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Equality of Educational Opportunity: A 40-Year Retrospective[1]

Adam Gamoran and Daniel A. Long

> Guess what Coleman's found? Schools make no difference; families make the difference.
> *—S. M. Lipset to D. P. Moynihan, as quoted by Hodgson (1975, p. 22)*

These words captured the popular perception of the new report by James Coleman and his colleagues, *Equality of Educational Opportunity* (Coleman et al., 1966). Released on July 4, 1966, in a vain attempt to avoid publicity for what were regarded as politically intemperate findings, the report was supposed to document what most assumed to be true: poor and minority children performed poorly in school because their schools lacked resources. Instead, the Coleman report (as it became known) discovered that differences among schools in average resources were not nearly as great as expected, and the impact of school resources on student achievement was modest compared to the impact of students' family backgrounds. Of course, this did not mean that "schools make no difference"; in fact, as subsequent research has shown, schools matter a great deal for student learning. However, Coleman's findings indisputably documented that *variation between schools* in their resource levels mattered little for *variation among individual students*, a result that remains the seminal finding in U.S. sociology of education.

Equality of Educational Opportunity (EEO) has inspired decades of research on school effects, on the impact of socioeconomic status (SES) on achievement, and on racial and ethnic disparities in academic achievement. The purpose of this paper is to take stock of EEO from the vantage point of 40 years later. First, we examine the main findings of EEO and consider whether they still hold in light of subsequent research and changing times. Second, we reassess the debate over whether the findings of EEO hold internationally. Third, we discuss the implications of the Coleman report and subsequent studies by Coleman for the debate over school choice and vouchers. Fourth, we discuss changes over the past 40 years in concepts of equality of educational opportunity, including those reflected in contemporary education reform policies in the U.S. We conclude with comments about the implications of EEO and school effects research for the prospects of equal opportunity in education.

Since its publication, EEO has been cited in academic journal articles more than 2,700 times. Figure 1, based on the *Social Sciences Citation Index* (1966–81) and on a compilation of the *Social Sciences Citation Index*, the *Science Citation Index*, and the *Arts and Humanities Citation Index* (1982–2005), shows that the citation peak was in 1975, with references in 132 academic journal articles. Annual citations dropped subsequently, with about 106 citations per year in the 1970s; 71, in the 1980s; and 48, in the 1990s. In the late 1990s, citation counts rose again and have averaged over 55 citations per year since 2000. Clearly, contemporary scholars continue to reference EEO as they pursue new work on schools and achievement.

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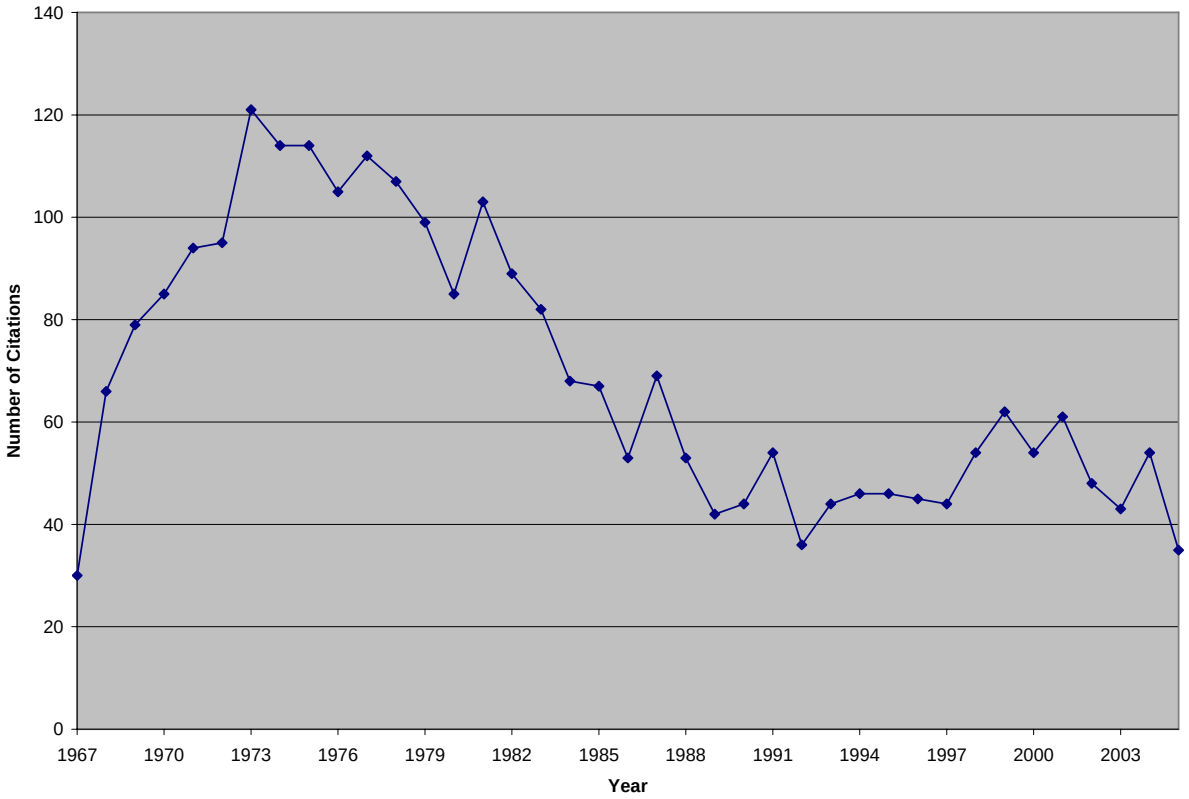
Figure 1. Citations of the Coleman report, 1967–2005.



(Sources: Institute for Scientific Information, 1979a, 1979b, 1983, 1987; Thompson Scientific, 2005)

Do the Main Findings of EEO Still Hold?

The most cited contribution of EEO is probably the debate it provoked about the relative effects of school resources and family background on achievement. However, the report provided groundbreaking research in several other areas, including the salience of school segregation and the size of White-minority gaps in student achievement. In this section, we review Coleman's findings in each of these three areas and examine the extent to which they remain valid today.

School Segregation

As expected, Coleman found that schools in the late 1960s were highly segregated. Of all racial and ethnic groups, White students were the most segregated, with 80% of 1st- and 12th-grade White students attending schools that were 90–100% White. Among minority groups, Blacks were the most segregated, with 65% of Black 1st-grade students attending schools that were mostly Black. The highest levels of segregation for Blacks and Whites were in the South. Noting that the 1954 *Brown v. Board of Education* Supreme Court decision declared that separate schools for Blacks and Whites are inherently unequal, EEO reported that by this standard, "American public education remains largely unequal in most regions of the country,

including all those [regions] where Negroes form any significant proportion of the population" (Coleman et al., 1966, p. 3).

Racial segregation in U.S. schools has gone through significant changes since the Coleman report. From 1954 through the 1970s, legal segregation was eliminated, and Black-White school segregation in the South dropped dramatically. In 1954, 99.99% of Southern Blacks were enrolled in schools that were composed of 50–100% minority students. This percentage declined to 86.1% in 1967–68 and reached a low of 57.1% in 1986–87, but then rose to 67.3% by 1998–99 (Orfield, 2001, p. 29). Changes in segregation were not as sharp in the nation as a whole, with the percentage of Blacks enrolled in 50–100% minority schools at 76.6% in 1967–68, dropping to 63.3% in 1986–87, and rising to 70.2% in 1998–99 (Orfield, 2001, p. 33). Nationally, the percentage of Blacks enrolled in 90–100% minority schools was at 64.4% in 1967–68, declined to a low of 32.2% in 1986–87, and rose to 36.6% in 1998–99 (Orfield, 2001, p. 31).

While there was a dramatic drop in school segregation in the Southern U.S. and a significant decline in the proportion of Blacks in 90–100% minority schools in the nation as a whole, the gains in desegregation peaked in the 1980s and were partially reversed in the 1990s. Many school systems experienced resegregation in the 1990s, leading to a reversal of a large portion of the gains that occurred from 1954 to the 1980s (Orfield & Eaton, 1997). Resegregation occurred in part because of growing minority enrollments, but also because the courts have declared that school systems have moved from "dual" to "unitary" status—that is, that they are no longer segregated through any action of the school system. As a result, district-wide desegregation programs have been dismantled, and schools have become more segregated (Orfield, 2001; Clotfelter, 2004; Gamoran & An, 2005).

In sum, school segregation has undergone shifting and contradictory changes over the last 40 years. In the nation as a whole, Blacks are about half as likely to be located in all-Black schools as they were in 1967–68. Still, more than a third are schooled in such racial isolation. Moreover, as the 21st century begins, the proportion of Blacks enrolled in predominantly minority schools has nearly returned to the levels described in EEO.

Achievement Gaps

A major portion of EEO examined the racial and ethnic gaps in student achievement. The authors found that among students who stayed in school until 12th grade, about 85% of Blacks scored below the average for Whites. On average, Blacks scored a standard deviation below Whites in academic achievement. In the 40 years since the Coleman report, this gap in achievement has narrowed. Trend data from the National Assessment of Educational Progress (NAEP) shows that the Black-White reading gap among 17-year-olds in 1971 was 1.2 standard deviations. This gap fell to 0.69 by 1996. There was a similar decline in the gaps in mathematics from 1.33 to 0.89 standard deviation units (Jencks & Phillips, 1998, p. 3).

The declining achievement gaps, however modest, occurred during the 1970s and 1980s; during the 1990s, the Black-White gap actually increased and then dropped slightly at the close of the century. As of 2004, the gaps for 17-year-olds in math and reading and 13-year-olds in reading were larger than in 1990. Between 1990 and 2004, the gap for 9-year-olds declined

slightly. The Black-White gap in NAEP reading scores for 13-year-olds was 39 in 1971; it declined to an 18-point difference in 1988 and then rose to a 22-point difference in 2004. The Black-White gap in NAEP math scores for 13-year-olds followed a similar pattern, with a gap of 46 in 1971 that declined to a 27-point difference in 1990, rose to 32 in 1999, and then returned to a 27-point difference in 2004 (Perie, Moran, & Lutkus, 2005).

Noticeably, the cessation of the decline in achievement gaps coincided with the rollback of school desegregation: as school desegregation was largely halted in the late 1980s, the Black-White achievement gap stopped declining. It seems likely the two are causally linked, although that has not been conclusively documented. Peer composition was the only school resource in EEO that *did* yield a significant impact—Black students who had more White classmates tended to score higher, a finding that has been sustained in subsequent studies—but again, the impact was modest compared to the wide range of variation within schools. Grissmer, Flanagan, and Williamson (1998) concluded that the benefits of desegregation for the overall decline in the Black-White achievement gap were limited to the South in the 1970s; otherwise, desegregation has not been a prominent source of changes in the achievement gap.

The Coleman report also found higher achievement for both low- and high-SES students was associated with a higher average SES student body. The findings on composition were used extensively to promote policies that would increase both racial and socioeconomic integration of schools. The findings were part of the reason for Coleman's initial support for busing and his support for policies that increased the socioeconomic integration of schools. Coleman later dropped his support for busing, believing it led to "White flight"—that is, Whites' departure from cities to escape busing plans (Coleman, Kelly, & Moore, 1975). However, longer term research has suggested that busing affected the pace but not the ultimate extent of changes in White urban school enrollments (Wilson, 1985).

School Effects

The most controversial finding of the Coleman report was that school resources had surprisingly little effect on educational outcomes once family background was controlled. Coleman et al. attempted to measure the effects of schools by examining an indicator of learning (performance on standardized tests) and the inputs that went into schools to produce learning. This model is called an *education production function* or *input-output model*. In this model, schools are considered "black boxes," and the activities that occur within the schools are unexamined. Users of this model consider that with adequate variation and accurate specification of inputs and outputs, a researcher can determine what mix of inputs will best improve academic achievement.

Economists have argued that production functions are useful, concise models of schools. The education production function models schools in the same way that economists model firms. Economists argue that they do not need to know how a particular economic process works within a firm in order to model how the firm operates. To know how an economic process works in a particular firm, one need only know the goals of the firm (such as profit maximization), the inputs, and the outputs—and assume that production is the same in all firms. The advantage of this black box model for firms or schools is that it allows for aggregate analyses without requiring an examination of the details of what happens within a particular firm or school.

The Coleman production function model examined school effects by measuring the proportions of variance in student achievement that could be attributed to school facilities, school curriculum, teacher qualities, teacher attitudes, and student body characteristics. Of these five sets of school factors, student body characteristics contributed the most to the variance in verbal achievement. For example, among ninth graders, 5% of the variance in verbal achievement could be accounted for by student body characteristics. The next most prominent factor was teacher qualities, accounting for 1% of the variance in verbal achievement. For ninth graders, all five sets of factors accounted for only 8% of the variance, compared to 38% of the variance accounted for in a model with the five school factors plus two family background factors and one individual attitude variable (Coleman et al., 1966, p. 312). This pattern was largely consistent across grade levels and demographic subgroups.

Several replications and reanalyses followed shortly after the publication of EEO. Averch, Carroll, Donaldson, Kiesling, and Pincus (1974) reviewed the education production function literature to reexamine EEO's findings. These authors uncovered no consistent findings for school resources. Some studies showed an effect for one set of resources, whereas others showed effects for a completely different set of resources. Most of the studies examined showed that the effect of family background was much stronger than the effect of school resources. Averch et al. (1974) concluded that there did not seem to be much value to paying a premium for smaller class size or teacher experience or advanced degrees.

Over the years, many scholars have critiqued the Coleman report specifically and the production function literature more broadly. These critiques have included arguments that Coleman's cross-sectional study could not adequately capture causal effects, that Coleman assumed a linear and additive relation between resources and learning, that cross-sectional measures of reading achievement could not distinguish between learning that occurs at home and learning that occurs at school, and that Coleman's estimation of school effects by measures of percent of variance explained were sensitive to assumptions about causal ordering (Sorensen & Morgan, 2000; Hanushek, 1979; Hanushek & Kain, 1972; Bowles & Levin, 1968). Two years after the Coleman report, Harvard researchers reexamined the evidence and considered how well the Coleman report withstood various critiques. Mosteller and Moynihan (1972) noted that the most important finding of the Coleman report was that there was relatively little variation in the resources for Black and White schools. This scant variation limits the extent to which school resources can explain differences in achievement between Black and White students. One could conclude that in a country with limited variation in school resources, family background is more closely associated with variance in student performance. This conclusion might be useful for trying to decide between different social policies in the U.S., such as funding schools or adopting a negative income tax; however, it gives a very limited understanding of *how* school resources may affect achievement.

Jencks et al. (1972) argued that the main findings of the Coleman report were that resources varied little among U.S. schools and that affluent peers boosted achievement. These authors examined the Coleman report and found that once the critiques of "sampling procedures, information-gathering techniques, and analytic methods" were taken into consideration, the results "[held] up surprisingly well" (Jencks et al., 1972, p. 70). Smith (1972), in a review of the Coleman report focused on regression coefficients instead of percent of explained variance, came to similar conclusions about the lack of effect of school resources once family background is

controlled. Hanushek and Kain (1972) examined the impact of different causal ordering of the variables in the study and found that the limited effect of school resources persisted.

Early studies of levels of school attainment came up with results similar to those of studies of performance on standardized tests. In their study of the correlates of educational attainment, Jencks et al. (1972) found that school resources had little effect after controlling for family background. Jencks and his colleagues went so far as to argue that educational institutions and educational resources could not address inequalities as long as inequalities remained in parents' income, occupational status, and education.

By the 1990s, hundreds of studies of education production functions had been conducted. Greenwald, Hedges, and Laine (1996a, 1996b) and Hanushek (1997; see also Hanushek, 1989, 1994, 1996) carried out reviews of this literature, with Greenwald et al. finding an effect of school resources on achievement and Hanushek not finding a persistent effect of school resources. The differences between these studies are based primarily on their different criteria for including studies in their meta-analyses, which resulted in different summaries of results. Greenwald et al. were much more selective, excluding or downweighting studies when multiple findings derived from the same data. They also took into account the magnitude and variability of effects across studies, whereas Hanushek tallied positive, negative, and neutral findings. As a result of their more selective scrutiny and synthetic approach, Greenwald et al. found moderate effects of school resources such as teacher's salaries and smaller class size.

Despite their differences, these reviews agreed on three points: (a) in at least some cases, higher levels of resources *are* associated with higher achievement; (b) the qualities of schools that produce these effects are hard to pin down; and (c) the ways in which resources are used is more consequential for achievement than the presence or absence of resources. A potential concern with these conclusions is that they may reflect endogeneity: perhaps schools get more resources, or appear to use resources effectively, when students are high achieving, rather than vice versa. Randomized experiments could get around this concern, but very few have been conducted (Borman, 2002); an exception is the Tennessee class size experiment, which showed that smaller classes raise test scores in the early elementary grades (Finn & Achilles, 1999).

Fixed-effects models of schools or teachers are another approach to production functions that help address endogeneity (e.g., Rivkin, Hanushek, & Kain, 2005). A *school fixed-effects model,* for example, includes a parameter for each school that captures all of its stable characteristics, whether observed or unobserved. Such models cannot indicate *which* school qualities matter, but they can assess whether some schools are more productive than others. These models demonstrate that achievement *does* vary systematically across schools, but that attempts to measure the school attributes that account for achievement variation generally fall short. Similarly, *teacher fixed-effects models* indicate that teacher effects are powerful, but only small portions of these effects have been attributed to specific teacher characteristics (Sanders, 1998; Rowan, Correnti, & Miller, 2002). Rivkin et al. (2005) estimated that an increase of one standard deviation in overall teacher effect (or teacher quality) is worth as much as a 10-student reduction in average class size. These findings bridge the earlier debate between Hanushek (1997) and Greenwald et al. (1996a), achieving a consensus that school and teacher resources do indeed "make a difference," although the contribution of specific measured characteristics of schools and teachers is difficult to detect.

Heyns (1978) cleverly pointed out that school contributions to student learning could be assessed by comparing learning growth during the school year, when school is in session, to that during the summer, when school is not in session. Examining a sample of elementary students from Atlanta who were tested in the fall and spring, she found that learning trajectories for students from advantaged and disadvantaged backgrounds diverged more during the summer than during the school year, suggesting that inequality tended to increase more when school was not in session. Entwisle, Alexander, and Olson (1997) found similar results for students from Baltimore, and Downey, von Hippel, and Broh (2004) recently confirmed the pattern with a national sample. Gamoran (1996) characterized this pattern as reflecting the *compensatory* effects of schooling; in the absence of schooling, inequality would be much greater than it already is. In this sense, also, schools matter a great deal, even though differences from one school to the next are small relative to the wide range of variation within schools. An important difference between the national findings of Downey et al. (2004) and the earlier studies of Atlanta and Baltimore is that the latter indicated that summer learning accounted for all (Baltimore) or nearly all (Atlanta) of the growth in achievement inequality by social class that occurred over the course of 12 months, whereas Downey et al. found that about half the growth in inequality occurred during the summer, and the remainder, during the school year. The findings of Downey et al. were limited to kindergarten, first grade, and the summer between them; no U.S. national data set contains fall and spring test scores beyond first grade.

Schooling Effects

Many writers have argued that looking at a school as a black box is misguided. As Bidwell and Kasarda (1980) explained, schools do not produce learning; rather, they provide a context in which schooling takes place. Learning, according to this perspective, is a result of schooling, not schools per se. Along these lines, sociologists such as Barr and Dreeben (1983) demonstrated how schools channel resources toward students, instead of resources at the school level causing student learning. They noted that students are nested in classrooms, which are nested in schools. Most of the variables examined in the school production function literature affect the school or classroom level and therefore only indirectly affect student learning. Economists have also argued that there is a need to look more specifically at the within-school processes that transform resources into learning. For example, Summers and Wolfe (1975) conducted an analysis of education production functions and found that resources such as class size and teacher quality have stronger effects for African American students and students from poorer families. Similarly, the fixed-effects studies noted above found significant teacher effects and determined that variation lies within schools.

Writers such as Bidwell and Kasarda (1980), Barr and Dreeben (1983), and Gamoran, Secada, and Marrett (2000) have argued that, given the large amount of within-school variation, processes within schools are much more important for understanding student learning than resource differences among schools. Within-school studies have focused on the effects of processes such as tracking (e.g., Heyns, 1974; Oakes, 2005; Gamoran & Mare, 1989) and exposure to learning material (e.g., Gamoran, Nystrand, Berends, & LePore, 1995; Applebee, Langer, Nystrand, & Gamoran, 2003). Research on teacher effects reinforces the conclusion that within-school variation in achievement is partially attributable to schooling (Rivkin et al., 2005).

Limitations of U.S. Research on School Effects

A distinctive limitation of U.S.-based research on school inputs and the organization of school inputs is that in the U.S., only about 20% of the variation in student achievement lies between schools, and the remaining 80% occurs within schools (Coleman et al., 1966). This limited between-school variation makes it theoretically plausible that school effects would be both small and difficult to detect. In developing countries, by contrast, between-school variation in achievement is larger. For example, in Latin American countries about 40% to 60% of the variation in student achievement lies between schools (Casassus, Cusato, Froemel, & Palafox, 2001). Therefore, in Latin America, school effects could be larger and easier to detect.

A second, related limitation of school effects research in the U.S. is the small variation in the key independent variables of school resources. While there are notable differences at the extremes of the distribution of U.S. schools in the amount of money spent per pupil (Kozol, 1994), on average U.S. schools tend to have similar levels of resources (Mosteller & Moynihan, 1972). The poorest schools in the U.S. still have many more resources than the typical school in the developing world. Schools in many developing countries face shortages of basic teaching materials such as textbooks (Montagnes, 2001). The relatively high lower bound of school resources in the U.S. as compared with developing countries means that statements about school resources in the U.S. may not apply to other contexts. For example, one could use the U.S. school effects literature to talk about the impact of an additional $1,000 per student for school expenditures between $4,000 and $12,000. But for over half the countries in the world, $4,000 is between 2 and 10 times the per capita income (International Monetary Fund [IMF], 2000). Consequently, studies of school effects conducted in developed countries probably say very little about the effects of school resources in developing countries. In addition, one could not use the results of U.S. studies to compare the effects of no school resources per student versus $1,000 in school resources per student per year. Similarly, one could talk about the effects of old versus new textbooks in the U.S., but not the effects of textbooks versus no textbooks in a classroom. Attempts to extrapolate beyond the range of existing data are generally unwise because the relation between two variables may differ outside the range of observed data from that inside the observed range (Manski, 1995).

Research on school effects in the U.S. may only be appropriate to answer the question, Are school resources associated with an increase in student achievement in relatively affluent schools that spend at least $4,000 or more per student per year? In contrast, international evidence about school effects might be better suited to addressing the simpler question, Are school resources associated with increased achievement for both poor and rich schools?

International Research on School Effects

With his 1975 *"Coleman Report" from a Non-Industrialized Society*, Stephen Heyneman's study of education in Uganda heralded the examination of school effects internationally. Since then, many school effects studies in developing countries have shown a large effect of school resources even after controlling for family background (Heyneman, 1976; Heyneman & Loxley, 1983; Buchmann, 2002; Fuller, 1987; Fuller & Clarke, 1994; Casassus et al., 2001; Willms & Somers, 2001). The contrast between the U.S. and international comparative research suggests there may be little effect of school resources on achievement in rich countries,

but stronger effects in poorer countries. These contrasting findings lend support to the idea that lack of school effects in developed countries is due in large part to a lack of variance in the independent variable of resources (Alexander, 2001).

Fuller (1987) examined 60 multivariate studies of the effects of school resources in developing countries and concluded that increasing resources in poor countries improves performance. Fuller and Clarke (1994) updated this review and concluded that even when family background is controlled, school factors such as infrastructure, class size, teachers' experience and qualifications, and the availability of instructional materials increase student performance. The majority of school resource effects derive from basic resources such as textbooks and teacher education (Heyneman & Loxley, 1983; Fuller, 1987; Fuller & Clarke, 1994; Buchmann, 2002).

Baker and LeTendre (2000) argued that there may be a threshold level of school resources beyond which the effects of additional resources on student performance are inconsequential. These authors called for more research into the comparative role of school effects. Baker, Goesling, and LeTendre (2002) provided a partial answer to that call with an examination of the Third International Mathematics and Science Study (TIMSS) data. They attempted to replicate Heyneman and Loxley's (1983) findings by examining the TIMSS 1995 survey of eighth graders in mathematics. The study analyzed explained variance for rich and poorer countries to determine whether SES or school characteristics explained more of the variance. The authors found effects of school resources neither for richer nor for poorer countries after controlling for students' family backgrounds. They argued that part of the reason for not finding an effect of school resources in poorer countries was that, due to economic growth, such countries have moved beyond the threshold at which schools are so underfunded that school resources matter.

Hanushek and Luque (2003) also studied the international effects of school resources by assessing their impact on mathematics achievement using the TIMSS 1995 data. These authors took into account the order in which variables are entered into the regression analysis and defined an upper and lower bound for the effect of school resources. They argued that their results disproved the Heyneman and Loxley pattern and showed that school resources do not make any large significant difference after controlling for family background. They concluded that schools should focus on the effects of school organization instead of school resources.

The TIMSS survey asked administrators about school resources with the following question: "In your opinion, is your school's capacity to provide instruction affected by a shortage or inadequacy of any of the following?" The TIMSS questionnaire then listed 19 school resources, from teacher qualifications to textbooks to computers, with response categories of *none*, *a little*, *some*, *a lot*, and *not applicable*. Unfortunately, these questions relied on teachers' subjective judgments about levels of school resources. Perceptions of how the "availability of qualified mathematics teachers" or "inadequacy of instructional materials" can affect instruction may vary dramatically between countries and by different regions within countries. Administrators in different countries and in different schools may have different definitions of what constitutes a qualified teacher or inadequate instructional materials. Thus, the TIMSS resource variables tell us little about objective differences in levels of resources between different countries.

Another problem with using TIMSS to update Heyneman and Loxley's (1983) research is that the countries in the TIMSS sample may be too wealthy to adequately test the continuation of the Heyneman and Loxley effect. The TIMSS sample has an average per capita income of $14,988, compared to the 1995 global average of $5,252. Tests of the effect of schooling in poorer countries by Baker et al. (2002) and Hanushek and Luque (2003) used a sample of countries with an average per capita income that was 300% of the global average.[2] In contrast, Heyneman and Loxley's sample of countries had an average per capita income only 50% larger than the global average ($1,613 as compared with $1,043).

Table 1 provides information on the per capita income (in 1990 dollars) for countries included in six major international studies of achievement, which have been used to test and update Heyneman and Loxley's (1983) findings. Along with the sample-specific per capita income averages, we list the average for all countries in the IMF (2000) database for that year. It is clear that the TIMSS 1995 and 1999 samples—along with the 1999 sample from PISA (Program for International Student Assessment), an OECD-sponsored international study—captured relatively advantaged populations, compared to the global averages. By contrast, the countries sampled by Heyneman and Loxley (1983) were much closer to the global average and much lower overall, as were the countries in a 1997 international study, the PEIC (Primer Estudio Internacional Comparativo), which focused on Latin American countries (Casassus, Cusato, Froemel, & Palafox, 1998).

Table 1
Mean and Standard Deviation of Per Capita Income in 1990 Dollars Among Six Major International Studies of School Achievement

Variable	Obs.	Median	Mean	S.D.	Min	Max
1974 PCI[a]	152	592	1704	2386	30	12957
Heyneman & Loxley (1983)	26	1359	2793	2465	207	7069
Variable	**Obs.**	**Median**	**Mean**	**S.D.**	**Min**	**Max**
1995 PCI	178	1582	5850	9380	66	45112
TIMSS 1995 pop1[b]	23	18313	17462	10893	1187	41016
TIMSS 1995 pop2	36	15967	16558	12552	1187	43550
TIMSS 1995 pop3	19	20012	19350	12447	1603	43550
Variable	**Obs.**	**Median**	**Mean**	**S.D.**	**Min**	**Max**
1997 PCI	178	1647	5945	9034	110	42096
PEIC[c]	11	2842	3409	2191	744	8298
Variable	**Obs.**	**Median**	**Mean**	**S.D.**	**Min**	**Max**
1999 PCI	178	1584	6037	9282	105	44206
PISA[d]	41	15389	16373	12693	740	44206
TIMSS 1999	38	4123	10365	10726	300	34386

Note. Per capita income data comes from IMF (2000).
[a]PCI = per capita income. [b]TIMSS = Third International Mathematics and Science Study. [c]PEIC = Primer Estudio Internacional Comparativo. [d]PISA = Program for International Student Assessment.

[2] The global per capita income data derive from the International Monetary Fund (IMF). The IMF does not provide statistics for Cuba, but given the economic crisis in Cuba and international sanctions, the per capita income is probably equal to or below the median income of other Latin American countries.

Adding the PEIC to the examination of differences across surveys is helpful because it is a recent study (like TIMSS and PISA), yet it focused on poorer countries (like Heyneman and Loxley, 1983). In Table 2, we compare three studies: Heyneman and Loxley (1983), Baker et al. (2002), and Long's (2006) analysis of the PEIC. The PEIC results are much closer to Heyneman and Loxley's results not only in per capita income, but also in achievement variance explained by school resources, lending credence to the notion that among poor countries, variation in school resources can matter substantially for student achievement.

Table 2
Per Capita Income (in 1990 Dollars) and Percent of Total Variance Explained by School Resources

Panel A: Per Capita Income (in 1990 Dollars)

Data	Mean	S.D.	Min	Max
Heyneman & Loxley (1983)[a]	2896	2476	207	7069
Baker et al. (2002)[b]	17429	11531	1562	43550
Long (2006)[c]	3409	2191	744	8298

Panel B: Percent of Total Variance Explained by School Resources

Data	Mean	S.D.	Min	Max
Heyneman & Loxley (1983)[a]	50.52	18.71	22	88
Baker et al. (2002)[b]	34.44	17.12	6	79
Long (2006)[c]	56.73	17.17	22	75

[a]Heyneman and Loxley (1983) examined the following countries: Uganda, Bolivia, Egypt, Iran, El Salvador, Thailand, Peru, Paraguay, Colombia, Brazil, Botswana, Chile, Mexico, Hungary, Argentina, New Zealand, Australia, Italy, United Kingdom, Belgium (Flemish), Belgium (French), Netherlands, Finland, Germany, Sweden, United States, and Japan.

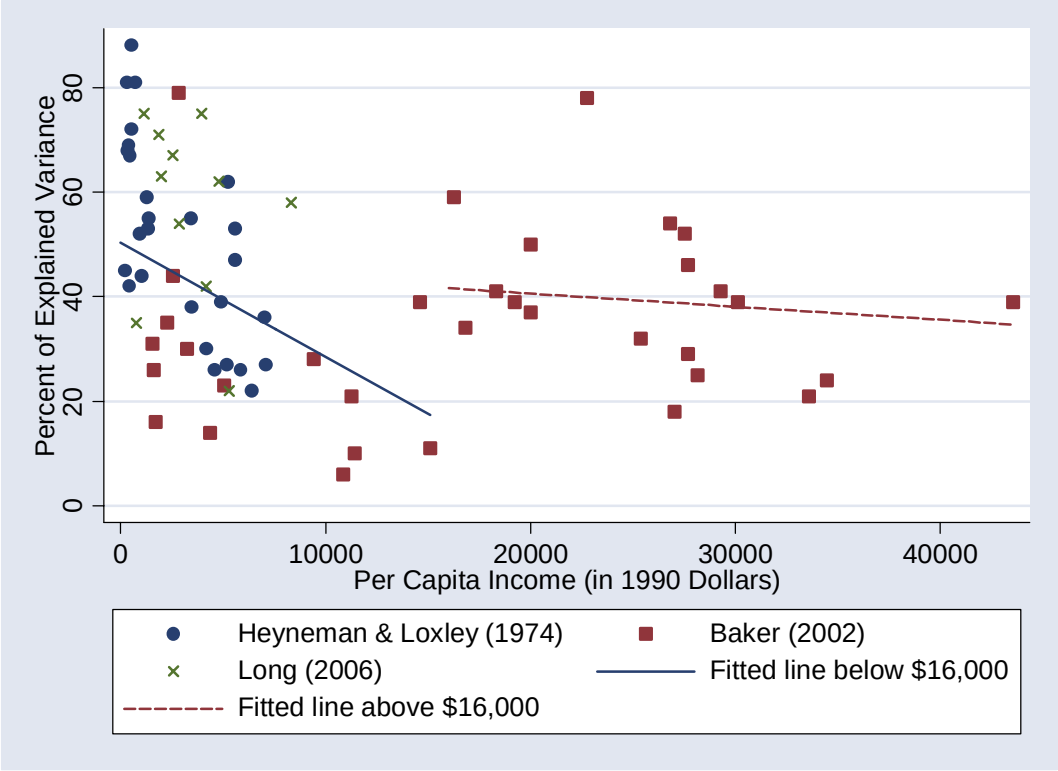
[b]Baker et al. (2002) examined the following countries: Russia, Romania, Thailand, Colombia, Latvia, Lithuania, Slovak Republic, Hungary, Czech Republic, Korea, Slovenia, Greece, Portugal, Cyprus, New Zealand, Spain, Israel, Australia, Canada, Hong Kong, France, United Kingdom, Belgium (Flemish), Belgium (French), Singapore, Netherlands, Ireland, Austria, Germany, Iceland, Denmark, United States, Norway, and Switzerland.

[c]Long (2006) examined the following countries: Honduras, Bolivia, Dominican Republic, Paraguay, Colombia, Brazil, Venezuela, Chile, Mexico, and Argentina. (Cuba is excluded from this analysis due to a lack of comparable IMF data on per capita income.)

Close inspection of these three studies suggests that it is the income levels of the countries selected, not the time the studies were conducted, that account for the contrasting findings. Figure 2 displays the results of all three studies. First, Heyneman and Loxley (1983) examined 1971–74 data from 26 countries and compared the percent of explained variance in achievement accounted for by school resources to the per capita income of each country. (The 26 countries are represented by circles in Figure 2.) They found that school effects were larger in poorer countries. The mean per capita income for the countries they studied was $2,896, and a mean of 51% of explained variance was attributable to school resources (see Table 2). Second, Baker et al. (2002) replicated Heyneman and Loxley's analysis with a richer set of countries, using data from the 1995 TIMMS survey. These countries had an average per capita income of $17,429 and an average of 34% of explained variance accounted for by school resources (see

Table 2). On their own, points in the scatterplot from TIMSS (see the squares in Figure 2) show no clear trend in the relation between per capita income and percent of variance accounted for by school resources. Third, Long (2006) examined 1997 data from Latin American countries with a per capita income similar to Heyneman and Loxley's: $3,409 for Long (2006) and $2,896 for Heyneman and Loxley (1983) (see Table 2). Long regressed parents' education, books in the home, region, school sector, and school resource variables (such as teacher's experience, number of library books, class size, school size, availability of textbooks, and chalkboards) on student achievement. In 11 of these Latin American countries, an average of 57% of the explained variance was accounted for by school resources. Long's findings confirm those of Heyneman and Loxley and suggest there is a clear threshold beyond which variation in school resources matters little.[3]

Figure 2. The relation between percent of variance explained by resources vs. per capita income (in 1990 dollars).



(Sources: Heyneman & Loxley, 1983; Baker et al., 2002; Long, 2006)

We tested a threshold model of school resources by combining the data points from the three studies whose results are displayed in Figure 2.[4] We found that a model with a threshold of

[3] Heyneman and Loxley (1983) and Baker et al. (2003) used different approaches to compute percentages of variance explained by school resources: the former computed it as the *ratio* of variance explained by school resources over variance explained by family background and school resources combined, while the latter computed the *difference* between variance explained by family background and school resources combined, and variance explained by family background alone. The PEIC data points in Figure 2 were computed using the former approach, but the threshold model holds equally well under either approach (see Long 2006).

[4] We estimated the following model: Y-hat = B_0 + B_1*(countries with a per capita income [PCI] below the threshold) + B_2*(countries with a PCI below the threshold). Next, we examined thresholds in $1,000 increments between

$16,000 in per capita income had an R^2 of 31% compared to an R^2 of 9% for a simple linear regression of per capita income on percent of variation accounted for by resources. This comparison provided clear statistical evidence of a better fit for the threshold model.[5] The two regression lines (above and below the threshold) are displayed in Figure 2. For countries with per capita incomes below $16,000, higher levels of per capital income are associated with sharply lower proportions of achievement attributable to school resources. For countries above this threshold, higher levels of per capita income are associated with very slightly (though statistically significant) lower levels of variance explained. It is particularly interesting to note that in combination with data points from Heyneman and Loxley (1983) and Long (2006), the results from Baker et al. (2002) also point to a threshold effect (see Figure 2).

In sum, international evidence shows that school resources do have a strong effect on student achievement for the poorest countries. This result suggests that the Coleman report finding of a limited association between school resources and achievement once family background is controlled holds only for countries that have passed a threshold of basic school resources and experience a diminishing (though non-zero) marginal return for additional school resources.

School Effects and Policy Debates: Sector, Choice, and Vouchers

School Effects and Private Schools

In the early 1980s, Coleman revisited the issue of school effects with new research on Catholic and other private high schools. Using a 1980 national survey called *High School and Beyond*, Coleman, Hoffer, and Kilgore (1982) and Coleman and Hoffer (1987) reported that Catholic and other private high schools produced higher achievement than public high schools. Moreover, achievement was more equitably distributed by social class in Catholic than in public schools. Interestingly, the political characterization of Coleman's findings shifted from his earlier work. In the 1960s and 1970s, liberal policies were threatened by the (incorrect) perception that "schools don't matter; families do." Meanwhile, conservative policies were bolstered by the emphasis on families as the source of inequality. By the 1980s, when Coleman *did* find school effects, his results were embraced by conservatives who favored vouchers for private schools, whereas liberals questioned the purported private school advantage.

While there is a contradiction in the popular responses to the 1966 and 1982 Coleman studies, there is no contradiction in the research results, despite the limited school effects found in the Coleman report and the positive school effects found in the later high school studies. Coleman et al. (1966) found a limited effect of school resources based on a study of public schools. In his 1982 and 1987 studies, Coleman expanded his sample to include public and private schools and found a positive effect of private schools on student performance.

$5,000 and $20,000. We used the *R*-squared of each model to choose a best-fit model, and this criterion yielded a threshold of $16,000.

[5] The simple ordinary least squares model was: *Y*-hat = $B_0 + B_1$*(PCI).

Debates About School Choice and Vouchers

Another legacy of the Coleman report is the regular reference to social science research in public debates about school reforms. We can see this legacy clearly in the research on school vouchers and school choice. Much of the debate about the role of school resources has focused on the efficiency gains from increased school choice, charter schools, school restructuring, private versus public schools, and the effects of privatization. Several writers have argued that increased school choice or privatization increases both quality and efficiency in education (e.g., Chubb & Moe, 1990; Friedman, 1955). Howell and Peterson (2002) cited evidence from New York and Cincinnati to argue that vouchers can also improve equity by increasing academic achievement for African Americans and diminish educational inequalities between racial and ethnic groups. Others have argued that school vouchers increase educational inequalities (Witte, 1998; Krueger & Zhu, 2004a) and do not improve student performance (Carnoy, 2001; Carnoy & McEwan, 2003).

Chubb and Moe (1990) reported evidence of positive effects of private schools on achievement due to increased school autonomy. Peterson, Howell, and Greene (1999) found positive effects of vouchers on achievement based on the evidence from the first 2 years of an experimental allocation of vouchers in Cleveland. In a second experimental study of vouchers in Dayton, Ohio, Washington, DC, and New York City, Howell and Peterson (2002) found no effect of vouchers for White and Hispanic students but a positive effect of vouchers for African American students in certain grades and locations.

Other researchers have examined the same evidence from private schools and voucher programs and found that they increase stratification with little or no gain in achievement. Lee and Bryk (Bryk & Lee, 1993; Lee & Bryk, 1993) criticized Chubb and Moe's (1990) methodology and reexamined their data, finding no evidence for those authors' pro-voucher argument. Researchers at the University of Indiana School of Education conducted a 4-year longitudinal study of the Cleveland voucher experiment and found no consistent effect of vouchers (Metcalf, West, Legan, Paul, & Boone, 2003). Krueger reexamined the data from the New York City voucher experiment and likewise found no effect of school vouchers (Kreuger & Zhu, 2004a, 2004b). Evidence from Milwaukee has also shown a stratifying effect of vouchers (Witte, 2000). While the Milwaukee voucher program was targeted to low-income families, Witte's (2000) research found that the more educated among the poor were the most likely to take advantage of the program. The result was an increase in stratification with a limited increase in achievement.

Nationwide voucher programs have been implemented in Chile, Colombia, Scotland, Sweden, and New Zealand. Evidence from Sweden and Chile seemed to show some stratifying effect of vouchers (Carnoy, 1998), as did school choice in Scotland (Willms & Echols, 1992). An examination of New Zealand's voucher program found numerous problems with the system of school competition, especially with questions about how to deal with failing or "bankrupt" schools (Fiske & Ladd, 2000). McEwan (2000) reviewed the literature on large-scale voucher programs and found mixed and inconclusive evidence as to whether the programs increased stratification and sorting or improved efficiency and achievement.

In a study of Latin American schools, Somers, McEwan, and Willms (2004) found that the positive effect of private schools on achievement disappeared when the mean level SES of the school was controlled. Somers et al. argued that any benefits of private education are due to peer effects and that a policy of subsidizing private education will yield limited benefits due to the small number of high-SES peers.

The Coleman report has played a strong role in shifting the focus of debates about school inequalities from inadequate resources to the ways in which resources are used. Debates about the structure of schools and the impact of private versus public schools have been influenced by the findings about composition effects and the importance of family background first described in EEO.

Changing Conceptions of Equality of Educational Opportunity

Equality of Educational Opportunity was a landmark not only in its empirical findings, but also in its conception of what equal opportunity meant. Prior to the Coleman report, equal opportunity was conceived as similar levels of inputs to schooling (Coleman, 1968). EEO recognized this view and attended to it by examining school differences in expenditures, laboratories, libraries, and so on, as well as racial composition, which—following the Supreme Court's declaration that "separate educational facilities are inherently unequal" (*Brown v. Board of Education*, 1954, p. 495)—was also viewed as a school input. At the same time, Coleman and his colleagues redefined equality of opportunity by focusing on *results*:

> A fourth type of inequality may be defined in terms of consequences of the school for individuals with equal backgrounds and abilities. In this definition, equality of educational opportunity is equality of results, given the same individual input (Coleman, 1968, p. 14).

This was the main definition of equal opportunity addressed in EEO, and it has also served as the primary focus for decades of research on school and schooling effects that have followed EEO. Controlling for family background, these studies ask what school and schooling conditions influence achievement. By controlling for individual inputs, these studies assess equality of results among students with similar backgrounds.

Although EEO's definition lies behind most subsequent research, two challenges to the prevailing view have emerged. One was articulated by Olneck (1993), who argued that equal inputs and equal results are similar in that both emphasize *distribution* of valued goods. With rising interest in diversity and multiculturalism, Olneck argued, two other concepts may serve as the basis for judgments about equal opportunity: *representation* and *participation*. Multicultural education demands that the expressions and experiences of disadvantaged groups be represented in the curriculum and recognized as valued knowledge. Only when the ideas of all groups are represented can equal opportunity be said to hold. Similarly, equal opportunity also rests on the chances for minority groups to participate in the process of defining the experiences of schooling and the criteria by which school success is to be judged. In the absence of equal representation and participation, unequal outcomes are likely to persist since the terms of success are dictated by dominant groups and located in criteria that best preserve their place in the social hierarchy. Support for this view may be found in Jencks and Phillips' (1998) analysis of test bias as a basis for the Black-White test score gap: Although test items are not prejudicial per se (in the sense of

being inaccessible to Blacks on the basis of their experience), the privileged position of standardized tests as a criterion of success, despite their questionable substantive validity, works to the persistent disadvantage of Blacks. Greater opportunity for Blacks to participate in determining the criteria of success might lead to more widespread use of other signals in which Blacks would fare better.

A second challenge to the prevailing definition of equal opportunity was presaged by Coleman et al. (1966), though it was not their main focus:

> A fifth type of inequality may be defined in terms of consequences of the school for individuals of unequal backgrounds and abilities. In this definition, equality of educational opportunity is equality of results given *different* individual inputs. The most striking example of inequality here would be children from households in which a language other than English, such as Spanish or Navaho, is spoken. Other examples would be low-achieving children from homes in which there is a poverty of verbal expression or an absence of experiences which lead to conceptual facilities (Coleman, 1968, p. 14).

In this conception, equal opportunity means equal results even among students from different social backgrounds. Thus, equality would be indicated by a regression model in which results are equal across groups *without* controlling for background conditions. This view places an extraordinary burden on schools: educators are charged with obtaining equal results among students who come to school with varying individual resources and experiences. Yet this is exactly the stance taken by current federal legislation in the U.S. The hallmark of the No Child Left Behind Act (NCLB; 2002), signed by President George W. Bush on January 8, 2002, is that all students will be judged "proficient" on standardized tests as of the school year 2013–14. In the space of a dozen years, schools around the country are expected to eliminate vast gaps in proficiency among subgroups. NCLB is distinctive in that schools are required to report not just overall averages, but the achievement average for each population subgroup that is of sufficient size for reliable estimation. Tests are designed and proficiency standards are set by states, not the federal government, and cross-state variation in what counts as proficient is already evident (Olson, 2005), but in all cases the requirement to eliminate subgroup differences is a substantial challenge. In the decentralized system of U.S. education, the federal government cannot actually impose standards on schools, but it has tied federal funding to adherence to the law, and while several states have raised objections and even filed suit against the federal government, no state has turned down the federal funding, and thus all are accountable for equal results.

Despite its obvious appeal, this conception of equal opportunity faces constraints that may limit its survival. First, in a time of strained budgets and competing demands, it seems unlikely that substantial compensatory resources will become available that will lead to equal results across subgroups that come from unequal backgrounds. Second, even if such resources were available, it is not clear that existing knowledge of educational effects would suffice to direct those resources to effective programs that would eliminate achievement gaps by 2013–14. As we have seen, researchers have had more success in assessing the size of school and teacher effects than in identifying specific school and teacher conditions that promote higher achievement.

NCLB has its own theories about how gaps can be reduced. The law requires "highly qualified" teachers in every classroom, specified as teachers with college degrees, teacher

certification, and subject matter competence. While the latter has been empirically associated with higher test scores (Goldhaber & Brewer, 2000), the association, like other effects, is modest. NCLB insists that students in failing schools be offered the chance to choose another school (public or private) and to receive free tutoring. Evidence on the achievement benefits of school choice is mixed (e.g., Howell & Peterson, 2002; Krueger & Zhu, 2004a); evidence on tutoring is limited but promising (e.g., Borman et al., 2005). The law also urges teachers to engage in practices supported by "scientific evidence"; while this principle seems promising in the long run, at present few programs and policies have rigorous evidence of causal effects (Comprehensive School Reform Quality Center, 2005).

In light of these challenges, accountability efforts under NCLB may shift more toward a *value-added* approach and away from an approach based on an absolute determination of school success or failure. Value-added assessments emphasize *growth* in student achievement, taking into account where students begin and how much they gain over time. Recently, the U.S. Department of Education announced it would allow 10 states to implement value-added measures in their accountability systems, on a pilot basis (Olson & Hoff, 2005). On the one hand, a value-added approach seems both more fair and more realistic, in that it recognizes that an effective school is one that serves its students well, rather than one that hits a predetermined target. On the other hand, the value-added approach reverts to EEO's conception of equal opportunity, in the sense that equality means equality of results *taking account of initial differences among students*. Without some attention to absolute standards, the goal of equal results for different subgroups is unlikely to be approached.

Conclusions: *Equality of Educational Opportunity* Today

Forty years on, the findings of the Coleman report hold up remarkably well, in some ways distressingly so. In the U.S., school segregation outside the South has nearly returned to its level in the late 1960s on some indicators: most Blacks study in schools with 50% or greater minority enrollment. This fact in part reflects the changing U.S. population, which has a much greater proportion of minority students overall, but it also reflects the rollback of school desegregation policies (Orfield, 2001). Most Whites, by contrast, are enrolled in schools that are predominantly White. The Black-White achievement gap, which declined notably until about 1990, has been stable since then. Student achievement still varies substantially within schools (in the U.S. and other developed countries), and this variation is still tied to students' social and economic backgrounds.

In light of these persisting patterns, the lessons of EEO and the research that followed in its wake leave little room for optimism about the power of schools and schooling to bring about equality of opportunity in the sense of equality of results, let alone equal participation. What would it take for contemporary policies to bring about equal opportunity? This could occur in one of two ways. First, policies could be enacted across the board that have greater benefits for disadvantaged students than for their more advantaged peers. Second, policies that have similar effects on all students could be focused mainly on disadvantaged students. The school choice provision of NCLB may fit the first category, in that private schools have in some studies been shown to benefit minority students more than other students (Coleman et al., 1982; Bryk, Lee, & Holland, 1993; Howell & Peterson, 2002). NCLB policies on teacher qualifications, evidence-based practice, and tutoring may fit the second category. These provisions may do little on their

own to close gaps; however, if they are primarily directed toward schools that enroll high proportions of disadvantaged students, they may make a difference.

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