A Review of the Reason Foundation's Report on Preschool and Kindergarten[1]

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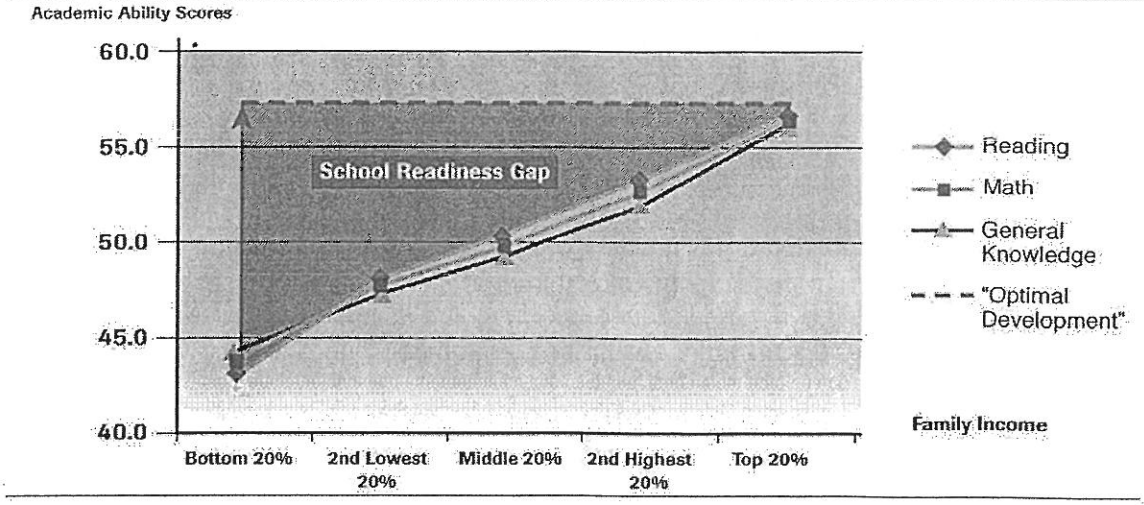
This analysis finds that the Reason Foundation (RF) report is an unreliable source of information about preschool education. The RF report's findings about children's readiness and the effects of preschool education are unwarranted and misleading, based on a selective review of early childhood programs that omits much of the evidence that would contradict its conclusions. The information that is included is unrepresentative and is selected and then presented in ways that yield a distorted view of research and its implications. As a result, the report's policy conclusions do not follow from the research and evidence presented in the report. A broader review of the relevant literature making consistent use of principles regarding research strengths for drawing causal conclusions yields quite opposite findings.

Q. ***Are American children well prepared to learn when they enter kindergarten?***

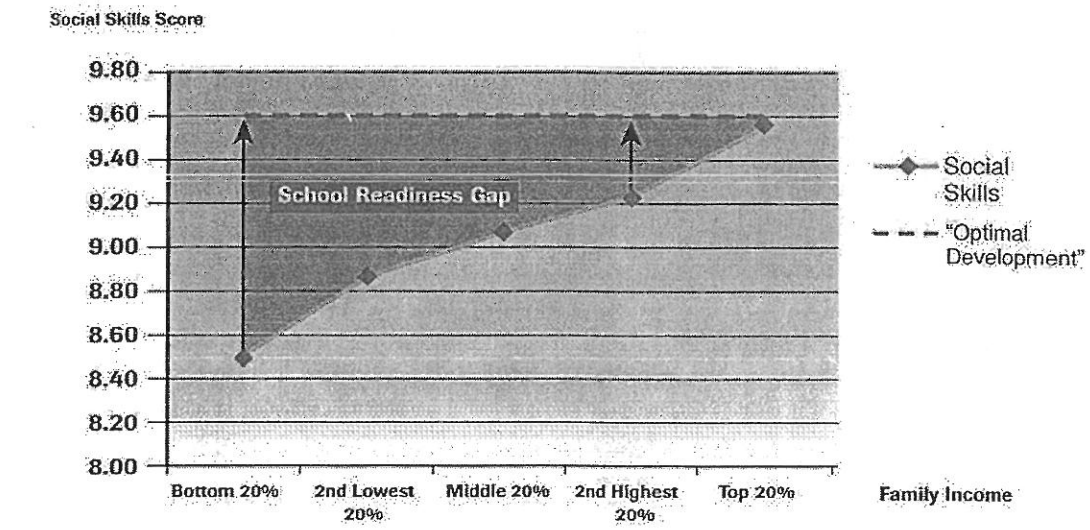
A. Far too many American children enter school lacking the academic and social skills needed to succeed in today's more rigorous educational environment and with much of their potential undeveloped. Children in low-income families are the least poorly prepared, but even children from middle income families begin school far behind their higher income peers. To support the argument that virtually all children are well prepared when they start school, the RF authors select a few isolated facts and ignore data from the same sources that contradict their argument. For example, the RF report cites ECLS-K data showing that "94 percent of children entering kindergarten pass mathematics proficiency level one," (e.g., counting to 10). The RF authors must also know that in ECLS-K only 66 percent pass level one for literacy, but chose not to report this much less rosy figure.[2] Nor do they report that only 29 percent of children pass proficiency level 2 in literacy (beginning word sounds) and only 58 percent pass level 2 in math (e.g., counting beyond 10, judging relative size). Looking at state learning standards for Pre-K, it is apparent that more is expected today than simple level one proficiency in math (e.g., counting to 10) and literacy (letter recognition).[3]

Despite the RF report's selective reporting of research findings, a more comprehensive look at the Department of Education's Early Childhood Longitudinal Study Kindergarten Cohort (ECLS-K) data reveals that most children fall far below their potential at kindergarten entry. Neither poor nor middle-income children are well prepared for school compared to higher income children. Children from families with average (median) incomes are as far behind children in families with higher incomes as poor children are behind the average. This middle class readiness gap was found for social and emotional development as well as cognitive development, as shown in the following graphs.[4]

Academic Abilities of Entering Kindergarteners by Family Income



Social Skills of Entering Kindergarteners by Family Income



The RF report cites older (1993) surveys of public kindergarten teachers about the need for children to know all the letters of the alphabet. They fail to report newer and more relevant information from kindergarten teachers about the broad range of skills that children need in today's schools. In a 1995 survey of 3,500 kindergarten teachers from across the country, many reported that large proportions of their students lacked important school readiness skills. For example, 46 percent of the kindergarten teachers reported that at least half of the students in their class had difficulty following directions, 36 percent reported that at least half of their class

lacked academic skills they needed, and 34 percent reported that at least half of their class had difficulty working independently. In Maryland, only 52 percent of children who entered kindergarten in 2002 were considered "fully ready." In a 2001 statewide survey, Colorado kindergarten and first-grade teachers reported that four out of 10 children were not academically prepared for school and that about one-third of their students were not socially and emotionally prepared.

Q. ***Do preschool education programs have lasting educational benefits for children?***

A. Both high quality preschool education and full-day kindergarten have been shown to produce valuable educational gains in the short- and long-run. Key relevant longitudinal studies demonstrate that effects seen at an early age continue as children grow older. The research that demonstrates long-term gains from preschool education includes rigorous studies of child care[5], Head Start[6] and other programs including the Effective Preschool Education study[7], the Infant Health and Development Program (IHDP) study, the Michigan School Readiness Program Longitudinal Study, and a follow-up to adulthood of a randomized trial of quality preschool education with disadvantaged children in Mauritius. These studies are in addition to the better-known longitudinal studies of the Perry Preschool Study, Chicago Child Parent Center, and the Carolina Abecedarian Project. Yet, the RF report uses claims of international comparisons between 4th and 8th graders and performance on National Assessment of Educational Progress scores to support their distorted conclusions.

Q. ***Do US international comparisons between fourth and eighth graders demonstrate students' scores dropping by middle school?***

A. No, children in the United States perform about the same in fourth grade and eighth grade relative to children in other countries contrary to the RF claims. Comparisons of performance in twelfth grade are difficult given the differences in education systems at that age. However, high quality preschool education programs have been shown to produce educational gains that last through high school and even influence high school graduation and college enrollment.

Literacy:

The RF report relies on the 2001 Progress in International Literacy Study (PIRLS) data to say that US 4th graders outperformed 26 of 35 countries. The RF report does not point out that U.S. 4th graders scoring 542 fell into a virtual three-way tie with Germany scoring 539 and Italy scoring 541 and fell far behind Sweden, the Netherlands and England, countries with strong investments in early childhood education.

The RF report uses a flawed approach to compare fourth to eighth graders in international standings by comparing the test results from one study (PIRLS) for the fourth graders against test results from a very different assessment, the Program for International Student Assessment

(PISA) for the eighth graders. The RF report also uses results from the 1991 PIRLS study for fourth grade, but even though 1991 PIRLS data existed for ninth grade scores, *that data was left out.* In fact, the 1991 PIRLS data *that was left out of the RF report* shows that U.S. ninth graders did as well as fourth graders. The National Center for Education Statistics (NCES) in *Reading Literacy in the United States,* pointed out that in the 1991 study, only one country, Finland, had a significantly higher score than the U.S. in ninth grade reading achievement when considering the effect of sampling variation as measured by the standard error. Thus, only Finland can reliably be said to have performed better than the U.S. on ninth grade literacy.[8] This debunks half of the RF thesis. Middle school kids' scores do not drop in reading.

Math and Science:

Do scores for U.S. children plummet in math and science? The RF report used evidence from a 1995 study to support its claims, and ignores newer 2003 findings from the source showing no decline for U.S. children from fourth to eighth grade. The Trends in International Math and Science Study (TIMSS) – the 1995 study used by RF to support its claim – showed in its 2003 study that there was no decline in the relevant performance of American children from fourth to eighth grade. U.S. fourth graders were 12th of 25, and scored above the international average in math on TIMSS2003. U.S. eighth graders were 14th of 44 nations in math, and also scored above the international average. Looking at science test scores from TIMSS 2003, the same stable pattern is evident. American fourth graders were 6th among 25 nations and eighth graders were 9th among 45. Fourth graders scored 536 compared to an international average of 489, and eighth graders scored 527 compared to an international average of 473. Clearly, the evidence shows no science and math achievement falloff for the United States from grade 4 to grade 8 in international comparisons.

Q. ***Are Positive Effects of State Prekindergarten Programs found based on National Assessment of Educational Progress (NAEP) Scores?***

A. Yes. First, NAEP scores in reading, math, and science have significantly increased since the 1970s, contrary to the RF report's assertion.[9] Even the RF report's own Figure 2 shows that this is the case, although a more appropriate basis for comparison is to look at scores separately for each ethnic group as the composition of the United States population has been changed.[10]

Second, the percentage of children enrolled in high quality prekindergarten programs remains quite small. The RF report uses the percentage of children who attend any center-based program at all at age 4, which is nearly 70 percent. However, this includes all sorts of poor quality child care and other programs that contribute little or nothing to children's learning.[11] The percentage of children who receive a high quality education at age 4 is far lower, perhaps less than one-third.

With so few children receiving high quality preschool education, it is unclear how much such programs could have influenced NAEP scores for the entire population. Still, given that

NAEP scores increased and high quality prekindergarten education increased, it is possible that preschool education is in part responsible for the increase in NAEP scores.

An Independent National Study of NAEP Scores and State Pre-K

One study has addressed the question of the effects of state preschool education policies on NAEP scores nationally in a rigorous statistical analysis. The RF report fails to mention this study. In a RAND study, David Grissmer and his colleagues found a positive effect on NAEP scores of state preschool programs, controlling for other state characteristics and educational policies.[12] This study provides a much stronger basis for investigating the effects of state preschool education policies on test scores than simply looking at changes in national NAEP scores and the percentage of children enrolled in any kind of early care and education program. Thus, it is noteworthy that the RAND study finds that state funded preschool education had a positive effect on NAEP test scores.

NAEP Scores and Pre-K In Georgia and Oklahoma

Georgia and Oklahoma serve a higher percentage of children in state funded prekindergarten programs than any other states in the country. Both states have committed to universal state funded Pre-K at age 4, though Oklahoma has made greater progress toward this goal.

The RF report very selectively compares NAEP reading scores for Georgia and Oklahoma in 1992 and 2005. This is an odd choice. Why start with scores that are more than a decade old when state education policies and the population attending school both changed a great deal over that time? This risks obscuring the comparison with the effects of changes that have nothing to do with universal prekindergarten. Also, why limit the comparison to just reading when math test scores also are available? The answers appear to be that when the NAEP data are not "cherry picked," they support exactly the opposite conclusion of that trumpeted by the RF report.

As NAEP is given in fourth grade, the first year students participating in universal prekindergarten show up in NAEP test data is 2001 in Georgia and 2004 in Oklahoma. Thus, it is possible to use much more recent NAEP test data than the RF report presents to look at test scores prior to UPK, and in some cases multiple years can be used before and after UPK. Also, it is important to look at scores disaggregated by ethnic group whenever possible so that comparisons are not distorted by changes in the population over time. Tables 1 through 3 below show exactly what NAEP scores were in Georgia and Oklahoma a short time before and after UPK students reached 4th grade.

Table 1. Georgia Fourth Grade Reading NAEP Scores Before and After UPK

	Ethnic Group		
Year	White	Black	Hispanic
1998 (Before UPK)	221	191	Not Avail.
2002 (After UPK)	226	200	200
2003 (After UPK)	226	199	201
2005 (After UPK)	226	199	203

Table 2. Georgia Fourth Grade Math NAEP Scores Before and After UPK

	Ethnic Group		
Year	White	Black	Hispanic
1996 (Before UPK)	224	201	205
2000 (Before UPK)	230	204	217
2003 (After UPK)	241	217	219
2005 (After UPK)	243	221	229

Georgia's fourth grade NAEP scores in both reading (Table 1) and math (Table 2) rose across the board from years just before to years just after children who attended UPK first reached the 4th grade test. Reading score gains from 1998 to 2005 are statistically significant for both Whites and Blacks. Math score gains from 1996 to 2003 and 2005 are statistically significant for all three ethnic groups. Math gains also are statistically significant for all groups from 2000 to 2005 and for Whites and Blacks from 2000 to 2003. Clearly, test scores have risen in Georgia, since UPK. Whether the test score gains are the result of UPK alone is another question. There have been other education reforms in Georgia.

In Oklahoma, where UPK is more recent than in Georgia, there is only one year of relevant data for children who attended UPK, 2005.[13] Oklahoma's 2005 results are for children who participated at the start of UPK when less than half of the state's children enrolled and disadvantaged children were more likely to attend. This allows only a very weak test of the effects of UPK, as many disadvantaged children had access to preschool education in the prior years and the first year increase in enrollment was relatively small. Future NAEP results will be more informative for Oklahoma. Nevertheless, the data that are available provide a picture that is more positive than negative.

Looking at NAEP scores for Oklahoma (Table 3), it is clear that there is essentially no change in reading scores for white children, but for other ethnic groups reading scores appear to increase. Math scores appear to increase for all groups. The number of students tested in Oklahoma limits the power of statistical tests of significance for achievement gains separately for each major ethnic group. It is possible to perform more powerful statistical tests across all children. There is no statistically significant difference in reading scores across the years. However, math score gains are statistically significant comparing both 2000 and 2003 to 2005.

Table 3. Oklahoma 4th Grade NAEP Scores Before and After UPK

		Ethnic Group		
Year	**White**	**Black**	**Hispanic**	**Indian**
Reading				
2002 Read (Before UPK)	220	188	197	209
2003 Read (Before UPK)	220	195	200	206
2005 Read (After UPK)	219	196	204	211
Math				
2000 Math (Before UPK)	229	205	207	221
2003 Math (Before UPK)	235	211	220	225
2005 Math (After UPK)	240	217	226	229

Conclusions Regarding NAEP Scores and Pre-K

Three different approaches to looking at the relationship between Pre-K and NAEP scores all show prekindergarten to be effective in raising student achievement. National trends in NAEP scores, the RAND study of the effects of state prekindergarten policies, and comparisons of NAEP scores before and after UPK in Georgia and Oklahoma all yield results that are consistent with the view that state investments in high quality Pre-K increase later student achievement. These results also are fully consistent with the results of rigorous long-term studies (including randomized trials) that find persistent effects of high-quality preschool education on children's achievement and educational attainment.[14] This evidence all suggests that states implementing educationally effective prekindergarten for all children can expect their elementary grade test scores to rise as a result.

Q. *Has Head Start produced positive effects on children's educational outcomes?*

A. Yes. The RF report presents a highly selective and misleading review of research on the effects of preschool education that fails to even mention much of the strongest research on publicly supported preschool. Thus, the RF claim that Head Start has no measurable effects on educational outcomes is based on incomplete and out of date evidence. It cites two outdated summaries of Head Start research—one is 20 years old, the other 10 years old—and ignores the two recent randomized trials of Head Start that find positive effects of the program.[15] The RF report also ignores the randomized trial of Early Head Start with its longer-term follow-up.[16] Even though Head Start also has the goals improving children's health and nutrition, evidence of positive effects on these outcomes is nowhere to be found in the RF report. The report similarly ignores positive evidence of long-term effects from studies that are at least as methodologically strong as the ones the report cites as evidence that Head Start has no lasting effects. These include studies that employed sophisticated methods to adjust for selection bias and found long-term results of Head Start on educational attainment and crime.[17]

Unfortunately, the RF report trumpets weak studies. It relies heavily on evidence from a study of the Georgia program with a weak design that is cited as proof that universal programs are ineffective. This study would be rated as among the weakest possible using the very criteria supposedly relied upon by the RF report to assess research quality.

The RF report omitted methodologically strong studies that found positive effects. These include:

- the national randomized trial of Head Start (which is the gold standard using their criteria), but that found positive effects of the program.
- the results from two methodologically rigorous studies of the Oklahoma universal prekindergarten program.[18]
- the strong quasi-experimental study of the long-term of effects of Michigan's state preschool education program.

- the only randomized trial comparing half- and full-day, extended year preschool and kindergarten education. This study found that full-day programs produced larger effects than half-day programs through first grade.

A complete and unbiased review of the literature reveals that multiple randomized trials have found positive effects of preschool education, including large-scale public programs. Both randomized trials and strong quasi-experimental studies have found long-term effects of preschool education on cognitive development (especially achievement test scores), grade retention, special education placements, educational attainment (e.g., high school graduation), employment and earnings, and crime. A list of these studies is provided later in this document.

Positive results of prekindergarten have been replicated across multiple studies, and the results apply to large-scale public programs as well as more intensive model programs. There does appear to be a dose-response relationship. Programs that are more educationally intensive, serve children over more years, and have longer hours produce larger results. The RF report reaches a different conclusion by omitting relevant studies from its review and leveling inaccurate and inconsistent criticism against studies that are too well known to simply ignore. Examples of this latter tactic are set out below.

Q. ***Is greater access to high quality preschool education something that benefits children from middle-income families as well as children in poverty?***

A. There is no sharp dividing line between rich and poor or low-income and middle-income in the United States when it comes to access to high-quality preschool education or the benefits of such programs. National statistics show that even families with incomes as high as $50,000 a year have no more access to preschool education than families below the poverty line. And, many of the programs that middle-income families can afford are of limited quality—so while they provide safe child care, they provide little educational benefit. Data from the ECLS-K study show that children from the middle class enter school as far behind children from higher income families as children in poverty are behind them. School failure and dropout are also far more common among the middle class than is generally understood. More than one in 10 middle class children fail a grade and are held back and a similar percentage fail to graduate from high school. Recent studies including evaluations of the Oklahoma's universal preschool program and a large study of 5 state pre-K programs have demonstrated substantial learning gains for children from middle income families. Long-term findings of positive effects for the middle class come from the two large-scale studies, the Effective Preschool Education study[19] in England and the Infant Health and Development Program (IHDP) study in the United States.[20] In addition, the size and breadth of the NAEP score gains in Georgia and Oklahoma suggest that gains from preschool in those states are very broad and not just limited to those in poverty. The benefits for children in middle-income families from quality preschool education may be less than the gains for children in lower-income families, but they are still important and worthwhile.

Q. ***Was the Perry Preschool Study methodologically sound?***

A. Yes. The Perry Preschool longitudinal study and its benefit-cost analysis have been published in a wide range of peer reviewed scientific journals. Clearly many peer reviewers have found that the Perry Preschool study and its benefit-cost analysis were methodologically sound, though not necessarily perfect. The RF report attempts to discredit this study by making misleading claims about this work.

- Rather than simply shifting children from special education to remedial programs, as suggested by RF, in fact, the reduction in special education the Perry Preschool program produced was much too large to have been offset by the small increase in remedial education.

- There was a difference in unemployment as a result of the Perry Preschool program, despite RF claims otherwise. At age 19 the children who had attended the Perry program were significantly more likely to be employed, had been employed for more months since leaving school, and had more total months of employment the year in which they turned 19. In follow-ups at ages 27 and 40 there was no significant difference in employment, but former preschoolers had higher earnings.

- The results of the Perry Preschool study were not largely due to the program's home visitation component – another RF claim. The program produced no significant effects on parental behavior or the home environment, and path analysis has shown later effects to be linked to initial effects on children.[21] Other studies have that found home visitation programs do not produce the type and magnitude of effects found in the Perry Preschool study.[22]

Q. ***Are the gains and economic returns from the Chicago Child Parent Center Study commonly cited due to the preschool program alone?***

A. Yes. The principal investigator of the CPC study has investigated the hypotheses that the results of the Chicago Child Parent Center (CPC) study may be primarily due to parent involvement or the extended elementary school program. The investigation produced estimates of the program impacts and costs and benefits that are limited to the preschool portion of the program.[23] ~~***The figures that are widely and appropriately cited are specifically for the gains and economic returns to the preschool program alone.***~~ Parent involvement in the CPC program consisted of volunteering in the classroom, attending social events and field trips, and assistance in completing high school. These same opportunities are available in most publicly funded preschool education programs.

Q. ***Do the cognitive effects of preschool disappear?***

A. No. A comprehensive review of the literature indicates that the cognitive advantages produced by preschool education are strongest right after the program and decline somewhat after children leave preschool education.[24] However, this does not mean that cognitive gains disappear altogether over the years, just that they are somewhat smaller later. Moreover, this is not necessarily because the effects of preschool education decline. When children who have not had preschool education enter kindergarten, the public schools work hard to help them catch up. Studies find that children who have not received a good preschool education get a boost after kindergarten entry. They also are more likely to repeat a grade and receive special education. Grade repetition and special education are, in fact, attempts to help children who are behind; to the extent they are successful they reduce the gap in later achievement between children who went to preschool programs and those who did not. However, this is a costly response to the problem of inadequate preschool education. The RF report labels effects on grade repetition and special education as short-term, but these effects have been found by numerous studies to persist through middle school and high school so they are hardly short-term.

Q. ***Have the findings of important randomized trials like the Perry Preschool and Abecedarian studies been replicated?***

A. Yes. The claims that these studies findings have not replicated are untrue, although the two programs differ in their educational quality from much of what is available to children today. The Abecedarian program differed from the part-day Perry Preschool program in that it offered education through full-day childcare from the first year of life up to kindergarten entry. Nevertheless, the Abecedarian study does demonstrate a replication of many of the findings of the Perry Preschool study, producing even larger educational gains as the result of a more intensive educational program in another time and place.[25] This is evidence of a relationship between the "dose" of preschool education and its effects.

The Perry Preschool findings have been replicated by other part-day preschool program studies, as well. The Chicago Child Parent Center study replicates virtually all of the Perry Preschool outcomes—with somewhat smaller effects on each as the result of a less intensive educational program, and two independent studies of the CPC's have found effects on achievement and high school graduation.[26]

Other research replicating the results on elementary and middle school achievement and school success include studies of:

- Cincinnati Title I preschool,
- Maryland Extended Elementary Pre-K,
- New York Experimental Pre-K, and the
- Michigan School Readiness Program.[27]

The Perry Preschool study's findings of long-term impacts on delinquency and crime have been replicated in:

- the CPC study and
- in a randomized trial with disadvantaged children in Mauritius.[28]

The Abecedarian study's findings have been replicated by other randomized trials of full-day programs including:

- the Milwaukee study, and
- the Infant Health Development Program (IHDP) study.[29]

The Milwaukee study is another randomized trial of a birth-to-5 program, and the estimated effects on IQ and achievement are strikingly similar to those in the Abecedarian study. The IHDP study was designed to replicate the Abecedarian model through age three with a low birth weight population. It has replicated a number of the Abecedarian findings with a heavier low birth weight population that is much more generally representative of the American population. The IHDP study provides rigorous evidence of long-term gains beyond the more narrow populations in the Perry Preschool and Abecedarian studies, even though it appears that these effects were weakened because the IHDP preschool program was offered at ages 1 and 2 but did not continue through ages 3 and 4.

Q. ***Does the RF analysis support its policy conclusions and recommendations?***

A. No. Even using the RF report's literature, the report's policy conclusions and recommendations generally do not follow from the literature reviewed. The recommendation for voucher programs proceeds entirely from their preconceived views. The private sector has not shown itself to have any advantages over the public with respect to the educational effectiveness of preschool education. This is similar to findings of no substantial differences in research on the relative effectiveness of public and private K-12 education.[30] Also, the call for vouchers is inconsistent with the RF report's concerns for financial accountability. The evidence highlighted in the RF report (RF pp. 30-31) indicates problems with private providers and highlights the need for public financial oversight.

In estimating the amount of money that could be taken from current public programs to fund vouchers for 4-year-olds, the RF report makes major errors. It adds up funds across multiple programs that serve children who are younger and older than 4. These programs include Head Start, which serves children from 3 to 5, and childcare, which serves children from birth through age 13. The RF report should have calculated the funds spent only on 4-year-olds. Essentially, it proposes robbing the 1-, 2-, and 3-year-old Peters to pay for the 4-year-old Pauls. In addition, the RF report appears to assume that there are no administrative costs and that no public accountability is necessary for a voucher program. Together these errors mean that the RF report greatly overestimates the size of the voucher that could be provided using existing early childhood funds. A realistic figure would be less than half the RF estimate.

Unfortunately, there typically is no logical connection between these and the RF report's recommendations. For example, everyone can endorse the report's call for better information about funding, services, and outcomes. It is a truism that more information is better than less. However, it does not follow that decisions on public investments in preschool education should be postponed until more information is available. Waiting has its own costs. Each year more children enter school without the benefits of good preschool education, and benefit-cost analyses indicate that the costs of waiting are high.

In another example, the RF report correctly observes that the field is fragmented and insufficiently coordinated. However, this does not mean it is a good idea to fold all public programs into a single giant voucher program. The various public programs for young children have different goals and serve different populations—some provide full-time childcare, some provide intensive special education, some provide health and social services. All of the children need a good education, but a one-size-fits-all voucher would be a poor fit for many children and would not address many of the goals of these diverse programs. Florida, which the RF report cites approvingly as an example, dismantled higher quality educational programs for which there was information on outcomes. These were replaced with a voucher that is too poorly funded to support quality education. There are no data on the educational effectiveness of this voucher, and enrollments are much lower than anticipated. A comparison of Florida enrollments with those in other states suggests that parents do not find the Florida program very attractive.

Conclusions

Given the RF report's flaws, it should not be used to inform early childhood policy decisions. Its conclusions are accompanied by snippets of accurate, though often irrelevant, generalities that give the report a patina of reasonableness.

In sum, the RF report is an unreliable guide to preschool education research and policy. It picks and chooses information and twists the interpretation of that information to reach predetermined conclusions. Much of the relevant research is omitted. The information that is included is frequently misrepresented, or inaccurately reported. Policy makers will have to turn elsewhere for useful information on preschool education and its effects. As an alternative, the American Educational Research Association has provided an independent, objective, and concise review of policy relevant research.[31] More expansive reviews are provided by two National Research Council publications—*Neurons to Neighborhoods: The Science of Early Childhood Development* and *Eager to Learn: Educating Our Preschoolers*.[32] Policy briefs relevant to many specific topics are available from the National Institute for Early Education Research at our website nieer.org.

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[10] The increase over time in the percentage of the population belonging to minority groups means that the change in the average score actually understates the increases in NAEP scores for children taking ethnicity into account. Thus, it is possible for the average for the whole population to show little change over time even if children in every ethnic group made large gains. This is an instance of what is commonly called "Simpson's Paradox," and it is a well known problem with the type of comparison the RF report makes. It is also noteworthy that the RF report's Figure 2 is constructed in such a way as to mislead the reader about changes in scores. For example, the reading score of 225 for 1971 is displayed higher than the reading score of 229 for 2004.

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