Twenty-First Century Social Science on School Racial Diversity and Educational Outcomes

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I. INTRODUCTION

In 2007 the United States Supreme Court considered the constitutionality of Seattle's and Louisville's voluntary desegregation plans.[1] In *Parents Involved in Community Schools v. Seattle School District No. 1*, the Court concluded that the ways Seattle and Louisville school districts used an individual student's race as a component of their voluntary desegregation student assignment plans[2] were unconstitutional because the plans were insufficiently narrowly tailored to meet the Court's standards for strict scrutiny. At the same time, five Justices[3] recognized the state's compelling

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[1] Parents Involved in Cmty. Sch. v. Seattle Sch. Dist. No. 1, 127 S. Ct. 2738 (2007).

[2] *Id*. *See also* Stephen S. Smith, Karen M. Kedrowski, Joseph M. Ellis & Judy Longshaw, *Your Father Works for My Father: Race, Class, and the Politics of Voluntarily Mandated Desegregation*, 110 TCHRS. COLL. REC. 994 (2008). Stephen Samuel Smith and his colleagues distinguish between two meanings of voluntary desegregation. The first meaning refers to the origins of a desegregation plan; e.g., court-ordered or undertaken by a district on its own volition, which they term voluntarily initiated desegregation. The second meaning refers to the strategy used to pursue desegregation; e.g., mandatory busing or magnet schools. Both Louisville's and Seattle's plans encompassed both aspects of voluntary desegregation: the school districts voluntarily initiated desegregation efforts and the strategies they employed encompassed voluntary aspects in that parents chose to participate in them by selecting to enroll their children into certain schools. In contrast, the Charlotte-Mecklenburg Schools (CMS) operated under a court order to desegregate between 1971 and 2002. To achieve desegregation, CMS employed a mandatory busing plan for almost twenty years. After 1991, most components of the mandatory desegregation plan became voluntary when a race-conscious controlled-choice magnet plan replace mandatory busing. Families voluntarily opted to participate in the choice plan. *Id*.

[3] *Parents Involved*, 127 S. Ct. at 2788 (Kennedy, J., concurring); *Id.* at 2800 (Breyer, J., dissenting).

interest in diverse public schools and in overcoming the racial isolation within them. Justice Kennedy's opinion suggested several specific strategies that school districts might employ to achieve diverse schools.[4]

Social science research about the relationships between school racial composition and educational outcomes was a prominent feature of many of the amicus briefs submitted to the Court on behalf of the Petitioners and Respondents in *Parents Involved*.[5] This research was brought to bear on the questions of whether racially diverse student bodies constituted a compelling state interest, and if so, whether Seattle and Louisville's plans were sufficiently narrowly tailored to achieve that interest.[6] Of the sixty-four briefs submitted in both cases, at least half included substantial discussions of social science research.[7] Among those with substantial social science, five amicus briefs and one reply brief were filed on behalf of the Petitioners, who challenged the constitutionality of Seattle's and Louisville's voluntary desegregation pupil assignment plans.[8] Twenty-seven amicus briefs were filed on behalf of the Respondents, who defended the constitutionality of the race-conscious plans. [9]

This Article seeks to contribute to the development and refinement of the role of social science amicus briefs in education rights cases. To achieve this end, I analyze, compare, and critique five of the thirty-two amicus briefs with substantial social science citations that were filed in *Parents Involved*.[10] These particular five briefs were chosen because their authors are seasoned researchers, educational practitioners, or organizations representing social and behavioral scientists. The foci of the five key briefs were the effects of school racial composition on K-12 educational outcomes and intergroup relations. Their common foci encouraged comparisons of the research garnered to support their arguments. While many of the other briefs extensively cite social science, they do not focus on both K-12 educational outcomes and intergroup relations to the extent found in the five key briefs.

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[4] *Parents Involved*, 127 S. Ct. at 2797 (Kennedy, J., concurring).

[5] Nat'l Acad. of Educ. [NAEd], Comm. on Soc. Sci. Research Evidence on Racial Diversity in Sch., *Race Conscious Policies for Assigning Students to Schools: Social Science Research and Supreme Court Cases* (Robert Linn & Kevin Welner eds., 2007) [hereinafter NAEd Report] (summarizing the social science research found in the sixty-four amicus briefs submitted in *Parents Involved*).

[6] *Id.*

[7] *Id.* at 1.

[8] *Id.* at 47.

[9] *Id.* at 47–48.

[10] *Id.*

The five key social science amicus briefs were those filed by Drs. David Armor, Abigail Thernstrom, and Stephen Thernstrom,[11] and Drs. John Murphy, Christine Rossell, and Herbert Walberg in support of the Petitioners,[12] and the briefs submitted by the American Educational Research Association (AERA),[13] the American Psychological Association (APA),[14] and 553 Social Scientists[15] in support of the Respondents. The two briefs filed on behalf of the Petitioners and the three filed on behalf of the Respondents differed substantially in the social science research they cited. The briefs supported very different conclusions about whether the scientific record supports a compelling interest in diverse schools. This Article originates in the striking contrasts in the scope, breadth, quality, age, and interpretations of the social science research literatures introduced in these five amicus briefs.

A. *Social Science Evidence and Educational Rights Cases*

There are many paths for social science research to reach the courts. The path of interest in this Article is the amicus brief. Scholars from many disciplines have commented on the use of social science amicus briefs in educational rights cases.[16] There is no longer much of a debate as to whether

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[11] Brief for Drs. David J. Armor, Abigail Thernstrom & Stephan Thernstrom as Amici Curiae Supporting Petitioners, *Parents Involved* and Meredith v. Jefferson County Bd. of Educ., 127 S. Ct. 2738 (2006) (Nos. 05-908, 05-915) [hereinafter Brief of Dr. David J. Armor et al.].

[12] Brief for Drs. John Murphy, Christine Rossell & Herbert Walberg as Amici Curiae Supporting Petitioners, *Parents Involved* and *Meredith*, 127 S. Ct. 2738 (2006) (Nos. 05-908, 05-915) [hereinafter Brief of Dr. John Murphy et al.].

[13] Brief for the American Educ. Research Ass'n as Amicus Curiae Supporting Respondents, *Parents Involved* and *Meredith*, 127 S. Ct. 2738 (2006) (Nos. 05-908, 05-915) [hereinafter Brief of the AERA].

[14] Brief for the American Psychological Association and the Washington State Psychological Association as Amici Curiae Supporting Respondents, *Parents Involved* and *Meredith*, 127 S. Ct. 2738 (2006) (Nos. 05-908, 05-915) [hereinafter Brief of the APA].

[15] Brief for 553 Social Scientists as Amici Curiae Supporting Respondents, *Parents Involved* and *Meredith*, 127 S. Ct. 2738 (2006) (Nos. 05-908, 05-915) [hereinafter Brief of 553 Social Scientists].

[16] *See generally* ANGELO ANCHETA, SCIENTIFIC EVIDENCE AND EQUAL PROTECTION OF THE LAW (2006) [hereinafter SCIENTIFIC EVIDENCE]; MARK A. CHESLER, JOSEPH SANDERS & DEBRA S. KALMUSS, SOCIAL SCIENCE IN COURT: MOBILIZING EXPERTS IN THE SCHOOL DESEGREGATION CASES (1988); Angelo Ancheta, *Civil Rights, Education Research, and the Courts*, 35 EDUC. RESEARCHER 26 (2006); Herbert Garfinkel, *Social Science Evidence and the School Desegregation Cases*, 21 J. POL. 37 (1959); Samuel R. Lucas & Marcel Paret, *Law, Race, and Education in the United States*, 1 ANN. REV. OF

social science should be introduced into education rights cases; rather, discussions concern which social science is appropriate and how it should be introduced.[17]

Discussions continue, however, about whether the social science evidence introduced in educational equity and school desegregation cases influences jurists' decisions, and if so, under what circumstances the evidence is most influential.[18] Legal scholars have identified several reasons to be skeptical about the likely influence of social science evidence in modern education rights cases. The adversarial process can easily twist the meaning of the research presented**.**[19] Judge Richard Posner observed "[many] experts bend their science in the direction from which their fees come."[20] Because of a lack of training or expertise in the relevant fields of knowledge, jurists often have difficulty discerning the more methodologically sound studies from the weaker ones. They typically have little training in interpreting social science findings. Moreover, courts may be skeptical of the value of social science research regarding the harms of racial isolation and the benefits of diversity. Some jurists perceive the social science evidence as highly politicized because a number of the researchers who provide expert testimony in desegregation cases seem politically committed to certain findings.[21]

Furthermore, it is widely accepted that jurists' personal opinions and ideologies play an influential role in judicial decisions.[22] For the jurists who frame educational rights in moral or normative terms, social science evidence is, at best, marginally useful.[23] In addition, because desegregation and other educational rights cases involve matters about which most judges have some personal experience, they may perceive a lesser need for social science to

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LAW & SOC. SCI. 203 (2005); Ronald Roesch, Stephen L. Golding, Valerie P. Hans & N. Dickon Repucci, *Social Science and the Courts: The Role of Amicus Curiae Briefs*, 15 LAW & HUM. BEHAV. 1, 2–3 (1991); Michael Rustad & Thomas Koenig, *The Supreme Court and Junk Social Science: Selective Distortions in Amicus Briefs*, 72 N.C. L. REV. 91 (1993); James Ryan, *The Limited Influence of Social Science Evidence in Modern Desegregation Cases*, 81 N.C. L. REV. 1659 (2003); Janet Schofield & Linda R. M. Hausmann, *School Desegregation and Social Science Research*, 59 AM. PSYCHOLOGIST 538 (2004); William L. Taylor, *Introduction and Overview: The Role of Social Science in School Desegregation Efforts*, 663 J. NEGRO EDUC. 196 (1997).

[17] CHESLER, *supra* note 16, at 181.

[18] *See id*.

[19] ANCHETA, SCIENTIFIC EVIDENCE, *supra* note 16, at 27–28.

[20] Ryan, *supra* note 16, at 1676 n.68.

[21] *Id.* at 1675.

[22] *Id*.

[23] Ancheta, *Civil Rights, Education Research, and the Courts*, *supra* note 16, at 27; Ryan, *supra* note 16, at 1690–91.

inform their opinions.[24] A jurist's view of the law and her personal experiences with education may become the prism through which she refracts the social science evidence about the effects of school racial compositions that come before her.

The distinction between adjudicative and legislative fact-findings is relevant for understanding the judiciary's use of social science evidence.[25] When a court engages in adjudicative fact-finding, it employs evidence to help it resolve a dispute between parties. *Daubert* standards assist the court in filtering good evidence from bad.[26] Legislative fact-finding formulates policy or legal principles.[27] Here, there are no existing standards for screening scientific evidence.[28] The courts can import the standards from adjudicative fact-finding, but they rarely do.[29]

Assessing the influence of the social science research presented in amicus briefs is difficult for many reasons.[30] Relying on counts of citations within Supreme Court opinions as evidence of its impact may generate a misleading impression of its influence. Counts of citations might underestimate the influence of research because judges may be reluctant to cite research even if it affected their opinions.[31] Also, some judges may use

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[24] Ryan, *supra* note 16, at 1679.

[25] Ancheta, *Civil Rights, Education Research, and the Courts*, *supra* note 16, at 27.

[26] Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 593–94 (1993). For an argument supporting judicial enforcement of certain basic standards for social science evidence, see Proof Brief for Social Science Academics and Associations as Amicus Curiae Supporting Plaintiffs-Appellees at 6–12, Varnum v. Brien, (No. 07-1499) (Iowa Sup. Ct. appeal docketed October 10, 2007) [hereinafter Brief of Social Science Academics and Associations]. *Daubert* standards are reflected in Federal Rule of Evidence 702, which states:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

FED. R. EVID. 702 (2006). *See* ANCHETA, SCIENTIFIC EVIDENCE, *supra* note 16, at 127–31 for a critical discussion of the practical and epistemological problems with the *Daubert* approach to scientific knowledge.

[27] Ancheta, *Civil Rights, Education Research, and the Courts*, *supra* note 16, at 27.

[28] *Id*.

[29] *Id*.

[30] Roesch et al., *supra* note 16, at 2–3.

[31] *Id.* at 3.

social science as a post hoc rationalization, citing studies or briefs when they support their positions and ignoring them when they do not.[32]

Nonetheless, because social science will likely continue to have some direct or indirect—albeit limited—influence in the judicial decision-making process in educational rights cases, amici will continue to submit social science briefs to Court.

B. *Amicus Briefs as Advocacy and Science Translation*

A social science amicus brief is a tool designed to bring to the attention of judges and justices scientific information relevant to a party's legal theory.[33] The potential value of an amicus brief for the Court rests on its ability to communicate social science knowledge adequately without overstating the data's scientific authority.[34] Amicus briefs are also written for the purpose of convincing the Court on one or more issues, not necessarily to be utterly objective summaries of research.[35] Unlike what would be expected of a literature review published in a scholarly journal, an amicus brief rarely is, and has not been expected to be, a clinical and comprehensive summary of research. Nor is it expected to be fully balanced in its interpretation of research findings. However, "[b]riefs may also be analyzed along a continuum. At one end is a *science translation* brief, which is intended to be an objective summary of a body of research. At the other end is an *advocacy* brief, which takes a position on some legal . . . issue."[36] Amicus briefs tend to reflect aspects of both science translations and advocacy.[37] The issue of interest in this Article is the appropriate role of the two dimensions in education rights amicus briefs.

C. *Social Science Amicus Briefs in* Parents Involved

Despite social science amicus briefs' uneven record of influence on the Court's decisions, there is reason to believe that the *Parents Involved* social science amicus briefs played some role in the Court's opinions. Justice Breyer referred extensively to the social science research records provided in the amicus briefs to support his opinion that there are broad compelling

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[32] *Id.*

[33] *Id.* at 4.

[34] *Id.* at 9.

[35] NAEd Report, *supra* note 5, at 5.

[36] Roesch et al., *supra* note 16, at 6.

[37] *Id.*

interests in diversity and in avoiding racial isolation.[38]

Social science amicus briefs had a clear role in Justice Thomas' opinion. In addition to citing specific works of social science scholarship, Justice Thomas drew directly from the text of the amicus briefs filed on behalf of the Petitioners to support his judgment that the social science record is too ambiguous and contradictory to support a compelling interest in diversity. He quoted from Petitioners' social science briefs twice; first with respect to the literature about school racial composition and achievement ("[i]n study after study, racial composition of a student body, when isolated, proves to be an insignificant determinant of student achievement,")[39] and again with respect to the inferences about compelling interests from the school diversity literature ("the research shows that there is no clear and consistent evidence of [educational] benefits" of diverse schools).[40]

The role of social science amicus briefs is much less clear in the other opinions. Chief Justice Roberts' opinion did not cite any social science research or any of the social science briefs. But he noted that "[t]he parties and their *amici* dispute whether racial diversity in schools in fact has a marked impact on test scores and other objective yardsticks or achieves intangible socialization benefits."[41] Neither Justice Kennedy's opinion nor Justice Stevens' dissent referred to any social science research or to a specific social science amicus brief.[42]

Two groups of scholars examined the social science cited in the *Parents Involved* cases. The National Academy of Education (NAEd) convened a distinguished panel of scholars and methodologists in the fall of 2006 to summarize and analyze the social science research referenced in the sixty-four briefs submitted in both cases.[43] Under the leadership of Professors Robert Linn and Kevin Welner, the panel analyzed only the briefs that included substantial discussions of social science research.[44] The panel's goal was to develop an independent summary and analysis of all the briefs' social science in order to inform policymakers and the public on issues related to the *Parents Involved* cases.[45]

The NAEd panel found that the social science in the Petitioners' six

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[38] *Parents Involved*, 127 S. Ct. at 2820–22, 2824 (Breyer, J., dissenting).

[39] *Id.* at 2777 (Thomas, J., concurring) (alteration in original) (quoting Brief for Dr. John Murphy et al., at 8).

[40] *Id.* at 2777 (alteration in original) (quoting Brief for David J. Armor et al., at 29).

[41] *Id.* at 2755 (Roberts, J., plurality).

[42] *Id.* at 2797–800 (Stevens, J., dissenting); *Id.* at 2788–2797 (Kennedy, J., concurring in part and concurring in the judgment).

[43] NAEd Report, *supra* note 5, at v–vi.

[44] *Id*.

[45] *Id.* at vi.

briefs (five amicus briefs and one reply brief) and the Respondents' twenty-seven amicus briefs occasionally overlapped.[46] It noted that while the thirty-two amicus briefs that cited social science research generally included the most recent and important studies, the research cited in the Petitioners' five briefs and Respondents' twenty-seven briefs was conducted in different periods of time.[47] The briefs opposing race-conscious pupil assignment policies primarily cited studies published earlier than those cited in the briefs supporting race-conscious voluntary desegregation policies.[48] The earlier studies examined desegregation interventions, while the later ones generally reported on the effects of differing school racial compositions on outcomes.[49] The studies also differed in the nature and quality of the data, with more recent databases allowing for more sophisticated and refined analyses,[50] which allow for more valid and reliable findings.

While the NAEd panel's report focused on social science in the *Parents Involved* amicus briefs, a second group of scholars led by Professor Linda Tropp examined how the Court's opinions in *Parents Involved* used social science.[51] The researchers first reviewed the current social science record on intergroup relations and, to a lesser extent, on educational outcomes.[52] They concluded that the preponderance of social science evidence indicates positive relationships among school racial diversity, academic achievement, and intergroup relations, and that the evidence suggested "implementing race-conscious programs in schools can be effective in reducing racial segregation and promoting more positive interracial relations."[53] The researchers also described the points of intersection and divergence between the social science record and the Court's various *Parents Involved* opinions.[54]

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[46] *Id.* at 21–22.

[47] *Id.* at 13.

[48] *Id.* at 14.

[49] NAEd Report, *supra* note 5, at 14.

[50] *Id.*

[51] Linda R. Tropp, Amy E. Smith & Faye. J. Crosby, *The Use of Research in the Seattle and Jefferson County Desegregation Cases: Connecting Social Science and the Law*, 7 ANALYSES OF SOC. ISSUES & PUB. POL'Y 93, 114 (2007) (analyzing the use of social science in the *Parents Involved* decision).

[52] *Id.*

[53] *Id.*

[54] *Id.* at 113.

D. *Purpose and Focus of this Article*

This Article focuses on a narrow question that neither the NAEd Report nor the social psychologists' article addressed: If amicus briefs are to bring relevant social science evidence to the attention of the Court in educational rights litigation, which research studies should be summarized and interpreted in the briefs?[55] I respond to this question in three ways. First, I build upon and extend the analyses of the social science amicus briefs conducted by the NAEd panel and the social psychologists by conducting a content analysis and methodological critique of five key amicus briefs filed in the 2006 *Parents Involved* cases.

Second, I introduce a group of social science studies about the effects of school racial diversity on educational outcomes conducted since 2000. The preponderance of these studies reported positive relationships between diversity and various school outcomes. I selected these studies because they are emblematic of the methodologically superior research on this topic being conducted in the twenty-first century. By discussing these studies, I hope to insert their findings into public discourse on the question of racial diversity as a compelling state interest, to illustrate their methodological rigor compared to earlier studies, and to suggest what is lost when amicus briefs' syntheses of social science literature do not meet scientific standards.

Third, based on the findings from my analysis of the five key social science briefs and the summaries of the twenty-first century social science studies on school racial composition effects, I offer several recommendations to improve the likelihood that future amicus briefs will bring rigorous and accessible social science summaries to the attention of the Court in education rights cases. I argue that the center of gravity of a social science amicus brief ought to be an objective scientific translation of a body of research, not advocacy of a position. A science translation focus will require that scholarly standards guide the preparation of social science amicus briefs.[56]

Finally, because many members of the judiciary are not prepared to use the social science in an amicus brief any more than they are prepared to use

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[55] The answer also relates to whether the brief is a science translation or advocacy, an issue I will address later in this Article.

[56] The argument that scientific principles ought to guide the preparation and utilization of social science amicus briefs is similar to the arguments advanced by several social science organizations with respect to the certification of social science expert witnesses. *See* Sally Hillsman, *Who Speaks for Social Science—in Court?*, ASA FOOTNOTES (American Sociology Ass'n, Wash., D.C.), May/June, 2008 at 2; Brief of Social Science Academics and Associations, *supra* note 26, at 5 (wherein the American Sociological Association, the American Anthropological Association, and other institutional and individual amici argue that *Daubert* standards should be applied to the certification of social science expert witnesses).

the science that underlies nanotechnology or DNA evidence,[57] I propose a strategy to enhance jurists' resources to address any lacunae in their understanding of contemporary social science in educational rights cases, and the cutting-edge research methodologies that contribute to the development of that knowledge.

II. CONCEPTUAL AND METHODOLOGICAL ISSUES

A. *Varying Terminology and Outcomes in Desegregation and Diversity Research*

Several conceptual and methodological issues in social science research are central to the arguments I advance in this Article. The foci and terminology used in studies of school racial compositional effects have shifted over the past fifty years. Although all the social science studies discussed in this Article examined related outcomes, the focus of a particular study may have been labeled desegregation, integration, segregation, school racial composition, or diversity. Early studies (pre-1990) tended to examine the effects of court-ordered desegregation in a single school district. With the decline in the number of school systems under court desegregation orders since the late 1980s, researchers switched their interests to the effects of variations in school racial composition.[58] The differences in the terminology across studies reflect important differences in the studies' underlying conceptual frameworks, research goals, the nature of the relationships under investigation, and the social and political realities of the time frames in which the studies were conducted. Nevertheless, the core issue of interest has been essentially the same: the relationship between a school's racial composition and educational outcomes.

The outcomes examined in school racial composition effects research fall into several domains: academic, intergroup relations, and adult life-course trajectories. Outcomes also can be conceptualized as short- or long-term effects.[59] As Table 1 illustrates, short-term academic outcomes include

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[57] *See* Claudia Dreifus, *A Conversation with James P. Evans*, N.Y. TIMES, July 1, 2008, at D2. While there are important differences in the development of the natural and social sciences, both are disciplines funded by the National Science Foundation (NSF). Moreover, the NSF considers the social sciences to be STEM (science, technology, engineering and mathematics) disciplines. *See* LISA FREHILL ET AL., NAT'L SCI. FOUND., TOOLKIT FOR REPORTING PROGRESS TOWARD NSF ADVANCE: INSTITUTIONAL TRANSFORMATION GOALS 28 (2005), http://www.cpst.org/diversity/toolkit1.pdf.

[58] NAEd Report, *supra* note 5, at 15.

[59] Amy S. Wells & Robert L. Crain, *Perpetuation Theory and the Long-Term Effects of School Desegregation*, 64 REV. EDUC. RES. 531, 531 (1994) (distinguishing the short- and long-term outcomes of school desegregation).

students' grades, test scores, and high school graduation rates. Long-term academic outcomes refer to educational aspirations and attainment. Intergroup dynamics include cross-racial friendships and racial attitudes in the short term, and the degree to which the perpetuation of racial fear and hostilities cease to be transmitted across generations in the long term. The last domain includes indicators of adults' life-course trajectories, such as occupational attainment, the demographic composition of adults' neighborhoods and workplaces, and individuals' preparation for citizenship in a multiethnic, democratic society.

B. *Changes in Research Design*

Over the last four decades, the designs[60] of school compositional effects research have shifted from primarily experiments and quasi-experiments[61] to

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[60] A research design is the planned strategy for conducting a scientific study. The design serves as a guide or a structure for the sequences of activities that permit the researcher to conduct the study. In this footnote and several others that follow, I provide nontechnical definitions of some of the social science research terminology that appears through out this Article. Readers interested in more detailed or technical definitions of these constructs may wish to consult the sources listed below [hereinafter Suggested Sources for Methodological Definitions]. *See generally* EARL BABBIE, THE BASICS OF SOCIAL RESEARCH (4th ed. 2008); KENNETH D. BAILEY, METHODS OF SOCIAL RESEARCH (4th ed. 1994); W. LAWRENCE NEUMAN, SOCIAL RESEARCH METHODS: QUALITATIVE AND QUANTITATIVE APPROACHES (5th ed. 2003); SHULAMIT REINHARZ, FEMINIST METHODS IN SOCIAL RESEARCH (1992); RESEARCH METHODS IN THE SOCIAL SCIENCES (Bridget Somekh & Cathy Lewin eds., 2005); CLIVE SEALE, RESEARCHING SOCIETY AND CULTURE (2d ed. 2004); WHITE LOGIC, WHITE METHODS (Tukufu Zuberi & Eduardo Bonilla-Silva eds., 2008); American Educational Research Association, *Standards for Reporting on Empirical Social Science Research in AERA Publications*, 35 EDUCATIONAL RESEARCHER 33, 33–40 (August/September 2006).

[61] In experimental research participants are randomly assigned to control and treatment groups and all other conditions are held constant (ideally, under laboratory conditions). Any differences in outcomes between control and treatment groups are attributed to the intervention. In quasi-experimental research, participants have not been randomly assigned to treatment and control groups. Thus, quasi-experiments are unlike experiments in that they cannot control for all extraneous factors that might also influence outcomes. In quasi-experiments, researchers attempt to control for extraneous factors with various statistical operations at the analysis stage rather than through initial random assignment to treatment or control groups as is done in true experiments. For example, in quasi-experimental social science and educational research, scholars may use subjects' prior achievement scores and other individual and family background information to control for the likely effects of these extraneous factors on the relationship between their school's racial composition and educational outcomes. *See* THOMAS D. COOK & DONALD T. CAMPBELL, QUASI-EXPERIMENTATION: DESIGN AND ANALYSIS ISSUES FOR FIELD SETTINGS (1979) (describing the elements of quasi-experimental research designs).

Table 1. Effects of K-12 School Diversity by Domain

Domain of Outcome	Short Term	Long Term
Academic	• Achievement (grades, test scores) • High school graduation	• Educational aspirations • Educational attainment
Intergroup Dynamics	• Interracial peers • Reduced prejudice and fear, and stereotypes	• Break in the intergenerational perpetuation of racial hostility and fears
Life Course		• Occupational attainment • Integrated neighborhoods • Integrated workplace • Preparation for citizenship in multiracial democracy

surveys[62] and multiple methods case studies.[63]

Many of the older experiments or quasi-experiments on the effects of school racial composition on student outcomes evaluated the effectiveness of a particular desegregation plan in a single school district. Experimental and quasi-experimental designs offer useful insights if they link student outcomes to a specific policy or program, which in the early studies was the actual desegregation intervention. However, there are important limitations to drawing inferences to larger populations of schools and students from an experimental case study that implements a particular desegregation plan in a unique school district.[64]

Desegregation experiments were notoriously problematic for many reasons. As the National Academy of Education panel observed, a

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[62] Survey research is a very common social science research design used to measure and model the relationship between school racial compositional effects and educational outcomes. A researcher develops a questionnaire with multiple items measuring the relationships of interest as well as possible intervening and antecedent factors such as student or family background characteristics. The researcher administers the questionnaire to a sample of subjects (chosen either randomly or nonrandomly from the target population). Survey researchers then use a variety of measures of individual, family background, and school-level characteristics to control for the likely effects of these extraneous factors on the key relationship of interest; in this case, the relationship of school's racial composition to educational outcome. *See* Suggested Sources for Methodological Definitions, *supra* note 60.

[63] Multiple-methods research designs utilize more than one approach to gathering and analyzing data. Multiple-methods designs let findings from one type of data analysis inform the others. *See* Jerry A. Jacobs, *Multiple Methods in ASR*, FOOTNOTES, Dec. 2005, http://www.asanet.org/footnotes/dec05/indextwo.html. Case studies are in-depth examinations of a single event, group, or phenomenon in its social and political context. For example, a multiple-methods case study of school racial composition effects might employ surveys, interviews, and document analysis related to desegregation in a single school district over several decades. Findings from case study research can be nuanced, but they are limited in their generalizability. *See* Suggested Sources for Methodological Definitions, *supra* note 60.

[64] The Riverside, California, elementary school desegregation plan illustrates these limitations. It was initiated in 1965 shortly after the Watts riots in nearby Los Angeles and implemented one year later. The plan consisted of one-way transfers of black and Latino/a students to white schools. When the plan began, a minority child was, on average, one of two children of color in a classroom. It was not until the sixth and final year of the study that the percent of minority children in the classrooms (twenty percent) approximated the distribution of the minority children in the district. HAROLD B. GERARD & NORMAN MILLER, SCHOOL DESEGREGATION: A LONG TERM STUDY 58 (1975). These (and other) implementation and design flaws undermined the integrity of the desegregation "treatment" and, hence, compromised the study's internal validity. The fact that the experiment was confined to a single school district limits the generalizability of its outcomes.

desegregation policy's direct causal effects[65] were necessarily confounded with associated reactions to the policy, such as the selective withdrawal of students from schools in response to a desegregation order, nonequivalence of treatment and control groups due to sample attrition,[66] or the poor quality of the policy's implementation.[67]

All studies face the challenge of isolating the effects of school racial composition on outcomes from other factors, such as school quality. But advances in research designs, higher-quality data, and better analytic tools make it easier for researchers today to correct for the design limitations characteristic of many earlier studies.[68] In some recent studies, researchers have utilized data from an entire state population.[69] More typically, a random sample of students or schools is selected to represent the population, or a purposive sample[70] of students or schools is drawn based on characteristics necessary to answer the research question.

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[65] Causal effects concern the relationship between two phenomena whereby one is found to be the result of the other. To establish causality, the cause must precede the effect, the cause and effect must covary, and competing explanations for the observed covariation must be eliminated. *See* Suggested Sources for Methodological Definitions, *supra* note 60.

[66] Sample attrition occurs when, over the course of the study, members of a sample drop out of the research project. This is a potential threat to drawing conclusions about the study's results if those who drop out are different from those who remain in the study. Even if the subjects were initially randomly assigned to treatment and control conditions, sample attrition will corrupt the equivalence of the two conditions. Thus, any differences in outcomes (or lack of differences in outcomes) may be due to differences in the remaining subjects in the conditions rather than the actual treatment effects. *Id*.

[67] NAEd Report, *supra* note 5, at 18–19.

[68] *Id*.

[69] *See, e.g.*, Eric A. Hanushek, John F. Kain & Steven G. Rivkin, New Evidence about Brown v. Board of Education: The Complex Effects of School Racial Composition on Achievement 1 (2008) (unpublished manuscript, on file with author). *See also* Kathryn M. Borman et al., *Accountability in a Postdesegregation Era: The Continuing Significance of Racial Segregation in Florida's Schools*, 41 AM. EDUC. RES. J. 605 (2004).

[70] A purposive sample is a type of nonrandomly selected group of participants. Members of a purposive sample are chosen because they possess a predefined characteristic that is critical to the research questions under investigation. Other types of nonrandom samples include convenience samples, chosen because they are willing to participate, and snowball samples, whereby a participant in a study recommends other potential subjects who are then invited to participate by the researcher. Other non-random sampling includes quota sampling, which generates sufficient numbers of individuals to allow for analysis of small sub-populations.

C. *Improved Data and Advances in Statistical Analyses*

A number of high quality survey data sets with these large, representative samples are now available for studying the effects of school racial composition on student outcomes. The survey datasets employ sophisticated measures of achievement outcomes (e.g., gain scores)[71] and have high-quality indicators of individual student characteristics (including prior achievement), family background (e.g., parents' education and occupations), school quality (e.g., teacher characteristics), and classroom factors (e.g., peer effects)[72] known to affect achievement. Many of the datasets are longitudinal. Longitudinal studies gather observations at multiple points in time.[73] To varying degrees, these improved databases provide researchers with sufficient information to test causal models of student achievement that distinguish among student, family, school, and neighborhood factors that shape achievement. The better data contribute to the likelihood that the findings from these studies will be valid and reliable.[74]

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[71] A gain score is the difference between a student's earlier test score and later test score. Gain scores are increasingly used as indicators of achievement because they reflect growth in learning over time irrespective of the student's initial score. Gain scores are appealing because they permit recognition of student learning even among those whose initial scores are very low. Although gain scores are better than single point-in-time scores, some measurement experts urge caution in using them as indicators of achievement. Any test score is a composite of the student's "true score" and random measurement error (due to various factors such as fatigue, distractions during testing, difficulty level of test items). Because gain scores are calculated from two test scores, the proportion of a gain score that is due to measurement error is likely greater than the proportion of measurement error in a single test score. *See* Dale Ballou, *Sizing Up Test Scores*, EDUC. NEXT, Summer 2002, at 10, 12.

[72] Peer effects are the influence of other students' characteristics (prior achievement, motivation) on the achievement of a student in the same classrooms (or school). Peer effects contribute to achievement outcomes and are especially influential for low ability students. *See* Ron W. Zimmer & Eugenia F. Toma, *Peer Effects in Private and Public Schools Across Countries*, 19 J. POL'Y ANALYSIS & MGMT. 75, 75 (2000).

[73] Panel studies are a type of longitudinal research that gathers data from the same respondents at multiple points in time. *See* Suggested Sources for Methodological Definitions, *supra* note 60.

[74] Validity concerns the truth status of research. Generally, validity reflects the logical tightness of inferences from a study's results. The two major types are (1) internal validity, which refers either to the elements in the study's design (for instance, a valid indicator measures the phenomenon in question) or to inferences from the results (the attributions of observed changes in the dependent variable to the program, policy, or other factors of interest); and (2) external validity, which refers to the generalizability of the results from the study's sample to the population. Studies can have high levels of internal validity but low levels of external validity, but internal validity is a necessary but insufficient condition for external validity. Reliability of research rests on the consistency

Better education data require advanced methods for analyzing them. The chosen analytic strategy[75] must disentangle the effects of a school's racial composition from the influences of the school's socioeconomic composition, as well as distinguish them from effects of the school's human and material resources, the students' own characteristics, and their family background.

The choice of a particular statistical method also influences the validity and reliability of the findings.[76] For example, large education survey databases like the Early Childhood Longitudinal Study (ECLS)[77] consist of students who are grouped—or nested—in classrooms, the classrooms are nested in schools, and schools are nested in districts. The hierarchical structure of the data poses analytical challenges for researchers.[78]

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of the measurement instruments used in a study. Reliable measures dependably produce the same results if used again with the same data. Reliability enhances validity, but is not sufficient to establish validity. *See* Suggested Sources for Methodological Definitions, *supra* note 60.

[75] A researcher's analytic strategy refers to the stages in the study's data analysis and, in the case of quantitative data, the choice of statistical methods. *Id*.

[76] Robert Crain & Rita Mahard, *The Effect of Research Methodology on Desegregation-Achievement Studies: A Meta-Analysis*, 88 AM. J. OF SOC. 839, 856 (1983); Robert Crain, *Is Nineteen Really Better Than Ninety-Three?*, *in* SCHOOL DESEGREGATION AND BLACK ACHIEVEMENT 68, 70, 72, 80 (Thomas Cook ed., Nat'l Inst. of Educ. 1984); Lindsay C. Page, Richard J. Murnane & John B. Willett, Understanding Trends in the Black-White Achievement Gap: The Importance of Decomposition Methodology 30 (March 14, 2008) (unpublished manuscript presented at the meetings of the American Educational Research Association, on file with author); Jan de Leeuw, *Regression Analysis in the Wilmington Case* 9–18 (UCLA Dept. of Statistics, Preprint No. 175, 1995), *available at* http://preprints.stat.ucla.edu/; Kevin G. Welner & Haggai Kupermintz, *Rethinking Expert Testimony in Education Rights Litigation*, 26 EDUC. EVALUATION. & POL'Y ANALYSIS 127 (2004) (analyzing expert testimony in two desegregation cases to illustrate how judges who are statistical novices can be confused and misled by experts).

[77] The Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K) is an ongoing study that focuses on children's early school experiences beginning with kindergarten and follows the children through middle school. The ECLS-K provides descriptive information on children's status at entry to school, their transition into school, and their progression through 8th grade. The longitudinal nature of the ECLS-K data enables researchers to study how a wide range of family, school, community, and individual factors are associated with school performance. Early Childhood Longitudinal Program, Kindergarten Cohort, http://nces.ed.gov/ecls/Kindergarten.asp (last visited November 24, 2008).

[78] An intuitive illustration of the nested structure of educational data is the widely recognized phenomenon whereby the grade of A in a course in one high school is not necessarily comparable to a grade of A in another school even if the courses have the same formal title and track level.

One widely used approach to the analytic challenges of nested data is multilevel modeling.[79] Multilevel modeling explicitly represents the hierarchical structure of the data in the statistical analyses, ameliorating a number of problems associated with conventional statistical analyses, such as ordinary least-squares (OLS) multiple-regression techniques. OLS either treats the school as the unit of analysis (ignoring the variation among students within schools) or treats the student as the unit of analysis (ignoring the nesting of students within schools). Neither approach is adequate for hierarchical data because both approaches produce biased estimates, which are misleading. [80]

D. *Issues in the Scholarship of Synthesis*

With these more general conceptual and methodological issues in mind, this Article turns to a discussion of the scholarship of synthesis.[81] The scholarship of synthesis is central to my analysis and critique of the five key *Parents Involved* social science briefs because their literature summaries are essentially syntheses.[82] In addition, all five briefs cited a number of studies that are themselves reviews of the literatures. Therefore, the five *Parents Involved* briefs are in some respects, syntheses of syntheses.

Scholarship of synthesis falls into two broad categories, the narrative review and the meta-analysis. The traditional and most common approach is the narrative review, whereby an author establishes criteria for inclusion of

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[79] *See generally* ITA KREFT & JAN DE LEEUW, INTRODUCING MULTILEVEL MODELING (Daniel Wright ed., 1998) (describing the statistics and applications of multilevel regression analysis). Hierarchical Linear Modeling (HLM) is a commonly used multilevel modeling approach. *See* ANTHONY BRYK & STEPHEN W. RAUDENBUSH, HIERARCHICAL LINEAR MODELS (Daniel Wright ed., Sage Publications Ltd. 1992) (introducing a statistical method to deal with interactions between individual and contextual effects). Multilevel modeling was not available when much of the early research on desegregation effects was conducted.

[80] HENRY BRAUN, FRANK JENKINS & WENDY GRIGG, U.S. DEPT. OF EDUC., NAT'L CTR. FOR EDUC. STATISTICS, COMPARING PRIVATE SCHOOLS AND PUBLIC SCHOOLS USING HIERARCHICAL LINEAR MODELING 4–5 (2006), *available at* http://nces.ed.gov/nationsreportcard/pubs/studies/2006461.asp.

[81] Ernest Boyer distinguished among the scholarship of discovery (basic research), the scholarship of integration of knowledge through synthesis, the scholarship of application of knowledge to social issues of the time, the scholarship of teaching, and the scholarship of engagement that connects the above dimensions to civic and ethical problems. ERNEST BOYER, SCHOLARSHIP RECONSIDERED: PRIORITIES OF THE PROFESSORIATE (1990).

[82] I consider a work to be a synthesis if, rather than reporting new empirical research, it summarizes other studies previously conducted either by the author or by other scholars.

research studies, surveys a literature, and then comprehensively and fairly integrates the findings into a coherent summary. A second technique is a quantitative summary of research findings called a meta-analysis. Meta-analysis is a statistical technique for estimating the size and consistency of the effects of certain factors on a given phenomenon across multiple empirical studies on the same topic.[83] The advantage of this approach is that it enables researchers to quantitatively integrate and interpret findings based on the entire research literature.[84] Meta-analyses enable researchers to examine the overall patterns of effects across many studies, to explore whether additional variables moderate those effects,[85] and to statistically test the possibility that studies' outcomes were affected by their methodological quality[86] or the time period during which they were conducted.

For example, in a meta-analysis of school desegregation studies where the outcomes are indicators of achievement, researchers face the challenge of summarizing results from multiple studies that used different achievement tests. To conduct a meta-analysis on this topic, a researcher establishes criteria for including and excluding research studies and then attempts to find every study on a particular topic that meets the inclusion criteria. After the relevant studies have been located and examined, the researcher statistically calculates an effect size for each study.[87] Once each study's achievement outcomes have been converted to the same metric, to quantify the effect size, researchers calculate the influence of school racial composition on achievement across all relevant studies.

The quality of both narrative reviews and meta-analyses depends on the inclusion and exclusion criteria their authors established, how fully and appropriately the scholarly literature was searched to locate relevant studies and whether the researchers dealt with the variation in methodological

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[83] Tropp et al., *supra* note 51, at 106 n.4; WILLIAM D. CRANO & MARILYNN B. BREWER, PRINCIPLES AND METHODS OF SOCIAL RESEARCH 331 n.1 (2d ed. 2002).

[84] Tropp et al., *supra* note 51, at 106 n.4 .

[85] *Id*.

[86] GENE V. GLASS, BARRY MCGAW & MARY LEE SMITH, META-ANALYSIS IN SOCIAL RESEARCH 22 (1981).

[87] Effect size is the name of a family of indices used for measuring and comparing results on a particular outcome across multiple studies that used different measures for that outcome. The correlation coefficient *r* is commonly used to indicate effect size. Another common effect size indicator is Cohen's *d*, calculated from the means and standard deviations of the treatment and control groups in each study included in the meta-analysis. The larger the values of *d* or *r*, the stronger the relationships between the independent variable (e.g., school racial compositional) and the dependent variable (e.g., achievement, intergroup relations, and so on). *See* Suggested Sources for Methodological Definitions, *supra* note 60.

quality when summarizing the findings.[88] The importance of the last point is especially relevant to two widely cited syntheses of desegregation effects on black achievement: the first was conducted in 1975 by psychologist Nancy St. John [89] and the second was conducted in 1984 by a panel convened by the National Institute of Education.[90]

In order to illustrate the importance of evaluating the scientific properties of the empirical research upon which a synthesis is based, I conducted content analyses[91] of the St. John and NIE studies. I reviewed the authors' inclusion criteria and the processes they employed to conduct their studies. I also examined the characteristics of the original research they included in their syntheses.

St. John's narrative review is one of the first published syntheses of desegregation research. Her study was cited by Justice Thomas,[92] the Armor Respondents' brief[93] and the brief of 553 Social Scientists,[94] albeit in different contexts. My content analysis of St. John's work revealed that the majority of the studies of black achievement she included in her synthesis were conducted before 1970. Almost all of them were case studies of a single school system's desegregation efforts. Roughly half of the studies had fewer than 100 subjects, and some had as few as fifteen in the experimental group. Of the studies that provided information about the implementation of the desegregation plan, almost 60% were evaluated after one year or less of implementation.[95] St. John concluded that school desegregation effects could simultaneously have both beneficial and detrimental effects on children. While St. John's narrative review is valuable as a historical document, its usefulness for understanding contemporary debates about the effects of educational diversity on outcomes is questionable given the dated nature of

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88 CRANO & BREWER, *supra* note 83, at 331 n.1; NAEd Report, *supra* note 5, at 14 n.11.

89 NANCY H. ST. JOHN, SCHOOL DESEGREGATION: OUTCOMES FOR CHILDREN x–xii (1975).

90 NAT'L INST. OF EDUC., SCHOOL DESEGREGATION AND BLACK ACHIEVEMENT 2–5 (1984) [hereinafter NIE Study].

91 Content analysis is a method commonly used in the social sciences for studying the information contained in texts, documents, or communications. After delineating a body of material to examine and describe, the researcher identifies and counts how often certain words, images, or themes occur. *See* Suggested Sources for Methodological Definitions, *supra* note 60.

92 *Parents Involved*, 127 S. Ct. at 2781 (Thomas, J., concurring).

93 Brief of Dr. David J. Armor, *supra* note 11, at 13.

94 Brief of 553 Social Scientists, *supra* note 15, at app.3 n.4.

95 ST. JOHN, *supra* note 89, at 142–56.

the empirical studies she reviewed and their many methodological weaknesses.

The second widely cited synthesis is the work of a panel convened by the National Institute of Education (NIE) in 1984.[96] The NIE study was cited in both Respondents' and Petitioners' amicus briefs.[97] The panel's participants identified nineteen studies among the 157 then-available empirical studies on desegregation as the most methodologically sound investigations of desegregation and black achievement. Most panelists conducted their own meta-analysis of the nineteen studies. Some panelists found no significant effects of desegregation, some found large positive effects, and others' findings were somewhere in between. One panelist strenuously objected to the majority's inclusion and exclusion criteria and stood by the results of his own earlier meta-analysis of ninety-three studies of the effects of school desegregation.[98]

Given the mixed results from the other panelists' meta-analyses of the nineteen "best" studies, the NIE panel's chair conducted his own meta-analysis of seventeen of the nineteen studies. He found that desegregation modestly increased blacks' reading levels, did not increase blacks' mathematics achievement, and did not affect whites' achievement. He also concluded the generalizability of the findings was unknown.[99] The chair speculated that the panelists' criteria for adequate methodology might have unnecessarily restricted the sample of studies included in the meta-analysis and compromised the underlying methodological assumptions of using multiple panelists for the NIE study.[100]

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[96] NIE Study, *supra* note 90.

[97] *See* Brief of Dr. David J. Armor, *supra* note 11, at 15; Brief of 553 Social Scientists, *supra* note 15, at app.14 nn. 41, 43; Brief of the AERA, *supra* note 13, at 12.

[98] Crain, *supra* note 76, at 69. Crain demonstrated that the size of the effect of desegregation on achievement obtained in the NIE panelists' meta-analyses was strongly positively correlated to the number of studies each panelist included in his meta-analysis. Referring to his own earlier published meta-analysis of ninety-three empirical studies, Crain noted that using ninety-three studies, he and his coauthor found desegregation raised black achievement between one-fourth to one-third of a standard deviation, while those using nineteen or fewer studies concluded that desegregation raised black achievement by one-eighth of a standard deviation. Crain & Mahard, *supra* note 76, at 839.

[99] Thomas Cook, *What Have Black Children Gained Academically from School Integration?: Examination of the Meta-Analytic Evidence*, *in* SCHOOL DESEGREGATION AND BLACK ACHIEVEMENT 40–41 (Thomas Cook ed., Nat'l Inst. of Educ. 1984). Generalizability, or external validity, refers to the extent to which findings from one study apply more broadly to the larger population. Generalizability is a very desirable property of research findings.

[100] *Id.* at 39.

My content analysis of the NIE panel's reports revealed that, like the studies used in St. John's narrative review, the nineteen studies included in the panelists' meta-analyses were very old; fifteen of the nineteen were conducted before 1974. All nineteen studies were evaluations of a specific desegregation plan that had been implemented in one community many years before the meta-analysis was conducted. Few of the studies provided detailed information about the implementation of the desegregation plan. And even though the nineteen studies were designed as experiments or quasi-experiments, many other characteristics of the studies were problematic. The two published articles[101] among the nineteen studies illustrate this point. The first published study was a randomized experiment of a city to suburban voluntary transfer program of black children. By the end of the study, only thirteen first grade students of the original twenty-six remained in the treatment group and fourteen remained in the control group.[102] Attrition of half of the experimental group poses a serious threat to the validity of a study's findings. The author of the second published study cautioned that his findings were limited by the fact that his subjects were not randomly assigned to the treatment and control groups and therefore his results were confounded by selection bias.[103] Nine of the nineteen studies were unpublished doctoral dissertations or master's theses. The other eight studies were reports produced by school districts' research units or papers presented at scholarly meetings.

Because its work is foundational for much of the social science research on school desegregation that has been conducted in the twenty-four years since it appeared, the NIE study commands respect. But the methodological weaknesses of the actual nineteen empirical studies on which the panel members relied for their meta-analyses limit the value of their findings for understanding the effects of school racial diversity on student outcomes today.

III. A CONTENT ANALYSIS OF FIVE KEY AMICUS BRIEFS

This cursory review of several conceptual and methodological issues in school racial composition effects research and the scholarship of synthesis

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[101] NIE Study, *supra* note 90, at 4–5. The publication status of only two of the nineteen core studies is relevant given that publication and peer-review have been recognized by the Court in *Daubert* as criteria that suggest the validity of scientific evidence. *See* Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 593–94 (1993).

[102] Stanley M. Zdep, *Educating Disadvantaged Urban Children in Suburban Schools: An Evaluation*, 1 J. APPLIED SOC. PSYCH. 173, 181 (1971).

[103] Daniel S. Sheehan, *Black Achievement in a Desegregating School District*, 107 J. SOC. PSYCH. 185, 188 (1979).

identified various properties relevant to assessing the rigor of social science research findings, and ultimately, the validity and reliability of conclusions drawn from their findings. With these conceptual and methodological issues in mind, this section reports the results of my content analysis of the social science literature cited in the five amicus briefs that are the focus of this Article. I coded as a social science citation any published peer-reviewed articles, chapters, and books; unpublished doctoral dissertations and master's theses; and reports issued by government agencies or research organizations. I did not include legal cases, journalism, school district reports, expert witness testimony and reports, or census reports as social science citations. I considered only the social science research that appeared in the body of a brief or its Appendix.

For each brief, I identified the citations to social science research on every page. I cross-referenced the citations on each page with the briefs' Table of Authorities. I resolved any discrepancies (citations in the brief not cited in a Table of Authorities; one study cited twice in a Table of Authorities) so that I counted each unique social science citation only once irrespective of the number of times it was cited in the text of the brief or its Appendix. Because neither the brief by Armor et al. nor that of the 553 Social Scientists included social science citations in their Tables of Authorities, I relied on the identification of citations on each page of the document. I then coded each citation for date of publication, type of research, and properties associated with scientific rigor.

A. *Findings from the Content Analysis of Five Amicus Briefs*

Table 2 presents the results of the content analysis by decade of publication. The first finding is that the Respondents' briefs referred to far more studies than the Petitioners' briefs: Murphy et al. cited twenty studies and Armor et al. utilized twenty-nine sources. The brief of the APA cited fifty-seven studies,[104] the AERA brief cited fifty-four studies,[105] and the 553 Social Scientists utilized 213 sources to support their claims.[106]

The raw count differences in the number of studies cited are not necessarily meaningful in and of themselves. It is far more important to notice that the amicus briefs filed on behalf of the Petitioners and Respondents relied on social science findings from different decades. The second finding is that the Petitioners' briefs are dominated by social science

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[104] Brief of the APA, *supra* note 14.

[105] Brief of the AERA, *supra* note 13.

[106] Brief of 553 Social Scientists, *supra* note 15, at app. 1–54. There are limits to the number of pages in an amicus brief. The 553 Social Scientists' brief presented its review of the social science literature in an Appendix to its brief.

conducted in the 1970s and 1980s. Several of the more recent studies cited in the Petitioners' briefs summarized research that was conducted decades earlier.[107] The Respondents' briefs also included several of the same earlier works, but the vast majority of their cited sources were studies conducted in the 1990s and 2000s. Forty-seven percent of the APA's studies were published since the 2000, with 80% appearing since 1990. Similar patterns appeared in the AERA (79% since 1990) and 553 Social Scientists' briefs (77% since 1990). In contrast, neither of the amicus briefs on behalf of the Petitioners utilized a majority of research published since 1990.[108]

The third finding from the content analysis concerns the scientific properties of studies before and after 1990. Social science research on school racial compositional effects conducted in the 1960s, 1970s, and 1980s (hereinafter, the early studies) differed from the studies conducted since 1990 (hereinafter, the later studies) in a number of critical ways.

I found that, on average, the later studies suffered from fewer threats to their internal and external validity compared to the early ones. A number of the early experimental studies on school desegregation were affected by either sample attrition, nonrandom assignment to experimental and control conditions, weak measures of key constructs, or incomplete or inappropriate implementation of the desegregation treatment—all threats to internal validity. Many early studies were experiments or quasi-experiments of desegregation plans implemented in a single school district. The earlier studies tended to have small samples and to have evaluated a desegregation plan's outcomes within one or two years of the plan's implementation.

Although many of the experimental and quasi-experimental studies randomly assigned subjects to the desegregation treatment, their subjects were not randomly selected to participate in the study (that is, students who did not live in the school district could not participate in the experiment). Therefore, at best the early studies tell us about desegregation effects in a particular community, but they cannot be generalized to the larger population. At worst, the early studies tell us even less because of the multiple threats to their internal validity discussed above.

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[107] The NAEd report cautions that "the publication date of the cited studies can be misleading because publications can and often do refer to analyses of school situations occurring years or decades prior to publication." NAEd Report, *supra* note 5, at 14 n.12. Therefore, it is important to attend to the date when the research was actually conducted.

[108] The result of a Chi-Square test indicates that authorship of a brief and the decade of publication of the research cited in it are related ($X^2 = 51.181$, $p < .001$). A Chi-Square test can be used as a measure of association for descriptive statistics like the ones in Table 2. The test examines the probability that two variables are independent. In this case, authorship of an amicus brief and decade of publication of the research cited in it are not independent. *See, e.g.*, NEUMAN, *supra* note 60, at 350.

Later studies tend to use survey research with representative national samples. Compared to earlier studies, the later ones were more likely to employ sophisticated measures of achievement, family background, school quality, and other important factors. The advanced statistical methods available in recent decades, in conjunction with better quality data, enhanced social scientists' capacities to isolate the role of school racial composition on outcomes apart from other influential factors like school socioeconomic composition, student characteristics, and family socioeconomic status.

Next, my content analysis attempted to distinguish between citations to empirical research and to another scholars' syntheses of research.[109] The fourth finding indicates the briefs varied in the extent to which they cited basic research and syntheses of prior scholarship. Forty-one percent of the Armor et al brief's citations were to syntheses rather than empirical studies. Thirteen percent of AERA's, 14% of APA's, 20% of Murphy et al.'s briefs' citations, and 6% of 553 Social Scientists' citations were to syntheses rather than to empirical studies.

Finally, I found differences in the proportions of the briefs' citations that were to published scholarship.[110] All of the APA's citations, and roughly 80% of the citations in briefs by the AERA and the 553 Social Scientists, were published as journal articles, books, or chapters. Sixty-three percent *(N = 17*) of the citations in the Armor et al. brief were published. Although 85% (*N = 17*) of the citations in the Murphy et al. brief were published, two of the 17 publications are problematic.

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[109] The percent of citations to empirical research is an estimate based on my knowledge of the research properties of a given citation. If I did not recognize a study or if its title did not specify it was a synthesis of prior research, I counted the citations as scholarship of discovery (empirical or basic research) rather than scholarship of synthesis. I may have slightly undercounted the number of syntheses in the APA and 553 Social Scientists' briefs. The possible undercount does not substantially change the findings.

[110] I do not argue that the publication status of a social science study is a necessary or sufficient criterion for indicating scientific merit. But publication in a peer-reviewed outlet has been recognized by the Court in *Daubert* as one indicator of the scientific merit of evidence. *See* Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 593–94 (1993).

Table 2. Number and Percent of Citations by Decade in Five *Parents Involved* Social Science Amicus Briefs

Amicus Brief of	1970s or earlier	1980s	1990s	2000s
Murphy, Rossell, & Walberg				
N of Citations = 20	40%	15%	30%	15%
Armor, Thernstrom, & Thernstrom				
N of Citations = 29	24%	28%	24%	24%
American Psychological Association				
N of Citations = 57	4%	16%	33%	47%
American Educational Research Association				
N of Citations = 54	4%	17%	13%	66%
553 Social Scientists				
N of Citations = 213	9%	14%	18%	59%

Most of the empirical claims in one of the citations are largely inaccurate,[111] and the other citation is to a handbook for school administrators.[112] Neither source provides reliable or valid social science findings about the role of school racial composition in achievement.[113] The two publications highlight the need to properly evaluate scientific evidence to determine whether it is indeed central to resolving a case.[114] The two aforementioned publications are not useful to the *Parents Involved* cases.

B. *Implications of Content Analysis of the Briefs for Drawing Conclusions About the Scholarly Literature*

Both Petitioners' and Respondents' amici linked their conclusions to the social science research they synthesized in their respective briefs. The amicus briefs for the Petitioners concluded that the social science research record on school racial compositional effects and educational outcomes is ambiguous and at times contradictory, and therefore there is no social science basis to

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[111] John Murphy, *After Forty Years: The Other Half of the Puzzle*, 96 TCHRS. COLL. REC. 743, 745–46 (1995) (discussing positive changes in the Charlotte-Mecklenburg Schools following the 1992 dismantling of mandatory busing under his leadership). Smith and Mickelson demonstrated that few of the substantive claims in Murphy's 1995 article have any basis in empirical data. Stephen S. Smith & Roslyn A. Mickelson, *All That Glitters Is Not Gold: School Reform In Charlotte-Mecklenburg*, 22 EDUC. EVALUATION & POL'Y ANALYSIS 101, 111–17 (2000) (assessing trends in achievement, drop out rates, and racial imbalance in CMS compared to two other North Carolina school districts that did not implement CMS's sweeping school reform plans in the early 1990s); *see also* Defendant's Exhibit No. 238, Capacchione v. Charlotte-Mecklenburg Bd. of Educ., 535 U.S. 986 (2002) (No. 01-1094) (January 12, 1995 memorandum from Jeffry Schiller and Sue Henry reporting to then-superintendent Murphy that CMS students' scores lagged considerably behind their peers in demographically comparable large urban school systems). This memorandum also contradicts Murphy's substantive claim regarding CMS's comparative performance on achievement indicators. *Id*.

[112] JOHN MURPHY & JEFFRY SCHILLER, TRANSFORMING AMERICA'S SCHOOLS: AN ADMINISTRATOR'S CALL TO ACTION (1992) (offering school leaders practical advice for reforming the public schools they administer).

[113] The authors of this handbook repeatedly cautioned administrators to guard against racially correlated tracking and ability grouping. *See id.* at 9. Yet when they were superintendent and assistant superintendent in the Charlotte-Mecklenburg Schools from mid-1991 through December 1996, they permitted racially-correlated tracking in core academic courses throughout the district's middle and high schools. *See* Roslyn Mickelson, *The Academic Consequences of Desegregation and Segregation: Evidence from the Charlotte-Mecklenburg Schools*, 81 N.C. L. REV. 1513, 1513–14 (2003) (presenting evidence of extensive racially correlated tracking in CMS middle and high schools in the 1996-1997 school year).

[114] *See* Ancheta, *Civil Rights, Education Research, and the Courts*, *supra* note 16, at 28.

conclude that school diversity is a compelling state interest.[115] The amicus briefs for the Respondents drew the opposite conclusion from the research record they summarized: that the preponderance of social science shows a clear, positive relationship between school racial composition and school achievement, intergroup relations, and adult life course trajectories, and therefore diversity is a compelling state interest.[116]

The scholarship of synthesis is not simply an additive process, whereby a researcher simply counts the number of studies with one set of the findings and compares that number to the count of studies with different conclusions. Conclusions in the Petitioners' amicus briefs imply that if the findings in a number of older studies are at odds with each other and with the findings in more recent studies, one must conclude that the social science research base is ambiguous or contradictory, and therefore no valid scientific conclusion can be drawn from the social science on the topic.

The methodological error of synthesizing research by merely tallying findings (irrespective of each study's scientific rigor) is not the most serious one from which the Petitioners' briefs suffer. As I have shown, the Petitioners' social science briefs omitted many studies conducted since 1990. And because the earlier and later studies differ in their actual scientific properties and conclusions about the effects of school racial composition, the Petitioners' amici's practice of largely ignoring the later studies and relying on the earlier ones distorts the social science research record in serious ways that lead to inaccurate translations of the social science research record in their amicus briefs.

Nobel laureate Sidney Altman provided me with an example from biochemistry to illustrate these points.[117] With the discovery that ribonucleic acid (RNA) was a catalyst in the early 1980s, "our understanding of the origin of life and what happens inside cells was totally changed."[118] What was known before was judged as incomplete, but not completely wrong. The new knowledge made our perspectives much clearer and better informed how we looked at the mechanisms of biology (or life). One cannot use the knowledge base before the discovery to argue today about what goes on

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[115] *See* Brief of Dr. David J. Armor et al., *supra* note 11, at 4; Brief of Dr. John Murphy et al., *supra* note 12, at 4.

[116] *See* Brief of the AERA, *supra* note 13, at 4; Brief of the APA, *supra* note 14, at 3; Brief of 553 Social Scientists, *supra* note 15, at 3.

[117] E-mail from Professor Sidney Altman, Yale University to author (July 11, 2008, 6:10:02 EST) (on file with author). Altman is the 1989 Nobel Prize Laureate in Chemistry.

[118] *Id.*

inside cells: all the available information that includes the latest knowledge must be used.[119]

Biological anthropologist Jonathan Marks made a similar point with an illustration from genetics. He noted that in 1970, it was thought that the 100,000 or so human genes were unique sequences in the human genome, separated by islands of highly repetitive deoxyribonucleic acid (DNA) sequences. Now we know that the 25,000 or so human genes are themselves part of a complex pattern of duplication and redundancy within the genome.[120]

Were the scientists leading the Human Genome Project to have approached the task of synthesizing the biological science literature following the logic reflected in the Petitioners' amici's methods of summarizing the social science literature (that is, an incomplete coverage of the entire body of research, scant attention to the rigor of a given study, and reliance on older research), the Human Genome Project might well have skipped the discovery of RNA's catalytic properties or proceeded on the assumption that if older studies indicated there were 100,000 human genes and newer studies indicate there are 25,000 human genes, the research record on the size of the human genome is ambiguous.

IV. TWENTY-FIRST CENTURY SOCIAL SCIENCE ON DIVERSITY

No scientific study is flawless, and that is certainly true of the social science on school racial composition and educational outcomes conducted since 1990. But, as is true of other scientific fields, over time better data and more advanced methods enable scholars to improve the quality of their research. In this section, I summarize a number of social science studies on the relationships among school racial composition and various academic, interpersonal relations, and adult life course outcomes that have been conducted since 2000. I refer to this group of studies as twenty-first century social science on school diversity and educational outcomes. Roughly half of these studies were cited in the *Parents Involved* Respondents' briefs. Two were cited in the Petitioners' briefs. Almost all the twenty-first century studies have been published or are scheduled for publication. The publication status of these studies is relevant, given the Court's opinion in *Daubert* identifying peer review and publication as factors for assessing the scientific value of expert testimony.[121] One of the studies appeared as an appendix to

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[119] *Id.*

[120] E-mail from Professor Jonathan Marks, University of North Carolina at Charlotte to author (July 16, 2008, 7:36:00 EST) (on file with author). Professor Marks is a Fellow of the American Association for the Advancement of Science.

[121] Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 593–94 (1993).

the day-long briefing on the benefits of racial and ethnic diversity in education conducted by the U.S. Commission on Civil Rights.[122]

These twenty-first century studies are by no means exhaustive of all the new social science on the topic. I purposively selected them because they are emblematic of the high quality quantitative studies conducted on this topic by social scientists since 2000.[123] I chose not to include qualitative studies on the topic of school racial composition. I selected only quantitative research about school racial composition effects in order to foster comparisons among the early quantitative social science research that dominated the Petitioners' two amicus briefs, the quantitative research since the 1990s that undergirded the Respondents' three social science briefs, and the new scholarship I summarize herein.[124] I also excluded studies of the effects of classroom racial composition differences due to tracking and ability grouping. The Seattle and Louisville cases that inspired this Article concerned voluntary desegregation at the school level, not within-school classroom compositional issues.[125]

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[122] David J. Armor & Shanea J. Watkins, *School Segregation and Black Achievement: New Evidence from the 2003 NAEP, in* THE BENEFITS OF RACIAL AND ETHNIC DIVERSITY IN ELEMENTARY AND SECONDARY EDUCATION 28–49 (U.S. Commission on Civil Rights 2006); Brief for the Petitioner at 10 n.6, Meredith v. Jefferson County Bd. of Educ., 548 U.S. 938 (2007) (No. 05-915), 2006 WL 3367873.

[123] I am familiar with the existing social science research on school compositional effects because since late 2005, my research team and I have been surveying and synthesizing the educational, social, and behavioral science literatures on the topic. The American Sociological Association's Sydney Spivack Program in Applied Social Research and Social Policy awarded Professor Kathryn Borman and me initial support for this endeavor. In 2006, I received additional support from the Poverty and Race Research Action Council (PRRAC) and from the National Science Foundation (NSF). My research team has developed a searchable database, the Spivack Archive, into which detailed two-page abstracts of the 250 or so studies we have identified have been entered. The Spivack Archive includes quantitative and qualitative social scientific studies about the relationship of school and classroom diversity to various educational outcomes that have been conducted during the past four decades. The Spivack Archive will be posted on the American Sociological Association's website at the conclusion of the Project in late 2009 [Preliminary Spivack Archive on file with author]. One outgrowth of the Spivack award is a set of Special Issues of Teachers College Record (Vol. 112, Nos. 3, 4, & 5, 2010) that Kathryn Borman and I are jointly editing. Several of the articles that will appear in the forthcoming Teachers College Record set are among the twenty-first century studies summarized in this Article.

[124] Admittedly, my decision to exclude qualitative research from this Article privileges positivist epistemology at the expense of interpretive and critical approaches to generating knowledge. Doing so was necessary given the aims of this Article.

[125] There is an enormous body of research that shows that heterogeneously grouped classrooms—that tend to be racially integrated—have positive effects on achievement independently of school-level racial composition effects. *See generally* JEANNIE OAKES,

The summaries that follow present the studies' findings and highlight their methodological strengths. Table 3 provides technical information about each study, including the datasets used, the sample size and demographics, the outcome and control variables, and analytic strategies. Table 3 shows that most of the twenty-first century studies share a number of properties characteristic of high quality social science research: large, demographically diverse, representative samples; longitudinal designs; datasets with measures of important constructs necessary to control for individual, family, and school characteristics associated with educational outcomes; and cutting-edge analytic methods.

A. *Achievement Studies*

1. *National Studies of Reading and Verbal Achievement*

The old chestnut that students learn to read so that they can read to learn captures the centrality of literacy to all educational endeavors. Racial gaps in reading achievement are not new. The 1966 Coleman Report, the landmark study of educational opportunity in the United States released more than ten years after *Brown v. Board of Education*,[126] documented reading gaps between black and white students.[127] Since its publication, it has influenced educational policy and social science research. The report found that blacks who attended diverse schools performed better than their peers who attended racially isolated minority schools and that for all students, attending a school with peers from higher socioeconomic backgrounds was positively related to achievement.

James Coleman and his colleagues reported that, overall, school characteristics were less influential than individual factors for student achievement. They concluded that family socioeconomic status was the most important predictor of achievement. However, among school factors, they reported that the socioeconomic composition of the student body was more highly predictive of achievement than any other school characteristic.[128]

Using Coleman's original data, Geoffrey Borman and Martiza Dowling replicated the 1966 study's statistical models using multilevel modeling,

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KEEPING TRACK: HOW SCHOOLS STRUCTURE INEQUALITY (2005); Beth C. Rubin et al., *Special Issue on Heterogeneous Grouping and Detracking*, 45 THEORY INTO PRACTICE 1, 1–102 (2006) (presenting recent research and studies on the detracking and heterogeneous grouping of students).

126 Brown v. Bd. of Educ. I, 347 U.S. 483 (1954).

127 JAMES COLEMAN ET AL., EQUALITY OF EDUCATIONAL OPPORTUNITY 325 (1966) [hereinafter Coleman Report].

128 *Id.* at 325.

which allowed them to examine the effects of school-level racial and socioeconomic composition on verbal achievement. Coleman could not use multilevel modeling in 1966 because the statistical tool was not yet available. In contrast to the original Coleman findings that reported family background was more influential than school factors for achievement, Borman and Dowling's findings revealed that school context effects are more influential than the effects of family background. Their findings provide very clear evidence that going to a high-poverty school or a highly segregated African-American school has a strong, negative effect on students' achievement outcomes, above and beyond the effect of their individual level of family poverty or minority status.[129]

Given the canonical status of the Coleman Report in the twentieth century social science of race and educational opportunity, the findings from Borman and Dowling's reanalysis of Coleman's data are noteworthy clarifications. School factors contribute *more* to achievement than family background factors, and racially isolated schools or schools with concentrated poverty have strong, negative effects on reading outcomes. In addition to this study's substantive findings regarding the importance of school factors for achievement, it also highlights the significance of advanced statistical tools, like HLM, for properly analyzing nested survey data.

Shelly Brown-Jeffy examined high school reading achievement in relation to the racial composition of high schools in metropolitan areas almost thirty years after Coleman collected his data. Her study indicated that diverse high schools have positive effects on all students' reading achievement. Controlling for students' prior achievement levels, she found that the black-white gap in reading achievement is significantly smaller in schools with between 25% and 54% black, Hispanic, and Native-American students; that is, racially diverse schools have smaller gaps than high schools with either very small or very large proportions of disadvantaged minority students.[130] This study's representative sample of youth from many racial backgrounds, its high quality data, and advanced statistical methods make its findings about the benefits of diverse schools generalizable beyond the students she studied.

The schools that students attend and the neighborhoods in which they live both contribute to observed race and socioeconomic differences in reading outcomes. Very few prior studies have attempted to identify the

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[129] Geoffrey Borman & Maritza Dowling, *Schools and Inequality: A Multilevel Analysis of Coleman's Equality of Educational Opportunity Data*, 112 TCHRS. COLL. REC. (forthcoming 2010) (manuscript on file with author).

[130] Shelly Brown-Jeffy, *The Race Gap in High School Reading Achievement: Why School Racial Composition Still Matters*, 13 RACE, GENDER & CLASS 268, 290 (2006).

unique effects of schools and neighborhoods on achievement outcomes. James Benson and Geoffrey Borman disentangled the effects of schools and neighborhoods on the reading achievement of young children. Their study's three-level HLM model reflected the layered nature of the data: students and their families, schools, and neighborhoods. Using students' home zip codes, they linked Census 2000 data on each child's neighborhood social contexts (percent poor, adult educational attainment) to the rich survey data on students' achievement, family background, and school racial and socioeconomic characteristics in the Early Childhood Longitudinal Survey-Kindergarten dataset.

The researchers found that neighborhood social contexts influenced reading achievement outcomes at school entry and during the summer season, but school social contexts were more salient for reading growth during the school year. While school racial composition had no significant effects on kindergarten reading growth, the authors found significant negative effects of school racial segregation on reading achievement during first grade.[131]

2. *National Studies of Mathematics Achievement*

Overall, achievement in mathematics among disadvantaged racial minority and lower-income students has improved slightly during the last decade or so, but it remains significantly lower than achievement among Asian, white, and middle-class students.[132] Mark Berends examined the relationships between race gaps in high school seniors' mathematics outcomes and their school's racial composition using four distinct, nationally representative databases that spanned a forty-year period. This longitudinal research design gave him an opportunity to investigate associations between the black-white and Latino/a-white test score gaps and changes in schools' minority composition over the four-decade period the study covered.

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[131] James Benson & Geoffrey Borman, *Family, Neighborhood, and School Settings Across Seasons: When Do Socioeconomic Context and Racial Composition Matter for the Reading Achievement Growth of Young Children*? 112 TCHRS. COLL. REC. (forthcoming 2010) (manuscript at 9, on file with author).

[132] *See* U.S. DEPT. OF EDUC., NAT'L CTR. FOR EDUC. STATISTICS, THE NATION'S REPORT CARD: SCIENCE 2005 20–21 (2006), *available at* http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2006466; U.S. DEPT. OF EDUC., NAT'L CTR. FOR EDUC. STATISTICS, THE NATION'S REPORT CARD: 12TH GRADE READING AND MATHEMATICS 2005 6 (2007), *available at* http://nces.ed.gov/Pubsearch/pubsinfo.asp?pubid=2007468.

Table 3. Technical Details of 21st Century Research on School Racial Diversity Effects

	Year	Data Type	Data Source	Sample Size and Type	Sample Demographics	Analytic Strategy	Outcome Variable	Key Control Variables
A. Achievement								
1. National Data on Verbal Outcomes								
Geoffrey Borman & Maritza Dowling, *Schools and Inequality: A Multilevel Analysis of Coleman's Equality of Educational Opportunity Data*, 112 TCHRS. COLL. REC, (forthcoming 2010).	2010	cross-sectional	EEO Data[a] (Coleman Report 1966)	Nationally representative cluster sample of 30,590 students 226 schools	black and white	HLM	Student's score on standardized verbal ability test	Multiple student- and school-level factors
Shelly Brown-Jeffy, *The Race Gap in High School Reading Achievement: Why School Racial Composition Still Matters*, 13 RACE, GENDER & CLASS 268 (2006).	2006	longitudinal	HSES[b] 1988	Random sample of 4,065 students and 219 schools in metropolitan areas	black, white, Latino/a, and Native American	HLM	12th grade reading achievement	Multiple student- and school-level factors
James Benson & Geoffrey Borman, *Family, Neighborhood, and School Settings Across Seasons: When Do Socioeconomic Context and Racial Composition Matter for the Reading Achievement Growth of Young Children*? 112 TCHRS. COLL. REC. (forthcoming 2010).	2010	longitudinal	ECLS-K[c] 2002 and US Census 2000	Random national sample of 4,178 students in 292 schools	black, white, Latino/a, Asian-Pacific Islander, and Native American	Three-level HLM growth models	Reading scale scores	Student- and family-level factors, and measures of school and neighborhood contexts

[a] Equality of Educational Opportunity Survey 1964
[b] High School Effectiveness Study which is a subset of the National Education Longitudinal Survey
[c] Early Childhood Longitudinal Survey—Kindergarten Cohort

2. National Data on Mathematics Outcomes								
Mark Berends, *Increasing Racial Isolation and Test Score Gaps in Mathematics: A 30-Year Perspective*, 112 TCHRS. COLL. REC. (forthcoming 2010).	2010	longitudinal	NLS[a] 1972, HSB[b] 1982, NELS[c] 1992, ELS[d] 2004	Random national samples: NLS: 14,469 students in 875 schools HSB: 26,000 students in 1110 schools NELS: 25,000 students in 1035 schools ELS: 15,362 students in 752 schools	black, white, and Latino/a	Oaxaca decomposition and multilevel regressions	Student math achievement	Multiple student- and school-level factors
Xiaoxia Newton, *End of High School Mathematics Attainment: How Did Students Get There?*, 112 TCHRS. COLL. REC. (forthcoming 2010).	2010	longitudinal	LSAY[e] 1987-1993	Random national samples: 3,116 students in 52 high schools	Minorities and non-minorities	Three-level HLM	Math scores, number and levels of high school math courses completed	Multiple student, school and time varying factors

[a] National Longitudinal Study of the High School Class of 1972
[b] High School and Beyond senior cohort of 1982
[c] National Education Longitudinal Study senior cohort of 1992
[d] Educational Longitudinal Study senior cohort of 2004
[e] Longitudinal Study of American Youth 1990s

DOUGLAS N. HARRIS, CTR. FOR AM. PROGRESS, LOST LEARNING, FORGOTTEN PROMISES: A NATIONAL ANALYSIS OF SCHOOL RACIAL SEGREGATION, STUDENT ACHIEVEMENT, AND "CONTROLLED CHOICE" PLANS 14 (2006).	2006	longitudinal	NCLB[a] data for 2004	18 million students in 22,000 schools in 45 states	black, white, and Latino/a	Simulations and multivariate regressions with fixed effects	Math score gains from 7-12 grades	Previous test scores, school percentage migrant, school status, and multiple student-level factors
DAVID J. ARMOR, LESSONS LEARNED FROM SCHOOL DESEGREGATION, IN GENERATIONAL CHANGE: CLOSING THE TEST SCORE GAP 115 (Paul Peterson ed., 2006).	2006	cross-sectional	NAEP 1996[b]	Random national sample	black and white	Descriptive and unspecified multivariate analysis	Math scores	unspecified
David J. Armor & Shanea J. Watkins, *School Segregation and Black Achievement: New Evidence from the* 2003 *NAEP, in* THE BENEFITS OF RACIAL AND ETHNIC DIVERSITY IN ELEMENTARY AND SECONDARY EDUCATION 28–49 (U.S. Commission on Civil Rights 2006).	2006	cross-sectional	NAEP 2003	Random national sample of 150,000 students	black, white, and Latino/a	Multiple regressions and descriptives	Reading and math scores in 8th grade	Race, SES, school accountability, teacher experience, and other school and family characteristics
Russell Rumberger & Greg Palardy, *Does Segregation Still Matter? The Impact of Student Composition on Academic Achievement in High School*, 107 TCHRS. COLL. REC. 2003 (2005).	2005	longitudinal	NELS 1988	Random national sample of 14,217 students from 913 high schools	black, white, Latino/a, and Asian	HLM-Multilevel model of achievement growth	Achievement growth in math, science, reading, history from 1988, 1990, 1992	Multiple individual, family and school characteristics

[a] No Child Left Behind Dataset
[b] National Assessment of Educational Progress

3. Statewide Data								
Kathryn M. Borman et al., *Accountability in a Postdesegregation Era: The Continuing Significance of Racial Segregation in Florida's Schools*, 41 AM. EDUC. RES. J. 605 (2004).	2004	cross-sectional	Florida Schools Indicators Reports 1999-2000	Florida population of 2.3 million students in 1547 elementary schools, 513 middle schools, and 368 high schools	black and white	Multivariate regression models	Percentage of students in school achieving proficiency in math and reading on Florida Comprehensive Assessment Test (FCAT)	School percent Latino/a, percent poverty, and other school-level characteristics
Eric A. Hanushek, John F. Kain, & Steven G. Rivkin, *New Evidence about Brown v. Board of Education: The Complex Effects of School Racial Composition on Achievement* 1 (unpublished manuscript, on file with author).	2008	panel data	Texas-wide student and school indicators from 1994, 1995 and 1996	Texas middle school population of 142,106 black and 661,352 white students	black and white	Fixed-effect multiple regressions	Student scores in math on Texas Assessment of Academic Skills (TAAS)	Multiple student, family, school, and peer characteristics
4. National Data on Dropping Out of School								
Jonathan Guryan, *Desegregation and Black Dropout Rates*, 94 AM. ECON. REV. 919 (2004).	2004	longitudinal	Census data from 1970 and 1980	Nonrandom, purposive samples of students in desegregating school districts	black and white	Differences in difference regression model with fixed effects	Dropout rates	Family background, state- and region-specific trends, and selective migration

B. Intergroup Relations								
Thomas F. Pettigrew & Linda R. Tropp, *A Meta-Analytic Test of Intergroup Contact Theory*, 90 J. PERSONALITY & SOC. PSYCHOL. 751 (2006).	2006	cross-sectional	526 articles written between 1940 and 2000 that met the meta-analysis' inclusion criteria	713 independent samples in 515 studies from a nonrandom purposive sample of articles	black, white, Latino/a, Asian	Meta-analysis (random-effects model)	Prejudice reduction effect size	Various controls in the 526 articles
LINDA R. TROPP & MARY A. PRENOVOST, *The Role of Intergroup Contact in Predicting Children's Inter-Ethnic Attitudes: Evidence from Meta-Analytic and Field Studies*, *in* INTERGROUP ATTITUDES AND RELATIONS IN CHILDHOOD THROUGH ADULTHOOD 236 (Sheri R. Levy & Melanie Killen eds., 2008).	2008	cross-sectional	198 of the studies about children and adolescents amongst Pettigrew & Tropp's 526 articles (see above)	(see above)	black, white, Latino/a, Asian	Meta-analysis (random-effects model)	Prejudice reduction effect size among children and adolescents in schools and neighborhoods	(see above)
Lincoln Quillian & Mary E. Campbell, *Beyond Black and White: The Present and Future of Multiracial Friendship Segregation*, 68 AM. SOC. REV. 540 (2003).	2003	cross-sectional	Add Health[a]	National random sample of 72,957 junior and senior high students from 130 randomly selected schools	black, white, Latino/a, Asian	Social network analysis of friendship dyads using logistic regression	Race and ethnicity of best friends	Race by Latino/a origin, immigrant status, family, school, and student factors

[a] The National Longitudinal Study of Adolescent Health

C. Long Term Educational Outcomes								
John T. Yun & Michal Kurlaender, *School Racial Composition and Student Educational Aspirations: A Question of Equity in a Multiracial Society*, 9 J. EDUC. FOR STUDENTS PLACED AT RISK 143 (2004).	2004	cross-sectional	Survey administered to all 11th graders in 2001	Non-random, purposive sample of 15,800 students in 58 high schools from three urban California school districts	black, white, Latino/a, Asian and other ethnicities	Multilevel logistic regressions	Student's aspirations to attend a four-year college	School- and student-level characteristics
Robert T. Teranishi & Tara L. Parker, *Social Reproduction of Inequality: The Racial Composition of Feeder Schools to the University of California*, 112 TCHRS. COLL. REC. (forthcoming 2010).	2010	cross-sectional	Data from CA's Postsecondary Education Commission and UC Corporate Student Base	Population of California high school graduates: 1,523,939 students from 823 comprehensive high schools	black, white and Latino/a	Descriptive and multivariate models	Percentage of a high school's graduates who attend a UC system	School demographics, percentage free lunch, enrollment taking advanced placement courses, school from urban area
D. Adult Life Course								
Jomills H. Braddock, *Social Isolation and Social Cohesion: The Effects of K-12 Neighborhood and School Segregation on Intergroup Orientations*, 112 TCHRS. COLL. REC. (forthcoming 2010).	2010	longitudinal	NELS[a] freshman 1999	National random sample of 4,573 students in 28 institutions	black, white, Asian and Latino/a	OLS regression	Measures of social cohesion: 1) preferences for same race neighbors, 2) for children to have same race school mates and 3) social distance from other races	Early racial isolation in neighborhood school, high school type, and context, student demographics

[a] National Longitudinal Survey of Freshmen

Elizabeth Stearns, *Long-Term Correlates of High School Racial Composition: Perpetuation Theory Re-Examined*, 112 TCHRS. COLL. REC. (forthcoming 2010) (manuscript on file with author).	2010	longitudinal	NELS 1988-1994	National, random sample of approximately 75,000 students	black, white, Latino/a, and Asian	Multivariate OLS	Workplace social and racial isolation in 1994 and 2000	High school racial composition, quality of race relations, residential and school segregation, SES, math and reading scores, gender, region
Pat Rubio Goldsmith, *Learning Apart, Living Apart: The Lasting Impact of Perpetual Segregation*, 112 TCHRS. COLL. REC. (forthcoming 2010) (manuscript on file with author).	2010	longitudinal	NELS 1988-2000, IPEDS U.S. Census 1990-2000	National random sample of 10,827 students	black, white, Latino/a, and Native American	Linear regression models	College and adult neighborhood percentage white	Racial, SES, and ethnic composition of residential neighborhood and high school, and student and family characteristics

He found that even after controlling for other school-level factors, individual, and family background measures, between 1972 and 2004 increases in school segregation corresponded to significant increases in the black-white and Latino/a-white test score gaps, outweighing the positive changes in family background measures for these minority groups.[133]

Another longitudinal study of mathematics achievement and school racial composition came to conclusions similar to Berends' study. Xiaoxia Newton investigated the predictors of both high school mathematics growth scores and the number and level of math courses completed by a nationally representative sample of high school seniors. Her longitudinal study examined the same cohort of youth over a five-year period. Because she used multilevel modeling, Newton could distinguish the effects of school racial isolation on math outcomes from the effects of other school characteristics, such as socioeconomic composition, and a number of individual-level factors. She reported that school composition—defined as percent minority—had an adverse effect on both individual math gain scores from seventh through twelfth grade, and on the number and difficulty of math courses high school students completed.[134] She reported that after holding other factors constant, the higher the percent minority in a high school, the lower the students' gains in mathematics achievement and the fewer math courses they took.[135]

In arguably the largest study ever conducted on the effects of school racial composition on achievement, Douglas N. Harris used mathematics test score information required by the federal No Child Left Behind (NCLB) Act[136] to examine the effects of segregation in more than 22,000 schools that enroll more than eighteen million students in forty-five states.[137] Harris

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133 Mark Berends, *Increasing Racial Isolation and Test Score Gaps in Mathematics: A 30-Year Perspective*, 112 TCHRS. COLL. REC. (forthcoming 2010) (manuscript on file with author).

134 Xiaoxia Newton, *End of High School Mathematics Attainment: How Did Students Get There*? 112 TCHRS. COLL. REC. (forthcoming 2010) (manuscript at 17, on file with author).

135 *Id.*

136 No Child Left Behind Act of 2001, 20 U.S.C. § 6301 et seq. (2001).

137 DOUGLAS N. HARRIS, CTR. FOR AM. PROGRESS, LOST LEARNING, FORGOTTEN PROMISES: A NATIONAL ANALYSIS OF SCHOOL RACIAL SEGREGATION, STUDENT ACHIEVEMENT, AND "CONTROLLED CHOICE" PLANS 14 (2006), http://www.americanprogress.org/issues/2006/11/pdf/lostlearning.pdf. Harris explains that the federal government commissioned the American Institutes of Research (AIR) to collect No Child Left Behind (NCLB) data from all the states in a single database. AIR then merged the NCLB data with indicators of free and reduced-price lunch eligibility and school characteristics from the National Center for Educational Statistics Common Core of Data. AIR's merged dataset is called the NCLB Database.

found that black and Hispanic students' mathematics gain scores were greater in integrated schools than in segregated ones.[138] He further reported that poverty is significantly and negatively associated with learning and poverty concentration effects were stronger than racial concentration effects.[139]

Harris' outcome measures are subject to the limitations associated with the standardized tests that states frequently use to measure student achievement.[140] However this caveat does not diminish the substantive importance of this study's findings about integration and achievement.

David Armor conducted two studies of the relationships between school racial composition and African-American achievement. In the first study, he found a significant, negative relationship between schools' minority composition and black achievement in 1996 NAEP math scores, although the size of the effect varied by state. He was able to replicate his national-level findings with state-level data from North Carolina, but not with state-level data from New York, South Carolina, or Texas.[141] In a subsequent paper, Armor and Shanea Watkins used 2003 NAEP data to investigate the association between racial composition and achievement nationally, and in several states.[142] After adjusting for socioeconomic status, the authors reported that segregation had a modest negative impact on black students' reading and math achievement. They reported that the effect was larger for eighth grade math than for reading. They found variations by state in the NAEP results, with the 2003 data indicating strong relationships between black-white segregation and achievement in some states, while in other states

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138 *Id.* at 3.

139 *Id.* at 18.

140 For example, tests designed to provide valid measures at the aggregate level (school) are used to make high-stakes decisions about individual students. NAT'L RESEARCH COUNCIL, HIGH STAKES: TESTING FOR TRACKING, PROMOTION, AND GRADUATION 30 (Jay P. Huebert & Robert M. Hauser eds., 1999). In addition, it has been argued that current political pressures arising from NCLB result in the use of high-stakes tests in ways that have eroded their validity. SHARON NICHOLS & DAVID BERLINER, COLLATERAL DAMAGE: HOW HIGH STAKES TESTING CORRUPTS AMERICA'S SCHOOLS (2007).

141 David J. Armor, *Lessons Learned from School Desegregation*, *in* GENERATIONAL CHANGE: CLOSING THE TEST SCORE GAP 115 (Paul Peterson ed., 2006). Armor has had a long career as a social scientist studying school desegregation. His extensive experiences as an expert witness in over forty desegregation and education rights cases, and his authorship of one of the Petitioners' amicus briefs make his recent scholarship reporting lower black achievement in racially isolated schools noteworthy. *See* Brief of Dr. David J. Armor et al., *supra* note 11, at 1; David Armor, *Reflections of an Expert Witness*, *in* THE END OF DESEGREGATION? 3 (Stephen J. Caldas & Carl L. Bankston III eds., 2003).

142 Armor & Watkins, *supra* note 122, at 28–49.

the relationship was either weak or absent.[143]

Although the majority of the twenty-first century social science research discussed in this Article found that school racial composition is related to achievement, Rumberger and Palardy did not.[144] They reported that although racial segregation matters, "it is the school's socioeconomic composition, not its racial composition . . . that impacts student achievement."[145] Rumberger and Palardy's longitudinal study investigated achievement growth between grades eight and twelve in mathematics, science, reading, and history for a large representative sample of students in U.S. high schools using multilevel modeling. By using multilevel modeling, they were able to distill school factors into racial composition and socioeconomic composition effects. Their study is important because of its sophisticated design and the comprehensive array of outcomes they examined. It is also noteworthy because the researchers demonstrated the importance of distinguishing the effects of a school's socioeconomic composition from the effects of the individual students' socioeconomic background. They show that school socioeconomic status (SES) is far more important than individual SES for predicting achievement, a finding also reported by Borman and Dowling.[146]

3. *State-Wide Achievement Data*

The authors of two recent studies used a statewide population of students to examine the effects of school racial composition on achievement outcomes. Studies based on population data are particularly valuable because there is no need to generalize from sample results to the population. Kathryn Borman and her colleagues examined the effects of school racial composition on the mean pass rates in reading and mathematics in all of Florida's elementary, middle, and high schools.[147] After controlling for many school quality, demographic, and family background factors, they found that racial isolation has a negative effect on a school's mean Florida Comprehensive Assessment Test (FCAT) pass rates; the higher the concentration of black students in a school, the lower the school's mean FCAT scores in both reading and mathematics.

Eric Hanushek, John Kain, and Steven Rivkin investigated how school racial composition affects individual scholastic achievement among multiple

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143 *Id.*

144 Russell Rumberger & Greg Palardy, *Does Segregation Still Matter? The Impact of Student Composition on Academic Achievement in High School*, 107 TCHRS. COLL. REC. 2003 (2005).

145 *Id.*

146 Borman & Dowling, *supra* note 129.

147 Borman et al., *supra* note 69, at 625–26.

cohorts of black and white Texas public middle school students.[148] Using detailed panel data, they disentangled school racial composition effects from the contributions of student abilities, family backgrounds, and other aspects of school quality. Their results offer strong support for the notion that having a higher percentage of black schoolmates reduces achievement for blacks, particularly those with higher initial achievement. They found no significant effects of composition on whites.[149] The authors concluded that given the existing level of segregation in Texas, racial composition appears to explain a meaningful portion of the black-white racial achievement gap.[150]

4. *National Dropout Rates*

The racial gap in academic achievement is not the only critical outcome of interest to educators, parents, and policymakers. Racial disparities in high school dropout rates mirror the race gaps in achievement, with blacks and Latinos/as less likely to graduate from high school than whites or Asians.[151] Among the nation's fifty largest cities, dropout rates are highest in racially isolated school systems with high concentrations of poor and minority students.[152] Jonathan Guyran used U.S. Census data from the 1970s and 1980s to investigate whether the implementation of desegregation plans in a community reduced black students' high school dropout rates.[153] He focused on the 1970s and 1980s, the decades when desegregation policies were pursued most actively. His results indicated a two to three percentage point decline in the black dropout rate during the 1970s, although there was no

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148 Hanushek et al., supra note 69, at 1.

149 *Id.* at 28.

150 *Id.* at 29. The Brief of Dr. David J. Armor et al. refers to an earlier version of the Hanushek et al.'s paper that contained a computational error. The error raised questions in the amici's minds about Hanushek et al.'s conclusions that racial segregation has a strong, negative effect on black students' achievement. Brief of Dr. David J. Armor et al., *supra* note 11, at 21 n. 41. However, the computational error was corrected in a revised version of this manuscript. The findings that racial segregation has a strong, negative effect on black students' achievement are essentially the same. E-mail from Steven Rivkin, Department of Economics, Amherst College, to author (Jan. 28, 2008, 10:40:00 EST) (on file with author).

151 Christopher B. Swanson, *Cities in Crisis: A Special Analytic Report on High School Graduation*, EDITORIAL PROJECTS IN EDUC. RES. CTR. 1 (2008), http://www.americaspromise.org/uploadedFiles/AmericasPromiseAlliance/Dropout_Crisis/SWANSONCitiesInCrisis040108.pdf.

152 *Id.* at 8–9.

153 Jonathan Guryan, *Desegregation and Black Dropout Rates*, 94 AM. ECON. REV. 919, 919 (2004) (reporting the results of a two-decade study concerning the impact of school desegregation on high school dropout rates).

effect on white students' rates.[154] The author noted that the largest decline in dropout rates took place in the school districts that had the largest declines in school segregation.[155]

B. *Intergroup Dynamics*

Academic lessons are not the only ones students learn in school. Educators, parents, and policymakers expect public schools to prepare students for their lives after high school where they will be workers in a globalizing economy and citizens in a multiethnic democratic society. Reducing interracial fears, hostilities, and stereotypes and fostering cross-racial understanding, although insufficient for achieving these ends, are important parts of children's socialization. Gordon Allport identified the optimal conditions for reducing interracial prejudice and fears: cooperative interactions among diverse people with equal status in the social context, shared goals, and support of authorities, law, or custom.[156] These are all features of many contemporary diverse school experiences.[157]

Since Allport's path-breaking work over fifty years ago, social psychologists have demonstrated that intergroup contact mitigates and transforms racial hostility, fear, and stereotypes; conversely, racial isolation tends to perpetuate these racial fears across generations.[158] The most recent comprehensive study of contact theory and intergroup attitudes research is Thomas Pettigrew and Linda Tropp's meta-analysis of intergroup contact research, which included 713 independent samples of subjects from 515

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[154] *Id.* at 939–40.

[155] *Id.* at 940.

[156] GORDON ALLPORT, THE NATURE OF PREJUDICE 281 (1954).

[157] Not all diverse schools have these conditions because the widespread practices of tracking and ability grouping tend to resegregate students at the classroom level, even in diverse schools. Tracking undermines the potential of school-level diversity to positively affect achievement and intergroup relations. *See generally* KENNETH J. MEIER ET AL., RACE, CLASS, AND EDUCATION: THE POLITICS OF SECOND GENERATION DISCRIMINATION 22–28 (1994); OAKES, *supra* note 123, at 184–85; Roslyn A. Mickelson, *Subverting* Swann*: First- and Second-Generation Segregation in the Charlotte-Mecklenburg Schools*, 38 AM. EDUC. RES. J. 215, 216–17 (2001); Kevin G. Welner & Jeannie Oakes, *(Li)Ability Grouping: The New Susceptibility of School Tracking Systems to Legal Challenges*, 66 HARV. EDUC. REV. 451, 452–53 (1996); Wells & Crain, *supra* note 59, at 531.

[158] *See generally*, Janet W. Schofield & Rebecca Eurich-Fulcer, *When and How School Desegregation Improves Intergroup Relations*, *in* BLACKWELL HANDBOOK OF SOCIAL PSYCHOLOGY: INTERGROUP PROCESSES 475, 475–94 (Rupert Brown & Sam Gaertner eds., 2002).

studies.[159] In addition to determining the overall effect across all studies, they also coded the studies for research rigor.[160] They found the most rigorous studies revealed the strongest effects.[161] This additional analysis gave the authors greater confidence in the overall findings that intergroup contact reduces intergroup prejudice, that its effects typically generalize beyond participants in the immediate contact situation, and that Allport's optimal conditions need not all be present for achieving positive intergroup outcomes.[162]

Linda Tropp and Mary Prenovost investigated specifically how school contact between youth from different racial and ethnic backgrounds related to reductions in prejudice and negative intergroup attitudes.[163] The authors conducted a meta-analysis of 198 samples of students in studies specifically dealing with interracial contact in schools.[164] Their samples were a subset of the 515 studies used by Pettigrew and Tropp in the meta-analysis described above.[165] Overall, Tropp and Prenovost's findings suggested that school contact among youth from different groups is associated with more positive intergroup attitudes, and such positive outcomes are stronger when the school environment reflects Allport's optimal conditions.[166]

Lincoln Quillian and Mary E. Campbell's investigation of multiracial friendships among secondary school students examined whether a school's racial and ethnic diversity shapes cross-race friendship patterns.[167] Using national data on friendship choices from a random sample of students in 7th through 12th grades, the researchers examined the effects of an ethnic group's relative size on intergroup friendship choices in schools with varying degrees of racial diversity.[168]

The researchers found that student race and Hispanic background, in conjunction with a school's racial and ethnic mix, influence the composition

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159 Thomas F. Pettigrew & Linda R. Tropp, *A Meta-Analytic Test of Intergroup Contact Theory*, 90 J. PERSONALITY & SOC. PSYCHOL. 751 (2006).

160 *Id.* at 754.

161 *Id.* at 766.

162 *Id.*

163 Linda R. Tropp & Mary A. Prenovost, *The Role of Intergroup Contact in Predicting Children's Interethnic Attitudes: Evidence from Meta-Analytic and Field Studies*, *in* INTERGROUP ATTITUDES AND RELATIONS IN CHILDHOOD THROUGH ADULTHOOD 236 (Sheri R. Levy & Melanie Killen eds., 2008).

164 *Id.* at 238.

165 *Id*. *See also* Pettigrew & Tropp, *supra* note 159, at 751.

166 Tropp & Prenovost, *supra* note 163, at 245.

167 Lincoln Quillian & Mary E. Campbell, *Beyond Black and White: The Present and Future of Multiracial Friendship Segregation*, 68 AM. SOC. REV. 540, 540 (2003).

168 *Id.*

of adolescents' friendship networks. They report that the relative size of an ethnic group in a particular school also has an important effect on friendship choices.[169] Moreover, they found different patterns for whites, blacks, Asians, and Latinos/as' cross-ethnic friendship choices.[170] While cross-ethnic friendships that include Asian and Latino/a are more common than those among blacks and whites, the likelihood of all cross-ethnic friendships increases with school racial and ethnic diversity. The likelihood that students select friends from their own ethnic group intensifies if they are members of a relatively small minority in a school (less than 10 percent of the school population).[171] The results indicate slightly stronger tendencies for racial homophily in schools with academic tracking.[172] The authors suggest that growing ethnic and racial diversity of student populations will lead to notable increases in cross-race friendships only if the national growth in student diversity "translates into increasing racial diversity within schools."[173]

C. *Long-Term Educational Outcomes*

Given the centrality of higher education for young middle-class adults' status maintenance and working-class youth's upward mobility, the individual attributes and social forces that contribute to college attendance require attention from policymakers and citizens concerned with racial gaps in educational attainment. Aspirations for a college education are widely known to influence the likelihood of a student enrolling in higher education.[174] John Yun and Michal Kurlaender investigated the effects of a high school's racial composition on students' college aspirations, using survey data from fifty-eight high schools in three California school districts.[175] They found students from minority-segregated schools had lower aspirations.[176] Even though the study's sampling frame of three California

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169 *Id.* at 559–60.

170 *Id.*

171 *Id.* at 555.

172 *Id.* at 558.

173 Quillian & Campbell, *supra* note 167, at 561.

174 Grace Kao & Marta Tienda, *Educational Aspirations of Minority Youth*, 106 AM. J. EDUC. 349, 349–50 (1998) (reporting the aspirations of ethnic minority adolescents); Zhenchao Qian & Sampson Lee Blair, *Racial/Ethnic Differences in Educational Aspirations of High School Seniors*, 42 SOC. PERSP. 605, 605–25 (discussing the racial and ethnic differences in educational aspirations of high school seniors).

175 John T. Yun & Michal Kurlaender, *School Racial Composition and Student Educational Aspirations: A Question of Equity in a Multiracial Society*, 9 J. EDUC. FOR STUDENTS PLACED AT RISK 143, 149 (2004).

176 *Id.* at 163.

school districts restricts the generalizability of the findings, the rich dataset and sophisticated statistical analysis suggest how high school diversity interacts with other school factors to influence college aspirations of students from many ethnic backgrounds.

Aspirations for a college degree are a critical student-level predictor of college admissions. But, as Robert Teranishi and Tara Parker demonstrated, the common hurdles to higher education access faced by most high school graduates are compounded if students attended a racially segregated minority high school.[177] Using population datasets from California high schools and University of California first-time freshmen, the authors analyzed the relationship between levels of racial segregation in California high schools and the likelihood that a given school would enroll one of its graduates in the University of California (UC) system.[178] The authors found that across the UC system, approximately two-thirds of first-time freshmen graduated from majority white high schools, even though these schools comprised less than half of all public high schools in the state.[179] Conversely, California secondary schools that enroll high concentrations of underrepresented minorities are less likely to send first-time freshmen to most UC campuses.[180] Although Teranishi and Parker's findings apply to California high schools and UC freshmen, the size and diversity of California's population make the findings suggestive of the dynamics that underlie college admissions nationwide.

D. *Life Course Outcomes*

Intergroup contact research indicates that diverse school experiences reduce racial fears and hostilities among students. But what happens to young adults' racial attitudes once they leave school? Perpetuation theory holds that racial isolation contributes to the intergenerational transmission of racial stereotypes, fears, and hostilities, leading to greater social isolation and less social cohesion among adults from different racial backgrounds.[181] Jomills Braddock III examined the relationship between social cohesion and social isolation among young adults who attended schools and lived in

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[177] Robert T. Teranishi & Tara L. Parker, *Social Reproduction of Inequality: The Racial Composition of Feeder Schools to the University of California*, 112 TCHRS. COLL. REC. (forthcoming 2010) (manuscript at 30, on file with author).

[178] *Id.* at 3–4.

[179] *Id.* at 28.

[180] *Id.*

[181] Jomills H. Braddock III, *Social Isolation and Social Cohesion: The Effects of K-12 Neighborhood and School Segregation on Intergroup Orientations*, 112 TCHRS. COLL. REC. (forthcoming 2010) (manuscript at 24, on file with author).

neighborhoods with varying degrees of racial diversity.[182] He used a longitudinal, nationally representative dataset that permitted him to examine multiple outcomes across several contexts.[183] His results suggest that, while both matter, social isolation in schools plays a more significant role than neighborhood isolation during childhood in diminishing social cohesion among young adults.[184] His overall findings show that social isolation in K-12 schooling influences "young adults' feelings of social distance, as well as their preferences for same race neighbors . . . ."[185]

Perpetuation theory also predicts that experiences in racially segregated or integrated schools will affect levels of segregation in students' future employment. Stearns investigated predictors of racial isolation in early adult employment.[186] Using large, nationally representative samples, one from subjects' high school years and the other from their early adulthood, she demonstrated that the racial composition of an individual's high school has a long-term effect on the level of racial isolation in that young adult's jobs.[187] Stearns found that attending high schools with higher percentages of same-race students increases the workplace racial isolation of Latinos/as, blacks, and Asians.[188] However, exposure to other racial groups in high school—specifically, exposure to Latinos/as for white students and exposure to Asians, Latinos/as, and whites for black students—reduces all students' racial isolation in the workplace settings they choose after high school.[189] These effects were detectable even after Stearns took into account levels of residential isolation in the neighborhoods where students lived prior to the survey period.[190]

The final example of twenty-first century research examined the intersection of high school racial composition and residential neighborhood integration during early adulthood. Pat Rubio Goldsmith compared the racial composition of adolescents' residential zip codes with the composition of their zip codes as young adults to test the influence of the racial composition of the high schools and colleges they attended as youth on the neighborhoods

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[182] *Id.* at 1.

[183] *Id.* at 8–9.

[184] *Id.* at 23.

[185] *Id.* at 24.

[186] Elizabeth Stearns, *Long-Term Correlates of High School Racial Composition: Perpetuation Theory Re-Examined*, 112 TCHRS. COLL. REC. (forthcoming 2010) (manuscript on file with author).

[187] *Id.* at 4–5.

[188] *Id.*

[189] *Id.* at 19–20.

[190] *Id.*

they chose to live in as young adults.[191] The author combined data from the U.S. Census with survey data from a large, nationally representative sample of high school students.[192] He followed members of the sample through college and early adulthood.

Goldsmith reported that the proportion of white students in individuals' high schools and later, in their colleges, has a strong influence on the percentage white people residing in their adult neighborhoods.[193] Given the role of integrated neighborhoods in creating integrated public schools, Goldsmith's findings illustrate the ways that the racial composition of schools contributes to breaking or maintaining intergenerational cycles of racial isolation in schools and neighborhoods.

E. *Why Twenty-First Century Social Science is Relevant to Education Rights Amicus Briefs*

My first purpose in summarizing this set of recent research studies was to introduce them into the legal and public policy discourse about school diversity and educational outcomes. The studies reported a positive association between diverse schools and education outcomes across the curriculum from elementary through high school, with positive long- and short-term effects on intergroup dynamics, an increased likelihood of going to college, and an increased likelihood of integrated living and working environments among young adults. These findings are consistent with and build upon much of the other social science research published since 1990.

The second purpose of the summaries was to showcase the rigor of their research designs and the quality of their data, samples, and analytic strategies in contrast to many of the pre-1990 studies discussed earlier. The third purpose was to illustrate why an incomplete survey of the social science literature and a reliance on research conducted before 1990 cannot adequately illuminate the relationships between school racial composition and education outcomes in contemporary American public schools. Consequently, any amicus briefs on this topic that largely ignore post-1990 research and elide the differences between methodologically weak and strong studies have limited scientific merit.

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[191] Pat Rubio Goldsmith, *Learning Apart, Living Apart: The Lasting Impact of Perpetual Segregation*, 112 TCHRS. COLL. REC. (forthcoming 2010) (manuscript on file with author).

[192] *Id.* at 15–16.

[193] *Id.* at 32.

V. DISCUSSION AND RECOMMENDATIONS

The twenty-first century social science summarized in this Article indicates that diverse schooling has positive effects on achievement, intergroup relations, and life course trajectories. This conclusion is consistent with the one reached by the National Academy of Education after reviewing the social science in all the *Parents Involved* amicus briefs, and by Tropp and her colleagues who compared the larger social science record to the *Parents Involved* opinions. The findings reported in these twenty-first century studies also are consistent with the conclusions reached by the Respondents' amici, but they are at odds with those of the Petitioners' amici.

The differences in the two sets of amicus briefs' conclusions developed from the amici's structural positions in an adversarial legal system and the different bodies of social science they summarized. The last difference likely arose as well from the fact that Petitioners' amici filed primarily advocacy briefs while the Respondents' amici filed briefs that were essentially science translations. Together these differences among the briefs directly relate to the central question of this Article: If amicus briefs are to bring relevant social science evidence to the court's attention in educational rights cases, what research studies should be summarized and interpreted in the briefs? My answer takes the form of several recommendations pertaining to the nature of amicus briefs that I believe ought to be submitted to the courts in educational rights cases, and the rigor and scope of the social science research summarized in them. I also propose strategies for enhancing jurists' capacities to utilize the social science they encounter in amicus briefs.

A. *Striking a Balance Between Science Translation and Advocacy*

The goal of advocacy, which is assumed for any given amicus brief, does not obviate the need for a commitment to the quality of the science translation the brief offers.[194] Once a brief in an education rights case clears a threshold of quality as a science translation, it can then strike a balance between science translation and advocacy within a reasonable range.

Contemporary educational rights cases involving complex social science and advanced methodologies increasingly require that the center of gravity of social science briefs be science translation, not advocacy. The last assertion is in tension with the advocacy model, which relies on the adversary system

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194 I am grateful to Kevin Welner for clarifying this point for me. I am responsible for any misinterpretations.

to serve as a quality control measure.[195] To some extent, the adversary model works in this fashion, but there is often a post hoc quality to jurists' use of the social science amicus briefs, and the adversary model presumes judges have the necessary stock of knowledge to navigate adversaries' competing claims.

Science translation briefs that summarize, interpret, and evaluate a body of social scientific literature will still reflect the perspectives of the amici.[196] Clearly, the five *Parents Involved* amicus briefs analyzed in this Article are, to varying degrees, advocacy briefs. But as I have shown, they are not all scientific translation briefs. Members of the judiciary increasingly face the necessity of understanding and evaluating complex scientific knowledge about school racial diversity effects and the advanced statistical methods that enabled researchers to develop that knowledge. Yet amicus briefs that advocate a position that is not grounded in a serious, comprehensive, and systematic synthesis of the scientific relevant literature will fail to bring the most current and useful scientific knowledge to the Court's attention.

B. Daubert *Standards and Amici Briefs in Education Rights Cases*

Daubert standards apply to the testimony of expert witnesses in adjudicative fact-finding.[197] But the courts could utilize *Daubert* standards for their legislative fact-finding, including their evaluations of amicus briefs. As I have demonstrated in this Article, reviews of scientific literatures that fall short of being rigorous, comprehensive, and cumulative surveys of extant knowledge lead to conclusions that are biased and unscientific, and inferences from such conclusions rest on very weak empirical reeds. The use of *Daubert* criteria as a guide for the evaluation of science translation amicus briefs in educational rights cases would encourage future *amicis* to use rigorous practices in their preparation of their briefs. As a result of setting the standard higher for the quality of social science syntheses, future amicus briefs are more likely to meet them.

C. *Enhancing Jurists' Utilization of Social Science*

Legal scholars and jurists have acknowledged that many jurists do not have the scientific training necessary for interpreting social science studies or

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[195] Briefs filed on behalf of neither party could bring useful scientific knowledge to the Court's attention. Presumably their neutrality would be more consistent with the character of a scientific translation brief.

[196] Roesch et al., *supra* note 16, at 6.

[197] See *supra* note 26.

understanding the statistical methods used in them.[198] Their lack of expertise makes it difficult for them to assess which social science research is methodologically better and which conclusions are valid.[199] A wide range of proposals has been advanced to improve jurists' capacities to engage the scientific evidence they encounter. Several options focus on supplementary ad hoc experts, special masters, and technical advisors to the court.[200] These court-appointed experts would provide scientific expertise to the court in a formal structure that is removed from the adversarial process.

Alternatively, pre- and post-trial expert panels could provide jurists with a deeper comprehension of both expert witnesses' testimony and amicus briefs.[201] For example, a scientific organization like the National Research Council's Division of Behavioral and Social Sciences and Education (DBASSE) could set up a credentialing body to certify that a social science amicus brief's presentation of research clears a basic threshold of comprehensiveness and fairness.[202]

Another set of proposals focuses on enhancing formal judicial training. One approach relies on the Federal Judicial Center to increase the judiciary's capacities to utilize social science through expanding its educational and training programs.[203] Others have proposed the creation of a permanent research service for the federal courts.[204] One recommendation suggests

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198 *See, e.g.*, Ancheta, *Civil Rights, Education Research, and the Courts*, *supra* note 16, at 27; JOHN C. JEFFRIES, JUSTICE LEWIS F. POWELL JR. 439 (2001); Welner & Kupermintz, *supra* note 76.

199 James Ryan, *The Limited Influence of Social Science Evidence in Modern Desegregation Cases*, 81 N. C. L. REV. 1659, 1676–77 (2003).

200 *See* ANCHETA, SCIENTIFIC EVIDENCE, *supra* note 16, at 147; CHESLER ET AL., *supra* note 16, at 181; Welner & Kupermintz, *supra* note 76, at 138.

201 ANCHETA, SCIENTIFIC EVIDENCE, *supra* note 16, at 147; CHESLER ET AL., *supra* note 16, at 181.

202 The National Research Council (NRC), the National Academy of Sciences (NAS), the National Academy of Engineering (NAE), and the Institute of Medicine (IOM) are collectively referred to as the National Academies. The goals of the National Academies are to improve governmental decision making and public policy through the acquisition and dissemination of knowledge in matters involving science, engineering, technology, and health. Welcome to the National Research Council, http://sites.nationalacademies.org/nrc/index.htm (last visited Nov. 15, 2008). I am grateful to Kevin Welner for suggesting the use of the National Academies in this capacity.

203 Since 1967, the Federal Judicial Center has been the primary federal agency responsible for judicial education. Federal Judicial Center,

http://www.fjc.gov/public/home.nsf (last visited Nov. 15, 2008).

204 ANCHETA, SCIENTIFIC EVIDENCE, *supra* note 16, at 147.

establishing a Judicial Research Service for the Supreme Court modeled after the Congressional Research Service.[205]

Building upon the previous suggestions for building the judiciary's capacities to understand and use the social science in expert testimony and amicus briefs, I suggest that the federal government establish a priority for social science training for members of the judiciary through existing nonprofit entities such as the Advanced Science and Technology Adjudication Resource Center (ASTAR).[206] I also propose that ASTAR expand its offerings to include the social science of racial composition effects in schools and the current research methods used in this field of scholarship.

As this Article has shown, the social science of racial composition effects in schools is increasingly complex. The body of research is arguably as complex as the science underlying the forensic uses of DNA, one of the topics in ASTAR's current curriculum. In some respects, school compositional effects research may be more complicated than, say, the forensic uses of DNA because, unlike blood or hair samples, students are reactive subjects of scientific inquiry. Moreover, students' behaviors are embedded in, respond to, and interact with many complex organizations (families, communities, and schools) that are affected by the larger economic, political, and cultural dynamics of American society.[207]

VI. CONCLUSION

U.S. public school students in the twenty-first century are demographically very different from their counterparts four decades ago. In 1968, 80% of public school students were white, 14% were black, 5% were

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[205] *Id.* at 147–48 (citing Kenneth Culp Davis, *Judicial, Legislative, and Administrative Lawmaking: A Proposed Research Service for the Supreme Court*, 72 MINN. L. REV. 9, 17 (1986)).

[206] ASTAR, the successor organization to the Einstein Institute for Science, Health, and the Courts (EINSHAC), is a congressionally-mandated judicial support program that assists federal jurists considering scientific evidence from a number of disciplines. Current ASTAR offerings include medical sciences, the Human Genome Project, and other areas within the scope of science, technology, and forensics that are likely to be introduced as evidence or issues in the trial and appeals of complex cases. Congressionally Mandated National Resource Judge Program, http://einshac.org/judgeProgram.htm (last visited Nov. 15, 2008).

[207] Dean Christopher Edley, Jr. of University of California, Berkeley School of Law (Boalt Hall) has opined that in the context of educational research, race issues "[are] not rocket science—[they are] harder than rocket science." Erica Gilbertson, *Christopher Edley Argues Civil Rights Education Must Get Back into National Conversation*, STAN. U. SCH. EDUC. NEWS, Nov. 3, 2005, http://ed.stanford.edu/suse/news-bureau/displayRecord.php?tablename=susenews&id=134.

Latinos/as, and 1% were Asians and Native Americans.[208] In 2006, the student population was 57% white, 20% Latino/a, 17% black, 5% Asian, and 1% Native American.[209] Indeed, at present a majority of public school students in California, Florida, and Texas are children of color.[210]

In addition to the demographic shifts in twenty-first century student populations, the racial and socioeconomic compositions of American public schools in urban, suburban, and rural communities are very different compared to earlier decades. Currently, all types of communities have higher percentages of black and Latino/a students in their public schools than in the past. Additionally, levels of racial, ethnic, and socioeconomic segregation are increasing in public schools located in cities and suburbs. Although scholars disagree about the extent to which U.S. schools are resegregating, even those who challenge claims of wholesale resegregation acknowledge that progress toward segregation "has faltered since the early 1990s."[211]

Segregation between school districts has surpassed segregation within school districts. Almost half of black and Latino students attend schools in inner ring suburban communities of large metropolitan areas. Two-thirds of the schools that blacks and Latinos attend are intensely racially segregated with high concentrations of poor students.[212] Asians are more likely to attend integrated schools than any other ethnic group. Whites are the least likely of any student group to attend segregated minority schools, especially if their

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[208] ERICA FRANKENBERG, CHUNGMEI LEE & GARY ORFIELD, THE CIVIL RIGHTS PROJECT/PROYECTO DERECHOS CIVILES, A MULTIRACIAL SOCIETY WITH SEGREGATED SCHOOLS: ARE WE LOSING THE DREAM? 23 (2003), http://www.civilrightsproject.ucla.edu/research/reseg03/AreWeLosingtheDream.pdf. (reporting demographical shifts in American student populations and levels of school segregation by race and socioeconomic status).

[209] GARY ORFIELD & CHUNGMEI LEE, THE CIVIL RIGHTS PROJECT/PROYECTO DERECHOS CIVILES, HISTORIC REVERSALS, ACCELERATING RESEGREGATION, AND THE NEED FOR NEW INTEGRATION STRATEGIES 16 (2007), http://www.civilrightsproject.ucla.edu/research/deseg/reversals_reseg_need.pdf (updating demographical shifts in American student populations and levels of school segregation by race and socioeconomic status through 2006).

[210] Status and Trends in the Education of Racial and Ethnic Minorities, http://nces.ed.gov/pubs2007/minoritytrends/ (last visited Nov. 15, 2008).

[211] JOHN LOGAN, LEWIS MUMFORD CENTER FOR COMPARATIVE URBAN AND REGIONAL RESEARCH, UNIVERSITY AT ALBANY, RESEGREGATION IN AMERICAN PUBLIC SCHOOLS? NOT IN THE 1990S 15 (2004), http://www.s4.brown.edu/cen2000/noresegregation/noresegregation_report.pdf.

[212] GARY ORFIELD & ERICA FRANKENBERG, THE CIVIL RIGHTS PROJECT/PROYECTO DERECHOS CIVILES, THE LAST HAVE BECOME FIRST: RURAL AND SMALL TOWN AMERICA LEAD THE WAY ON DESEGREGATION 6 (2008),

http://www.civilrightsproject.ucla.edu/research/deseg/lasthavebecomefirst.pdf (reporting on trends in racial and economic segregation by type and size of community).

families live outside of central cities. Whites tend to attend schools in suburban and rural communities.

Racial isolation in America's schools is not a phenomenon, like the tides, that is largely beyond the reach of conscious human efforts to change. School leaders make policy choices—highly politicized policy choices—when they draw attendance boundaries. The creation of school district boundaries has historically been a "mechanism for translating residential demographic patterns into the composition of schools."[213] There are important exceptions to this statement, as the nation's remaining voluntary desegregation plans indicate.[214] In fact, in metropolitan areas where whites and blacks are segregated into separate neighborhoods, public schools do not always have higher school segregation.[215] Policy choices matter.

Given that Justice Kennedy's opinion in *Parents Involved* described several pupil assignment strategies school systems might use to achieve diverse schools,[216] district leaders who seek an integrated school system likely will draw new pupil assignment plans guided by his suggestions. It is also likely that the implementation of such new pupil assignment plans will trigger legal struggles over whether the districts' strategies meet the Court's standards for strict scrutiny. The role of social science amicus briefs in any future educational rights cases will be, as it has been before, varied and unpredictable. The centrality of public schools to a democratic society—and to the lives of the millions of students who attend them—requires that jurists have the most current, comprehensive, and rigorous social science available to inform their decision.

This Article has proposed several possible steps toward addressing the practical challenges of improving the scientific rigor of amicus briefs in future education rights cases and the judiciary's capacity to use them. While there will likely always be grey areas of honest disagreement as to whether certain social science studies employ adequate statistical methods and appropriate data, this Article has identified the reasons why—and boundaries beyond which—it is unreasonable to consider inferences drawn from incomplete literature reviews and outdated social science research as reliable, valid, or based on scientific standards.[217]

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[213] John Logan, Deirdre Oakley & Jacob Stowell, *School Segregation in Metropolitan Regions, 1970–2000: The Impacts of Policy Choices on Public Education*, 113 AM. J. SOC. 1611, 1636 (2008).

[214] Smith et al., *supra* note 2, at 988.

[215] Logan et al., *supra* note 213, at 1636.

[216] *Parents Involved*, 127 S. Ct. at 2793 (Kennedy, J., concurring).

[217] Here I paraphrase the social science amici who made a similar argument regarding conclusions proffered by experts testifying outside the boundaries of their expertise. Brief of Social Science Academics and Associations, *supra* note 26, at 1.