Review of Educational Research
Fall 2005, Vol. 75, No. 3, pp. 417–453

Socioeconomic Status and Academic Achievement: A Meta-Analytic Review of Research

Selcuk R. Sirin
New York University

This meta-analysis reviewed the literature on socioeconomic status (SES) and academic achievement in journal articles published between 1990 and 2000. The sample included 101,157 students, 6,871 schools, and 128 school districts gathered from 74 independent samples. The results showed a medium to strong SES–achievement relation. This relation, however, is moderated by the unit, the source, the range of SES variable, and the type of SES–achievement measure. The relation is also contingent upon school level, minority status, and school location. The author conducted a replica of White's (1982) meta-analysis to see whether the SES–achievement correlation had changed since White's initial review was published. The results showed a slight decrease in the average correlation. Practical implications for future research and policy are discussed.

KEYWORDS: achievement, meta-analysis, SES, social class, socioeconomic status.

Socioeconomic status (SES) is probably the most widely used contextual variable in education research. Increasingly, researchers examine educational processes, including academic achievement, in relation to socioeconomic background (Bornstein & Bradley, 2003; Brooks-Gunn & Duncan, 1997; Coleman, 1988; McLoyd, 1998). White (1982) carried out the first meta-analytic study that reviewed the literature on this subject by focusing on studies published before 1980 examining the relation between SES and academic achievement and showed that the relation varies significantly with a number of factors such as the types of SES and academic achievement measures. Since the publication of White's meta-analysis, a large number of new empirical studies have explored the same relation. The new results are inconsistent: They range from a strong relation (e.g., Lamdin, 1996; Sutton & Soderstrom, 1999) to no significant correlation at all (e.g., Ripple & Luthar, 2000; Seyfried, 1998). Apart from a few narrative reviews that are mostly exclusive to a particular field (e.g., Entwisle & Astone, 1994; Haveman & Wolfe, 1994; McLoyd, 1998; Wang, Haertal, & Walberg, 1993), there has been no systematic review of these empirical research findings. The present meta-analysis is an attempt to provide such a review by examining studies published between 1990 and 2000.

McLoyd (1998), in her review of recent research on SES and child development, and Entwisle and Astone (1994), in their review of SES measures, identified a number of major factors that differentiate the research published during the 1960s

and the 1970s from that published in recent years. The first of these is the change in the way that researchers operationalize SES. Current research is more likely to use a diverse array of SES indicators, such as family income, the mother's education, and a measure of family structure, rather than looking solely at the father's education and/or occupation.

The second factor is societal change in the United States, specifically in parental education and family structure. During the 1990s, parental education changed dramatically in a favorable direction: Children in 2000 were living with better-educated parents than children in 1980 (U.S. Department of Education, 2000). Likewise, reductions in family size were also dramatic; only about 48% of 15-to-18-year-old children lived in families with at most one sibling in 1970, as compared with 73% in 1990 (Grissmer, Kirby, Berends, & Williamson, 1994).

A third factor is researchers' focus on moderating factors that could influence the robust relation between SES and academic achievement (McLoyd, 1998). With increased attention to contextual variables such as race/ethnicity, neighborhood characteristics, and students' grade level, current research provides a wide range of information about the processes by which SES effects occur.

Thus, because of the social, economic and methodological changes that have occurred since the publication of White's (1982) review, it is difficult to estimate the current state of the relation between SES and academic achievement. This review was designed to examine the relation between students' socioeconomic status and their academic achievement by reviewing studies published between 1990 and 2000. More specifically, the goals of this review are (a) to determine the magnitude of the relation between SES and academic achievement; (b) to assess the extent to which this relation is influenced by various methodological characteristics (e.g., the type of SES or academic achievement measure), and student characteristics (e.g., grade level, ethnicity, and school location); and (c) to replicate White's meta-analysis with data from recently published studies.

Measuring Socioeconomic Status

Although SES has been at the core of a very active field of research, there seems to be an ongoing dispute about its conceptual meaning and empirical measurement in studies conducted with children and adolescents (Bornstein & Bradley, 2003). As White pointed out in 1982, SES is assessed by a variety of different combinations of variables, which has created an ambiguity in interpreting research findings. The same argument could be made today. Many researchers use SES and social class interchangeably, without any rationale or clarification, to refer to social and economic characteristics of students (Ensminger & Fothergill, 2003). In general terms, however, SES describes an individual's or a family's ranking on a hierarchy according to access to or control over some combination of valued commodities such as wealth, power, and social status (Mueller & Parcel, 1981).

While there is disagreement about the conceptual meaning of SES, there seems to be an agreement on Duncan, Featherman, and Duncan's (1972) definition of the tripartite nature of SES that incorporates parental income, parental education, and parental occupation as the three main indicators of SES (Gottfried, 1985; Hauser, 1994; Mueller & Parcel, 1981). Many empirical studies examining the relations among these components found moderate correlations, but more important, these studies showed that the components of SES are unique and that each one measures

a substantially different aspect of SES that should be considered to be separate from the others (Bollen, Glanville, & Stecklov, 2001; Hauser & Huang, 1997).

Parental income as an indicator of SES reflects the potential for social and economic resources that are available to the student. The second traditional SES component, parental education, is considered one of the most stable aspects of SES because it is typically established at an early age and tends to remain the same over time. Moreover, parental education is an indicator of parent's income because income and education are highly correlated in the United States (Hauser & Warren, 1997). The third traditional SES component, occupation, is ranked on on the basis of the education and income required to have a particular occupation (Hauser, 1994). Occupational measures such as Duncan's Socioeconomic Index (1961) produce information about the social and economic status of a household in that they represent information not only about the income and education required for an occupation but also about the prestige and culture of a given socioeconomic stratum.

A fourth indicator, home resources, is not used as commonly as the other three main indicators. In recent years, however, researchers have emphasized the significance of various home resources as indicators of family SES background (Coleman, 1988; Duncan & Brooks-Gunn, 1997; Entwisle & Astone, 1994). These resources include household possessions such as books, computers, and a study room, as well as the availability of educational services after school and in the summer (McLoyd, 1998; Eccles, Lord, & Midgley, 1991; Entwisle & Astone).

Aggregated SES Measures

Education researchers also have to choose whether to use an individual student's SES or an aggregated SES based on the school that the student attends (Caldas & Bankston, 1997) or the neighborhood where the student resides (Brooks-Gunn, Duncan, & Aber, 1997). School SES is usually measured on the basis of the proportion of students at each school who are eligible for reduced-price or free lunch programs at school during the school year. Students from families with incomes at or below 130% of the poverty level are eligible for free meals. Those with incomes between 130% and 185% of the poverty level are eligible for reduced-price meals. Neighborhood SES, on the other hand, is usually measured as the proportion of neighborhood/county residents at least 20 years old who, according to the census data, have not completed high school (Brooks-Gunn, Denner, & Klebanov, 1995). School and neighborhood SES indicators vary in how they assess SES, but they share the underlying definition of SES as a contextual indicator of social and economic well-being that goes beyond the socioeconomic resources available to students at home (see Brooks-Gunn, Denner, & Klebanov).

Using aggregated SES measures may introduce the issue of "ecological fallacy" into the interpretation of results from various studies with differing units of analysis. The ecological fallacy is simply a misinterpretation wherein an individual-level inference is made on the basis of group aggregated data. In the context of the current review it refers to the erroneous assumption that research findings at the school or neighborhood level also represent within-school or within-neighborhood relationships, and vice versa. Aggregated SES data on the school or neighborhood levels cannot be interpreted as if they represented family SES variables, nor should student-level SES data be used to explain differences between schools.

Student Characteristics

Socioeconomic status is not only directly linked to academic achievement but also indirectly linked to it through multiple interacting systems, including students' racial and ethnic background, grade level, and school/neighborhood location (Brooks-Gunn & Duncan, 1997; Bronfenbrenner & Morris, 1998; Eccles, Lord, & Midgley, 1991; Lerner 1991). For example, family SES, which will largely determine the location of the child's neighborhood and school, not only directly provides home resources but also indirectly provides "social capital," that is, supportive relationships among structural forces and individuals (i.e., parent–school collaborations) that promote the sharing of societal norms and values, which are necessary to success in school (Coleman, 1988; Dika & Singh, 2002). Thus, in addition to the aforementioned methodological factors that likely influence the relation between SES and academic achievement, several student characteristics also are likely to influence that relation.

Grade Level

The effect of social and economic circumstances on academic achievement may vary by students' grade level (Duncan, Brooks-Gunn, & Klebenov, 1994; Lerner, 1991). However, the results from prior studies about the effect of grade or age on the relation between SES and academic achievement are mixed. On the one hand, Coleman et al.'s (1966) study and White's (1982) review showed that as students become older, the correlation between SES and school achievement diminishes. White provided two possible explanations for the diminishing SES effect on academic achievement. First, schools provide equalizing experiences, and thus the longer students stay in the schooling process, the more the impact of family SES on student achievement is diminished. Second, more students from lower-SES backgrounds drop out of school, thus reducing the magnitude of the correlation. On the other hand, results from longitudinal studies have contradicted White's results, by demonstrating that the gap between low- and high-SES students is most likely to remain the same as students get older (Duncan et al., 1994; Walker, Greenwood, Hart, & Carta, 1994), if not widen (Pungello, Kupersmidt, Burchinal, & Patterson, 1996).

Minority Status

Racial and cultural background continues to be a critical factor in academic achievement in the United States. Recent surveys conducted by the National Center for Education Statistics (NCES) indicated that, on average, minority students lagged behind their White peers in terms of academic achievement (U.S. Department of Education, 2000). A number of factors have been suggested to explain the lower academic achievement of minority students, but the research indicates three main factors: Minorities are more likely to live in low-income households or in single parent families; their parents are likely to have less education; and they often attend under-funded schools. All of these factors are components of SES and linked to academic achievement (National Commission on Children, 1991).

School Location

The location of schools is closely related to the social and economic conditions of students. A narrative review of research on school location (U.S. Department of

Education, 1996) showed that even after accounting for family SES, there appear to be a number of significant differences between urban, rural, and suburban schools. Data from the National Assessment of Educational Progress, for example, indicated that the achievement of children in affluent suburban schools was significantly and consistently higher than that of children in "disadvantaged" urban schools (U.S. Department of Education, 2000).

In summary, the relation between SES and academic achievement was the focus of much empirical investigation in several areas of education research in the 1990s. Recent research employed more advanced procedures to best examine the relation between SES and academic achievement. The present meta-analytic review was designed to assess the magnitude of the relation between SES and academic achievement in this literature. Further, it was designed to examine how the SES–achievement relation is moderated by (a) *methodological characteristics,* such as the type of SES measure, the source of SES data, and the unit of analysis; and (b) *student characteristics*, such as grade level, minority status, and school location. Finally, it was designed to determine if there has been any change in the correlation between SES and achievement since White's 1982 study.

Methods

Criteria for Including Studies

To be included in this review, a study had to do the following:

1. Apply a measure of SES and academic achievement.
2. Report quantitative data in sufficient statistical detail for calculation of correlations between SES and academic achievement.
3. Include in its sample students from grades kindergarten through 12.
4. Be published in a professional journal between 1990 and 2000.
5. Include in its sample students in the United States.

Identification of Studies

Several computer searches and manual searches were employed to gather the best possible pool of studies to represent the large number of existing studies on SES and academic achievement. The computerized search was conducted using the ERIC (Education Resources Information Center), PsycINFO, and Sociological Abstracts reference databases. For SES, the search terms *socioeconomic status*, *socio-economic status*, *social class*, *social status*, *income*, *disadvantaged*, and *poverty* were used. For academic achievement the terms *achievement*, *success*, and *performance* were used. The search function was created by using two Boolean operators: "OR" was used within the SES set and the academic achievement set of search terms, and "AND" was used between the two sets. Because the majority of studies used SES as a secondary or control variable and, therefore, the computerized databases did not always index them by using one of the above search terms as a keyword, the search was performed by using the "anywhere" function, not the "keyword" function. All databases were searched for the period 1990 to 2000 (on November 24, 2001). The search yielded 1,338 PsycINFO documents, 953 ERIC documents, and 426 Sociological Abstracts

documents. After double entries were eliminated, there remained 2,014 unique documents.

Next, the *Social Science Citation Index* (SSCI) was searched for the studies that cited either Coleman et al.'s (1966) or White's (1982) review, or both, because both of those publications have been highly cited in the literature on SES and academic achievement. Through this process, an additional 170 articles that referenced White's study and 266 articles that referenced Coleman's report were identified. In addition, I received 27 leads from previous narrative reviews and from studies that had been identified through the initial search. In total, the final pool contained 2,477 unique documents.

After the initial examination of the abstracts of each study, I applied the inclusion criteria to select 201 articles for further examination. I made the final decisions for inclusion after examining the full articles. Through this process, I selected 58 published journal articles that satisfied the inclusion criteria.

Coding Procedure

A formal coding form was developed for the current meta-analysis on the basis of Stock et al.'s (1982) categories, which address both substantive and methodological characteristics: Report Identification, Setting, Subjects, Methodology, Treatment, Process, and Effect Size. To further refine the coding scheme, a subsample of the data ($k = 10$) was coded independently by two doctoral candidates. Rater agreement for the two coders was between .80 and 1.00 with a mean of 87%. The coders subsequently met to compare their results and discuss any discrepancies between their ratings until they reached an agreement upon a final score. The coding form was further refined on the basis of the results from this initial coding procedure. The final coding form included the following components:

1. The *Identification* section codes basic study identifiers, such as the year of publication and the names and disciplines of the authors.
2. *The School Setting* section describes the schools in terms of location from which the data were gathered.
3. *The Student Characteristics* section codes demographic information about study participants including grade, age, gender, and race/ethnicity.
4. *The Methodology* section gathers information about the research methodology used in the study, including the design, statistical techniques, as well as sampling procedures.
5. *The SES and Academic Achievement* section records data about SES and academic achievement measures.
6. *The Effect Size (ES)* section codes the statistics that are needed to calculate an effect size, such as correlation coefficients, means, standard deviations, *t* tests, *F* ratios, chi-squares, and degrees of freedom on outcome measures used in the study.

Interrater Agreement

All studies were coded by the author. A doctoral student who helped design the coding schema coded an additional random sample of 10 studies. Interrater agreement levels for the six coding categories ranged from 89% for the methodology section to 100% for the names of the coding form.

Analytical Procedures

Calculating Average Effect Sizes

The effect size (ES) used in this review was *Pearson's correlation coefficient r*. Because most results were reported as a correlation ($k = 45$), the raw correlation coefficient was entered as the ES measure. There were 8 studies that did not originally report correlations but provided enough information to calculate correlations using the formulas taken from Hedges and Olkin (1985), Rosenthal (1991), and Wolf (1986) to convert the study statistic to *r*. Correlations oversestimate the population effect size because they are bounded at –1 or 1. As the correlation coefficients approach –1 or 1, the distribution becomes more skewed. To address this problem, the correlations were converted into Fisher's *Z* score and weighted by the inverse of the variance to give greater weight to larger samples than smaller samples (Lipsey & Wilson, 2001). The average ESs were then obtained through a *z*-to-*r* transformation with confidence intervals to indicate the range within which the population mean was likely to fall in the observed data (Hedges & Olkin). The confidence interval for a mean ES is based on the standard error of the mean and a critical value from the *z* distribution (e.g., 1.96 for $\alpha = .05$).

Statistical Independence

There are two main alternative choices for the unit of analysis in meta-analysis (Glass, McGaw, & Smith, 1981). The first alternative is to use each study as the unit of analysis. The second approach is to treat each correlation as the unit of analysis. Both of these approaches have shortcomings. The former approach obscures legitimate differences across multiple correlations (i.e., the correlation for minority students versus the correlation for White students), while the latter approach gives too much weight to those studies that have multiple correlations (Lipsey & Wilson, 2001). A third alternative, which was chosen for this study, is to use "a shifting unit of analysis" (Cooper, 1998). This approach retains most of the information from each study while avoiding any violations of statistical independence. According to this procedure, the average effect size was calculated by using the first alternative; that is, one correlation was selected from each independent sample. The same procedure was followed when the focus of analysis was a *student characteristic* (e.g., minority status, grade level, or school location). For example, if a study provided one correlation for White students and another for Black students, the two were included as independent correlations in the same analysis. The only exception to this rule was the moderation tests for the *methodological characteristic* (e.g., the types of SES or academic achievement measure). For example, if a study provided one correlation based on parental education and another based on parental occupation, they were both entered only when the moderator analysis was for the type of SES measure. In both alternatives, there was only one correlation from each study for each construct. When studies provided multiple correlations for each subsample, or multiple correlations for each construct, they were averaged so that the sample on which they were based contributed only one correlation to any given analysis. Thus, in Tables 1 (page 424) and 2 (page 429), the correlation for each study is the average correlation (*r*) for all constructs for that specific sample.

Fixed and Random Effects Models

There is an ongoing discussion about whether one should use a fixed or random effects model in meta-analysis (Cooper & Hedges, 1994; Hedges & Vevea, 1998).

TABLE 1
Summary of the independent samples

Author(s) (publication year)	Grade/ school level	Ethnicity (or % minority)	School location	SES measure	Achievement measure	*N* of students (or *N* of schools)	*r*
Alexander, Entwisle, & Bedinger (1994); Entwisle, Alexander, & Olson (1994)	Primary	60	Baltimore schools	FRL[a] Education	GPA Achievement Test	453 489	.391
Alspaugh (1991); Alspaugh (1992)	Primary	N/A	Urban/rural	% FRL	Missouri Mastery Achievement Test	Urban school *N* = 39 Rural school *N* = 106	Urban = .719 Rural = .072
Balli, Demo, & Wedman (1998)	Middle	White	Midwestern school	Income	Achievement Test	74	.430
Brown et al. (1993)	Mean age 9.5 years	N/A	N/A	Hollingshead (1975)	K-ABC Achievement Composite	26	.270
Caldas & Bankston (1999); Caldas (1993)	Grades K–12	44	Louisiana public schools	% FRL	Achievement Test	School *N* = 1,301	.680
Caldas & Bankston (1999); Bankston & Caldas (1998)	Grade 10	Black and White	Louisiana public schools	Income[a] Education School	Achievement Test	W = 21,263 B = 13,279	W = .247 B = .142
Carlson et al. (1999)	Grades 1–3	17	Minneapolis	Duncan's SEI[b] Income Education	PIAT	168	.340
Chen, Lee, & Stevenson (1996)	High school	N/A	Minneapolis metropolitan area	Education[a] Occupation Home	Math and general information tests	213	.307

Christian, Morrison, & Bryant (1998)	Kindergarten	83	Greensboro, NC	Education	PIAT-R	317	.403
Dixon-Floyd & Johnson (1997)	Grades 6–8	75	El Paso, TX, school districts	FRL	Texas Assessment for Academic Scores	85	.467
Dornbusch, Ritter, & Steinberg (1991)	High school	Black and White	Suburban	Education[a] Neighborhood	Self-reported GPA	W = 3,533 B = 372	WF = .32 WM = .36 BF = .07 BM = .05
			Black-Urban White-Mixed	Education	Self-reported GPA	W = 1,368 B = 446	WF = .23 WM = .20 BF = .02 BM = .05
Felner at al. (1995)	Grades 7–9	49	Rural Southeast	Hollingshead's (1975) four-factor	CAT GPA	398	.132
Gonzales, Cauce, Friedman, & Mason (1996)	Grades 7–8	Black	Urban	Education [a] Income Neighborhood	GPA	120	.130[c]
Greenberg, Langau, Coie, & Pinderhughes (1999)	Grade 1	47	Nationwide multi-state longitudinal study	Education [a] Occupation Home Neighborhood	Woodcock-Johnson Psycho-Educational Battery–Revised	337	.249
Griffith (1997)	Grades 3–6	38	Suburban school district	% FRL	Criterion Referenced Test	School $N = 119$	.650
Grolnick & Slowiaczek (1994)	Grades 6–8	2	N/A	Education	GPA	302	.095

(*continued*)

TABLE 1 *(Continued)*

Author(s) (publication year)	Grade/ school level	Ethnicity (or % minority)	School location	SES measure	Achievement measure	*N* of students (or *N* of schools)	*r*
Gullo & Burton (1993)	Kindergarten	21	Urban	FRL	Metropolitan Readiness Test (Nurss & McGauvran, 1974)	1,573	.124
Jimerson, Egeland, Sroufe, & Carlson (2000)	Grade 1	36	Urban	Duncan's SEI[b] Education Occupation Income	Achievement Test	143	.300
Johnson & Lindblad (1991)	Grade 6	33	Eastern city	FRL	SRA Assessment Survey	1,686	.175
Kennedy (1992)	Primary school	Black and White	Mixed	Education[b] Occupation	Achievement Test	WM = 1,328 BM = 1,028	WM = .330 BM = .160
Klingele & Warrick (1990)	Grade 4	19	Arkansas school districts	% FRL	MAT-6	School *N* = 332	.54
Lamdin (1996)	Grades K–12	79	Baltimore schools	% FRL	% of students above median CAT scores	School *N* = 97	.73
McDermott (1995)	Mixed	31	Mixed	Education	Achievement Test	1,200	.315
Miyamoto et al. (2000)	Grades 9–12	76	Hawaiian	Education	GPA	696	.180
O'Brien, Martinez-Pons, & Kopala (1999)	Grade 11	60	Large metropolitan area	Income	Pre-Scholastic Aptitude Test	415	.150
Otto & Atkinson (1997)	Grade 11	28	North Carolina rural counties	Education[a] Occupation	CAT	335	.202

Overstreet, Holmes, Dunlap, & Frentz (1997)	Age 8–16 years	50	N/A	Hollingshead (1975)	WRAT-R	116	.621
Patterson, Kupersmidt, & Vaden (1990); Pungello, Kupersmidt, Burchinal, & Patterson (1996)	Grades 2–4	38	Urban	Public Assistance	SRA Achievement Test	M = 417 F = 451	M = .409 F = .391
Rech & Stevens (1996)	Grade 4	Black	Urban	FRL	CAT	133	.060
Ripple & Luthar (2000).	Grade 9	85	Urban	Hollingshead two-factor	GPA	96	.010[c]
Schultz (1993)	Grades 4–6	Black and Hispanic	Urban	FRL	BASIS	133	.430
Seyfried (1998)	Grades 4–6	96	Suburban near large Midwest city	Education[b] Income	GPA MAT	113	.005
Shaver & Walls (1998)	Grades 7–8	6	Marion County, WV	FRL	CTBS	335	.166
Strassburger, Rosen, Miller, & Chavez (1990)	Grades 7–9	19	N/A	Occupation	GPA	357	.080
Sutton & Soderstrom (1999)	Grades 3 and 10	27	Mixed	FRL	Achievement Test	School *N* = 2,307	.750[c]
Thompson et al. (1992)	Mixed	N/A	N/A	Hollingshead two-factor (1957)	Achievement Test	76	.555

(*continued*)

TABLE 1 *(Continued)*

Author(s) (publication year)	Grade/ school level	Ethnicity (or % minority)	School location	SES measure	Achievement measure	*N* of students (or *N* of schools)	*r*
Trusty, Watts, & House (1995)	Grades 4–6	Black	Rural	Education[b] FRL	Stanford Achievement Test	F = 265 M = 298	F = .150 M = .210
Trusty, Watts, & Lim (1996)	Grades 7–8	Black	Rural	Education[b] FRL	Stanford Achievement Test	F = 157 M = 129	F = .200 M = .260
Trusty, Peck, & Mathews (1994)	Grade 4	55	Mixed	Education[b] FRL	Stanford Achievement Test	392	.440
Unnever, Kerckhoff, & Robinson (2000)	Grade 11	N/A	Virginia's 128 school districts	Neighborhood SES	Achievement Test	School district *N* = 128	.540
Walker, Greenwood, Hart, & Carta (1994)	Primary school	48	Kansas city area.	Education[a] Occupation Income	Achievement Tests (WRAT-R, MAT, CTBS)	29	.334[c]
Watkins (1997)	Grades 2–5	23	Midwestern city	Education	GPA	150	.360
White, Reynolds, Thomas, & Gitzlaff (1993)	Mixed	N/A	Urban	FRL	Achievement Test	15,045 School *N* = 102	.154 School = .720

Note. *r* = effect size; N/A = information not available; K-ABC = Kaufman Assessment Battery for Children; FRL = free or reduced-price lunch; W = White; B = Black; SEI = Socioeconomic Index; PIAT = Peabody Individual Achievement Test; PIAT-R = Peabody Individual Achievement Test–Revised; F = female; M = male; CAT = California Achievement Test; WRAT = Wide Range Achievement Test; SRA = Science Research Associates; BASIS = Basic Achievement Skills Individual Screener; WRAT-R = Wide Range Achievement Test–Revised; MAT = Metropolitan Achievement Test; CTBS = Comprehensive Test of Basic Skills.

[a]This study reported independent results per SES component. [b] This study combined these components in its SES measure. [c]Only the first wave of data were used to calculate ES from this longitudinal study.

TABLE 2
Summary of nationwide studies included in the meta-analysis

Name of survey	Published data source	Grade/school level	Ethnicity (or % minority)	SES measure	Achievement measures	*N* of students	*r*
National Educational Longitudinal Study: 88/90/94	Kennedy (1995) for NELS base year; Levine & Painter (1999) for multiple SES correlations; Rojewski & Yang (1997) for multiple achievement correlations; Singh & Ozturk (2000) for NELS: 88 and follow-up samples	Grade 8	Asian American	Education[a] Occupation Income	GPA	AF = 741 AM = 785	AF = .190 AM = .240
			Black	Education[a] Occupation Income	GPA	BF = 1,538 BM = 1,467	BF = .280 BM = .230
			Hispanic	Education[a] Occupation Income	GPA	HF = 1,538 HM = 1,630	HF = .180 HM = .200
			White	Education[a] Occupation Income	GPA	WF = 8,166 WM = 8,151	WF = .330 WM = .350
National Longitudinal Study of Youth: Children of mothers 1986, Cohorts I & II	Ricciuti (1999); Dubow & Ippolito (1994)	Kindergarten (Cohort 1)	N/A	Education Income	PIAT	W = 280 B = 235 H = 256	W = .215 B = .235 H = .256
		Kindergarten (Cohort 2)	N/A	Education Income	Achievement Test	W = 440 B = 260 H = 240	W = .165 B = .153 H = .215
Longitudinal Study of American Youth: Three-waves, panel study: fall, 1987; spring 1987; fall 1988	Reynolds & Walberg (1992a)	Grade 7	38% minority	Home[a] Education Expectations	NEAP Math Test	3,116	.588
	Gallagher (1994)	Grade 7		Education	NEAP Science Test	1,166	.320
	Reynolds & Walberg (1992b)	Grades 10–11	38% minority	Education[a] Duncan's SEI Expectations	NEAP Science Test	2,535	[b]Grade 10 = .535
National Transition Demonstration Project: Control sample	Chan, Ramey, Ramey, & Schmitt (2000)	Kindergarten	43% minority	Education[c] Income	Achievement Test	378	.225

Note. ES*r* = effect size *r*; A = Asian American; B = Black; H = Hispanic American; W = White; F = Female; M = Male; PIAT = Peabody Individual Achievement Test; NEAP = National Educational Assessments of Student Progress.
[a] This study combined multiple SES components in the SES measure. [b] Only the first wave of data was used to calculate ES from this longitudinal study. [c] This study reported separate results for each SES component.

A fixed effects model allows for generalizations to the study sample, while the random effects model allows for generalizations to a larger population. For the present review, both fixed and random methods results are provided for the main effect size analysis. For the moderator analyses, fixed methods were chosen to make inferences only about the studies reviewed in this meta-analysis.

Test of Homogeneity

The variation among correlations was analyzed using Hedges's *Q* test of homogeneity (Hedges & Olkin, 1985). This test uses the chi-square statistic, with the degree of freedom of $k - 1$, where k is the number of correlations in the analysis. If the test reveals a nonsignificant result, then the correlations are homogenous and the average correlation can be said to represent the population correlation. If the test reveals a significant result, that is, if the correlations are heterogeneous, than further analyses should be carried out to determine the influence of moderator variables on the relation between SES and academic achievement.

Test for Moderator Effects

To test for the significance of the moderating factors, the homogeneity analysis outlined by Hedges and Olkin (1985) was followed. For this step of the analysis, fixed-effects analyses were used to fit homogeneous effect sizes into either analysis of variance (ANOVA) or a modified weighted least squares regression model to examine whether the variability in effect sizes could be accounted for by moderator variables. The statistical procedure for this analysis involves partitioning the *Q* statistics into two proportions, *Q-between* (Q_b), an index of the variability between the group means, and *Q-within* (Q_w), an index of variability within the groups. Therefore, a significant *Q-between* would indicate that the mean effect sizes across categories differ by more than sampling error. Regression analysis was performed only for the minority status moderation analysis. The rest of the analyses were performed using the weighted ANOVA procedure. To keep the results section consistent, when the moderator variables were investigated, I reported the *Q-between* statistics alone.

Publication Bias

It is well documented in meta-analysis literature that there is a publication bias against the null hypothesis (Lipsey & Wilson, 2001; Rosenthal, 1979). We used two methods to evaluate publication bias in the current review. First, publication bias in this review would be minimal partly because the SES–achievement relation was not the primary hypothesis for most studies, as the bias toward significant results is likely to be contained within the primary hypothesis (Cooper, 1998). To empirically test this assumption, we determined whether the SES–achievement relation was one of the main questions in each study by checking the title, abstract, introduction, research questions and/or hypotheses. Of the 58 articles included in the review, 24 articles had the SES–achievement relation as one of the main questions (i.e., central variable) of the study. The remaining 34 articles did not have the SES–achievement relation as a central variable, but instead used it as a control variable. To examine the possibility of bias, articles in which the SES achievement relation was a main question were treated as the central group, and articles in which the relation was a control variable were treated as a control group. On the basis of the student-level data ($N = 64$), there

were 21 independent samples using SES–achievement relation as a main hypothesis and 43 independent samples using the SES–achievement relation as a control variable. The results showed that the central group effect size (.28) was slightly higher than the control group effect size (.27). This difference, however, was not statistically significant, $Q(1, 63) = .13$, $p = .72$.

Second, we plotted study sample size against the ES to evaluate the funnel plot. While studies with small sample sizes are expected to show more variable effects, studies with larger sample sizes are expected to show less variable effects. With no publication bias, the plot should thus give the impression of a symmetrical inverted funnel. An asymmetrical or skewed shape, on the other hand, suggests the presence of publication bias. Figure 1 shows the plot for this review, which conformed to a funnel shape. The only exception to the symmetry appears to be from two large sample studies that used home resources as a measure of SES and which showed the strongest ES in this review. To better understand the link between sample size and ES, using Begg's (1994) formula, the correlation between the ranks of standardized effect sizes and the ranks of their sampling variances were calculated. The results showed that the Spearman rank correlation coefficient was, $r_s (64) = .07$, $p > .59$. The Kendall's rank correlation coefficient was $t(64) = .06$, $p > .46$. Both of these statistics indicate that there was no statistically significant evidence of publication bias.

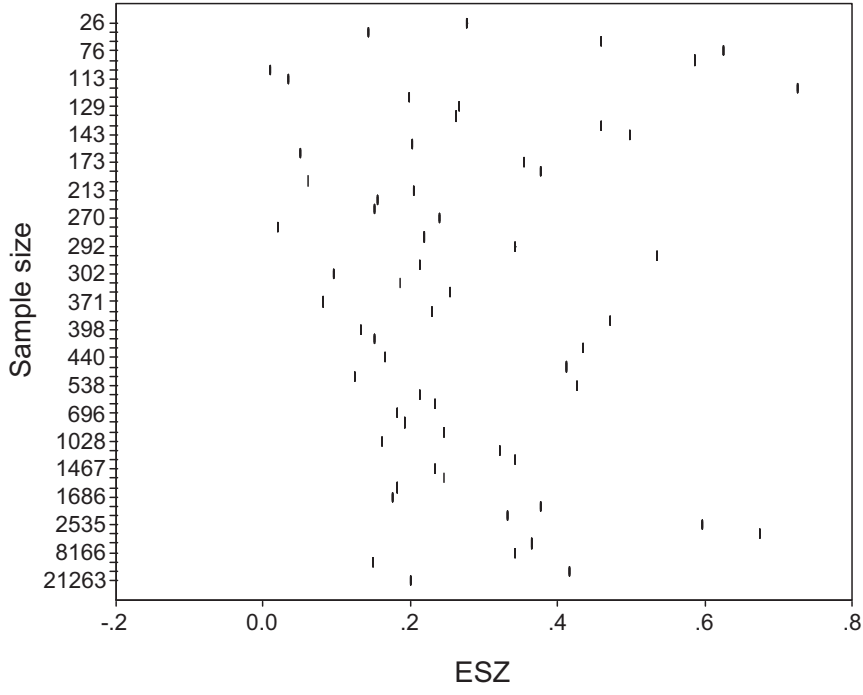

FIGURE 1. *Funnel plot is used to visually inspect data for publication bias. The symmetrical inverted funnel shape suggests that there is no publication bias. The only exception to the symmetry appears to be from two large sample studies that used home resources as a measure of SES.*

Results

The results are presented in three subsections. First, to address the first question, the magnitude of the relation between SES and academic achievement, we reported general findings of the review. To address the second question, testing for the effects of methodological and student characteristics, we reported the results of the moderator tests. Finally, to compare our findings with that of White's (1982) review, we reported results from another set of analyses that was conducted using White's procedures.

General Characteristics of the Studies

Table 1 contains information about the studies used in this analysis and the variables for which they were coded. There were 75 independent samples from 58 published journal articles. Summary of nationwide studies, including data from the National Educational Longitudinal Study, the National Longitudinal Study of Youth, and the Longitudinal Study of American Youth are presented in Table 2. Of 75 samples, 64 used students as the unit of analysis, while 11 used aggregated units of analyses (i.e., schools or school districts). The total student-level data included 101,157 individual students. The sample sizes for this group ranged from 26 to 21,263, with a mean of 1,580.58 (SD = 3,726.32) and a median of 367.5. The aggregated level data included 6,871 schools and 128 school districts.

Although the publication years of the studies were limited to the period of 1990–2000, the actual year of data collection varied from 1982 to 2000.The data collection year was reported in most of the articles (k = 36). The year 1990 had the largest number of studies (k = 7) followed by 1988 and 1992 with 6 studies each. A weighted regression analysis revealed no statistically significant association between publication year and the effect sizes, $\beta = -.03$, n.s.

*The Effect Size (*r*)*

Most studies had multiple indicators of the variables of interest. As a result, there were 207 correlations that could be coded. Overall, correlations ranged from .005 to .77, with a mean of .29 (SD = .19) and a median of .24.

For the samples with the student-level data, *the average ES for the fixed effects model* was .28 with a 95% confidence interval of .28 to .29, and it was significantly different from zero (z = 91.75, p <.001). *The average ES for the random effects model* was .27 with a 95% confidence interval of .23 to .30, and it was significantly different from zero (z = 14.26, p < .001).

For the samples with the aggregated level data, however, the correlations ranged from .11 to .85, with a mean of .60 (SD = .22). The weighted ES ranged from .11 to 1.25. *The average ES for the fixed effects model* was .67 with a 95% confidence interval of .66 to .67, and it was significantly different from zero (z = 147.56, p < .001). *The average ES for the random effects model* was .64 with a 95% confidence interval of .57 to .70, and it was significantly different from zero (z = 13.27, p < .001).

To avoid committing the ecological fallacy, only studies with student-level data were investigated for the remainder of data analysis. The Q test of homogeneity was significant, indicating that the correlations were heterogeneous and other factors beyond sampling error may be involved in the explanation of the differences across the studies $Q(1, 64)$ = 1,844.95, p < .001. The possible factors leading to

differences across the correlations will be the focus of the rest of the results section. The results of the *Q* statistic along with the mean ES and the variation around the mean ES value that encompasses the 95% confidence interval for the different levels of each moderator variable are presented in Tables 3 and 4.

The Methodological Moderators

There were 102 unique correlations that provided information about one or more components of SES. Table 3 presents the results of the methodological moderator analyses. The average ES for this distribution ($k = 102$) was .31. This ES is significantly different from zero ($z = 144.12$, $p < .001$). The test for homogeneity was significant, indicating that the correlations in this set were not estimating the same underlying population value, and therefore it is appropriate to look for possible moderators, $Q(1, 102) = 2{,}068.36$, $p < .001$. The number of SES components in each study, the type of SES components, and the source of SES data were considered as methodological moderators.

TABLE 3
Methodological characteristics moderators of the relationship between SES and academic achievement

Moderator	Categories	*k*	*Q-between*	Mean ES	−95% CI	+95% CI
Type of SES components		79	587.14*	.32	.32	.33
	Education	30		.30	.30	.31
	Occupation	15		.28	.26	.29
	Income	14		.29	.27	.31
	Free or reduced-price lunch	10		.33	.32	.34
	Neighborhood	6		.25	.22	.28
	Home	4		.51	.49	.53
SES range restriction		102	238.65*	.32	.32	.33
	No restriction	78		.35	.35	.36
	3 to 7 SES groups	15		.28	.28	.29
	2 SES groups only	9		.24	.22	.27
SES data source		62	775.55*	.29	.28	.30
	Parents	31		.38	.37	.39
	Students	18		.19	.19	.20
	Secondary sources	13		.24	.21	.26
Achievement measures		167	884.21*	.29	.28	.29
	General achievement	45		.22	.22	.23
	Verbal	58		.32	.32	.33
	Math	57		.35	.34	.36
	Science	7		.27	.27	.29

Note. *k* = number of effect sizes; ES = effect size; CI = confidence interval for the average value of ES.
*$p < .005$.

The Type of SES Component

Six SES components were used to assess SES (see Table 3). Parental education was the most commonly used SES component ($k = 30$), followed by parental occupation ($k = 15$), parental income ($k = 14$), and eligibility for free or reduced lunch programs ($k = 10$). The Q statistic of homogeneity indicated that the type of SES component significantly moderated the relation between SES and academic achievement, $Q_b(5, 79) = 587.14$, $p < .001$. A weighted ANOVA revealed that the average ES was .28 for parental occupation, .29 for parental income, and .30 for parental education. SES measures based on "home resources" produced the highest mean ES (.51), followed by eligibility for free or reduced lunch programs (.33). There were six neighborhoods with an average effect size for these measures was .25. The follow-up tests consisted of all pairwise comparisons among the six types of SES indicators. Pairwise comparisons were conducted using Bonferroni adjusted alpha levels of .003 per test (.05/15). Each of the pairwise comparisons between the three most commonly used indicators (education, occupation, and income) were nonsignificant. Other pairwise comparisons, however, were all statistically significant at $p < .001$, with the exception of the pairwise comparison of occupation and neighborhood, which was nonsignificant.

Restriction on the SES Variable

Of the 102 correlations, there were 9 student-level correlations where the SES variable was operationalized as a dichotomy (e.g., high versus low SES). An additional 15 correlations were based on SES measures that were restricted to 3–7 categories (e.g., low, medium, high). The rest of the correlations ($k = 78$) were based on continuous SES variables; that is, there were no reported restriction in the operationalization of SES. Pairwise comparisons between three restriction categories were conducted using Bonferroni adjusted alpha levels of .016 per test (.05/3). All of the pairwise comparisons between the groups were significant at $p < .005$.

The results of the weighted-ANOVA test showed that there were significant differences in mean ES across these three groups, $Q_b(2, 102) = 238.65$, $p < .001$. As presented in Table 3, the average ES for the two-SES group only category (e.g., high versus low SES) was .24, while the average ES for the 3–7 SES groups category was .28. When there were no restrictions on the range of the SES variable, the average ES was .35. In other words, placing restrictions on the range of the SES variable significantly decreased the correlation between SES and academic achievement.

The Source of SES Data

Of 64 independent student-level studies, 62 reported information about the source of SES data. Studies were coded into the following three categories of data source: Secondary sources ($k = 13$), students ($k = 18$), and parents ($k = 31$). The source of the SES data proved to be a significant moderator, $Q_b(2, 64) = 775.55$, $p < .001$. The results presented in Table 3 show that the average ES was .38 when the SES data were gathered from parents, .24 when the data were gathered from secondary sources, and .19 when the data were gathered from students themselves. Pairwise comparisons between the three sources were conducted using Bonferroni adjusted alpha levels of .016 per test (.05/3), and they were all significant at $p < .005$.

Type of Academic Achievement Measure Moderator Analysis

To estimate the effect of the choice of academic achievement measure on the relation between SES and academic achievement, a separate database was constructed using studies that reported correlations on single or multiple academic achievement variables. In total, there were 167 independent correlations with a mean ES of .29. As presented in Table 3, there were four different measures used to assess academic achievement: math achievement ($k = 57$), verbal achievement ($k = 58$), science achievement ($k = 7$), and general achievement ($k = 45$). The choice of academic achievement measure was a significant moderator of the correlation between SES and academic achievement, $Q_b(4, 167) = 884.21$, $p < .001$. The mean ES was .22 for general achievement outcomes. When the studies chose a single achievement indicator, the average ES was .27 for science achievement outcomes, .32 for verbal achievement outcomes, and .35 for math achievement outcomes. Pairwise comparisons between four achievement measures were conducted using Bonferroni adjusted alpha levels of .008 per test (.05/6). All of the pairwise comparisons between the measures were significant at $p < .001$.

Student Characteristics Moderators

The main sample, with 64 student-level correlations, was used to examine various student characteristics as possible moderators of the relation between SES and academic achievement. More specifically, student's grade level, minority status, and school location were considered as student characteristics moderators. Table 4 presents the results of these moderator analyses.

TABLE 4
Student characteristics moderators of the relationship between SES and academic performance

Moderator variable	Categories	*k*	*Q-between*	Mean ES	−95% CI	+95% CI
Grade level		71	162.23**	.28	.28	.29
	Kindergarten	9		.19	.16	.22
	Elementary school	21		.27	.25	.30
	Middle school	19		.31	.31	.32
	High school	22		.26	.26	.27
Minority status		35	164.86**	.24	.23	.25
	White students	11		.27	.25	.28
	Minority students	24		.17	.16	.19
School location		26	10.15*	.25	.23	.27
	Suburban	9		.28	.25	.30
	Urban	13		.24	.22	.27
	Rural	4		.17	.12	.23

Note: *k* = number of effect sizes; ES = effect size; CI = confidence interval for the average value of ES.
*$p < .005$. ** $p < .001$.

Grade Level

The sample used for this analysis had 71 correlations, which included the original 64 student-level correlations and 7 additional correlations that came from the longitudinal studies that provided multiple correlations for the same students over time. Because some studies presented data from multiple grades without further specification, the grade data were coded as Kindergarten (1), Elementary School (2), Middle School (3) and High School (4).

Student's grade level was found to be a significant moderator of the correlations between SES and academic achievement, $Q_b(3, 70) = 162.23$, $p < .001$. As presented in Table 4, the mean ES was .19 for the kindergarten students, .27 for the elementary school students, .31 for middle school students, and .26 for high school students. Thus, with the exception of the high school students, there seems to be a trend of increasing ES from kindergarten to middle school. Pairwise comparisons between the four grade levels were conducted using Bonferroni adjusted alpha levels of .008 per test (.05/6). All of the pairwise comparisons between the four groups were significant at $p < .001$, with the exception of the pairwise comparison of elementary school and high school ES.

Minority Status Moderator Analyses

More than half of the studies in the student-level data ($k = 35$) reported separate correlations for White ($k = 11$) and minority students ($k = 24$). The *Q-between* statistics suggested a significant difference between these two groups, $Q_b(1, 35) = 164.86$, $p < 001$. The mean ES for White student samples (.27) was significantly larger than the mean ES for minority student samples (.17).

Because there were 21 additional studies that provided information about the number of minority students in their sample, an additional analysis was conducted by taking the ratio of minority students in each sample as a predictor of the correlation between SES and academic achievement. To evaluate the association between the ratio of minority students and the magnitude of the correlation coefficient between SES and academic achievement, a modified weighted least squares regression was run. There were 56 independent correlations used in this analysis. The minority ratio was the predictor and the ES was the criterion variable. The proportion of minority students in the sample was a significant predictor of the correlation between SES and academic achievement, $Q(1, 56) = 131.70$, $p < .001$. The increase in the number of minorities in a study sample was negatively associated with SES–achievement correlations, $\beta = -.30$. In other words, the correlation between SES and academic achievement was minimized with the increase in the proportion of minorities in the study sample.

School Location Moderator Analyses

There were only 26 studies (out of a possible 64) with data about the geographical location of the schools. These studies were categorized in one of the following three groups: suburban ($k = 9$), urban ($k = 13$), and rural ($k = 4$). The Q test of homogeneity provided evidence for a significant geographic location effect, $Q_b(2, 26) = 11.62$, $p < .005$. As presented in Table 4, the average ES for the suburban schools was the largest (.28), and the average ES for the rural schools was the smallest (.17). The average ES for urban schools was also .23. These results suggest that the relation between SES and academic achievement is stronger for stu-

dents in suburban schools than for students in rural or urban schools. Pairwise comparisons between three school locations were conducted using Bonferroni adjusted alpha levels of .016 per test (.05/3). The only significant pairwise comparison was between suburban school and rural schools, $p < .001$.

Replicating White's (1982) Meta-Analysis

One of the main goals of this meta-analysis was to replicate White's (1982) meta-analysis using journal articles published from 1990 to 2000. However, it is difficult to compare the findings reported so far in this review with the findings from White's review for three reasons. First, White's calculation of the mean ES was based on the average of the unweighted correlations. This procedure is likely to overestimate the results because it treats each correlation equally by not weighting them with appropriate sample size parameters (Lipsey & Wilson, 2001). Second, White's review allowed for multiple correlations from the same sample to be used in the data analysis as independent correlations. The problem with this approach is that it violates the principle that there would be only one unique correlation from one unique sample According to White's procedure, for example, one study would have 5 correlations and another study would have only 1 correlation, but for meta-analytic purposes, the first study would be represented with 5 ESs, whereas the second study would only be represented with 1 ES. This approach, therefore, assigns disproportionate influence to studies that included multiple measures of SES and/or school achievement. Finally, the inclusion criteria were different between the two reviews. For example, unlike the current review, White's review accepted IQ scores as a measure of achievement and did not limit its samples to U.S. students. For these reasons, to allow for a comparison between these two meta-analyses, a new meta-analysis was conducted using the same procedures outlined in White's study for this section of the results.

Replication Sample

Following sampling procedure in White's (1982) review, the comparison sample included 207 correlations. This number is comparable to the 219 correlations in White's review. The two reviews were also comparable in terms of the number of journal articles. The current review was based on 58 journal articles published between 1990 and 2000, and White's review was based on 59 journal articles published between 1918 and 1975.

The Average Correlation

The following are results of the current meta-analysis and of White's (1982) meta-analysis based on journal articles from the two year spans:

Present review (1990–2000): $M = .299$, $SD = .169$, $k = 207$
White's review (1918–1975): $M = .343$, $SD = .204$, $k = 219$

The average correlation in the present review was .299, as compared with White's average correlation of .343. Although it is not possible to provide statistically significant evidence for the change over time, it is safe to suggest that the magnitude of the relation between SES and school achievement is not as strong in the present review as it was in White's review.

Comparisons across the two meta-analyses also showed that for both studies, parental education was the most frequently used measure of SES, but parental income and parental occupation also continued to be commonly used as a single measure of SES. Among these traditional three components of SES, income was the strongest correlate in both meta-analyses.

Discussion

The general goals of this study were to (a) determine the extent to which a significant relation exists between SES and academic achievement based on research published between 1990 and 2000; (b) assess the influence of several moderating factors in this relation; and (c) estimate whether this relation has changed in comparison with the findings from White's (1982) study.

What Is the Relation Between SES and Academic Achievement?

Using Cohen's (1977) guidelines, the overall ES of the present study reflects a medium level of association between SES and academic achievement at the student level and a large degree of association at the school level. This interpretation, however, is limited because, as Cooper (1998) pointed out, one has to interpret a particular ES in comparison with other findings in that particular area of research. The overall finding from this study compares quite favorably with results from Lipsey and Wilson's (1993) review of more than 300 meta-analyses ($r = .27$, transformed to Cohen's $d = .56$ for comparison purposes). Of all the factors examined in the meta-analytic literature, family SES at the student level is one of the strongest correlates of academic performance. At the school level, the correlations were even stronger.

This review's overall finding, therefore, suggests that parents' location in the socioeconomic structure has a strong impact on students' academic achievement. Family SES sets the stage for students' academic performance both by directly providing resources at home and by indirectly providing the social capital that is necessary to succeed in school (Coleman, 1988). Family SES also helps to determine the kind of school and classroom environment to which the student has access (Reynolds & Walberg, 1992a). Past research that compared low-SES schools with higher-SES schools found several important differences in terms of instructional arrangements, materials, teacher experience, and teacher-student ratio (Wenglinsky, 1998). Finally, in addition to the quality of instruction, family SES also influences the quality of the relationship between school personnel and parents (Watkins, 1997). The overall finding, therefore, not only reflects the effect of resources at home but also may reflect the effect of social capital on academic achievement.

SES and Academic Achievement: Unraveling a Complex Relationship

Beyond the main findings, the results from this review also show that the magnitude of the relationship between SES and academic achievement is contingent upon several factors. More specifically, methodological characteristics, such as the type of SES measure, and student characteristics, such as student's grade, minority status, and school location, moderated the magnitude of the relationship between SES and academic achievement.

Methodological Issues

The findings show that the studies used several conceptual frameworks to capture students' social and economic background. Overall, this meta-analysis provides empirical evidence regarding how the type of SES measure affects the strength of correlations found. This information suggests that researchers should consider the following four factors when conceptualizing SES: (a) the unit of analysis for SES data; (b) the type of SES measure; (c) the range of the SES variable; and (d) the source of SES data.

Unit of Analysis for SES Data

As expected, when researchers chose an aggregated unit of analysis for their SES variable, the average ES doubled in magnitude in comparison with would be observed if the student were the unit of analysis. When aggregated SES data were used to examine the SES–achievement relationship at the student level, the findings were likely to be contaminated because of the ecological fallacy. In other words, it is problematic to make assumptions at the student level from aggregated data.

Type of SES Measure

The type of SES measure changed the relationship between SES and academic achievement. The average correlations between SES and academic achievement ranged from .25, when SES was operationalized by using neighborhood characteristics as an indicator of family SES, to .47, when SES was operationalized by using home resources as an indicator of family SES. These two indicators, however, were based on a limited number of studies. More commonly used SES components such as education, occupation, income, and eligibility for school lunch programs produced similar results.

Range of the SES Variable

The findings suggest that the studies that used dichotomous SES variables—that is, low as opposed to high SES—were less likely to produce stronger correlations than the studies that did not dichotomize the SES variable. This finding is not surprising considering the statistical principle of correlations with artificially dichotomized measures. Because both school achievement and SES are believed to be continuous in nature (i.e., variables that are normally distributed in the population) placing constraints in the measurement process creates artificial categories. As a statistical rule, when one of the variables in the correlation is artificially categorized, as was the case for many of the studies in this review, observed correlations will be lower than would be observed if a continuous measure had been used (Hunter & Schmidt, 1990). In other words, when SES has an artificially restricted range, the correlation will be pushed closer to zero and the degree of attenuation will increase as the skew of the dichotomy increases (Lipsey & Wilson, 2001). Thus, artificially restricting student's SES significantly reduces the magnitude of the interaction between SES and school achievement.

Source of SES Data

When students provided the data about their family's SES, the magnitude of the relationship between SES and academic achievement was the smallest. When the

SES data were collected from parents, however, the results were likely to be much higher. As Entwisle and Astone (1994) suggest, information about students' SES should be collected from parents, as they are the authoritative source on their own socioeconomic status. One could, therefore, argue that students are likely to overestimate their family background, which would artificially limit the variability of the SES measure by pushing it upward. It is also possible that they overestimate their family resources, because they might be reluctant to admit having limited resources. In a recent study, Ensminger et al. (2000) examined the extent to which adolescents accurately report their family's SES. Both mothers and adolescents completed questionnaires that included measures of SES. Although the results show relatively high agreement on SES measures between the two sources of informants, the agreement level varied by age, family structure, and school performance. Older students, students from two-parent households, and higher-achieving students were more likely to report accurately than were younger students, students from single-parent households, and lower-achieving students.

Achievement Measures

Studies reviewed in this analysis assessed students' academic achievement using different types of academic achievement measures. Single subject achievement measures, such as verbal achievement, math achievement, and science achievement, yielded significantly larger correlations than general achievement measures (e.g., GPA or a composite achievement test). It is possible that global achievement measures conceal differences between subject areas (math and verbal achievement, for example) and therefore obscure meaningful differences between subject domains. For example, when the studies assessed academic achievement at the subject level, the correlations were strongest with math achievement as compared with verbal and science achievement.

Student's Grade Level

Unlike the results presented by White (1982) and Coleman et al. (1966), the current review suggests that the relationship between SES and academic achievement increases across various levels of schooling, with the exception of the high school samples. The overall trend was that the magnitude of the SES–academic achievement relationship increased significantly by each school level, starting from primary school and continuing to middle school. For the high school samples, however, the average ES was similar to that of elementary school samples. In general, this finding is in agreement with the findings from longitudinal studies, which show that the gap between low- and high-SES students is most likely to remain the same, if not to widen. In addition, because academic achievement typically is a cumulative process, in which early school achievement provides a basis for subsequent educational achievement in later years of schooling, it is possible that those students who are doing poorly in elementary school because of their family SES are more likely to drop out of school in later years and therefore are not included in research samples in the later years of schooling.

This finding should be interpreted with caution because only longitudinal studies can provide accurate estimates of true intra-individual change over time. Although the present review included some longitudinal studies (Carlson et al., 1999; Chen, Lee, & Stevenson, 1996; Gonzales, Cauce, Friedman, & Mason, 1996;

Walker et al., 1994; and data from nationwide longitudinal studies such as NELS and NLSY), the majority of the studies included were one-time-only assessments of SES and academic achievement. Thus, because this review examined grade levels cross-sectionally, not longitudinally, the findings reported here do not reflect the influence of SES over time on an individual basis.

The Role of Minority Status

Socioeconomic status was a stronger predictor of academic achievement for White students than for minority students. Additional evidence that minority status acts as a moderating factor came from the significant association between the percentage of minority students in a sample and the magnitude of the correlation between SES and academic achievement. Stated differently, the more minority students in a sample, the weaker the association between SES and achievement.

The finding that family background variables such as parental education, income, and occupation are less predictive for minorities should be of concern not only for reasons of future research methodology, but also for its for social policy implications. Although few in number, some studies suggest that neighborhood and school SES, not family SES, may exert a more powerful effect on academic achievement in minority communities, particularly in African American communities. For example, Gonzales et al. (1996) examined the combined effect of family and neighborhood influences on the school performance of African American high school students. They found that family SES variables were not as predictive of academic achievement as were neighborhood SES factors. Neighborhood factors were related to lower grades and also moderated several other factors such as parenting support and control. In a large-scale examination of the same issue, Dornbusch, Ritter, and Steinberg (1991) compared the differential effects of parental SES and neighborhood SES in relation to academic achievement. They reported that the ability of family SES to influence academic achievement is minimized when students, regardless of their ethnic background, live in a census tract with a substantial proportion of minority residents. In other words, the weaker SES–achievement correlation among minorities in general and African Americans in particular is not solely because of their minority status but partly because most of these families, and fewer Whites, live in neighborhoods with higher educational risk factors.

The Role of School Location

The relationship between family SES and academic achievement was the weakest for urban schools as compared with non-urban schools. This result should be interpreted in the context of economic segregation of people (Wilson, 1987, 1996), because the location of the school largely determines the financial resources available for education. In a nationwide study of more than 17,000 school districts, Parrish, Matsumoto, and Fowler (1995) found that higher neighborhood SES, as measured by the value of owner-occupied housing or by residents' educational attainment, is significantly related to greater school expenditures per student. In addition to this nationwide analysis, several statewide surveys showed the same phenomenon, in which differential resources were available for schools in different locations. For example, Unnever et al. (2000) examined Virginia data indicating that resources are associated with a school district's SES characteristics and that resources were related to students' academic achievement. Thus the role of

school location, combined with the finding that higher concentrations of minority students in a sample decrease the correlation between SES and school performance, suggest that the influence of family SES on school performance is contextual. In other words, the impact of family SES varies for individuals depending on where they live and the cohort with whom they go to school.

Comparisons With White's (1982) Review

The final question that this review addressed was whether the relationship between SES and school achievement is any different in the 1990s from that reported in White's (1982) study. To provide a comparison across the two studies, I used the same meta-analytical procedures adopted by White. The findings for this replication study are, therefore, slightly different from the ones presented so far because White's meta-analytical procedures were different from the ones adopted by the present meta-analysis.

Overall, the magnitude of the SES–school achievement relationship is not as strong as was reported in White's (1982) meta-analysis. Studies published before 1980 reported a mean correlation of .343, which is higher than what was found in this meta-analysis (.299). This is the most comparable finding because both correlations were drawn from published journal articles. The decline is in line with White's observation that there was a slight trend toward lower correlations between SES and school achievement for the more recent studies in his sample. The weaker correlation between SES and school achievement in the current review may be attributed to several factors, including changes in research on SES and school achievement, and changes experienced in the larger social and economic context. As outlined before, unlike the earlier research, which conceptualized SES as a static phenomenon, recent research emphasizes a contextual developmental approach to both SES and school performance. As a result, there is an increasing emphasis on using more precise measurements of social and economic background (Entwisle & Astone, 1994). For example, traditional research measured the father or father figure's social and economic characteristics, such as education and labor force status, as the most salient indicators of SES, whereas current research generally tries to gather information from both mothers and fathers. It is also possible that the weaker correlation in the current review, as compared with White's (1982) review, may reflect social and overall policy changes over time. For example, the increasing access to learning materials such as books, TV, and computers, as well as the availability of compensatory education, may have helped to reduce the impact of SES on academic achievement in recent years. More important, unlike the earlier research that overlooked and understudied students from diverse ethnic backgrounds, there seems to be more emphasis on diverse students in recent decades (McLoyd, 1998). Likewise, the economic desegregation between urban and nonurban schools was not as pronounced as it currently is. Hence the correlation reported in this study is likely to be reduced partly because of the increasing number of minority and urban students in published studies, as reported correlations for both of these groups were significantly lower than for the rest of the student body.

Limitations of This Review

The results of this review should be interpreted with caution for several reasons. First, its focus is limited to studies published during a certain period: 1990–2000.

This was the most recent data available on the topic when the review was conducted. Although this study failed to find statistically significant evidence of differences between data collected in the 1980s and in the 1990s, a more direct test of this assumption was not possible because of the partial data available in this review.

Second, although we found no statistically significant evidence for publication bias in this review, in the absence of unpublished data the review was limited to published journal articles. White's (1982) meta-analysis shows that effect sizes from published studies were 17% larger than effect sizes from unpublished studies. This overestimate is much smaller in comparison with other meta-analyses where effect sizes from published studies were 36% larger than effect sizes from unpublished studies (Lipsey & Wilson, 1993). Nevertheless, this study did not empirically test the impact of publication types as a possible moderator factor; therefore, the results are likely to be overestimated and should be interpreted with caution.

Third, the sample for this study was limited to students in the U.S. schooling system. Therefore, it is not possible to draw conclusions about how SES and academic achievement relate in the context of other countries. This would be an important direction for future research because educational systems are an integral part of every country's unique social and economic system.

Fourth, although every effort was made to locate all relevant studies, there was no way to be certain that the sample of this meta-analysis included all of the studies that examined the relationship between SES and achievement that were published during the 1990s. We primarily used electronic databases (i.e., PsycINFO, ERIC, and Sociological Abstracs) and manually searched the Social Science Citation Index for relevant studies. The only manual searches were of studies cited in narrative reviews. Thus it is likely that some relevant studies were not found.

Finally, each meta-analysis is limited by the quality of the research on which it relies (Glass et al., 1981). For the purposes of this study, there was no effort to eliminate studies on the basis of quality. Although study quality was indirectly tested through several moderator variables that were geared to assess the study design (e.g., type of SES and academic achievement measures, unit of analysis, and SES data source), these variables were only proxy indicators of quality. This limitation, however, is not detrimental, as past research on the association between the study quality and effect sizes found no significant correlation (Glass et al., 1981; Harris & Rosenthal, 1985).

Implications for Research

Despite these limitations, the results of this meta-analysis provide some practical guidelines for education researchers. As the overall finding suggests, researchers must continue to assess student's SES as part of their understanding of family effects on academic performance. The decision about how to measure SES, however, is a complicated one. On the basis of the results from this meta-analysis, the following points may help researchers to better capture students' social and economic background in education research.

First, the unit of analysis is of critical importance. The availability of school- and/or neighborhood-level SES data, through many state and nationwide datasets, increasingly puts researchers at risk of committing the ecological fallacy. Because

of the magnitude of the difference between the student level and the school/neighborhood levels of analysis, future research should consider using aggregate data appropriately in understanding individual-level processes. For example multilevel modeling techniques can now be used for combining individual-level data with school- or aggregate-level data. This method can deal with the issue of the ecological fallacy because it simultaneously estimates individual and school-level effects (Bryk & Raudenbush, 1992).

Second, socioeconomic status is a multi-dimensional construct, and different components yield different results. Of six major components of SES, researchers most often choose the three traditional ones—income, education, and occupation—as the basis for their SES conceptualization. Researchers should make an effort to use multiple components of SES in their operationalization because, when only a single component is chosen, the results are more likely to overestimate the effect of SES.

Third, the use of participation in school lunch programs as a measure of SES, though common, is conceptually problematic. The process of determining eligibility is open to mistakes; and, more important, the effect that participation in a school lunch program itself might have on students' school performance is difficult to differentiate from the effect of SES. Furthermore, research shows that eligibility for full or partial school lunch programs only weakly correlates with academic achievement as grade level rises, possibly because adolescents are less likely than younger children to file applications (McLoyd, 1998). Despite these limitations, eligibility for lunch programs is still one of the most commonly used SES measure in the current literature on academic achievement, partly because it is easier to obtain than school records and does not require having to gather data from students and parents. As was also pointed out by Hauser (1994), researchers should avoid using school lunch eligibility as an SES indicator for students.

Fourth, the findings of this review suggest that only a small number of studies considered neighborhood characteristics as part of their assessment of students' social and economic background. Research on neighborhood SES has generally used census tract data to assess neighborhood SES structure. This approach has its limitations because it may refer to many communities with different features, and it only provides a distal marker for community SES, which may not best reflect the community SES itself. Despite these limitations, the census tract may provide some insight into the relationship between SES and academic achievement that may not be possible to delineate with family SES variables alone. In addition to neighborhood census tract data, future research should find new ways to incorporate neighborhood characteristics into the operationalization of SES. There are promising alternatives, such as various neighborhood risk measures (for examples, see Gonzales et al., 1996; Greenberg, Lengua, Coie, Pinderhughes, 1999). These alternatives may provide more accurate ways to capture the effects of family SES in relation to the overall socioeconomic well-being of the neighborhood where they live and send their children to school.

Fifth, SES seems to have different meanings for students from different ethnic backgrounds. One of the main findings of this review was that, for minorities, SES did not seem to be as strongly related to academic achievement as it was for Whites. For White students, SES is an essential variable that should continue to be examined; but for minorities, it is limited in its capacity to capture students' social

and economic background. Although this could be partly explained by the variance differences in two groups (that is, studies with minority samples are likely to have less variance in SES variables than studies with White samples), when researchers investigate SES with minority students they should consider using other indicators of SES, such as home resources and accumulated wealth. As Krieger and Fee (1994) have demonstrated, although the median family income of White households is 50% greater than that of Black households, the median wealth, meaning the distribution of capital assets such as home and estate ownership, is about ten times greater. Researchers should use home resources and/or accumulated wealth as part of their operationalization of SES or present their findings separately for different ethnic groups.

Sixth, it is important to decide from whom the SES data should be collected. As the results show, studies that collect SES data from students yield much smaller correlations with achievement than do studies that collect data from parents. If we assume that parents are the ultimate authority on their SES (Entwisle & Astone, 1994), then it should be of concern to researchers that students' reports of SES may not be accurate. Future research should make an attempt to gather SES data from parents rather than students.

Finally, the location of schools should be an integral part of research on students' SES and academic achievement. The results of this review suggest that for urban students SES–achievement relationships were not as strong as they were for suburban students. Thus, without consideration of the geographical location of the school, the observed correlations between SES and academic achievement are likely to confound the differences between rural, urban, and suburban schools.

Implications for Educational and Social Policy

The results of this review have important policy implications. Both White's (1982) review and this review strongly suggest that the impact of SES on school achievement was much higher when the focus was on schools, not individual students. These results should not be surprising for those who are familiar with the school funding system. In the United States, family SES is the most important determinant of school financing, as nearly half of all public school funding is based on property taxes within a school district (National Research Council, 1999). Although districts with limited local funds are compensated within a state, in most cases this outside financial support fails to create financial equity between school districts (Parrish et al., 1995). For example, in Illinois financial disparity in per-pupil expenditures ranged from $3,000 to $15,000 in 1995–1996 (National Conference of State Legislatures**,** 1998). Thus current school financing policies create a situation where students who come from lower-family-SES backgrounds are likely to be in school districts that are at best financially inferior to schools in more wealthy districts, and at worst, in financial crisis.

As the main finding of this review shows, school success is greatly influenced by students' family SES. This finding indicates that our society may be failing in one of the greatest commitments of every modern society, that is, the responsibility to provide educational opportunities for each student regardless of social and economic background. Unfortunately, many poor students come to schools without the social and economic benefits held by many middle- to high-SES students. At present, one in five children in the United States lives in poverty, which puts many of these stu-

dents at risk for poor school performance or failure (Dalaker & Proctor, 2000). Thus, to significantly reduce the gap in achievement between low-and high-SES students, policy decisions at the local, state, and federal levels must aim at leveling the playing field for students deemed to be at risk academically as a result of their family SES.

Furthermore, poverty in the 1990s has become more concentrated in inner-city neighborhoods and among minorities (Wilson, 1996), two groups for whom, as the present review indicates, the influence of family SES on academic achievement is significantly lower than it is for other student groups. Thus, even when the current school financing system achieves its goal of financial *equity* between poor and wealthy school districts, it does not necessarily achieve a comparable "ecological equity"—because students in poor and wealthy school districts do not enjoy comparable living circumstances outside school (Clune, 1994). In addition to differences at the family-SES level, children who live in poor school districts, as compared with children who live in wealthy school districts, also have to deal with limited social services, more violence, homelessness, and illegal drug trafficking (Wilson, 1987, 1996). Likewise, many poor urban and rural schools need more financial incentives to attract and keep qualified teaching staff and thus need more funding than their counterparts in suburban areas (Wenglinsky, 1998). To address these social and educational inequalities, policymakers should focus on *adequacy*—that is, sufficient resources for optimal academic achievement—rather than *equity* as a primary education policy goal (Clune, 1994). Poor school districts have more than their equal share of challenges to deal with, and consequently they need adequate financial resources that may be more than equal to those needed by wealthier schools.

As a result of current educational and social policies, students who are at risk because of family SES are more likely to end up in schools with limited financial resources. Despite these limitations, there have been many interventions that have successfully improved the educational achievement of those who might otherwise fail in school because of their family background. For example, small school and class size (Glass & Smith, 1989), early childhood education, federal programs such as Title 1 and Head Start, after-school programs and summer school sessions (Entwisle & Alexander, 1994), and financially qualified school personnel (Wang et al., 1993), all have been found to be important factors in reducing the achievement gap between children of the "haves" and the "have-nots." Future educational and social programs should provide more support for these and other innovative programs that can lift the educational achievement of those who are at risk for school failure because of family SES. Without such support, the current system is likely to produce an intergenerational cycle of school failure because of family SES.

Conclusions

This meta-analysis is the second review of literature relating to SES and school achievement, the last having been conducted 20 years ago (White, 1982). Since White's review, there have been several changes both in the literature on the SES–achievement relationship and in meta-analytical procedures. The current review uses these advances in research methodology, provides an empirically valid and conceptually rich statistical summary of the literature, and offers a critical examination of how several moderating factors influence the relationship between SES and academic achievement. The findings of this review will serve a practical use for education researchers and policymakers in their efforts to better assess the

implications of family SES on educational processes and to provide equal educational opportunities for all.

This meta-analysis also provides several areas where future research should further test the complex nature of SES–achievement relationships. As the overall findings suggest, researchers must assess student's family background regardless of their main research focus. Although the ongoing trend in the study of school performance suggests that the social and economic context is key in understanding school success, it is still a common practice to mention SES in the introduction and discussion sections of journal articles without actually incorporating it in the measurement model. Researchers should no longer limit themselves by discussing only the context but rather should actually measure and evaluate the social and economic context in relation to their special area of interest.

In addition to these general points, this meta-analysis also provides several methodological challenges for future research in education. For example, given the finding that there is only a weak relationship between SES and academic achievement among minority students, should we continue to use SES as an important contextual indicator of school success for minority students? Or, given the finding that there is a discrepancy between the data collected from parents and others, should we continue to ask students or school administrators to provide SES data? The results of this study can act as a springboard for research that addresses these important questions.

Note

I would like to thank Lauren Rogers-Sirin, Jacqueline Lerner, Penny Hauser-Cram, David Blustein, Albert E. Beaten, and four anonymous reviewers for their feedback on earlier versions of this article.

References

Begg, C. B. (1994). Publication bias. In H. Cooper & L. V. Hedges (Eds.), *Handbook of research synthesis* (pp. 399–409). New York: Russell Sage Foundation.

Bollen, K., Glanville, J. A., & Stecklov, G. (2001). Socioeconomic status and class in studies of fertility and health in developing countries. *Annual Review of Sociology, 27,* 153–185.

Bornstein, M. C., & Bradley, R. H. (Eds.). (2003). *Socioeconmic status, parenting, and child development.* Mahwah, NJ: Lawrence Erlbaum.

Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental processes. In W. Damon (Series Ed.) & R. M. Lerner (Vol. Ed.), *Handbook of child psychology: Vol. 1. Theory* (5th ed.). New York: Wiley.

Brooks-Gunn, J., Denner, J., & Klebanov, P. K. (1995). Families and neighborhoods as contexts for education. In E. Flaxman & A. H. Passow (Eds.), *Changing populations changing schools: Ninety-fourth yearbook of the National Society for the Study of Education, Part II* (pp. 233–252). Chicago: National Society for the Study of Education.

Brooks-Gunn, J., & Duncan, G. J. (1997). The effects of poverty on children. *The future of children, 7*(2), 55–71.

Brooks-Gunn, J., Duncan, G. J., & Aber, J. L. (Eds.). (1997). *Neighborhood poverty: Context and consequences for children: Vol. 1.* New York: Russell Sage Foundation Press.

Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models.* Newbury Park, CA: Sage.

Caldas, S. J., & Bankston, C. (1997). Effect of school population socioeconomic status on individual academic achievement. *Journal of Educational Research, 90*(5), 269–277.

Clune, W. H. (1994). The shift from equity to adequacy in school finance. *Educational Policy, 8*(4), 376–394.

Cohen, J. (1977). *Statistical power analysis for the behavioral sciences* (rev. ed.). New York: Academic Press.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94,* S95–S120.

Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfeld, F. D., & York, R. L. (1966). *Equality of educational opportunity.* Washington, DC: Government Printing Office.

Cooper, H. M. (1998). *Synthesizing research: A guide for literature reviews* (3rd ed.). Newbury Park, CA: Sage.

Cooper, H., M., & Hedges, L. V. (Eds.). (1994). *Handbook of research synthesis.* New York: Russell Sage Foundation.

Dalaker, J., & Proctor, B. D. (2000). *U.S. Census Bureau, current population reports, Series P60-210: Poverty in the United States, 1999.* Washington, DC: Government Printing Office.

Dika, S., & Singh, K. (2002). Applications of social capital in educational literature: A critical synthesis. *Review of Educational Research, 72*(1) 31–60.

Duncan, G. J., & Brooks–Gunn, J. (1997). Income effects across the life span: Integration and interpretation. In G. J. Duncan & J. Brooks–Gunn (Eds.) *Consequences of growing up poor* (pp. 596–610). NY: Russell Sage Foundation Press.

Duncan, G., J. Brooks-Gunn, & P. Klebanov. (1994). Economic deprivation and early childhood development. *Child Development 65*(2), 296–318.

Duncan, O. D. (1961). A Socioeconomic index for all occupations. In A. J. Reiss, Jr. (Ed.), *Occupations and Social Status* (pp. 139–161). NY: Free Press.

Duncan, O. D., Featherman, D. L., & Duncan, B. (1972). *Socio-economic background and achievement.* NY: Seminar Press.

Eccles, J. S., Lord, S., & Midgley, C. (1991). What are we doing to early adolescents? The impact of educational context on early adolescents. *American Journal of Education, 99*, 521–542.

Ensminger, M., Forrest, C. B., Riley, A.W., Kang, M., Green, B. F., Starfield, B., Ryan, S. (2000). *The validity of measures of socioeconomic status of adolescents. Journal of Adolescent Research,15*(3). 392–419.

Ensminger, M. E. & Fothergill, K. E. (2003). A Decade of measuring SES: What it tells us and where to go from here. In Bornstein & Bradley (Eds.). *Socioeconomic status, parenting, and child development* (pp. 13–27), Mahwah, NJ: Lawrence Erlbaum Associates.

Entwisle, D. R. & Astone, N. M. (1994). Some practical guidelines for measuring youth's race/ethnicity and socioeconomic status. *Child Development, 65*(6), 1521–1540.

Glass, G. V, McGaw, B., & Smith, M. L. (1981). *Meta-Analysis in Social Research.* Beverly Hills, CA: Sage Publications.

Glass, G. V. & Smith, M. L. (1989). Meta-analysis of the relationship between class size and achievement. *Educational Evaluation and Policy Analysis, 1*, 2–16.

Gottfried, A. (1985). Measures of socioeconomic status in child development research: Data and recommendations. *Merrill-Palmer Quarterly, 31*(1). 85–92.

Grissmer, D. W., Kirby, S. N. Berends, M., & Williamson, S. (1994). *Student achievement and the changing American family.* Santa Monica, CA: RAND Corporation.

Harris, M. J., & Rosenthal, R. (1985). Mediation of interpersonal expectancy effects: 31 meta-analyses. *Psychological Bulletin,* 97, 363–386.

Hauser, R. M. (1994). Measuring socioeconomic status in studies of child development. *Child Development, 65*(6), 1541–1545.

Hauser, R. M. & Huang, M. H. (1997). Verbal ability and socioeconomic success: A Trend Analysis. *Social Science Research, 26,* 331–376.

Hauser, R. M. & Warren, J.R. (1997). Socioeconomic indexes for occupations: A Review, update, and critique. In A. E. Raftery (Ed.) *Sociological Methodolog,* (pp.177–298), Cambridge, MA: Basil Blackwell.

Haveman, R., & Wolfe, B. (1994). *Succeeding generations: On the effects of investment in children.* NY: Russell Sage.

Hedges, L. V. & Olkin, I. (1985). *Statistical methods for meta-analysis*. NY: Academic Press.

Hedges, L.V. & Vevea, J.L. (1998). Fixed and random-effects models in meta-analysis. *Psychological Methods, 3,* 486–504.

Hunter, J. & Schmidt, F. (1990). *Methods of meta-analysis: Correcting error and bias in research findings.* Beverly Hills CA: Sage.

Krieger, N. & Fee, E. (1994) Social class: the missing link in the U.S. health data. *International Journal of Health Services, 24*, 25–44.

Lerner, R. (1991). Changing organism-context relations as the basic process of development: A developmental contextual perspective. *Developmental Psychology, 27*, 27–32.

Lipsey, M. W., & Wilson, D. B. (1993). The efficacy of psychological, educational, and behavioral treatment: Confirmation from meta-analysis. *American Psychologist, 48*, 1181–1209.

Lipsey, M. W. & Wilson, D. B. (2001). *Practical meta-analysis*. Thousand Oaks, CA: Sage Publications.

McLoyd, V. (1998). Socioeconomic disadvantage and child development. *American Psychologist, 53*, 185–204.

Mueller, C.W., & Parcel, T.L. (1981). Measures of socioeconomic status: Alternatives and recommendations. *Child Development, 52,* 13–30.

National Commission on Children (U. S.) (1991). *Beyond rhetoric: A new American agenda for children and families.* Washington, D.C.: National Commission on Children.

National Conference of State Legislatures (1998). *The Education Partners Project. Educational adequacy: Building an adequate school finance system.* Denver: Author.

National Research Council. (1999). *Equity & adequacy in education finance: Issues and perspectives.* Washington, D.C.: National Research Council Committee on Education Finance.

Parrish, T. B., Matsumoto, C. S., & Fowler, W. J., Jr. (1995). *Disparities in public school district spending 1989–90: A multi-variate, student-weighted analysis, adjusted for differences in geographic cost of living and student need.* Washington, DC: National Center for Education Statistics, U.S. Department of Education.

Rosenthal, R. (1979). The "file drawer problem" and tolerance for null results. *Psychological Bulletin, 86,* 638–641.

Rosenthal, R. (1991). *Meta-analytic procedures for social research* (Rev. ed). Newbury Park, CA: Sage.

Stock, W. A, Okun, M., Haring M., Miller W., Kenney, C., & Ceurvorst, R. (1982). Rigor in data synthesis: A case study of reliability in meta-analysis. *Journal of Educational Research, 11*(6), 10–14.

U.S. Department of Education, National Center for Education Statistics. (1996). *Location, Poverty and Schools*. Washington, D.C.: Government Printing Office.

U.S. Department of Education, National Center for Education Statistics. (2000). *The Condition of Education 2000, NCES 2000-602*. Washington, DC: Government Printing Office.

Wenglinsky, H. (1998). Finance equalization and within-school equity: The relationship between education spending and the social distribution of achievement. *Educational Evaluation and Policy Analysis, 20*(4), 269–283.
White, K. (1982). The relation between socioeconomic status and academic achievement. *Psychological Bulletin, 91,* 461–481.
Wilson, W. J. (1987). The hidden agenda. In W. J. Wilson (Ed.), *The truly disadvantaged: The inner city, the underclass and public policy* (pp. 140–164). Chicago: University of Chicago Press.
Wilson, W. J. (1996). *When work disappears: The world of the new urban poor*. New York: Alfred A. Knopf.
Wolf, F. M. (1986). *Meta-analysis: Quantitative methods for research synthesis.* Beverly Hills, CA: Sage.

The following sources were included in the meta-analysis:

Alexander, K. L., Entwisle, D. R., & Bedinger, S. D. (1994). When expectations work: Race and socioeconomic differences in school performance. *Social Psychology Quarterly, 57*(4), 283–299.
Alspaugh, J. (1991). Out-of-school environmental factors and elementary-school achievement in mathematics and reading. *Journal of Research and Development in Education, 24*(3), 53–55.
Alspaugh, J. W. (1992). Socioeconomic measures and achievement: Urban vs. rural. *Rural Educator, 13*(3), 2–7.
Balli, S. J., Demo, D. H., & Wedman, J. F. (1998). Family involvement with children's homework: An intervention in the middle grades. *Family Relations: Interdisciplinary Journal of Applied Family Studies, 47*(2), 149–157.
Bankston, C. L., III, & Caldas, S. J. (1998). Family structure, schoolmates, and racial inequalities in school achievement. *Journal of Marriage & the Family, 60*(3), 715–723.
Brown, R. T., Buchanan, I., Doepke, K., Eckman, J. R., & et al. (1993). Cognitive and academic functioning in children with sickle-cell disease. *Journal of Clinical Child Psychology. 22*(2), 207–218.
Caldas, S. J. (1993). Reexamination of input and process factor effects on public school achievement. *Journal of Educational Research, 86*(4), 206–214.
Caldas, S. J., & Bankston, C. (1998). The inequality of separation: Racial composition of schools and academic achievement. *Educational Administration Quarterly, 34*(4), 533–557.
Caldas, S. J., & Bankston, C. L., III. (1999). Multilevel examination of student, school, and district-level effects on academic achievement. *Journal of Educational Research, 93*(2), 91–100.
Carlson, E. A., Sroufe, L. A., Collins, W. A., Jimerson, S., Weinfield, N., Hennighausen, K., et al. (1999). Early environmental support and elementary school adjustment as predictors of school adjustment in middle adolescence. *Journal of Adolescent Research, 14*(1), 72–94.
Chan, D., Ramey, S., Ramey, C., & Schmitt, N. (2000). Modeling intraindividual changes in children's social skills at home and at school: A multivariate latent growth approach to understanding between-settings differences in children's social skill development. *Multivariate Behavioral Research, 35*(3), 365–396.
Chen, C., Lee, S. Y., & Stevenson, H. W. (1996). Long-term prediction of academic achievement of American, Chinese, and Japanese adolescents. *Journal of Educational Psychology, 88*(4), 750–759.
Christian, K., Morrison, F. J., & Bryant, F. B. (1998). Predicting kindergarten academic skills: Interactions among child care, maternal education, and family literacy environments. *Early Childhood Research Quarterly, 13*(3), 501–521.

Dixon-Floyd, I., & Johnson, S. W. (1997). Variables associated with assigning students to behavioral classrooms. *Journal of Educational Research, 91*(2), 123–126.

Dornbusch, S. M., Ritter, P. L., & Steinberg, L. (1991). Community influences on the relation of family statuses to adolescent school performance: Differences between African Americans and non-Hispanic whites. *American Journal of Education* [Special issue: Development and education across adolescence], *99*(4), 543–567.

Dubow, E. F., & Ippolito, M. F. (1994). Effects of poverty and quality of the home-environment on changes in the academic and behavioral adjustment of elementary school-age-children. *Journal of Clinical Child Psychology, 23*(4), 401–412.

Entwisle, D. R., Alexander, K. L., & Olson, L. S. (1994). The gender gap in math: Its possible origins in neighborhood effects. *American Sociological Review, 59*, 822–838.

Felner, R. D., Brand, S., DuBois, D. L., Adan, A. M., Mulhall, P. F., & Evans, E. G. (1995). Socioeconomic disadvantage, proximal environmental experiences, and socioemotional and academic adjustment in early adolescence: Investigation of a mediated effects model. *Child Development, 66,* 774–792.

Gallagher, S. A. (1994). Middle school predictors of science achievement. *Journal for Research in Science Teaching, 31*(7), 721–734.

Gonzales, N. A., Cauce, A. M., Friedman, R. J., & Mason, C. A. (1996). Family, peer, and neighborhood influences on academic achievement among African-American adolescents: One-year prospective effects. *American Journal of Community Psychology, 24*(3), 365–387.

Greenberg, M. T., Lengua, L. J., Coie, J. D., & Pinderhughes, E. E. (1999). Predicting developmental outcomes at school re-entry using a multiple-risk model: Four American communities. *Developmental Psychology, 35,* 403–417.

Griffith, J. (1997). Linkages of school structural and socioenvironmental characteristics to parental satisfaction with public education and student academic achievement. *Journal of Applied Social Psychology, 27*(2), 156–186.

Grolnick, W. S., & Slowiaczek, M. L. (1994). Parents' involvement in children's schooling: A multidimensional conceptualization and motivational model. *Child Development, 65*(1), 237–252.

Gullo, D. F., & Burton, C. B. (1993). The effects of social class, class size and prekindergarten experience on early school adjustment. *Early Child Development & Care, 88,* 43–51.

Jimerson, S. R., Egeland, B., Sroufe, L. A., & Carlson, B. (2000). A prospective longitudinal study of high school dropouts: Examining multiple predictors across development. *Journal of School Psychology, 38*(6), 525–549.

Johnson, R. A., & Lindblad, A. H. (1991). Effect of mobility on academic performance of sixth grade students. *Perceptual & Motor Skills, 72*(2), 547–552.

Kennedy, E. (1992). A multilevel study of elementary male black students and white students. *Journal of Educational Research, 86*(2), 105–110.

Kennedy, E. (1995). Correlates of perceived popularity among peers: A study of race and gender differences among middle school students. *Journal of Negro Education, 64*(2), 186–195.

Klingele, W. E., & Warrick, B. K. (1990). Influence of cost and demographic factors on reading achievement. *Journal of Educational Research, 83*(5), 279–282.

Lamdin, D. J. (1996). Evidence of student attendance as an independent variable in education production functions. *Journal of Educational Research, 89*(3), 155–162.

Levine, D. I., & Painter, G. (1999). The NELS curve: Replicating the bell curve analyses with the National Education Longitudinal Study. *Industrial Relations, 38*(3), 364–401.

McDermott, P. A. (1995). Sex, race, class, and other demographics as explanations for children's ability and adjustment: A national appraisal. *Journal of School Psychology, 33*(1), 75–91.

Miyamoto, R. H., Hishinuma, E. S., Nishimura, S. T., Nahulu, L. B., Andrade, N. N., & Goebert, D. A. (2000). Variation in self-esteem among adolescents in an Asian/Pacific-Islander sample. *Personality & Individual Differences, 29*(1), 13–25.

O'Brien, V., Martinez-Pons, M., & Kopala, M. (1999). Mathematics self-efficacy, ethnic identity, gender, and career interests related to mathematics and science. *Journal of Educational Research, 92*(4), 231–235.

Otto, L. B., & Atkinson, M. P. (1997). Parental involvement and adolescent development. *Journal of Adolescent Research, 12*(1), 68–89.

Overstreet, S., Holmes, C. S., Dunlap, W. P., & Frentz, J. (1997). Sociodemographic risk factors to intellectual and academic functioning in children with diabetes. *Intelligence, 24*(3), 367–380.

Patterson, C. J., Kupersmidt, J. B., & Vaden, N. A. (1990). Income level, gender ethnicity, and household composition as predictors of children's school based competence. *Child Development, 61,* 485–494.

Pungello, E. P., Kupersmidt, J. B., Burchinal, M. R., & Patterson, C. J. (1996). Environmental risk factors and children's achievement from middle childhood to early adolescence. *Developmental Psychology, 32*(2), 755–767.

Rech, J. F., & Stevens, D. J. (1996). Variables related to mathematics achievement among black students. *Journal of Educational Research, 89*(6), 346–350.

Reynolds, A. J., & Walberg, H. J. (1992a). A process model of mathematics achievement and attitude. *Journal for Research in Mathematics Education, 23*(4), 306–328.

Reynolds, A. H. & Walberg, H. J. (1992b). A structural model of science achievement. *Journal of Educational Psychology, 83*(1), 97–107.

Ricciuti, H. N. (1999). Single parenthood and school readiness in white, black, and Hispanic 6- and 7-year-olds. *Journal of Family Psychology, 13*(3), 450–465.

Ripple, C. H., & Luthar, S. S. (2000). Academic risk among inner-city adolescents: The role of personal attributes. *Journal of School Psychology, 38*(3), 277–298.

Rojewski, J. W., & Yang, B. (1997). Longitudinal analysis of select influences on adolescents' occupational aspirations. *Journal of Vocational Behavior, 51*(3), 375–410.

Schultz, G. F. (1993). Socioeconomic advantage and achievement motivation: Important mediators of academic performance in minority children in urban schools. *Urban Review, 25*(3), 221–232.

Seyfried, S. F. (1998). Academic achievement of African American preadolescents: The influence of teacher perceptions. *American Journal of Community Psychology, 26*(3), 381–402.

Shaver, A. V., & Walls, R. T. (1998). Effect of parent involvement on student reading and mathematics achievement. *Journal of Research & Development in Education, 31*(2), 90–97.

Singh, K., & Ozturk, M. (2000). Effect of part-time work on high school mathematics and science course taking. *Journal of Educational Research, 91*(2), 67–74.

Strassburger, L. A., Rosen, L. A., Miller, C. D., & Chavez, E. L. (1990). Hispanic-Anglo differences in academic achievement: The relationship of self-esteem, locus of control and socioeconomic level with grade-point average in the USA. *School Psychology International, 11*(2), 119–124.

Sutton, A., & Soderstrom, I. (1999). Predicting elementary and secondary school achievement with school-related and demographic factors. *Journal of Educational Research, 92*(6), 330–338.

Thompson, R. J., Gustafson, K. E., Meghdadpour, S., Harrell, E. S., Johndrow, D. A., & Spock, A. (1992). The role of biomedical and psychosocial processes in the intellectual and academic functioning of children and adolescents with cystic fibrosis. *Journal of Clinical Psychology, 48*(1), 3–10.

Trusty, J., Peck, H. I., & Mathews, J. (1994). Achievement, socioeconomic status and self-concepts of fourth-grade students. *Child Study Journal, 24*(4), 281–298.

Trusty, J., Watts, R. E., & House, G. (1996). Relationship between self-concept and achievement for African American preadolescents. *Journal of Humanistic Education & Development, 35,* 29–39.

Trusty, J., Watts, R. E., & Lim, M. G. (1995). Multidimensional self-concepts and achievement in African-American middle school students. *Education, 114*, 522–529.

Unnever, J. D., Kerckhoff, A. C., & Robinson, T. J. (2000). District variations in educational resources and student outcomes. *Economics of Education Review, 19*(3), 245–259.

Walker, D., Greenwood, C., Hart, B., & Carta, J. (1994). Prediction of school outcomes based on early language production and socioeconomic factors. *Child Development, 65*(2), 606–621.

Wang, M. C., Haertel, G. D., & Walberg, H. J. (1993). Toward a knowledge base for school learning. *Review of Educational Research, 63*(3), 249–294.

Watkins, T. J. (1997). Teacher communications, child achievement, and parent traits in parent involvement models. *Journal of Educational Research, 91*(1), 3–14.

White, S. B., Reynolds, P. D., Thomas, M. M., & Gitzlaff, N. J. (1993). Socioeconomic status and achievement revisited. *Urban Education, 28*(3), 328–343.

Author

SELCUK R. SIRIN is an Assistant Professor in the Department of Applied Psychology, New York University, East Building, 239 Greene Street #409, New York, NY 10003; e-mail *sirins@nyu.edu*. His research examines the impact of developmental challenges on the lives of minority and low-income children and ways to increase professionals' ability to address those challenges. His most recent research examines developmental trajectories of Muslim-American youth.