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Researcher Perspectives on Class Size Reduction

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Abstract

This article applies to class size research Grant and Graue's (1999) position that reviews of research represent conversations in the academic community. By extending our understanding of the class size reduction conversation beyond published literature to the perspectives of researchers who have studied the topic, we create a review that includes political histories of, contextual details about, and assumptions undergirding the conversation. We find divergent (and sometimes competing) perspectives on identifying beneficiaries of class size reduction (or CSR) and the correct context in which to view CSR research. By contrasting the logic and assumptions embedded in pupil-teacher ratio (PTR), class size (CS), and class size reduction studies, we conclude that sometimes research conflates these constructs and their associated theories of action, and such distortion poorly serves the needs of policymakers and stakeholders in education. We recommend that future inquiry focus on mechanisms of change, particularly instruction—both in terms of instructional strategies that capitalize on the resource of a smaller group and the types of support needed for teacher and administrator professional development.

Keywords: class size; teacher student ratio; educational policy.



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Perspectivas de un Investigador sobre la Reducción del Tamaño de Clases

Resumen

Este artículo aplica la perspectiva de Grant y Graue (1999) de que las revisiones de investigaciones son conversaciones entre comunidades académicas, para el caso de las investigaciones sobre tamaño de la clase. Al ampliar nuestra comprensión sobre la reducción de tamaño de las clases, más allá de la literatura publicada, a las perspectivas de investigadores que han estudiado el tema, estamos creando una revisión que incluye las historias de las políticas, los detalles acerca del contexto, y las hipótesis que sustentan las conversaciones acerca de esas investigaciones. Encontramos diferentes perspectivas (a veces en competencia) en la identificación de los beneficiarios de las propuestas de reducción de tamaño de clase (o RSE) y cual sería contexto apropiado para entender las investigaciones sobre RSE. Contrastando la lógica y los supuestos incorporados en las relaciones “alumnos por maestro” (PTR), el “tamaño de la clase” (CS), y la reducción de tamaño de las clases, llegamos a la conclusión de que a veces estas investigaciones confunden estos conceptos y las teorías de acción derivadas de los mismos, y que tal distorsión perjudica las tareas de los encargados de formular políticas educativas. Recomendamos que en el futuro las investigaciones atiendan fundamentalmente los mecanismos de cambio, en particular los relacionados con la instrucción, tanto en términos de estrategias de enseñanza que aprovecha los recursos que surgen al trabajar con un grupo más pequeño y los tipos de apoyo necesarios para el desarrollo profesional de los/as profesores/as y administradores/as.

By their very nature, policy decisions are political. They come about through a process of decision-making that involves weighing evidence, consensus building, and privileging particular interests. The case of class size reduction is no exception. A hugely popular reform initiative in education, class size reduction is hotly debated in the research community. In this paper, we explore class size reduction as an example of how policies can develop through a confluence of specific political, economic, and intellectual conditions. We look at how research, policy, and practice mutually inform each other in ways that are very different from the march of science and its application in policy.

To begin, we articulate what we feel are key parameters in the discourse around class size research because there is disagreement about the meaning of the term. Class size is an umbrella term that includes three distinct strands of inquiry and policy. The simplest form analyzes staffing patterns, examining the number of salaried staff serving a set of pupils. This is typically called *pupil teacher ratio* or PTR. This is a macro approach relating expenditures on a per student basis. The next level focuses on classrooms and examines *class size* (CS). Class size discussions explore the number of students in a single classroom and the actions of teachers within those four walls. The last genre is *class size reduction* (CSR), which focuses on specific programs that lower the number of students in a class below a particular threshold number.

The key attribute that differentiates the three is that PTR and CS examine *what is*, describing practices and outcomes in naturally varying contexts, while CSR is a specific reform that is predicated on changes that are thought to occur between teachers and students in smaller groups. As

a result of these differences, research informing class size (broadly construed) must necessarily be clear about its focus and intentions. Across the three types, PTR is the most general and least related to classroom processes, CS is more specific to instruction, and CSR is the most clearly linked to teacher-student interactions. CSR advocacy makes crucial assumptions about changing those interactions to shift student outcomes. Studies of class size reduction are contextually located in particular historical conditions, coming out of specific interests and needs and based on particular assumptions. The need for research that focuses specifically on class size reduction is sometimes forgotten, particularly when researchers use research methods commonly thought to allow wide-ranging generalization. The overarching purpose of this article is to sort through some of the points of contention and confusion in this literature.

We clarify issues in CSR research by focusing on the discourse of key researchers. Given the existence of several substantive reviews on the area (e.g., Biddle & Berliner, 2002; Ehrenberg, Brewer, Gamoran, & Willms, 2001; Finn, Pannozzo, & Achilles, 2003; Grissmer, 1999), we follow the idea first suggested by Grant & Graue (1999) that reviews represent conversations in the education research community. As such, they are sites of interaction that present multiple perspectives on a topic. However, the literature itself has no voice—researchers take positions and speak about topics in their areas of interest. Therefore, rather than reanalyzing the literature on class size reduction in a traditional way, we briefly summarize the literature but devote the majority of this paper to an analysis of a different type. We present *researchers' perspectives* on the literature and knowledge through analysis of interviews with a sample of scholars who have worked on the topic. To the best of our knowledge, this represents a new layer of research review; we know of no one who has added this dimension to a synthesis of literature.¹

We begin our analysis by summarizing the literature on class size reduction—including the ways in which researchers and members of the general public have conflated it with PTR and CS research—and highlighting our understanding of major themes. We then describe how we approached the task of directly talking with key researchers who have contributed to the knowledgebase, including how we selected researchers for interviews, who chose to participate, and how we analyzed the conversations. We identify the key issues in this area (inclusive of points of convergence and contention), as they emerged from our interviews. We close with a reflection on the implications of our analysis.

Prior Research

The broad topic of class size (inclusive of PTR, CS, and CSR) has been studied by researchers representing interests ranging from economics to administration and has focused on short- and long-term outcomes for students. Researchers have also focused on the cost of CSR relative to other reform choices as well as teachers' attitudes and practices. CSR advocates often claim that they choose CSR as a strategy to reduce the effects of poverty, to enhance student achievement, and to help students develop the dispositions that will make them successful in school (Ehrenberg et al., 2001; Grissmer, 1999; Finn et al., 2003; Molnar & Zmrazek, 1994). CSR rests on a large, complex, and discordant body of literature. Though hugely popular with the public, the funding for CSR programs is often supported by kitchen table wisdom rather than a thorough review of all available literature. In the last ten years, 40 states have implemented CSR programs.

¹ We recognize that some might not recognize this as a review per se but we look to the basic meaning of the word review to frame this project, hoping to *look again* at the issue of class size so that we can critically evaluate the literature and its application in practice.

The federal government had a short-lived program that infused teachers into the employment ranks to reduce class size. A number of reviews have suggested that children learn more in smaller classes, their teachers are more satisfied, and discipline problems are reduced. Anchored by the only large scale randomized experiment in field-based educational research (Finn & Achilles, 1990), the research on CSR is voluminous and highly varied in both quality and foci. The research on CSR is primarily founded on four major policy implementations: a large-scale experiment in Tennessee, statewide policies in Wisconsin and California, and a comparison of larger and smaller classes in Great Britain. We provide a summary of these four projects in Table 1.

Historically, the first question researchers addressed that policymakers desperately wanted an answer to is: *Does class size reduction work?* For the most part, researchers thus far have provided affirmative answers to this question, linking reduced class size to positive effects on student achievement (Biddle & Berliner, 2002; Finn & Achilles, 1990; Glass & Smith, 1979; Grissmer, 1999), particularly in the early primary grades and for African-American and poor students (Bain, Achilles, McKenna, & Zaharias, 1992; Nye, Hedges, & Konstantopoulos, 2004; Smith, Molnar, & Zahorik, 2003). According to some reports, these effects are sustained beyond the “treatment” years for students who are exposed to small classes (Ehrenberg et al., 2001; Finn, Gerber, Achilles, & Boyd-Zaharias, 2001; Nye, Hedges, & Konstantopoulos, 2001).² Positive outcomes on student and teacher attitudes have also been found in the context of smaller classes (Smith & Glass, 1980; Zahorik, Halbach, Ehrle, & Molnar, 2003). Therefore, it would seem that CSR works to improve student achievement in the early grades and for students often thought to be at risk and that it enhances the affective experiences of both teachers and students.

As many have assumed that the central issue of effectiveness is settled,³ a second question emerged, focusing instead on the instructional processes at work within smaller classes: *How* (and why) *does class size reduction work?* This line of analysis focuses on the mechanism(s) at work in CSR reform contexts and recognizes that something changes in smaller classes beyond the number of people in the room. Some assert that teacher action is essentially the same in classes of different sizes, and since instructional practices do not change, class size reduction is essentially a structural reform in that it is administratively controllable (Cahen, Filby, McCutcheon, & Kyle, 1983; Rice, 1999; Slavin, 1989; Stasz & Stecher, 2002). Others have charted patterns related to student outcomes, and they have identified differences related to teacher action (Blatchford, Baines, Kutnick, & Martin, 2001; Blatchford, Bassett, & Brown, 2005; Zahorik et al., 2003). In these cases, effective teachers of small classes individualize teaching, have clear expectations, are less distracted by discipline problems, and balance teacher-directed and child-centered teaching.

² We have quotation marks around the term because CSR is so variable that it can hardly be called a treatment.

³ This is certainly not the case across the board. For some researchers, CSR is a poor choice for resource allocation. This will be discussed in a forthcoming section.

Table 1
Major class size and class size reduction studies

	Student Teacher Achievement Ratio (STAR)	Student Achievement Guarantee in Education (SAGE)	California Class Size Reduction	Class Size & Pupil Adult Ratio Project (CSPAR)
Location	Tennessee	Wisconsin	California	United Kingdom
Context	State-sponsored pilot begun in 1984, mandated in 1985. Four-year, \$12 million project completed in 1990; STAR included 79 elementary schools in 42 districts.	Urban initiative designed to ameliorate the effects of poverty. Piloted in 30 schools, primarily in urban Milwaukee.	Governor Pete Wilson proposed a class size reduction for K-3 and the legislature enacted the program in 1996.	Class sizes capped at 30 in early years. Blatchford et al. studied the natural variation in classes.
Treatment conditions	Students & teachers randomly assigned to one of 3 conditions: 1) small class (13–17), 2) full size class (22–25), or 3) full size class with aide. A cohort of students followed K-3, with students kept in the same treatment condition.	Piloted in 30 high poverty schools, rolled out to almost 500, with four elements: class size reduced to 15; rigorous curriculum, professional development, and lighted schoolhouse for social services. Funding: \$2000 per low-income student.	Universal implementation K-3 throughout state. Districts received \$650 per student and facilities grants for \$25,000 if classes were limited to 20 students.	Examined natural variation in class sizes in early years of schooling rather than imposing a treatment.
Class size	Three groups: <ul style="list-style-type: none"> • Small (13–17) • Full (22–25) • Full w/ aide 	Class size of 15 through 15:1 classes, 30:2 shared space, 30:2 team-taught or SAGE block classes in which a second teacher is added for literacy or math.	20 students per class K-3	Four groups: <ul style="list-style-type: none"> • Under 20 • 20–25 students • 26–29 students • 30+ students

	Student Teacher Achievement Ratio (STAR)	Student Achievement Guarantee in Education (SAGE)	California Class Size Reduction	Class Size & Pupil Adult Ratio Project (CSPAR)
Research design	Random assignment experiment comprised of volunteer schools with enough sections for treatment & control sections. Data include measures of student achievement, observations of classroom process, follow on analysis beyond 4 years of the implementation, including analyses of retention, graduation.	Quasi experiment, comparing treatment to control schools similar in family income, reading, school size, & racial composition. Mean class sizes in the comparison group 22–25 students per teacher. Data included Terra Nova Comprehensive Test of Basic Skills administered in Grades 1-3, teacher surveys, teacher logs, classroom observations, student records.	CSR Research Consortium studied 432 schools and conducted surveys of 1485 teachers, 336 principals and 2113 third grade parents. Study compared schools that implemented CSR and those that did not. Data included the Stanford Achievement Test scores, administrative data, data on students with disabilities, surveys, classroom observations & case studies.	Mixed-methods inquiry examining whether CSR affects student achievement but also studying the underlying relationships between class size & classroom processes. Data included case studies, teacher reports, observations, teacher ratings of student behavior, & teachers' estimates of time use.
Results	Students in small classes outperformed students in larger groups or in classes with aides. Addition of aide to full size class not beneficial. Reduced race based achievement gap. Fewer discipline problems, more interaction in class.	SAGE students outperformed comparison group in literacy and math K-1 with best outcomes for African-American students. SAGE classrooms had fewer disciplinary problems and they had more time spent on explicit instruction. Implementation influenced by physical space constraints and teacher adaptation to team teaching situations.	Qualified teachers and classroom space became more rare for many low-income students, thus widening the resource gap between wealthy and poor schools. Overall benefits included a slight increase in test scores after years 2 and 3, more time teaching, less disciplining, & more reported parent-teacher contact time.	Enhanced literacy instruction, student talk, and participation in smaller classes. Teachers used more instructional strategies and there were more opportunities for social interaction—but generally a lower quality of peer relations—TAs (classroom aides) positively influenced classroom interactions but did not measurably affect academic outcomes.

In the period since the most recent research review on class size reduction (Finn, Pannozzo, & Achilles, 2003), researchers have continued to explore the topic through two general approaches. The first type classifies class size as a structural input that should be related to student outcomes. These studies are typically analyses of databases that tie student achievement to markers of class size (sometimes PTR, sometimes CS). For example, Simms (2008) asserts that the use of combination classes motivated by the class size threshold in California caused a test scored gap for certain second or third graders. Konstantopoulos (2008) found that higher ability students benefited more from being in a small class and that use of smaller classes did not reduce the achievement gap. The second type of research has focused on the mechanisms or processes in classes of different sizes. Researchers from this group explored student and teacher behaviors in different sized classes (Blatchford, Bassett, & Brown, 2005) or compared measures of student teacher interaction and structural inputs and found that the former better predicted student outcomes (NICHD Early Child Care Research Network, 2004, 2005). What distinguishes these projects is whether the model for the mechanisms of student learning focuses on structural inputs (such as class size) or whether it includes attention to process (such as student/teacher interaction). The former is a first generation approach, the latter a second or third generation approach.

Methods

An examination of primary research studies and reviews reveals threads of similarity as well as serious disagreements. We identified key researchers and research teams who have contributed to the scholarship on CS and CSR and interviewed individuals who represented varied perspectives and areas of expertise. We chose researchers who had been affiliated with each of the major class size reduction initiatives, as well as those who had worked on syntheses of the literature. Our group included Charles Achilles (STAR), Alex Molnar (SAGE), Joan McRobbie (California), and Peter Blatchford (CSPAR), scholars instrumental in evaluation of the major CSR initiatives.⁴ In addition, we interviewed Bruce Biddle, David Grissmer, and Adam Gamoran who have synthesized the CSR literature. We also interviewed Eric Hanushek, an economist who analyzes the cost of CSR relative to other investments in education, and Norman Webb, a researcher who conducted secondary and follow-up analyses of SAGE data. Our interview participants represent an importance sampling of CSR researchers.⁵ Though we might be faulted for not including more researchers seen as critics of CSR programs, we feel that our sample provides a creditable picture of the scholarly discussions on CS and CSR. The interviews were conducted by phone in all but two cases, were audio taped and transcribed, and lasted between 35 and 120 minutes. The interview protocol is provided in the Appendix.

The analysis presented here involved interpretive readings of the literature and researcher interviews through identification of themes in these two sources. This description includes voices from both the interviews and the published literature, for it would be remiss of us to ignore the textual voices of those who were not part of the researcher sample. Our analysis represents traditional modes of interpretive research that call for reading various data sources in relation to each other (Emerson, Fretz, & Shaw, 1995; Erickson, 1986). A first-pass analysis contrasted responses by interview questions, which were structured around particular issues we wanted to

⁴ Refer to Table 1 for a description of each project.

⁵ One researcher, who represented a major CSR implementation, declined participation, citing scheduling conflicts. We note that as a research team, we were open to conducting interviews at any time convenient for the participants.

address in our analysis. A second-pass analysis identified themes from within the interviews and the literature, again contrasting among participants and texts. For example, as we worked to understand class size reduction implementation, we found that researchers variously considered and sometimes conflated PTR, CS, and CSR in both the published literature and our interviews. This led us to examine the theory of action underlying advocacy of each of these approaches to CSR research. Our recursive analytic approach was accomplished through reading and re-reading all sources, coding themes, and cross-checking occurrences across sources. Rather than relying on convergence as an indicator of valid assertions, we try to detail both convergence and divergence of opinion and findings that illustrate this complex topic.

Pupil-Teacher Ratio, Class Size, and Class Size Reduction

One of the major issues in this literature has been definitional: What exactly *is* class size reduction? Some define it as the reduction of students in a particular classroom, while others say it is the reduction of the number of students per teacher. Moreover, is studying class size and comparing large and small classes the same as conducting research in a class size reduction context? While all of these topics are related, they are not the same (Achilles, Finn, & Pate-Bain, 2002; Addonizio & Phelps, 2000; Biddle & Berliner, 2002; Blatchford & Mortimore, 1994; Ehrenberg et al., 2001; Finn, 2002; Finn et al., 2003; Odden, 1990). Much of this confusion is related to the fact that these constructs are used interchangeably in research publications. For example, in an edited book that examines how education resources are related to achievement, readers looking in the index for a discussion of class size are referred to listings for pupil-teacher ratio (Burtless, 1996). This conflation of the PTR and CS is not just an artifact of the editing process but links two different approaches to thinking about resource allocation.

In a hypothetical school with 30 certified staff members and 300 K-2 students, one would be tempted to use a *pupil-teacher ratio* (PTR) to understand class size. The PTR approach is most often used as a proxy in economic analyses that address total staff expenditures, including both classroom and specialist teachers. But the 10:1 ratio in the hypothetical case is not the number of students per teacher in every child's classroom. In almost all schools, certified staff include several people who do not teach at all, or whose jobs are not with general-education classrooms. Adam Gamoran noted this in his interview:

Many of the correlational studies have been of pupil-teacher ratios rather than class sizes. Those are two very different things. For example, they basically mix in funds for special ed. with class size so that a school with a lot of special ed. teachers would appear to have a smaller expenditure. But while those special ed. teachers are probably going to be good for the special ed. kids, they probably are not going to raise average test scores in the school by any substantial amount. So that's a methodological problem in much of the correlational work.

Because of this mixture problem, a school's PTR says little about what actually happens in a classroom and how human resources are allocated. More generally, targeted services for any small group of students leaves a higher PTR for all other students. In this hypothetical example, if three special education teachers serve 21 students in self-contained classrooms, the special education PTR is 7:1, while the remaining 280 students in the school are served by 17 classroom teachers with an effective PTR of approximately 16.5:1. Without additional information, school-level PTR provides very little information about how a school functions.

A PTR approach can also obscure situations in which a larger group of students is paired with more than one teacher. This is the case in Wisconsin's SAGE program where 30:2 and 15:1

configurations were used interchangeably (Graue, Hatch, Rao, & Oen, 2007). For example, in the hypothetical case described above, if a 300-student school has three special education teachers, one or all of them may be teaching by themselves specifically to children receiving special education services, but they may also work in general-education classrooms in a co-teaching environment. In a co-teaching environment, the pupil-teacher ratio could be much lower than the class size.

If PTR has clear flaws in linking human resources to student experiences, a second approach has been the study of *class size*. Using this approach, researchers might compare classrooms with varying numbers of students. Examining outcomes from or processes in classrooms with 38, 20, and 16 students provides more detailed data than a schoolwide PTR of 25:1. However, as Berger (1982) states, “Focusing on class size alone is like trying to determine the optimal amount of butter in a recipe without knowing the nature of the other ingredients” (p. 7). The last approach is to study *class size reduction* (CSR). CSR limits the total number of students in individual classrooms or assigned to a particular teacher, and the challenge of researchers is to analyze CSR as an intervention. In another hypothetical example (20 certified staff and 300 students), a class size reduction reform could call for classrooms to be limited to 15 students. But that is not always what happens, depending on the structure of a program. If there is flexibility, as happened in many Wisconsin SAGE schools, teachers and administrators would need to decide how best to meet this or a similar mandate. Moreover, since a CSR program would likely be adopted for a particular purpose or to satisfy a particular need, teacher, administrator, and parent decisions shape implementation and maintenance, determining what the program looks like in practice.

While the research projects in PTR, CS, and CSR are different, typically the findings of studies organized in these three distinct ways are discussed as if they were interchangeable. This conflation has led to a confusing situation for policymakers and other stakeholders who look to research for guidance. Implementations of CSR programs have relied on data from PTR studies. Data that describe CS and PTR have been used to support (and undermine) CSR programs. Tools to evaluate CSR programs have represented PTR logic. Our interview participants helped us realize that understanding this confusion requires unpacking the assumptions used in research, policy, and practice. It is this task that we turn to next.

One contrast is related to the focus of each approach. PTR is typically understood as an administrative tool while CS and CSR (and, to some extent, a PTR approach to CSR) are conceptualized instructionally. The clearest advocate of this line of demarcation is Charles Achilles:

Pupil-teacher ratio is to assure equitable distribution of funds. To make sure that every building and every youngster, whatever the state formula is, gets his or her share of the money. It's not an organization for instruction. It's an administrative device to trace money and to deal with desegregation issues and things like that. This is the thing that amazes me, then to have people assume that those two are the same and then using them as the same.

In addition to the administrative use of PTR is the research use, which is often a matter of ease of data access. Achilles explained that getting good data on class size is difficult. PTR data are easier to come by:

People who are not in education find it hard to do class size studies because essentially they have to be done class-by-class, building-by-building. Two states attempt to collect class size data, Utah and North Carolina. We cannot get class size data from any state education agency, including Wisconsin. It's too hard to get. It's easier to take a number of teachers, a number of kids and [divide]. It's really not easy and the best proxy is not pupil/teacher ratio—it's average class size. The Digest of Ed Statistics uses both, they give us the American PTR's

estimated over years. Those are the data you find in the arguments that class size doesn't make a difference. Another table in the digest tells us estimated class size. Achilles is referring to an annual statistical compilation by the U.S. Department of Education (Snyder, Dillow & Hoffman, 2008) as his example of multiple and confusing displays of information. Several figures in the 2007 version provide information on pupil teacher ratio over time and suggest that the current PTR for the US is 16. In contrast, another table cites the average class size in elementary schools nationwide is 20.4. This 25% difference in estimates is not inconsequential. When PTR data are paired with expenditures on teacher salaries and student achievement over time (as they are in the Digest) this discrepancy causes even more confusion.

Embedded within PTR logic is the assumption of a linear relationship between resources allocated to teacher salaries and improvements in student achievement. However, how that allocation is determined is a key point of contention among researchers. Hanushek and other economists prefer a focus on *better* teachers rather than *more* teachers because, according to their research, teacher quality is a better predictor of student outcomes than PTR. As he stated during his interview:

The fact is that learning in a classroom is so dominated by the quality of the teacher that [teacher quality] overwhelms any of the small differences in class size we are normally talking about. Secondly, for the most part the evidence seems to suggest that with changes in class size, teachers don't change what they do. So there is no reaction. We know that achievement varies quite dramatically across individual classrooms and it's not explained by class size but it's in fact explained by systematic differences among teachers.

The terminology used here is revealing. While Hanushek states that changes in class size in and of themselves do not cause teachers to change what they do, his comments do not address the type of systemic reform effort needed in a CSR context.

A focus on CSR does not trade quantity for quality. Instead, it assumes that some fundamental quality of classroom interactions is altered through CSR. A focus on CSR assumes that when teachers are assigned fewer students, quality increases (Ehrenberg et al., 2001). The reasons cited for this change are numerous. Some researchers claim that teachers in CSR contexts have more time for teacher-student interaction (Biddle & Berliner, 2002; Blatchford, Edmonds, & Martin, 2003). Others focus on the increased knowledge teachers can have of student needs and strengths (Zahorik et al., 2003). Still others find that students are more easily socialized into school culture in smaller groups (Finn et al., 2003). This theory of action for CSR implies change and improvement; improvement that requires concerted, purposeful, and coordinated effort. Bruce Biddle hit many of these points in his contrast of a hypothetical large and small class:

Let's say we've got a first grade with thirty or forty kids in it, the teacher doesn't really have much of a chance to have one-on-one contact with all of the kids in the classroom and she is in fact spending much of her time in the management of a bunch of squirming bodies and kids who are just firing off in all directions, [kids] who do not yet have any kind of a notion as to what it takes to succeed in education. Whereas, when you get the classroom down to about 15 kids, all of those kids are known individually to the teacher and the teacher has an opportunity to interact with each person and to find out what that person is all about and to learn about the needs of all of the kids, particularly the kids who come to the school from minority backgrounds or from impoverished homes where very few resources are available that would support education at all. Then the teacher is able, on a one-on-one basis to say to this kid, "Johnny or Susie, I

understand you have such and such skills, you can make it, you can do this too. You don't have to fail in this situation. All you have to do is learn the rules of how to get on around here and you too can succeed in education."

There is a chain of effects implied in class size reduction logic—smaller groups mean more intimate learning relationships, which in turn provide more in-depth knowledge and makes instruction more responsive to needs, ideally yielding greater student achievement. Of course, this logic also implies that teachers in CSR contexts understand and buy into this logic and that they have the capacity to create these changes in their classrooms or that they are provided with the support necessary to achieve these goals. Without this type of capacity or support, what Biddle refers to is a CS comparison, implying that CSR is a magic elixir for all that ails the educational system without specifying the ingredients of the cure.

Contrasting the logic embedded in PTR, CS, and CSR illustrates how research that conflates these constructs and their associated theories of action does a disservice to policymakers and stakeholders in education. Each theory of action leads to valuing specific criteria and using different measures. Even the same measures are interpreted differently when they are informed by contrasting values. With the distinction among PTR, CS, and CSR in mind, we turn now to an explicit focus on CSR: who benefits, who decides, and what changes.

The Beneficiaries: Politics of CSR

The question of who benefits from CSR can be addressed from a variety of perspectives. At the level of policy analysis the typical perspective is focused on what group is affected the most. When we compare the varied subgroups that have participated in CSR studies, researchers in the United States are typically united behind the idea that smaller classes are most beneficial for children living in poverty and for children of color (Finn & Achilles, 1990; Krueger, 1999; Nye et al., 2004). In his interview, Bruce Biddle told us,

Class size reduction in the early grades helps kids who are at risk primarily. In other words, it's not an across the board thing. That doesn't mean that middle class kids aren't helped, they are helped by class size reduction, but the evidence suggests that the amount of help is greater for kids from minority backgrounds and from impoverished homes.

In his interview, David Grissmer distinguished middle class students from middle class parents, noting that it might be "sort of an insurance policy for high income parents," because they will have to spend less time on homework and out of school support of student learning. A number of middle class parents found they wanted such an insurance policy in Wisconsin when the initial SAGE studies found positive outcomes for children living in poverty. The program was subsequently offered to all districts with reimbursement provided only for the low-income students served.

An unexpected theme in our discussions with researchers was the incredibly political nature of CSR. Discussion primarily circulated around four general topics: elected officials who sponsor and endorse CSR policies; the historical context in which CSR policies have been adopted and CSR research conducted; the researchers who have studied CSR; and influential groups in favor of CSR (such as teachers unions and organized parents' groups). The discussion helped us understand the links among these topics and the degree to which political issues shape CSR research. Elected officials were often key players in class size reduction efforts. In some conversations the elected officials were governors, in others they were legislators or heads of state education agencies. Several respondents pointed to California as a case in point:

Pete Wilson started this whole thing as governor of California, his popularity doubled within a two or three week period when he announced class size reduction policy for the state. And so, for that reason, 20 plus governors had announced their own class size reduction policies within a month. The President of the United States announced his class size reduction policy within a month and a half. (Hanushek interview)

U. S. officials were not the only ones swept up in interest in CSR. Peter Blatchford described how class size had been a key point of discussion between political parties in England. Elected officials were particularly taken by the results of the STAR study, with its randomized experiment. David Grissmer provided an interesting analysis of why STAR was so influential with politicians:

One of the reasons experiments have an influence on policy is that they can be transparently presented to legislatures so that they can probably understand what went on and as opposed to most of the other research which is non-transparent to legislators even though people try to explain it to them. So that's one reason why Tennessee had such a huge influence.

Our participants framed the experience of elected officials in two distinct ways. On the one hand CSR was a powerful tool for increasing popularity; on the other hand its popularity with legislators was heightened by Tennessee's use of an experimental model that seemed easier to understand than other types of research, but this is only part of the picture.

The class size reduction movement that built steam in the 1990s could be seen as an example of a perfect storm—a confluence of historical, political, economic, and educational factors that produced evidence, interest, and resources that could be invested in a particular policy. While others told pieces of the story, Joan McRobbie provided a narrative that linked many of the issues:

[Frederick Mosteller] got a hold of Tennessee STAR study somewhere around the early 90's and was so impressed by it that he got together with some journalism fellows and worked with them to get the word out in the media about this study because he felt it was so important. It was so clear definitively that there is a class size effect, that this thing should be getting popularized around the country and using the media to reach policy makers.... He really pushed on getting the word out about it and then once there started to be some press stories that there was this very outstanding study showing that class size... It coincided with, throughout the 1990's, there has been this move toward accountability, results-based education and so people were looking for things from the research that were the places to invest and make a difference. So it was appealing but the other key was not only did the research show that there was a class size effect, but you have to put this through the political process and politically this is a big plus because there is not a parent or a teacher who doesn't like smaller classes.

So if you are a politician and you embrace this, you're going to have all of the parents and teachers on your side. It's easy; it's not a hard sell. The hard part is if you want to actually target and take the limited resources and use them in the otherwise-known-as SAGE way. So it seems like the context and accountability in the 1990's really helped to popularize the idea of class size reduction. The Tennessee STAR study was well timed so that it fed right into the accountability movement.

This story continues in California, where STAR findings were used to shape a major CSR initiative:

The goal is a murky thing because there were political goals in there. The governor was Pete Wilson and he had a sort of bad experience with the California Teachers Association [CTA] which is the most powerful lobby in the state and when the state started coming out of its early 90's recession, there was extra money to spend and under the law it had to be spent on education and he pushed hard with the legislature to earmark it for class size reduction as a means to keep it out of the hands of the CTA. If it wasn't earmarked for class size reduction or something it would have gone into the general money that goes to schools, in which case it would go to teacher salaries at the bargaining table. So he made a big point, he got a hold of the Tennessee STAR study and said "Here's what we will do with this money," and it was then tied up in class size reduction as opposed to being free to go to the bargaining table and go into teaching salaries. And so it was this part political thing and meanwhile the irony is that as time went by, the CTA has been one of the strongest voices pushing to maintain it as it is and not allow any changes in it.

David Grissmer described his own experience as an expert at the time:

When we got the results from our 2000 study across states that showed class size had about the same effect across states, that the Tennessee stuff would predict, I got invitations from governors and state legislators and I was probably in 15 or 20 states talking to policy makers, either legislators or in governors' offices about class size reduction. There was this huge interest in this topic. The legislatures are so hungry to get something that looks solid.

CSR came on to the scene at a time when states experienced economic booms that provided discretionary funding targeted for education. At the same time, STAR provided an intervention perceived as highly scientific and effective, and states were increasingly focused on evidence-based programming. Together, this particular set of conditions produced a context amenable for policy implementation.⁶

Finally, influential political groups supported class size reduction including teachers unions and organized parent groups, a fact that further complicated the use and development of CSR literature. These groups used their influence to begin or broaden CSR programs in the U.S. and the U.K. Eric Hanushek described how the popularity of the program with parents interacted with the use of data to support CSR:

The main decisions on statewide class size policy have been ones that are political decisions and that the use of evidence has been very much... selective use of evidence has been employed to support the political decisions.... The polls suggested that parents of students very much liked the idea of reduced class size so they were riding on that. They didn't have to have much support and then they never asked why do you support this; they pointed sometimes incorrectly, sometimes correctly to just a small number of studies that supported their decision on it.

⁶ In the current economic context, states and districts are examining all budget items, including the large investments required for big class size reduction programs. For example, the phased in Florida class size reduction program, introduced through a constitutional amendment, will require \$850 million to attain full implementation at the same time that districts are pushed to cut millions of dollars from their budgets. In California, the most recent budget called for more flexibility in implementing the \$1.3 billion class size reduction program. In a state that is furloughing employees and slashing other budgets, class size reduction clashes with calls for budget reduction.

Changes in California's program have been met with much resistance by teacher and parent groups according to McRobbie:

Every time it comes up to make some kind of change, groups like the CTA [the California Teachers Association] and PTA [California Congress of Parents, Teachers, and Students, Inc.] slam the brakes on because they are afraid of losing it. They are afraid that it will get watered down and that that would be a first step toward losing it.

In our interviews, there was recognition that not all parents had the same power. Although much of the research literature would lead to targeted rather than universal approaches to CSR, it was the more affluent parents who possessed the wherewithal to advocate for CSR programs for all (thereby including their children in programs):

People have an intuitive understanding that this stuff is really going to be useful for the poor and needy and the poor and needy in America don't have very many advocates, particularly the poor and needy kids of America. (Biddle interview)

The political power of teacher organizations to mobilize and leverage policy was often framed as pork barrel politics in that it diminished the notion that policy is implemented in an impartial manner relying on science. For researchers like Eric Hanushek, teachers were working on behalf of their own interests because CSR made the job of teaching easier and increased the demand for new teachers. For others, the general bias towards CSR created a bias in teacher reports about their practice and therefore the results of many studies. In this perspective, teachers were likely to react positively to CSR because it was a good thing for them. This was the underlying image in Gamoran's caution about relying on teacher report data:

So it's really important to get beyond teachers' opinions. Their opinions are more favorable because the experience is better, because it's an easier job. It's really important to just not take what they say at face value and try to make an objective assessment of what they are experiencing.

On the other hand, the recognition that this reform had the backing of powerful political groups—that it was part of deals forged for both educational and political reasons during a period of relative budget affluence—was as surprising as it was refreshing.

The Implementation of CSR: What changes, what does not, what should, and why?

It's not just having small classes but the teachers have to change what they actually do... Teachers have to do things differently with a small class, they have to give students more attention, that's the theory but if they are going to get the effects from that, then they have to carry out the theory. (Webb interview)

One of the most pervasively held beliefs among researchers is that in itself, class size reduction is only one piece of a puzzle. Although class size reduction logic assumes that teaching practices would shift in response to the smaller group, researchers have consistently found that teachers use the *same* strategies in smaller and larger groups (Ehrenberg et al., 2001; Finn et al., 2003; Robinson, 1990; Slavin, 1989). While teachers suggest that they provide more individualized instruction, observations of teaching practice do not bear this out. Finn et al. (2003) suggest that teacher practice changes in quantity (more or less of what they already do) rather than quality (doing things differently).

Most researchers suggest structural explanations for this lack of change, asserting that schools, as complex systems, are resistant to change in the long standing practices that have served the system well.

Overall, the weight of the evidence tilts strongly toward a conclusion that reducing class size, by itself, does not typically affect the instructional activities that occur in classrooms.... The finding that teaching practices do not vary with class size is consistent with recent work on school restructuring. Observers report that teaching methods are highly resistant to changes in school structure... This does not mean teachers *cannot* change practice along with class size reductions, but it may take time, and may require opportunities for teachers to learn about other approaches to teaching. (Ehrenberg et al., 2001)

Hanushek suggests another explanation: Teacher quality is more important than group size. For Hanushek, this should be what researchers and policymakers should focus on. The variation among teachers accounts for the variation in student performance and when class size reduction is implemented at the state level, it increases the number of teachers needed in what he would characterize a shallow pool of talent. Employing poor quality teachers in more classrooms compounds the problem of low teacher quality (Hanushek, 1999).

In contrast, regardless of the perceived teaching practices, research on CS finds that small groups differ in quality from larger groups (Biddle & Berliner, 2002). This was specifically analyzed in Finn et al.'s (2003) review, which suggests that teachers in smaller classes get to know their students better because there are more opportunities for interaction and connection between life at home and school. Further, teachers tolerate a wider range of student behavior in smaller classes. These changes provide a context in which students become more engaged and therefore have more opportunity to learn. Gamoran suggested a differential effect that was developmentally and institutionally fixed:

The kinds of activities that go on in first grade and kindergarten classes are ones that benefit from smaller classes. Whereas the kinds of activities that predominate in classes with older kids doesn't make so much of a difference. By this I mean, by third, fourth, fifth, certainly middle school, teachers are basically lecturing and engaging in kind of question/answer recitation, and assigning seatwork. Well, those are activities that it doesn't matter if you have 27 or 17 kids, if you are lecturing and doing seatwork.... Whereas in kindergarten, first grade... there is a lot more small group work, there might be more one-on-one-contact with teachers. Certainly there is more of a concern with establishing a nurturing environment. So those are the kinds of activities that might especially benefit from having small classes.

In the literature and interviews researchers suggested that any investment in a class size needs to be accompanied by support for teacher change. Stated another way, if a state or country is going to invest in class size reduction, there needs to be concomitant investments in professional development so that educators have the tools they need to make the most of smaller classes. Joan McRobbie made such a case:

You often hear people say what should accompany smaller classes is professional development of teachers so that they learn strategies for teaching in small classes but then no one can seem to answer the question what are those strategies, what do you do differently if you have a class of 35 versus a class of 20 or whatever.

Echoing the findings on teacher practice, Odden (1990) pointed to work from the STAR study that noted that professional development related to teaching strategies for smaller groups had

little effect on third-grade teaching practice. Jeremy Finn (2002) alluded to the issue of teacher quality, noting that an influx of new teachers in a class size reduction context paired with the need for retraining current teachers makes a system of professional development especially important. McRobbie suggested strategies at the level of professional community. She thought of professional development systemically, as something that was not a make-and-take approach provided in an isolated in-service but instead generated a stronger community of colleagues:

The key issue is figuring out how to make sure the teachers get the kinds of professional development that they need in order to be able to do the job, as opposed to the kind where you just go off to a hotel to a conference all day... the kind that is sort of embedded in your daily work that has to do with mentoring and modeling and meeting with other teachers and sitting down and saying, “Here’s what we know the kids need to learn, how do we know if they are learning it and what do we do if they are not?” A staff working together, the staff that works all with the same students group sitting down.

This is a very different image of professional development—instead of being delivered to teachers by experts, this collaborative approach suggests that cultural change and leadership are vitally important to the development enterprise. It is an investment in staff expertise, recognition that class size reduction has a vital instructional component that requires development. From this perspective there should not be a tradeoff between teacher quality and class size. Instead, an investment in teacher quality is the key to unlocking the potential of class size reduction.

Discussion

What makes research most valuable to a democracy over the long haul is uncertainty about what it may find. Research that merely confirms the conventional wisdom is not without value, but its value is limited. Research that really carries a payoff is research that surprises us, that shows us something we did not know or that forces us to reconsider something that we thought we knew. (Henig, 2008, p. 237)

In *Spin Cycle*, Jeffrey Henig explores how research on charter schools has been used within public policy debates. He contrasts the needs of the research and policy communities, arguing that they operate using different standards and needs and are therefore often in conflict with one another. One clear difference is the fact that policy makers look for convergence in research findings so that they can take policy relevant action while researchers long for a new and different result to distinguish themselves from their colleagues. As a result, researchers sometimes overstate and simplify the certainty of their findings as they attempt to communicate their research.

In our researcher interviews on class size reduction, we saw this play out as researchers narrated the plot of policy enactment that provided the backstory for the literature. Research and policy had a symbiotic relationship, with researchers feeding results to policymakers who used findings to justify public investment in class size reduction programs that provided data collection opportunities for researchers in these new CSR programs. This cycle progressed with sometimes selective use of research, relying on projects sold as the “gold standard” (what Henig refers to as the “killer study”) and the marshalling of politically powerful stakeholders to maintain programs even in the face of muddy results. The dual forces of research and policy remind us of Dr. Doolittle’s Pushmi-pullyu—comprising a single set of discussions and actions but often going in opposite

directions. It is within this broad context that we set our discussion of our conversations with researchers about class size reduction, recognizing that they do not stand alone but that they are framed in relation to a vibrant policy debate about CSR.

The large and varied literature related to class size reduction rests on early meta-analyses and re-analyses that variously find positive effects on student outcomes. At this point, we know that none of the previously implemented CSR programs is perfect—each had strengths and weaknesses that reflect the politics and compromises of the moment. But across the research conversations, we would have to say that we think we are getting good enough research—that taken as a group, we can begin to form a fuzzy picture of the class size reduction research.

The biggest take-home message is that CSR, PTR, and CS research cannot be used interchangeably. As long as these frameworks for allocating resources are conflated we will have continued disagreement about how CSR affects student outcomes. While PTR is the simplest data to gather and studies of CS can be informative, they often do not reflect the day-to-day life in the CSR classroom. Pointing to this issue may seem overly simple—that we could just argue that studies on PTR should be eliminated from analysis of class size reduction research. The confounding of the literatures and theories of action at work in CSR, PTR, and CS in policy, practice, and research shows that they continue to be confused in the minds of multiple audiences. Researchers generally state that what teachers do is as important as how many students they have—that instructional practices must change if CSR is to be effective. Most researchers we read and talked with could not point to work that showed change in teacher practice when class sizes were reduced—in fact, they held that no change occurred. One question we find ourselves asking is what constitutes a change in teacher practice? What has to change for researchers to recognize it as something different? If the quantity of certain practices change, are things different?

Beyond recognizing how researchers think about teacher change, we need more focused attention to the change itself. Much of the research on class size reduction has had a singular focus on student outcomes. Those outcomes have been difficult to interpret because the treatment has not been clearly described or enacted. One way that we might better understand the outcomes of class size reduction is to have an enhanced sense of the nature of instruction in varied CSR instructional contexts. This will require a two-pronged approach. The first is to use the growing body of research on best practices to build a framework for instructional strategies that capitalize on the resource of a smaller group. This approach is based on the idea that CSR is more than an administrative tool; instead, it requires specific actions by teachers to change the learning opportunities available for students. Work by Blatchford and colleagues has laid the foundation for this and it can be extended by building on content specific knowledge practice and the emerging scholarship on classroom process.

Recognizing that change in teacher practice must be facilitated, the second prong of this work would address the needs for teacher and administrator professional development. Few of the CSR implementations included targeted teacher support on CSR pedagogy and those that did may have been less effective than needed because they lacked a systematic literature on best practice. Next generation implementation and research should focus on what educators need to know to use CSR effectively and models of education that productively develop that knowledge.

If CSR is an intervention, should it be targeted to those most in need or should it be universally administered as a benefit to all? Whose benefit should be considered when such a program is implemented? Most researchers agreed that CSR had the greatest potential for students typically deemed as at risk—children of poverty and of color. Others extend the notion of benefit to middle class families, suggesting that it is a kind of insurance policy for students who are likely to do well in school anyway. The immense popularity of CSR was also recognized—parents wanted the benefit for their children and teachers wanted it to make teaching easier. This popularity made

changes in the policy difficult to leverage as the electorate and lobbying groups worked hard to maintain an easy to understand policy alternative. One of the main issues to be considered is whether class size reduction is seen as a tool to close the pervasive achievement gap or if it is a tool to boost achievement across all student groups. The former calls for a targeted approach; the latter a universal approach.

The literature on class size reduction is anything but dry and dispassionate. There is more sniping and name calling than we ever thought. One interview we conducted was practically unusable for this paper as the researcher spewed so much venom about state education officials he disagreed with and about other scholars who have researched the topic. Why do people become incensed when talking about how many kids to put in a classroom? Our hunch, after much reflection, is that it turns on two key issues. The first is that conversations about class size reduction are flashpoints for the issue of what counts as evidence in education research. When researchers do not see their value systems operationalized in inquiry they raise flags about the work's adequacy. The rules of the game are not unitary, but are shaped to the perspectives of varied communities of researchers. It's no wonder policymakers have a hard time making sense of what we do—researchers are not a unified “we” but instead are more likely characterized as tribes of likeminded scholars. This played out specifically in terms of what researchers saw as the findings of the research and their suggestions for next steps.

The second point is that class size reduction turns on basic issues of equity. It forces us to think about the basic inequality of schooling, the mechanisms that might mediate those differences, and the investments that we are willing to make as a society to put success in reach of all children. The very idea that people would think that achievement goes up just by changing the number of students in a classroom is typical of the idealistic thinking that afflicts much of education. Class size reduction is not an inoculation that can ameliorate the damage that poverty, violence, or inadequate child care may set in the path of children coming to school for the first time. It is enacted in the institutional context of high stakes testing, crumbling buildings, increasing numbers of children with high needs, and competition from other programs for teacher attention and effort. Adding resources for class size reduction is a nod toward the inequities that form the foundation of schooling but it is not enough.

CSR is part of a system of reforms and problems that will be most fruitfully considered in a coordinated manner—in terms of both the practice and research of schooling. It necessitates implementation that connects the resources for class size reduction with all curricular, administrative, and institutional efforts that shape teaching and learning. It will require many different kinds of inquiry—large-scale studies that allow disaggregation of results as well as small-scale studies of process and mapping of social relations and practice. Class size reduction cannot solve all of our problems. But considering its potential as part of coordinated systems—practice, policy, and research—will make it more likely to be appropriately understood.

References

- Achilles, C. M., Finn, J. D., & Pate-Bain, H. (2002). Measuring class size: Let me count the ways. *Educational Leadership, 59*(5), 24–26.
- Addonizio, M. F., & Phelps, J. L. (2000). Class size and student performance: A framework for policy analysis. *Journal of Education Finance, 26*(2), 135–156.
- Bain, H., Achilles, C. M., McKenna, B., & Zaharias, J. (1992). Class size does make a difference. *Phi Delta Kappan, 74*(3), 253–256.
- Berger, M. A. (1982, April 17–20). *Class size is not the issue*. Paper presented at the National School Board Association (Atlanta, GA).
- Biddle, B. J., & Berliner, D. C. (2002). Small class size and its effects. *Educational Leadership, 59*(5), 12–23.
- Blatchford, P., Baines, E., Kutnick, P., & Martin, C. (2001). Classroom contexts: Connections between class size and within class grouping. *British Journal of Educational Psychology, 71*, 283–302.
- Blatchford, P., Bassett, P., & Brown, P. (2005). Teachers' and pupils' behavior in large and small classes: A systematic observation study of pupils aged 10 and 11 years. *Journal of Educational Psychology, 97*(3), 454–467.
- Blatchford, P., Edmonds, S., & Martin, C. (2003). Class size, pupil attentiveness and peer relations. *British Journal of Educational Psychology, 73*(1), 15–36.
- Blatchford, P., & Mortimore, P. (1994). The issue of class size in schools: what can we learn from research? *Oxford Review of Education, 20*(4), 411–428.
- Burtless, G. (1996). *Does money matter?: The effect of school resources on student achievement and adult success*. Washington, DC: The Brookings Institution.
- Cahen, L. S., Filby, N., McCutcheon, G., & Kyle, D. W. (1983). *Class size and instruction*. New York: Longman.
- Ehrenberg, R. G., Brewer, D. J., Gamoran, A., & Willms, J. D. (2001). Class size and student achievement. *Psychological Science and the Public Interest, 2*(1), 1–30.
- Emerson, R. M., Fretz, R. I., & Shaw, L. L. (1995). *Writing ethnographic fieldnotes*. Chicago: University of Chicago Press.
- Erickson, F. (1986). Qualitative methods in research on teaching. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed., pp. 119–161). New York: Macmillan.

- Finn, J. D. (2002). Small classes in American schools: Research, practice, and politics. *Phi Delta Kappan*, 83(7), 551.
- Finn, J. D., & Achilles, C. M. (1990). Answers and questions about class size: A statewide experiment. *American Educational Research Journal*, 27(3), 557–577.
- Finn, J. D., Gerber, S. B., Achilles, C. M., & Boyd-Zaharias, J. (2001). The enduring effects of small classes. *Teachers College Record*, 103(2), 145–183.
- Finn, J. D., Pannozzo, G. M., & Achilles, C. (2003). The “whys” of class size: Student behavior in small classes. *Review of Educational Research*, 73(3), 321–368.
- Hanushek, E. A. (1999). Some findings from an independent investigation of the Tennessee STAR experiment and from other investigations of class size effects. *Educational Evaluation and Policy Analysis*, 21(2), 143–163.
- Henig, J. R. (2008). *Spin cycle. How research is used in policy debates: The case of charter schools*. New York: Russell Sage Foundation.
- Glass, G. V., & Smith, M. L. (1979). Meta-analysis of research on class size and achievement. *Educational Evaluation and Policy Analysis*, 1(1), 2–16.
- Grant, C., & Graue, M. E. (1999). (Re)viewing the review: A case study of the *Review of Educational Research*. *Review of Educational Research*, (69)4, 384–396.
- Graue, E., Hatch, K., Rao, K., & Oen, D. (2007). The wisdom of class size reduction. *American Educational Research Journal*, 44(3), 670–700.
- Grissmer, D. (1999). Conclusion: Class size effects: Assessing the evidence, its policy implications, and future research agenda. *Educational Evaluation and Policy Analysis*, 21(2), 231–248.
- Krueger, A. B. (1999) Experimental estimates of education production functions. *Quarterly Journal of Economics*, 114(2), 497–532.
- Molnar, A., & Zmrazek, J. (1994). *Improving the achievement of Wisconsin's students: urban initiative task force recommendations and action plan*. Bulletin no. 95079. Madison, WI: Wisconsin State Department of Public Instruction.
- NICHD Early Child Care Research Network. (2004). Does class size in first grade relate to children's academic & social performance or observed classroom processes? *Developmental Psychology*, 40(5), 651–665.
- NICHD Early Child Care Research Network. (2005). A day in third grade: A large-scale study of classroom quality and teacher and student behavior. *Elementary School Journal*, 105(3), 305.

- Nye, B., Hedges, L. V., & Konstantopoulos, S. (2001). The long-term effects of small classes in early grades: Lasting benefits in mathematics achievement at grade 9. *Journal of Experimental Education, 69*(3), 245–57.
- Nye, B., Hedges, L. V., & Konstantopoulos, S. (2004). Do minorities experience larger lasting benefits from small classes? *Journal of Educational Research, 98*(2), 94–100.
- Odden, A. (1990). Class size and student achievement: research-based policy alternatives. *Educational Evaluation and Policy Analysis, 12*(2), 213–227.
- Rice, J. (1999). The impact of class size on instructional strategies and the use of time in high school mathematics and science courses. *Educational Evaluation and Policy Analysis, 21*, 215–230.
- Robinson, G. E. (1990). Synthesis of research on the effects of class size. *Educational Leadership, 47*(7), 80-90.
- Sims, D. (2008). A strategic response to class size reduction: Combination class and student and student achievement in California. *Journal of Policy Analysis and Management, 27*(3), 457–478.
- Slavin, R. (1989). Class size and student achievement: Small effects of small classes. *Educational Psychologist, 24*(1), 99–110.
- Smith, M. L., & Glass, G. V. (1980). Meta-analysis of research on class size and its relationship to attitudes and instruction. *American Educational Research Journal, 17*(4), 419–433.
- Smith, P., Molnar, A., & Zahorik, J. (2003). Class-size reduction: A fresh look at the data. *Educational Leadership, 61*(1), 72.
- Snyder, T. D., Dillow, S. A., & Hoffman, C. M. (2008). *Digest of education statistics 2007* (NCES 2008-022). National Center for Education Statistics, Institute of Education Sciences, U. S. Department of Education. Washington, DC.
- Stasz, C., & Stecher, B. M. (2002). Before and after class size reduction. In J. D. Finn & M. C. Wang (Eds.), *Taking small classes one step further* (pp. 19–50). Greenwich, CT: Information Age Publishing.
- Zahorik, J., Halbach, A., Ehrle, K., & Molnar, A. (2003). Teaching practices for smaller classes. *Educational Leadership, 61*(1), 75–77.

Appendix

Researcher Interview Questions

Thanks for talking with me today. We're interested in learning more about how the knowledge base related to class size reduction has developed over time. We identified you as someone who could help us understand:

- The general development of the literature related to CSR
- The local, Wisconsin development of class size reduction
- The national policy related to CSR

Let's begin by your telling me a little bit about yourself – what's your background, what are your intellectual interests, how did you get involved in work related to class size reduction?

If you were going to summarize the knowledge base related to class size research, what would be the major points that you would highlight?

- What has been the historical context that has shaped this literature?
- What are the mechanisms underlying the effects of CSR? How do we know?
- What are the effects of instructional practice? Administrative practice?
- What are the strengths of the literature?
- What are the weaknesses?
- Who are the major researchers? What assumptions shape their work?
- How have the methods used in this work shaped what we know?
- How has this knowledge base been translated into policy?
- How has policy been translated to practice?
 - What studies need to be done at this point? Which don't need to be done?
 - If you could direct investment related to CSR, what do you think would make the most sense?
 - What accounts for the popularity of CSR?
 - Who benefits?
 - Who loses out?
 - If you were going to design a study that would add to our knowledge, what would that study look like?
 - Who else do you think I should be talking to in order to get a sense of the literature?

Is there anything that I didn't ask you that I should have?

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