on the excellence of student achievement (at the school and district level as measured with state-mandated tests) is positive, but in impoverished settings, the influence is negative. In other words, larger sizes are academically beneficial in affluent communities, but they are harmful in impoverished communities, producing a *differential excellence effect.*[64] In addition, as with the Lee studies, achievement equity was substantially enhanced in smaller schools (schools in each state were divided by the median size). Importantly, these findings apply equally to district size.

The strength of the differential excellence effects, however, varied markedly from state to state. For instance, predominately rural Montana maintains many small schools. The state showed weaker differential excellence effects, and generally higher achievement equity across the board, than did other states. The smaller half of schools in the state exhibited lower socioeconomic status than the larger, somewhat more affluent, half of schools. Despite that difference, achievement equity was so high in Montana that the smaller half of schools exhibited

higher achievement levels than the larger, more affluent half. Even with a reduced correlation of poverty and achievement across the board, however, equity was greatest in the smaller schools and districts in the state. At some grade levels within the smaller half of schools, the relationship between poverty and achievement was not statistically significant.[65]

Evidence of the differential excellence effect of school size was strong in California, Georgia, Ohio, West Virginia, and Texas. The Alaska study,[66] unlike the others, used student-level data and a host of control variables relevant to students, schools, and communities. But even with such extensive controls in place, the interaction between SES and school size remained a statistically significant influence on individual-level achievement.

Bickel and Howley extended the Matthew Project investigations to a multi-level analysis using their Georgia data set, and examining schools within districts.[67] The single-level Georgia analyses had not found a differential excellence effect at the district level. The multi-level study, however, found influences interacting in a variety of ways. Poverty at the school level, for instance, interacted with the overall size of a district. A number of other such interactions between multiple influences also were found. The multi-level study also discovered a remarkable pattern to equity results among four groups of schools, created by dividing schools and districts at the medians of school and district size.[68] Achievement was *least* equitable in larger schools in larger districts (many of these "larger districts" were rural countywide districts) and *most* equitable in smaller schools in smaller districts (some of which operated in urban locales). Smaller schools in larger districts were the second most *equitable* configuration, and larger schools in smaller districts were the second most *inequitable* configuration. In general this study showed that school- and district-level variables interacted complexly to influence achievement excellence and equity.

CRITIQUING THE BEST RESEARCH

Three consensus implications seem to lurk in this body of work:

1) smaller school size is associated with higher achievement under some conditions;

2) smaller schools promote substantially improved achievement equity; and

3) smaller schools may be especially important for disadvantaged students.

Without a broader critique of the limitations and the sharp differences among the works cited, however, translating these vague implications directly into practice is unwise.

The Walberg studies seemed to suggest that smaller schools and districts were universally more efficient and effective, but the findings pertain almost exclusively to New Jersey and are hardly generalizable to other states or to the nation as a whole. The norms of school and district size are quite different from state to state.[69] It's quite possible that replications in contrasting states would yield substantially different results.

Nonetheless, the studies of the Walberg team were among the first to suggest the possibility that smallness might harbor an achievement advantage, a hypothesis that had not previously been taken very seriously by prominent researchers.[70] The Walberg team's district-level findings have been almost entirely ignored, as have those of the Howley team.[71]

Lee and Smith analyzed a national data set (NELS:88), rather than state data sets, largely because their research questions focused not on school size, but on national efforts to sponsor school restructuring. Use of a national data set to study school size specifically is problematic if the state-level variations in the norms of size are not accounted for. This critique, in the author's view, compromises the external validity of the focal study.[72] Policy makers must regard claims about "ideal high school size" as unproven in the context of actual practice in the various states.[73]

The Howley team's studies, like the Walberg team's, focused not on student-level achievement but on school and district performance on a variety of state-mandated tests. The problem with such analyses, however, is that school- and district-level scores exhibit less variability than do individual-level scores. A complete model would examine individual-level achievement within classroom, school, district, and state contexts of size. This insight links the notion of the scaling of the educational system,[74] which has hardly been studied at all.[75] Bickel and Howley (by examining schools within districts) and Lee and Smith (by examining individuals within schools), however, have made a beginning with two-level analyses.

In essence, the Walberg, Lee, and Howley teams studied different phenomena using different methods. The Walberg team's work was exploratory and conducted in one state; the Lee team modeled gains in student achievement, but ignored variability in state contexts and imputed a dubious "ideal" size; the Howley team replicated the California work of Friedkin and Necochea in six additional states, providing support for the original theory about school and district size. Nonetheless, student-level variability is absent from this team's work, which is more relevant to policy than to instructional manipulations themselves.

WHAT REMAINS UNKNOWN

Much more is unknown than is known about school size, despite the popularity of the issue in current writing for practitioners and in state and national legislation (e.g., the Feinstein amendment to the ESEA reauthorization). In particular the author believes that assertions about "ideal size" are misleading abstractions, and that the school-within-schools strategy of simulating smallness has emerged with no basis in research to suggest that it will produce the achievement advantages confirmed for extant smaller schools operating under certain circumstances.

Several of the key unknowns have hardly been addressed in the research literature at all.

In the author's judgment, the following unknowns merit substantial attention from scholars of schooling (with student achievement the dependent variable):

- To what extent do the popular but unresearched administrative simulations of smaller size (i.e., houses, pods, "academies" or other such within-school grouping arrangements) realize achievement advantages (including improvements in achievement equity) comparable to those reported for *actually small* schools?
- To what extent does "ideal size," as asserted by Lee and Smith, vary by state and under what conditions (type of locale, educational level, grade span configuration)?
- Do minimum and maximum size thresholds actually exist (and under what conditions – state, type of locale, educational level, grade span configuration), beyond which larger or smaller size magnifies the negative effects of poverty?[76]
- What is the relationship of grade span configuration to student learning, given differing state policy contexts and the likely influence of community socioeconomic status?
- What are the simultaneous and interacting relationships of class size, school size, district size, and state context to the achievement level (particularly achievement gains) of individual students with respect to SES? What are the relationships of these interacting contexts to school-level achievement equity?

Many, many other unanswered questions exist. For instance, *why* is smaller school size (variously defined) associated with higher and more equitable levels of achievement for individuals, schools, and districts? Hypotheses abound, with most having to do with the care,

attention, and respect enabled by smallness in the conduct of personal relations. Links between achievement level and equity and such possible influences have hardly been investigated at all, however.[77]

SUMMARY AND RECOMMENDATIONS[78]

It would be an educational tragedy for current and future generations if, after a decade or so of experimentation with "small schools," policy makers were to conclude that "small schools don't work." The danger is real, however, because in the name of "small schools" as a reform tactic, there has been a tendency to confound schools-within-schools, established in the name of "small schools" reform, but which have not been seriously studied, with the school size research reviewed here. As a reform product, "small schools" has almost nothing to do with the extant research base on school size, and lacks a pertinent research base of its own.[79]

"Small schools" will become another fad unless approached thoughtfully in the realms of practice and policy. Research can supply some, but not even most, of the necessary thoughtfulness. Because so many small schools continue to exist, however, small schools are not principally a reform project, so far as the research into school size goes. Some schools are smaller than others, and some smaller schools are awful places. On average, though, smaller schools come out ahead of larger schools, but under certain conditions and not always.

MAJOR CONCLUSIONS

Three overarching implications seem warranted across all the works cited:

1) Many US schools are too large to serve students well.
2) Smaller schools are widely needed.
3) Smaller schools are particularly valuable in impoverished communities.

Common to many literature reviews on this topic,[80] such implications have been translated into practical decision-making principles for policy makers by the author:[81]

- **Find ways to sustain existing small schools,** especially in impoverished rural and urban communities.
- **Acknowledge an upper limit for school size** (even though not confirmed by research), acknowledgment that means many schools should be much smaller than the upper limit.
- **Don't design, build, or sustain mega-schools** (serving upwards of 500 to 2,000 students depending on educational level and grade-span configuration).[82] Schools this large provide no detectable advantage to affluent students (the elite New England private high schools, for instance, enroll about 1,000 students in grades 9-12) and probably do academic harm to impoverished students.
- **Design, build, and sustain much smaller schools in impoverished districts** or districts with a mixed social-class composition. In very poor communities, design, build, and sustain the smallest schools.[83]
- **Don't oversell smaller schools.** Like other schools, smaller schools can be wonderful or awful, but, all else equal, their odds of being awful are reduced as compared to larger schools. Operating smaller schools in impoverished communities is good policy, but it is not a "magic bullet."
- **Do not believe that mega-schools serving affluent areas are necessarily excellent or even very good.** Most accountability schemes obscure this fact because they do not generally take SES into account. Graduates of such schools, however, can articulate the problems: cliques, careerism, anti-intellectualism, de facto tracking,

and so forth.[84]

- **Recognize that smaller schools in impoverished settings accomplish miracles even when test their scores are about average.** Such schools exhibit a very real but almost entirely unacknowledged degree of excellence, compared to which the vaunted "excellence" of large, well-funded suburban schools is more properly understood as mediocrity.

INCREASING THE NUMBER OF SMALLER SCHOOLS

Three efforts need to be engaged simultaneously – retaining existing small schools in impoverished communities (especially necessary in rural communities), establishing new autonomous small schools in impoverished communities (especially necessary in urban communities), and helping struggling small schools to thrive. *Small* in this instance means high schools enrolling approximately 400 or fewer students, and elementary schools enrolling approximately 200 or fewer students. Recommendations for policy makers include the following:[85]

1) Provide capital outlay mechanisms not based on big-school norms.
2) Put an absolute enrollment cap of between 600 and 1,000 students on the size of new high schools and between 300 and 500 on the size of new elementary schools.[86]
3) In impoverished locales establish, sustain, and improve schools that are substantially smaller than the absolute upper limits.
4) Revise curriculum policies to implement small-school (rather than big-school) principles.

5) Implement a statewide salary scale (which helps stabilize staffing, with stable staffing a foundation of school improvement).[87]

Superintendents, principals, and teachers work in particular communities and schools, and, with this fact in mind, the author has offered the following counsel:[88]

1) Become better informed about the recent literature on small schools.

2) Take communities' desires to retain or to re-establish smaller schools seriously, and not as a symptom of sentimentality or as a wild pipe dream.

3) Engineer the political will locally to support smaller schools, if the district currently operates mega-schools, or if it serves either mixed-social-composition or impoverished communities. Engineering this political will is a lengthy process, and waiting to discuss the issue when construction funds materialize is dangerously reactive. Obviously, stable leadership is required.

4) Develop community purposes for smaller schools; smaller schools are most sustainable when levels of community engagement are high.[89]

5) Work with other administrators and with policy makers to facilitate appropriate policy changes (see above).

6) Regard claims made about "schools-within-schools" with great skepticism. Research on the variety of SWAS options does not exist, and this review regards claims about achievement-related benefits for "pods," "houses," and *non-autonomous* "schools" as unwarranted.

Surely it makes sense to reorganize mega-schools in the attempt to foil the anonymity and impersonality of bureaucratically oriented high schools. It is, however, not necessary to justify this move with reference to the school size literature related to student achievement; to do so misuses the literature and, worse, misrepresents the facts.

The best way to capture the achievement benefits of smaller size is to establish new smaller schools and to sustain and to exert effort to improve the ones already in existence. Schools everywhere need not be small – unless by "small" one means a school enrolling fewer than 1,000 students, the benchmark used in the Feinstein amendment. One thousand students, however, is a large school. Nothing in the empirically based research literature on school size and achievement suggests that academic benefits of any sort accrue in schools larger than this, even in schools serving a very affluent clientele.

REFERENCES AND NOTES

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1 D. Morgan and D. Alwin, "When Less is More: School Size and Social Participation," *Social Psychology Quarterly* 43 (1980): 241-252.

2 This discussion will use the phrase *small schools* without quotes to indicate the entire realm of interest in smaller-scale schooling, but with an emphasis on schools rather than classrooms or school districts, though these features will receive consideration as required to examine the related issues.

3 Large-scale studies that produce generalizable findings are privileged in this synthesis.

4 K. Cotton, *Affective and Social Benefits of Small-Scale Schooling* (Charleston, WV: ERIC Clearinghouse on Rural Education and Small Schools, 1996), ERIC, ED 401088.

5 See, for example:

K. Irmsher, *School Size* (Eugene, OR: ERIC Clearinghouse on Educational Management, 1997), ERIC, ED 414615.

M. Klonsky, *Small Schools: The Numbers Tell a Story. A Review of Research and Current Experiences* (Chicago: Small Schools Workshop, 1995), ERIC, ED 386517.

6 A recent study confirms the policy importance of conducting state-level analyses of the relationship between school size and student achievement. Based on an innovative methodology that combines information from the National Assessment of Educational Progress (NAEP), state reading assessments, and the Schools and Staffing Survey (SASS) in 20 states, Donald McLaughlin and Gili Drori estimate that the relationship between *class size* and their experimental achievement measure is almost exclusively a *national-level phenomenon* (since the various states regulate class size rather stringently, within-state variation in class size is much less than between-state variation). The situation is different, however, with respect to *school size*. See:

D. McLaughlin and G. Drori, *School-Level Correlates of Academic Achievement: Student Assessment Scores in SASS Public Schools* (Washington, DC: U.S. Department of Education, 2000), ERIC.

McLaughlin and Drori report that school size varies more within than between states (Table 7, p. 42). McLaughlin and Drori, using national level data, and controlling for SES, concluded that a modest *positive* relationship existed between school size and their experimental achievement measure at the secondary level, but not at the elementary or middle school level. This finding stands in sharp contrast to the findings summarized in this review. In fact, however, Table 12 (p. 48) demonstrates that state by state regression coefficients of the experimental achievement measure regressed on school size vary between -.44 and +.99, a finding that is seemingly consistent with the interaction hypothesis that SES regulates the influence of size on achievement (see subsequent consideration of this approach in the main discussion). Findings from this study are pointedly deemed "tentative" due to its emphasis on methodological innovation. Indeed, the study is most useful as a pioneering attempt to separate within and between state variability in school size, class size, school climate and other supposed correlates of achievement.

7 An exception is V. Lee and J. Smith, "High School Size: Which Works Best and for Whom?" *Educational Evaluation and Policy Analysis* 19, no. 3 (1997), 205-227.

Threshold effects are substantial changes in results associated with relatively modest changes in circumstances or conditions. Much of the opinion literature suggests dramatic differences in outcomes for large versus small schools, but fails to justify lines that might divide small from large. That gap in the empirical literature is one reason that this review advises readers to consider size in relatively (smaller and larger) rather than categorically (small versus large).

Studies have used 300 or 400 as cut points for small 9-12 high school for some time. See:

J. Conant, *The American High School Today: A First Report to Citizens* (New York: McGraw-Hill, 1959).

Elementary schools (K-8 or K-6) in the U.S. enroll about half so many students as high schools, and, therefore, if 400 defines the upper limit of "small" for high schools, 200 is a reasonable cut point for elementary schools. Oakland's new "Autonomous Small Schools" policy defines as "small" those schools with enrollments up to the following numbers of students: K-5 – 250; K-8 – 400; K-12 – 500; 6-8 – 400; 6-12 – 500; 9-12 – 400. See:

Oakland Unified School District, *New Small Autonomous Schools District Policy*, May 2000 <http://www.ousd.k12.ca.us/news/New_Schools/Revised_NSA_%20Policy.htm>.

The recently adopted Feinstein amendment to the reauthorized ESEA, which supports construction of "smaller schools," defines as small schools with enrollments less than the following maxima: K-5—500; 6-8—750; 9-12—1,500. See:

U.S. Senate Approves Feinstein Amendment to Build Smaller Schools, 12 June 2001, <http://feinstein.senate.gove/releases01/school_size_esea.html>.

The Feinstein limits are two to five times higher than those proposed by most authorities. See:

C. Howley, *Research on Smaller Schools: What Education Leaders Need to Know to Make Better Decisions*, (Arlington, VA: Educational Research Service, 2001).

They also stand in sharp contrast to the Oakland (CA) limits, which are more consistent with positions held by most researchers and small-schools advocates. In the author's view the Feinstein limits represent defensible *absolute upper limits of (large) size* rather than cutpoints between small and "not small." See:

C. Howley, "Dumbing Down by Sizing Up," *School Administrator* 54, no. 9 (1997): 24-26,28,30.

In fact, a 9-12 high school enrolling 1,400 students would be a *large* school according to the school size researchers cited in this review. Again, these figures are offered to readers as multiple reference points; the work to be considered in this review does not focus on smallness per se but on school size. For the very wide state-by-state variations of high school size, see:

Small High Schools That Flourish: Rural Context, Case Studies, and Resources, eds. C. Howley and H. Harmon (Charleston, WV: AEL, Inc., 2000).

Finally, state capital outlay mechanisms reportedly have widely set enrollment floors beneath which state funding for new construction is unavailable. According to Barbara Lawrence, for instance, Alabama will not fund K-6 schools enrolling fewer than 140 students or 9-12 high schools enrolling fewer than 240. Kentucky will not support construction of schools enrolling fewer than 300 (elementary), 400 (middle), or 500 (high schools) students. Ohio will not fund construction of any school enrolling fewer than 350 students (any level). North Carolina claims that "ideal" sizes for schools are 300-400 (elementary), 300-600 (middle), and 400-800 (high school). Tennessee will not fund schools enrolling fewer than 100 (middle) and 300 (high school). Virginia recommends the following sizes: 500-600 (elementary), 800-1200 (middle), and 1200-1500 (high school). West Virginia requires 50 students per grade at the elementary level (i.e., 1-6 minimum enrollment of 300) and 150 students per grade at the high school level (9-12 enrollment minimum of 600 students). By contrast, Nebraska will not fund construction of high schools enrolling fewer than 25 students, and the North Dakota high school minimum is 35. See:

B. Lawrence, "Facilities minimum # of students," 23 June 2001, <facilities@lists.ruraledu.org>.

None of the positions referenced in the Lawrence report are solidly warranted by research. *Lower* limits of size are without any research justification at all, though the positions in Nebraska and North Dakota are clearly consistent with much current thinking about smaller school size. The Feinstein definition ("small" defined as fewer than 1,500 students) substantially exceeds the *upper* limits of size recommended in all recent reports known to this author. The intent of the Feinstein amendment, readers should realize, appears to be to prevent construction of mega-schools. For that purpose, 1,500 students seems a reasonable dividing line between "large school" and "mega-school." If 1,500 is accepted as the line dividing small from large, however, the likely result is to be the proliferation of large schools masquerading as small schools. Educators should avoid this form of self-deception.

8 *Small Schools, Big Imaginations: A Creative Look at Urban Public Schools*, eds. M. Fine and J. Somerville, J. (Chicago: Cross City Campaign for Urban School Reform, 1998), ERIC, ED 427127.

Klonsky.

D. Meier, *The Power of Their Ideas: Lessons for American from a Small School in Harlem* (Boston: Beacon Press, 1995).

P. Wasley et al., *Small Schools, Great Strides: A Study of New Small Schools in Chicago* (New York: Bank Street College of Education, 2000).

9 Howley and Harmon.

Only a few studies have conducted before- and after-consolidation comparisons. The general finding is that the desired cost benefits are not likely to be realized. See:

T. Schwinden and L. Brannon, *School Reorganization in Montana: A Time for Decision* (Helena, MT: Montana School Boards Association, 1993).

J. Streifel, G. Foldsey, and D. Holman, "The Financial Effects of Consolidation," *Journal of Research in Rural Education* 7, no. 2 (1991), 13-20.

R. Valencia, *School Closures and Policy Issues (Policy Paper No. 84-C3)* (Stanford, CA: Institute for Research on Educational Finance and Governance, 1984), ERIC, ED 323040.

Astute observers agree that promises of monetary savings are exaggerations and that consolidation's real purpose is to reallocate expenditures away from funds required to maintain smaller units and toward other purposes. See, for instance:

E. Cubberley, *Rural Life and Education: A Study of the Rural-School Problem as a Phase of the Rural-Life Problem* (New York: Houghton-Mifflin, 1915), ERIC, ED 392559.

R. Dunn, *The Rural Education Dichotomy: Disadvantaged Systems and School Strengths*, 2000, <http://www.ncrel.org/policy/pubs/html/dichot.htm>.

10 Howley and Harmon.

11 Ibid.

12 S. Lawton, "School Size, Cost, and Quality," *School Business Affairs*, November 1999, 19-21.

13 National averages obscure the real dimensions of practice locally. The smallest public K-6 school in the US (in Nebraska) enrolled four students in 1997-1998, whereas the largest 9-12 high school (in Florida) enrolled about 5,160. See:

National Center for Education Statistics, *Common Core of Data (CCD): School Years 1993-94 through 1997-98* (Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement., 2000), CD-ROM, NCES 2000-370.

14 One reason that schools continue to grow larger is that the people who plan them misunderstand the issue of school size. The author has worked with school systems whose leadership teams have planned consolidated elementary-level schools with narrow grade-span configurations (e.g., K-4 or 3-6) projected to enroll (in rural areas) between 1,000 and 2,000 students. Elementary schools of this size are mega-schools like the center city high schools enrolling 2,000 to 4,000 students and thought to be far too large to serve students well.

15 A small literature is emerging on the relationship of student achievement to grade span configuration. See, for example:

R. Bickel, C. Howley, T. Williams, and C. Glascock, "Will the Real 'Texas Miracle in Education Please Stand Up? Grade Span Configuration, Achievement, and Expenditure Per Pupil," *Education Policy Analysis Archives*, ERIC, ED 447995.

B. Franklin and C. Glascock, "The Relationship Between Grade Configuration And Student Performance In Rural Schools," *Journal of Research in Rural Education* 14, no. 3 (1998): 149-153.

D. Wihry, T. Coladarci, and C. Meadow, "Grade span and eighth-grade academic achievement: Evidence from a predominantly rural state," *Journal of Research in rural Education* 8, no. 2 (1992): 58-70.

Wihry and colleagues found that 8th grade student achievement in Maine was highest in K-8 schools as opposed to middle schools or 7-12 high schools. Franklin and Glascock found that 6th and 7th grade students performed better in K-12 schools, and high school achievement did not differ significantly as compared to other schools. Bickel and colleagues concluded that small K-12 schools in Texas not only helped mitigate the negative relationship between SES and achievement but were cost effective.

16 In other words, bricks-and-mortar is not quite the impediment to creating smaller schools that it is usually made out to be. What really gets in the way of reconfiguring grade spans in this way? The way professional educators think about child development is a likely culprit. Narrower grade span configurations supposedly cater better to the "developmental needs" primary, elementary, and secondary students. In the example, the three narrowly configured schools house all students in the district, and they may be located on a single campus. Creating three K-8 schools on a single campus violates professional norms about "developmentally appropriate education" that are themselves the outcome of long struggle. Creating three K-8 schools would also be viewed as a slap in the face to the communities whose K-8 schools were originally closed to make the single-campus, more "developmentally appropriate" schools. In short, ideology, more than bricks-and-mortar, may be at stake.

17 R. Bickel and C. Howley, "The Influence of Scale on Student Performance: A Multi-Level Extension of the Matthew Principle," *Education Policy Analysis Archives* 8, no. 22 (2000), <http://seamonkey.ed.asu.edu/epaa/v8n22.html.>.

18 Howley, 2001.

19 Howley, 1997; Howley, 2001.

20 T. Sergiovanni, "Organizations or Communities? Changing the Metaphor Changes the Theory," *Educational Administration Quarterly* 30, no. 2 (1994): 214-226.

21 Meier.

22 Lawton.

23 Rural Trust, "Busing hearings in West Virginia: Citizens tell their tales," *Rural Policy Matters*, February 2000, <Available online: http://www.ruralchallengepolicy.org/rpm/rpm.html>.

24 Howley and Harmon.

25 M. Raywid, "How do we downsize our schools?" October 2000, <http://www.ael.org/eric/scaletrn.htm>.

26 R. Riley, "Schools as centers of community," 13 October 1999, <http://www.ed.gov/Speeches/10-1999/991013.html>.

27 M. Fulton, *The ABC's of Investing in Student Performance* (Denver, CO: Education Commission of the States, 1996).

28 National Association of Secondary School Principals and the Carnegie Foundation, *Breaking ranks: Changing an American institution* (Reston, VA: Author, 1996), ERIC, ED 393205.

29 M. Raywid, personal communication (June 2001).

V. Lee with J. Smith, *Restructuring High Schools For Equity And Excellence* (New York: Teachers College Press, 2001).

SWAS is one strategy used to humanize large schools. Schools thus "humanized" may be newly built – designed around houses, pods, or one or several separately run "schools within the school." Lee with Smith

notes "our own field-based research in five [urban] high schools divided into schools-within-schools has suggested that social stratification is a definite possibility with this reform." (p. 143)

As a strategy to simulate smallness in a newly constructed and intentionally large school (a not uncommon contemporary scenario in rural areas), the simultaneous deployment of the SWAS stratagem should be viewed as cynical because research evidence of the effectiveness of SWAS in simulating the achievement advantage of small size is *negligible*. Even evaluation evidence on SWAS is much thinner than the school size research evidence reported in this review. Small schools—each with its own faculty, principal, unique curriculum and co-curriculum, and fiscal autonomy—can, of course, be housed under a single roof. This arrangement, however, is *much less common* than SWAS arrangements that more resemble grouping arrangements than they resemble autonomous schools with evident organizational integrity -- i.e., all those things that make a school a "school". See Meier, 1995, for a very thoughtful consideration.

30 Lee and Smith, 217.

31 See, for instance, Bickel and Howley; Franklin and Glascock; and Lee and Smith.

The poverty-related portion of the search strategy used was "poverty OR disadvantaged OR socioeconomic status OR socioeconomic influence." From 1966-2001 31 ERIC resources were classified with indexing terms noted as *major* topics (descriptors so indicated) of the documents and as also being "research reports." Of these 31, 9 were either not *focused* on these three issues or represented a conference paper subsequently published in the journal literature (and which should therefore be considered a duplicate entry for this assessment). Of the remaining 22, just 10 were also published as journal articles. The search was illustrative rather than definitive: it did not retrieve all of the focal studies discussed in this review.

32 Building on prior findings in Alaska, California, and West Virginia, the Matthew Project was particularly concerned to investigate the possible contributions of small size to academic success in impoverished communities regardless of rural, suburban, or urban locale. The Matthew Project, with funding (1997-1999) from the Rural School and Community Trust, investigated the Friedkin and Necochea hypothesis of possible equity and excellence effects of school and district size in Georgia, Montana, Ohio, and Texas. The project title refers to a parable about stewardship in the gospel according to Matthew (13:12); "For whosoever hath, to him shall be given, and he shall have more abundance: but whosoever hath not, from him shall be taken away even that he hath."

33 Bickel and Howley.

N. Friedkin and J. Necochea, "School System Size and Performance: A Contingency Perspective," *Educational Evaluation and Policy Analysis* 10, no. 3 (1988): 237-249.

C. Howley, "Compounding Disadvantage: The Effects of School and District Size on Student Achievement in West Virginia," *Journal of Research in Rural Education* 12, no. 1 (1996): 25-32.

C. Howley, "Sizing Up Schooling: A West Virginia Analysis and Critique," *Dissertation Abstracts International (A)* 57, no. 3 (1996): 940.

C. Howley and R. Bickel, *The Matthew Project: National Report* (Randolph, VT: Rural School and Community Trust Policy Program, 1999), ERIC, ED 433174.

G. Huang and C. Howley, "Mitigating Disadvantage: Effects of Small-Scale Schooling on Student Achievement in Alaska," *Journal of Research in Rural Education* 9, no. 3 (1993): 137-149.

34 Howley, *Sizing Up Schooling*.

35 Friedkin and Necochea.

36 See, for instance, Lee and Smith.

Not considered here are the wide claims made about the *general superiority* of small versus large schools on a host of input (e.g., cost, curriculum, faculty characteristics), process (e.g., faculty cohesion, student alienation, truancy), and output (e.g., self-esteem, postsecondary enrollment rates, postsecondary success) measures. Readers interested to assess such claims should consult the works cited in:

M. Raywid, *Current Literature on Small Schools* (Charleston, WV: ERIC Clearinghouse on Rural Education and Small Schools, 1999), ERIC, ED 425049.

Irmsher.

Cotton, *Affective and Social Benefits of Small-Scale Schooling.*

K. Cotton, *School Size, School Climate, and Student Performance* (Close-Up No. 20) (Portland, OR: Northwest Regional Educational Laboratory, 1996), ERIC, ED 397476.

In the author's view, qualitative or mixed-method accounts of the experience of small-scale schooling (Meier; Wasley et al.) are a more appropriate source of insight into such disparate issues as faculty collegiality or cohesion, student self-actualization, and leadership than large-scale studies can ever be.

37 W. Fowler, "What Do We Know About School Size? What Should We Know?" paper presented at the annual meeting of the American Educational Research Association, San Francisco, April 1992, ERIC, ED 347675.

W. Fowler and H. Walberg, "School Size, Characteristics, And Outcomes," *Educational Evaluation and Policy Analysis* 13, no. 2 (1991): 189-202.

H. Walberg, "District Size and Student Learning," *Education and Urban Society* 21, no. 2 (1989): 154-163.

H. Walberg and W. Fowler, "Expenditure and Size Efficiencies of Public School Districts," *Educational Researcher* 16, no. 7 (1987): 5-13.

H. Walberg and H. Walberg, "Losing Local Control," *Educational Researcher* 23, no. 5 (1994): 19-26.

38 V. Lee and S. Loeb, "School Size in Chicago Elementary Schools: Effects on Teachers' Attitudes and Students' Achievement," *American Educational Research Journal* 37, no. 1 (2000): 3-31.

V. Lee and J. Smith, "Effects of School Restructuring on the Achievement and Engagement of Middle-Grade Students," *Sociology of Education* 66, no. 3 (1993): 164-187.

V. Lee and J. Smith, "Effects of High School Restructuring and Size on Early Gains in Achievement and Engagement," *Sociology of Education* 68, no. 3 (1995): 241-270.

Lee with Smith.

39 R. Bickel, *School Size, Socioeconomic Status, and Achievement: A Georgia Replication of Inequity in Education* (Randolph, VT: Rural Challenge Policy Program, 1999), ERIC, ED 433985.

R. Bickel, *School Size, Socioeconomic Status, and Achievement: A Texas Replication of Inequity in Education*, (Randolph, VT: Rural Challenge Policy Program, 1999), ERIC, ED 433986.

Bickel and Howley.

Bickel, Howley, Glascock and Williams.

C. Howley, *The Matthew Project: State Report for Montana* (Randolph, VT: Rural Challenge Policy Program, 1999), ERIC, ED 433173.

C. Howley, *The Matthew Project: State Report for Ohio* (Randolph, VT: Rural Challenge Policy Program, 1999), ERIC, ED 433175.

C. Howley, *Compounding Disadvantage*.

C. Howley, *Sizing up Schooling*.

Huang & Howley.

40 Differences in the unit of analysis and the definition of the dependent variable (achievement level in the Howley and Walberg teams' work and achievement gain in the Lee team's) make direct comparison of study findings inappropriate.

41 Nearly everyone can agree that mitigating the *negative* influence of *poverty* is a public good. But what about mitigating the negative influence of SES overall? The question is worth asking because the notion that the *positive* influence of *affluence* on academic achievement is also unfair strikes many people as too politically radical a position, suggesting, as it does, that the negative influence of poverty is related to the positive influence of affluence. The fear seems to be that reducing the influence of SES overall may repress the academic competence of students from affluent backgrounds (an effect known since at least the 17th century as "leveling"). But this is not necessarily so. In the context of this concern, Mark Fetler's study is very important, as it shows that reduced dropout rates (in his California data) are associated with higher levels of achievement. See:

M. Fetler, "School Dropout Rates, Academic Performance, Size, and Poverty: Correlates of Educational Reform," *Educational Evaluation and Policy Analysis* 11, no. 2 (1989): 109-116.

One should speculate that learning is not a "zero-sum game" and that productive synergies in healthy schools and districts can indeed improve the intellectual lot of students quite broadly. The Lee and Howley teams, as well, show a link between excellence and equity.

42 Fowler and Walberg; Walberg; Walberg and Fowler; Walberg and Walberg.

43 Lee and Smith used a two-level hierarchical linear model (students nested within schools) with student gain scores the dependent variable. SES controls are in place for both levels of the analyses in Lee and Smith (1997), which, for the purpose of this review, is the most seminal article in the Lee team series.

44 Regression analysis predicts one variable ("dependent variable") from an assortment of other variables ("independent variables"). The equations take this general form: $z = ax + by + c$, which should be familiar to readers from their days in high school algebra classes. The studies described are all based on some variation of this basic equation. For the purposes of this review, z could represent predicted achievement, x could represent SES, and y could represent school size (a, b, and c would be constants that describe the slope and intercept of the equation). The variables *x* and *y* are the "independent variables" that predict achievement, *z*, with known degrees of strength and accuracy.

45 Friedkin and Necochea.

46 Size-related opportunities, according to Friedkin and Necochea's theory, are (1) economies of scale, (2) market domination (a sort of monopoly influence over funders), (3) benefits of size when funding is awarded on a percentage basis, and (4) ability to improve operations (talent, expertise, facilities). Size-related constraints include (1) problems of coordination and control, (2) factionalism among line personnel, (3) increased free-riding (deflection of resources to irrelevant functions), (4) administrative bloat (deflection of resources to administration), and (5) special program bloat (deflection of resources away from the mass of students and toward exceptional students).

47 Friedkin and Necochea, 240.

48 See, for example, Fowler and Walberg; Walberg; Walberg and Fowler.

49 Fetler.

50 Walberg and Fowler; Fowler and Walberg.

51 Fowler and Walberg.

52 In bivariate analyses, district enrollment reported in Walberg and Fowler, correlated between -.24 (third grade) and -.56 (ninth grade) with achievement. The regression coefficients of school size in the focal studies (Walberg & Fowler, 1987; Fowler & Walberg, 1991) remained negative and were the most influential variables after SES. The *net* magnitude of *school* size, however, was not great.

Beta weights (standardized regression coefficients) for school size varied between about -.05 and -.10 in Fowler and Walberg . This means that for every increase of one-standard deviation in school size--approximately 520 students--the average test score of a school would decrease by 1/20th to 1/10th of a standard deviation; e.g., a decrease of 1% passing the then-mandated New Jersey high school proficiency test in reading, for

each additional 520 students enrolled in a high school (Beta = -.05). In fact, the influence of the *number of schools in the district* (a measure of district size) in most of the equations exerted a much stronger influence than did school size, a fact which received no comment in the discussion section of this article. In the case of the percentage passing the reading test, for instance, the strength of this influence was equivalent to an average 35% decrease in percent passing for each additional 14 schools in the district. Now, readers should understand that New Jersey maintains over 600 districts, ranging from very small rural-suburban districts to extremely large inner-city districts. Outlier districts were not removed from the analysis in Walberg (1991) and this fact may partially account for the strong influence of this measure of district size.

53 Fetler.

54 (r=-0.24). This is a somewhat lower correlation than prevailed in New Jersey, but still stronger than in many states, where bivariate correlations generally hover near zero.

55 Fetler's results also suggest a kind of mediating role for size, though the use of achievement as an independent rather than a dependent variable would tend to obscure such a relationship, if it existed. Hypothetically, his findings are related to the work of the Howley and Lee teams, in which equity and excellence are cultivated simultaneously in smaller schools.

56 This entire body of work -- Lee & Smith, 1993, 1995, 1997 -- is summarized in Lee with Smith, 2001.

57 Lee and Smith, 1997.

58 In 300-student increments: <300, 301-600, 601-900, 901-1200, 1201-1500 (the category to which relative effects were compared), 1501-1800, 1801-2100, and >2100. Lee and Smith, 1997

59 Effect sizes were approximately as follows (301-600: -0.1 in mathematics, +0.2 in reading; 601-900: +1.6 in mathematics, +0.6 in reading; 901-1200: +0.6 in mathematics, +0.4 in reading). Negative effect sizes in all other categories (except 1201-1500, the reference category, with effect sizes equated to zero) ranged from about -.03 to about -1.8.

60 This concept refers to the comparative strength of the relationship between SES and achievement. A strong relationship is inequitable, and a weak relationship is more equitable. A statistically non-significant relationship (reported for some analyses in this line of research) is equitable by definition

61 Effect size of 3.2

62 Lee and Smith, 1997

63 Alaska (Huang and Howley); Georgia (Bickel, *School Size…Georgia*; Bickel and Howley); Ohio (Howley, *Matthew Project…Ohio*); Montana (Howley, *Matthew Project…Montana*); Texas (Bickel, *School Size…Texas*; Bickel, Howley, Glascock & Williams); West Virginia (Howley, *Compounding Disadvantage* and *Sizing Up Schooling*)

The model was Friedkin and Necochea. Friedkin and Necochea, however, did not investigate equity effects of size.

64 This concept refers to differences in achievement level associated with the interaction of SES and size. This line of research found that the effect of size is not constant, but changeable, depending on SES.

65 The Montana system enrolls about 12% American Indian students, and predominately Indian schools were included in the data set.

66 Huang and Howley.

67 Bickel and Howley.

68 The four categories follow: (1) larger schools in larger districts, (2) smaller schools in larger districts, (3) larger schools in smaller districts, and (4) smaller schools in smaller districts.

69 For example, Howley and Harmon.

70 With a few exceptions. See

L. Baird, "Big School, Small School: A Critical Examination of the Hypothesis," *Journal of Educational Psychology* 60, no. 4 (1969): 253-260.

James Coleman's famous *Equality of Educational Opportunity Report* was, circa 1966, among the first to report an overall negative correlation of school size and achievement, about r = -.10. See:

Howley, *Compounding Disadvantage*.

71 C. Howley, *School District Size and School Performance* (Charleston, WV: AEL, Inc., 2000), ERIC, ED 448961.

72 Lee and Smith.

73 To achieve the "ideal" high school size, many states would have to implement massive consolidations that (as in the Montana case) are not feasible on account of terrain or population density, or, in fact, community preference. The very notion of an ideal size derives conceptually from an abstraction (the nation as a whole) that has little bearing on the social institutions and circumstances that have actually determined school size. Given the shortcoming of national data sets for approaching the issues of school and district size, the author advises educators to look skeptically on one-size-fits-all prescriptions. Such prescriptions in educational matters seem remarkably unresponsive to the variety of lifeways and purposes that characterize U.S. society. For a full discussion as related to schooling, see:

S. Arons, *A short route to chaos: Conscience, community, and the reconstitution of American schooling* (Amherst, MA: University of Massachusetts Press, 1997).

The cultural tenor of the current era (postmodern or information-age) rejects one-best solutions in favor of multiple perspectives.

74 J. Guthrie, "Organizational Scale and School Success," *Educational Evaluation and Policy Analysis* 1, no. 1 (1979): 17-27.

R. Slater, "Education Scale," *Education and Urban Society* 21, no. 2 (1989): 207-217.

75 R. Jewell, "School and School District Size Relationships," *Education and Urban Society* 21, no. 2 (1989): 140-153.

76 See Bickel and Howley.

77 See Fowler; Huang and Howley; and Lee and Loeb for related discussions.

78 This discussion, in particular, relies heavily on a similar section in Howley, *Research on Smaller Schools: What Education Leaders Need to Know to Make Better Decisions*.

79 This is so partly because the state-to-state variation of what might be considered a small school is very wide, a variation that the author regards as properly responsive to the local circumstances prevailing within states.

80 See, for example, Cotton, *Affective and Social Benefits…* and *School Size, School Climate…*; Howley; Irmsher; Raywid.

81 See Howley, 1997, 2001.

82 Again, readers are cautioned to recognize that a K-2 school enrolling 500 students is a very large school indeed; in comparison, a K-8 school of 500 is one-third the size.

83 See Lee & Smith, 1997, for a tempering view.

84 C. Howley, A. Howley, and E. Pendarvis, *Anti-intellectualism and Talent Development in American Schooling* (New York: Teachers College Press, 1995).

85 Howley, 1997, 2001; Howley and Harmon.

86 The danger with upper limits is that they are confused with "optimal" or "ideal" size. The point of the Feinstein legislation is to encourage the construction of schools smaller than these maxima. Readers should note well that these upper limits accord with many interpreters' views of the absolute upper limit of school size,

which means that these upper limits describe large, not small, schools. In practice, many administrators may be tempted to build schools as large as the upper limits given in the Feinstein amendment in order to maximize both size and resources. Administrators are largely responsible for the construction of large schools and districts (see Howley, 1997, 2001).

87 Most of the research about educator salaries concerns salary level, rather than between-district differences (inequities). Inequities are theoretically important because of their probable influence on a district's organizational capacity to sustain improvement efforts. A few studies treat the issue of between-district differences tangentially, and just one (Beaudin) considers the issue directly (ERIC searches conducted by the author in October, 2001). In a Connecticut study, Beaudin found that districts filled 20% of vacancies with "migrants" from other districts. The migrants were younger and less experienced than the 80% of within-district hires, and they received larger salary increases as a result of "migrating." Disadvantaged districts lost more migrants than did advantaged districts. In general, it seems, wealthier and larger districts pay higher salaries than poorer and smaller districts (a hypothesis confirmed by Ready & Hart in an Ohio study). The issue of statewide salary equity is vastly under-researched and merits substantially more attention from researchers and policy makers. In the meantime, the recommendation given is based on logic, the small extant research base, and the counsel of superintendents of small districts interviewed by Howley and Harmon.

See: Howley and Harmon.

K. Ready and M. Hart, "Pattern Bargaining in Education," *Education Economics* 1, no. 3 (1993): 259-266.

B. Beaudin, *Teacher Interdistrict Migration: A Comparison of Teacher, Position, and District Characteristics for the 1992 and 1997 Cohorts.* Paper presented at the annual meeting of the American Educational Research Association, San Diego, CA, April 1998, ERIC, ED 422616.

88 Howley.

89 Howley and Harmon.