DOCUMENT RESUME

ED 381 247 PS 023 074

TITLE	Early Childhood Programs: Parent Education and Income Best Predict Participation. Report to the Chairman, Subcommittee on Children, Family, Drugs and Alcoholism, Committee on Labor and Human Resources, U.S. Senate.
INSTITUTION	General Accounting Office, Washington, DC. Health, Education, and Human Services Div.
REPORT NO	GAO/HEHS-95-47
PUB DATE	Dec 94
NOTE	36p.
AVAILABLE FROM	U.S. General Accounting Office, P.O. Box 6015, Gaithersburg, MD 20884 (first copy, free; additional copies are $2 each; 100 or more mailed to a single address discounted 25%).
PUB TYPE	Legal/Legislative/Regulatory Materials (090)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*At Risk Persons; Educational Attainment; *Enrollment; *Family Income; Individual Differences; Low Income Groups; *Parent Background; Predictor Variables; *Preschool Education; Racial Differences; Regional Characteristics; Social Differences; *Socioeconomic Influences

ABSTRACT

This report examined the participation of at-risk children in preschool programs, after controlling for selected individual, family, and geographic characteristics. A multivariate statistical technique, a logistic regression, was applied to data from the 1990 Decennial Census. This allowed an analysis of the relative effects of each of the following variables on preschool participation: income, education status of most educated parent, race, immigrant status, linguistic-isolation status, employment status of parent, family type, the urbanicity of residence, and state of residence. With Head Start funds reaching less than half of the eligible 3- and 4-year-olds, children living in low-income families were 16 to 20 percent less likely to attend preschool than their middle-income counterparts, even after controlling for ethnicity, family type, immigrant status, parent education, and other family characteristics. By contrast, children in higher-income families were 25 to 50 percent more likely to go to preschool than children from middle-income families. The education level of children's parents has a large influence on participation; the higher the level of education of the parent(s), the more likely that the child would participate in preschool. The report also found that Black and Native American children were more likely than white children to attend preschool, after controlling for individual, family, and geographic characteristics. Three appendices contain the objectives, scope, and methodology of the study, data points for report figures, and General Accounting Office (GAO) contacts and staff acknowledgements. (MDM)

United States General Accounting Office

GAO

Report to the Chairman, Subcommittee on Children, Family, Drugs and Alcoholism, Committee on Labor and Human Resources, U.S. Senate

ember 1994

EARLY CHILDHOOD PROGRAMS

Parent Education and Income Best Predict Participation

GAO/HEHS-95-47

GAO

United States
General Accounting Office
Washington, D.C. 20548

Health, Education, and
Human Services Division

B-259742

December 28, 1994

The Honorable Christopher J. Dodd
Chairman, Subcommittee on Children,
Family, Drugs and Alcoholism
Committee on Labor and Human Resources
United States Senate

Dear Mr. Chairman:

In recent years, the Congress has consistently recognized the importance of providing preschool for young children by increasing the budget for the Head Start program. The Congress has also recently enacted the Goals 2000 legislation. The first goal states that by the year 2000 all children will enter school ready to learn. One major objective of the first goal is that all children will have access to quality preschool. Further, welfare reform proposals discussed in the 103rd Congress included provisions for increases in the availability of child care for low-income working women.

To assist the Subcommittee's deliberations over early childhood programs in the context of the National Education Readiness Goal and the ongoing welfare reform debate, you asked that we determine the individual, family, and geographic characteristics that influence children's preschool participation.

In July 1993, we provided you with demographic information on preschool-aged children (5- and 4-year-olds) in our report, Poor Preschool Aged Children: Numbers Increase but Most Not in Preschool (GAO/HRD-93-111BR, July 21, 1993). In that report, we found that most at-risk[1] preschool-aged children participated in preschool at lower rates than those not at risk. More specifically, we found that children in each of the following groups participated at lower rates than those not at risk: children who live in immigrant families,[2] linguistically isolated[3] (LI) households, single-parent families, families where the most educated parent has less than a high school diploma, and families where the parents

[1]At-risk is defined as those in immigrant families, linguistically isolated households, single-parent families, families where the most educated parent has less than a high school diploma, or families where the parents do not work.

[2]Immigrant child is defined as a child who is foreign born or whose parents are foreign born and came to the United States within the last 10 years.

[3]Linguistically isolated child is defined as a child in a household in which no one 14 years or older speaks English "only" and no one 14 years old or older who speaks a language other than English speaks English "very well."

were not working. We also found that poor children in some states participated in preschool at higher rates than those in other states. However, that report did not examine whether these patterns hold when simultaneously controlling for other characteristics.

You asked us to more closely examine this information to determine whether these patterns hold for those at risk, after controlling for selected individual, family, and geographic characteristics. You also asked what the relative effect of each individual, family, and geographic characteristic is on children's preschool participation.

To answer your questions we applied a multivariate statistical technique—a logistic regression—to data from the 1990 Decennial Census.[4] This multivariate approach allowed us to determine the relative effects of each of the following variables on preschool participation: income, education status of most educated parent, race, immigrant status, linguistic-isolation status, employment status of parent, family type, the urbanicity of residence, and state of residence. We did our analysis based on two logistic regression models, one for all children and another for poor children. (See app. I for a more detailed discussion of our objectives, scope, and methodology and for definitions of terms used throughout the report.)

Results in Brief

With Head Start funds reaching less than half the eligible 3- and 4-year-olds, we found that children living in low-income families are less likely to attend preschool than their middle-income counterparts.[5] In addition, the education level of children's parents has a large influence on children's participation. After controlling for other characteristics, children whose most educated parent has not completed high school are less likely to go to preschool compared with those whose most educated parent has graduated from high school.

Surprisingly, children in some risk groups appear about as likely to participate in preschool as those not at risk, after controlling for other characteristics. In this regard, immigrants are about as likely to attend preschool as nonimmigrants. Further, LI children—those in families where

[4]Our prior report provided descriptive statistics separately for each risk group but did not control for other characteristics.

[5]Fiscal year 1994 data indicate that approximately 40 percent of eligible children are attending Head Start. Because our analysis was based on 1990 decennial census data, all numbers in the report are from 1990 unless otherwise indicated.

no person speaks English well—are nearly as likely to attend preschool as non-LI children, and children whose parents are not working are nearly as likely to attend preschool as those with working parents.

It is also interesting to note that black and American Indian children are more likely than white children to attend preschool, after controlling for individual, family, and geographic characteristics. Children with single parents are also more likely to participate than those in married-couple families, after controlling for other characteristics.

Although it might be suggested that state variability in preschool participation is mostly a result of the demographics of the states, we found that demographics account for less than half of the variability. Even after controlling for characteristics such as income and the percentage of the children in urban versus rural areas, children in some states are still much more likely to participate in preschool than children in other states.

Background

In 1994, the Congress made a commitment to young children by enacting the Goals 2000: Educate America Act. The first goal of this legislation states that by the year 2000 all children in America will start school ready to learn. The objectives of this goal are that: (1) all children will have access to quality preschool, (2) all parents will be a child's first teacher and will have access to the training and support they need, and (3) all children will arrive at school with healthy minds and bodies.

Research has demonstrated that children with certain risk characteristics are significantly less likely to succeed in school.[6] Research has also concluded that children who receive high-quality preschool services have improved test scores in elementary school, fewer grade retentions, and reduced placements in special education programs.[7] Furthermore, individuals who receive high-quality preschool as children are more likely to attend college and hold jobs, and are less likely to be on welfare or

[6]Gary Natriello, Edward McDill, and Aaron Pallas, Schooling Disadvantaged Children: Racing Against Catastrophe (New York: Teachers College Press, 1990).

[7]The Impact of Head Start on Children, Families and Communities, U.S. Department of Health and Human Services, Office of Human Development Services, Head Start Bureau, Administration for Children, Youth and Families, Pub. No. (OHDS)-85-31193 (Washington, D.C.: U.S. Government Printing Office, 1985).

arrested for a serious crime compared with those who do not receive such services.[8]

Despite the demonstrated benefits of quality preschool for disadvantaged children, recent studies have shown that disadvantaged children continue to be the least likely to participate in preschool.[9] In 1990, approximately 35 percent of poor 3- and 4-year-olds participated in preschool compared with approximately 60 percent of those in the highest income group.

Head Start is administered by the Department of Health and Human Services (HHS) and currently targets children who live in families below the poverty level (income below $12,674) or who receive public assistance.[10] The program funds child development services, coordinates nutrition and health services, and provides parental education services. The Head Start program, funded at $3.3 billion in fiscal year 1994, is the largest federal program providing preschool and developmental services to poor preschool-aged children and social services for their families. However, despite the increasing funding in the past few years, Head Start still serves only about 40 percent of the eligible 3- and 4-year-olds in the country. Further, quality improvements could be made in some Head Start centers.

In addition to Head Start, federal, state, and local governments fund early childhood programs, some of which include parental involvement and education as important elements. The Even Start program, administered through the Department of Education, is one such program designed to help parents become full partners in the education of their children and to assist children in reaching their full potential.

[8]John R. Berrueta-Clement, Lawrence J. Schweinhart, W. Steven Barnett, Ann S. Epstein, and David P. Weikart, Changed Lives: The Effects of the Perry Preschool Program on Youths Through Age 19, Ypsilanti, Michigan: High/Scope Educational Research Foundation, 1984; and Lasting Effects After Preschool, U.S. Department of Health, Education and Welfare, Office of Human Develoment Services, Administration for Children, Youth and Families, Pub. No. (OHDS) 79-30179 (Washington, D.C.: 1979).

[9]Poor Preschool-Aged Children: Numbers Increase but Most Not in Preschool (GAO/HRD-93-111BR, July 21, 1993).

[10]Head Start uses Office of Management and Budget (OMB) poverty guidelines. Throughout this report poverty ratios are used to control for family size. The dollar amounts provided in this report are the total household income for an average-sized family—a family of four in 1990. If the family is smaller, the dollar amount is less; similarly, if the family is larger, the dollar amount is more.

Principal Findings

Income and Parent Education Largest Influences

Income and parent education are the largest influences on children's preschool program participation. After controlling for selected demographic characteristics,[11] children in or near poverty are 16 to 20 percent less likely to attend preschool programs than middle-income children.[12] By contrast, children in higher-income families are 25 to 50 percent more likely to go to preschool than middle-income children. (See fig. 1 and table II.1.)

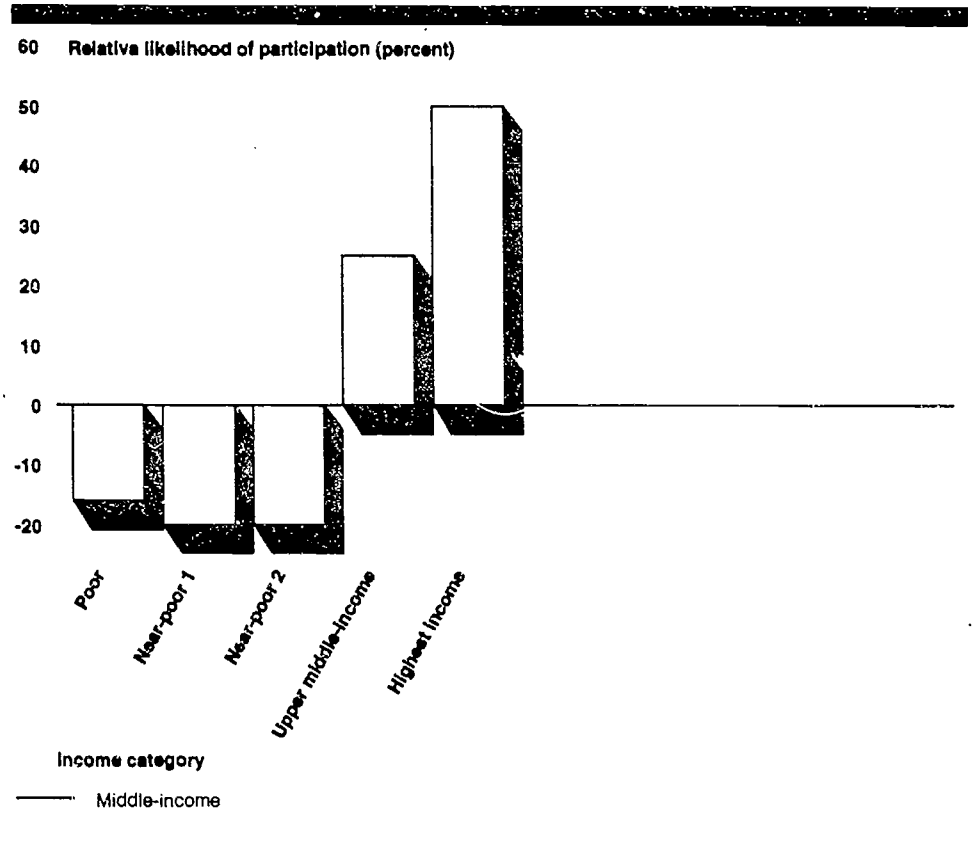
By contrast, a recent study shows that when publicly funded kindergarten is available to all, children in and near poverty are about as likely to participate as children with higher incomes.[13] This finding suggests that publicly funded kindergarten is effective in equalizing access to programs before the first grade.

[11]The characteristics we controlled were for race/ethnicity, family type, immigrant status, linguistic-isolation status, education status of most educated parent, work status of parents, urbanicity, and state of residence.

[12]We define family income using OMB guidelines and Census data for poverty increments to control for family size. The annual income dollar amounts that correspond to the categories used in the report for a child in a family of four in 1990 are as follows: poor: below $12,674; near-poor 1: above $12,674 to $16,856; near-poor 2: above $16,856 to $23,446; middle-income: above $23,446 to $44,359; upper-middle income: above $44,359 to $63,370; highest income: above $63,370.

[13]Access to Early Childhood Programs for Children at Risk, U.S. Department of Education, National Center for Educational Statistics, Office of Education , Research and Improvement (NCES 93-372) (Washington, D.C.: 1994.)

Figure 1: Poor and Near-Poor Children Less Likely to Participate

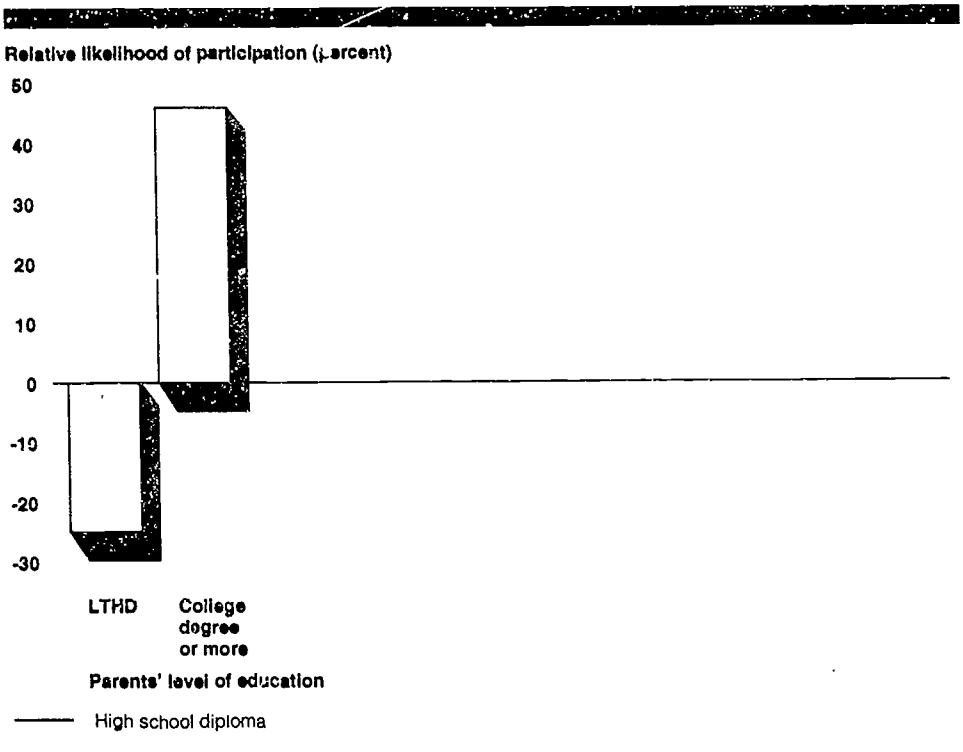


Children whose most educated parent has not completed high school are also among the least likely to attend preschool. After controlling for selected characteristics,[14] children whose most educated parent has less than a high school diploma are 25 percent less likely to go to preschool than children whose parents have a high school diploma. Compared with children whose parents have a high school diploma, children whose most educated parent has a college degree or more are about 46 percent more likely to attend a preschool program. (See fig. 2 and table II.2.)

The relationship between parental education and children's likelihood of participating in preschool may be due to a lack of knowledge about or appreciation of the importance of early childhood education.

[14]The characteristics we controlled for were race/ethnicity, family income and type, immigrant status, linguistic-isolation status, work status of parent, urbanicity, and state of residence.

Figure 2: Parents With Low Education Less Likely to Send Children to Preschool



Poor children whose most educated parent has not completed high school are also less likely (23 percent) to go to preschool compared with poor children whose parents have a high school diploma.

Race, Urbanicity, and Family Status Moderate Predictors of Preschool Participation

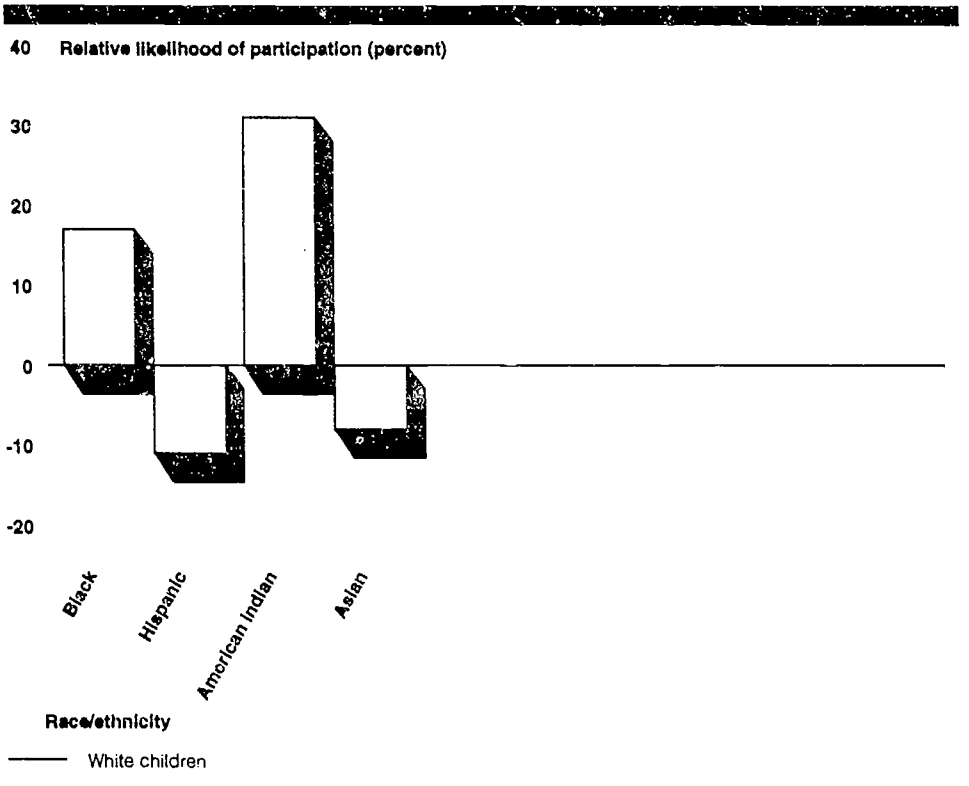
Black and American Indian Children Are More Likely to Participate

Controlling for selected demographic characteristics,[15] black children are 17 percent and American Indian children are 31 percent more likely to attend preschool programs compared with white children. These findings for black and American Indian children are consistent with public policies aimed at raising the enrollment levels of disadvantaged minority children.

[15]The characteristics we controlled for were family income and type, immigrant status, linguistic-isolation status, education status of the most educated parent, work status of parent, urbanicity, and state of residence.

Although Hispanic and Asian children are somewhat less likely to participate than white children after controlling for other characteristics, including poverty and education status of the most educated parent, these differences are not material.[16] (See fig. 3 and table II.3.)

Figure 3: Likelihood of Participating Relative to White Children



Controlling for other demographic characteristics,[17] differences in preschool participation for poor children are even larger. For example, poor black children are 32 percent and American Indian children are 60 percent more likely to go to preschool compared with white children. Once again, these findings are consistent with public policies aimed at raising the enrollment levels of these children.

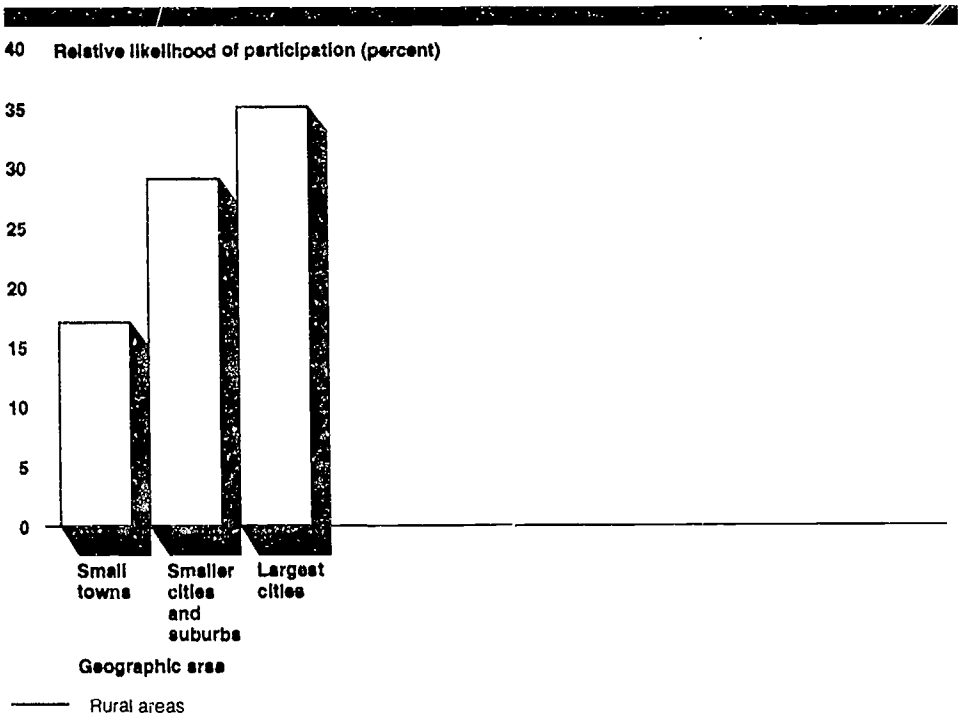
[16]We define material differences as those greater than 15 percent. Because of the large sample size, virtually all differences stated in this report are statistically significant. We therefore focus on those differences that are material or notable

[17]The characteristics we controlled for were family income and type, immigrant status, linguistic-isolation status, education status of the most educated parent, work status of parent, urbanicity, and state of residence.

Rural Children Among Least Likely to Participate

Compared with children in rural areas and accounting for other characteristics,[18] children in small towns are 17 percent more likely to go to preschool, and children in smaller cities and suburbs and the largest cities are 29 and 35 percent, respectively, more likely to attend preschool programs.[19] (See fig. 4 and table II.4.)

Figure 4: Likelihood of Participating Relative to Children in Rural Areas



Among the poor, children in rural areas are also less likely to participate in preschool after accounting for other demographic characteristics. However, poor children in nonrural areas are about 20 percent more likely to participate in preschool than those in rural areas, regardless of size of town.

[18]The characteristics we controlled for were race/ethnicity, family income and type, immigrant status, linguistic-isolation status, work status of parent, education status of the most educated parent, and state of residence.

[19]We define largest cities as the urban portions of the counties comprising the 25 largest cities in 1990, smaller cities and suburbs as the urban portions of the remaining Metropolitan Areas (MAs), small towns as the urban portions of non-MAs, and rural areas as all remaining portions of counties.

Research suggests a number of reasons that may explain low participation among rural children.[20] Reasons include greater reluctance to receive public services, greater distances to travel to receive services, and poor public transportation.

Children of Single Parents More Likely to Participate

Children in single-parent families are about 18 percent more likely to attend preschool than those in married-couple families after accounting for select demographic characteristics.[21] This percentage difference is similar for poor children (21 percent). Research suggests that single parents may use preschool as one form of child care.

Some Risk Factors Have Little Influence

After controlling for other characteristics, immigrant children, LI children, and children with parents who do not work are nearly as likely to attend preschool as their counterparts. While LI children are about 33 percent less likely to attend preschool than their non-LI counterparts, they are only 3 percent less likely after controlling for other characteristics (see table 1.1).[22] Similarly, the gap between immigrant and nonimmigrant closed from 22 percent to 10 percent[23] and the gap for children with working parents versus nonworking parents closed from 29 percent to 10 percent after controlling for other characteristics.[24]

Table 1.1: Difference in Likelihood of Participating in Preschool Relative to Reference Group

Figures are percent

Risk factors	Unadjusted difference	Adjusted difference
Immigrant	-22	-10
Linguistically isolated	-33	-3
Parent(s) not working	-29	-10

[20]Lief Jensen, Families in Poverty: Patterns, Contexts, and Implications for Policy, Washington, D.C.: Family Impact Seminar, 1992.

[21]The characteristics we controlled for were race/ethnicity, family income, immigrant status, linguistic-isolation status, work status of parent, education status of the most educated parent, urbanicity of residence, and state of residence.

[22]The characteristics we controlled for were race/ethnicity, family income and type, immigrant status, work status of parent, education status of the most educated parent, urbanicity of residence, and state of residence.

[23]The characteristics we controlled for were race/ethnicity, family income and type, linguistic-isolation status, work status of parent, education status of the most educated parent, urbanicity of residence, and state of residence.

[24]The characteristics we controlled for were race/ethnicity, family income and type, immigrant status, linguistic-isolation status, education status of the most educated parent, urbanicity of residence, and state of residence.

Children who are immigrant, linguistically isolated, or living with parents who are not working are more likely to be poor and to live in families in which the most educated parent has less than a high school diploma—characteristics among the strongest predictors of preschool participation. The higher portions of these at-risk children who are poor and who live in families where the most educated parent has less than a high school diploma may explain the closing of the gap between the nonadjusted preschool rates and the adjusted rates. For example, 30 percent of immigrant children lived in poverty, compared with 19 percent of nonimmigrant children. Similarly, 39 percent of immigrant children lived in families where the most educated parent had less than a high school diploma, compared with 13 percent of nonimmigrant children. (See table 1.2.)

Table 1.2: Children In Select Risk Groups In Poverty and Families Where Parents Have Less Than a High School Diploma

Figures are percent

Risk factor	In poverty	Less than high school diploma
Immigrant vs. nonimmigrant	30 vs. 19	39 vs. 13
Linguistically isolated vs. nonlinguistically isolated	41 vs. 19	54 vs. 13
Parent(s) not working vs. parent(s) working	81 vs. 13	49 vs. 11

Among the poor, immigrant children, children in LI households, and children whose parents are not working are also about as likely to participate as their poor counterparts.

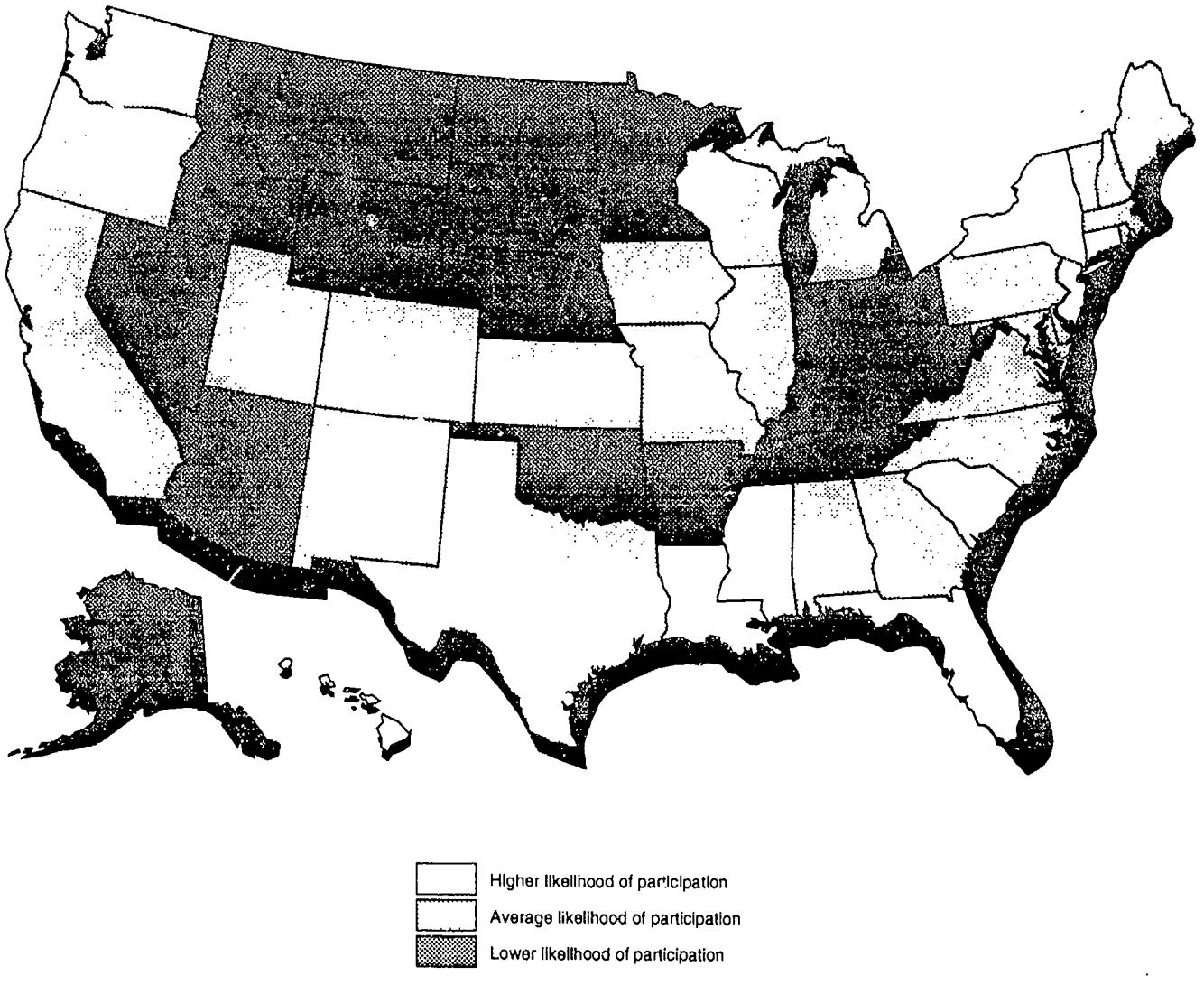
State Variation in Participation

Children in some states are more likely to participate in preschool than those in other states, even after controlling for demographic differences. The eight demographic characteristics we controlled for account for about 42 percent of the overall state variability in preschool participation.[25] The remaining variation may be explained by factors such as state preschool policies or expenditures as illustrated in figure 5. For example, 8 states and the District of Columbia had adjusted rates notably above the national average while 17 had adjusted rates notably below the national average.[26] (See fig. 5.)

[25]The characteristics we controlled for were race/ethnicity, family income and type, immigrant status, linguistic-isolation status, work status of parent, education status of the most educated parent, and urbanicity of residence.

[26]Because of the large sample size, virtually all differences stated in this report are statistically significant. We defined differences of 15 percent or more as notable or material.

Figure 5: State Preschool Participation Varies for All Children



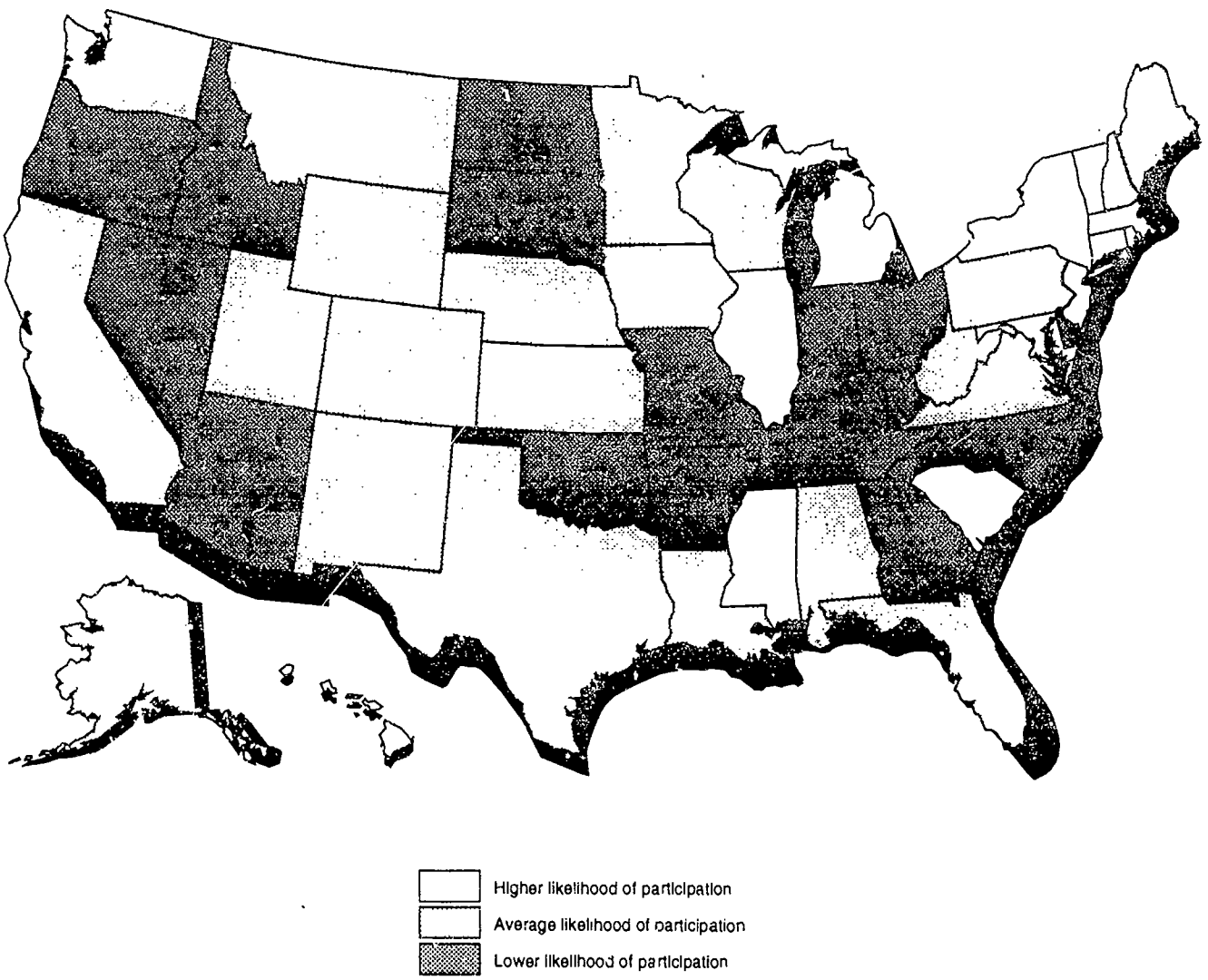
In general, changes in state preschool participation were not material after controlling for other characteristics.[27] However, in a few states the relative difference from the national average changed by more than 15 percentage

[27]That is, changes were not greater than 15 percent.

points. For example, Maryland was about 27 percent higher than the national average before accounting for demographics. This differential declined to 11 percent, after accounting for the seven demographic characteristics. Mississippi's rate, which was similar to the national average, climbed to 23 percent above the national average after controlling for demographic variations.

For poor children, we estimate that the seven characteristics we controlled for account for about 23 percent of the state variability in preschool participation. The remaining variability could be explained by state preschool policies or expenditures for poor children. Figure 6 illustrates the remaining variation; 12 states and the District of Columbia had rates notably above the national average for poor children, while 16 had rates notably below the national average.

Figure 6: State Preschool Participation Varies for Poor Children



In some states, the adjusted preschool participation rate for poor children relative to the national average is substantially different than for the overall preschool population. After standardizing for demographics, Montana, Rhode Island, Vermont, and West Virginia have higher relative

participation rates for poor children than for all children. (See figs. 5 and 6.) In contrast, Delaware, Georgia, and North Carolina had higher adjusted preschool attendance rates for all children than for poor children.

Some states have relatively high preschool participation rates for all children and for poor children. For example, Connecticut, Hawaii, Mississippi, New Jersey, New York, and South Carolina have adjusted preschool participation rates more than 15 percent above the national average for all children and poor children.

Conclusions

Children whose parents have less than a high school diploma, whose families have low incomes, and who live in certain areas are the least likely to participate in preschool. Research has shown considerable benefits of preschool participation, and yet some children remain considerably less likely to participate compared with their peers. Consequently, the National Education Readiness Goal, that all children will be ready for school by the year 2000, likely will be difficult to attain.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to the Secretary of Health and Human Services, the Secretary of Education, and other interested parties. If you have any questions concerning this report, please call me at (202) 512-7014. Major contributors to this report are listed in appendix III.

Sincerely yours,

Linda G. Morra
Director, Education
and Employment Issues

Contents

Figures

Abbreviations

HHS	Department of Health and Human Services
LTHD	less than high school diploma
LI	linguistically isolated
MA	Metropolitan Area
OMB	Office of Management and Budget
WIC	Women, Infants, and Children program

Objectives, Scope, and Methodology

The Chairman of the Senate Subcommittee on Children, Family, Drugs and Alcoholism, Committee on Labor and Human Resources, asked us to answer the following questions to assist the Subcommittee's deliberations on early childhood programs in the context of the National Education Readiness Goal and the ongoing welfare reform debate:

- Do children in each risk group still appear to go to preschool at lower rates than those not at risk, after controlling for selected individual, family, and geographic characteristics?
- After controlling for selected characteristics, what is the relative effect of each individual, family, and geographic characteristic on children's preschool participation?

We used a multivariate statistical technique—logistic regression—to address the requester's questions. We did our analysis based on two logistic regression models, one for all children and another for poor children. We did this analysis between September 1994 and December 1994 in accordance with generally accepted government auditing standards.

Data Sources and Population Analyzed

For this study, we used the 1990 Decennial Census Edited Detail File, which contains data on a 15.5-percent sample of the total U.S. population. Our analysis is based on preschool-aged children in this sample—3- and 4-year-olds—on Census day in April 1990. This sample represents about 7.1 million 3- and 4-year-olds in 1990, of whom about 1.4 million were in families with incomes below the Office of Management and Budget's (OMB) poverty threshold.[28]

Analytic Technique

We used a multivariate statistical technique—logistic regression—to estimate the relative influences of selected demographic variables on the likelihood of preschool participation. We used this technique to produce estimates of the effect of each variable, while holding the others constant. Our analysis is based on two logistic regression models, one for all children and another for children from families with incomes below the poverty threshold.

[28]In our prior report Poor Preschool-Aged Children, we adjusted the ages of preschool-aged children to better approximate ages at the beginning of the 1989-90 school year. The analysis in this report focuses on differences among subgroups rather than on actual rates of school participation. We did not age-adjust the data for our multivariate analysis because it was not feasible; adjusting ages would likely have had a similar effect across subgroups.

Dependent Variable

The dependent variable in our models reflects children's school enrollment, a proxy measure for preschool participation. Because the Census did not contain a question about preschool participation per se, we used the responses to the following Census question as a proxy:

"At any time since February 1, 1990, has this person attended regular school or college? Include only nursery school, kindergarten, elementary school, and schooling which leads to a high school diploma or a college degree."

This variable was coded as 1 if the Census data indicated the child was in school, otherwise the variable was coded as 0.[29] It is likely that 3- and 4-year-olds enrolled in school were in nursery school or preschool.

Independent Variables

The independent variables in our models were selected to reflect characteristics of children, their families, and the geographic location of their residences. These variables include: family income, race/ethnicity, education status of most educated parent, immigrant status, linguistic-isolation status, employment status of parent, family type, urbanicity of residence, and state of residence. See table I.1 for percentage distributions.

Estimation of Relative Effects of Independent Variables

We used the results of our logistic regression models to quantify the net effects of the variables in our model. To calculate these effects, we applied the following procedures to obtain adjusted probabilities for each subgroup of the variables in our models:

1. For all subgroups except the one whose effect we were estimating, we multiplied the model coefficients by the corresponding proportion of children in the subgroup. See table I.1 for these coefficients and proportions.

2. In separate calculations for each subgroup of the variable whose probability was being calculated, we multiplied the subgroup coefficient by 1 and the other subgroups' coefficients by 0 (rather than by the corresponding proportions in table I.1).

3. We summed the products described in 1. and 2. above.

[29]In a previous study, we found that preschool participation rates based on the Census question above were about 5 percentage points lower than estimates obtained from the National Child Care Survey. However, even if preschool participation is underestimated by using this question, our analysis will not be biased if the magnitude of understatement is similar across the subgroups in our analysis.

4. We performed the logit transformation to obtain the adjusted probability.

The logit transformation is

$$probability = \frac{1}{1+e^{-X'\beta}} \quad .$$

X represents a matrix of the independent variables in the model, and β represents a vector of the estimated model coefficients. X'β is the sum of the variables multiplied by their estimated coefficients. (See Jan Kmenta, Elements of Econometrics, 2nd ed. (New York: Macmillan Publishing Company, 1988), pp. 550-53, for a thorough discussion of logit models.)

We used the adjusted probabilities obtained from the procedure outlined above to calculate the net effects for each variable. Specifically, we calculated the relative difference in adjusted probabilities between each subgroup and a reference group for the variable.[30] For example, in model 1, the adjusted probability for black children was about 17 percent higher than that for white children. Relative differences are presented for all variables in table I.2.[31]

Sampling Errors and Criterion for Material Differences

Because of the extremely large number of children that were covered by the 15.5-percent Census sample, most of the effects we estimated in our models were statistically significant at the 95-percent confidence level. In our analysis we focused on material differences, which we defined as differences of at least 15 percent. For example, when the adjusted probability for a particular group of children was 30 percent and it differed from the reference group by 4.5 percentage points or more (that is, 15 percent of 30 percent), then we considered the difference to be material or notable.

[30]State differences were computed relative to the national average rather than relative to a reference group.

[31]Data for figures are contained in appendix II.

Table I.1: Model Coefficients and Proportion of Children in Each Category

Characteristic	Model 1: All children		Model 2: Children under poverty	
	Proportion	Model coefficient	Proportion	Model coefficient
Family income				
Poor	0.197	–0.8478	[a]	[a]
Near-poor 1	0.070	–0.9045	[a]	[a]
Near-poor 2	0.118	–0.9041	[a]	[a]
Middle-income	0.337	–0.6110	[a]	[a]
Upper middle-income	0.155	–0.2884	[a]	[a]
Highest income	0.123	0.0000	[a]	[a]
Race/ethnicity				
Hispanic	0.123	–0.1515	0.209	0.0242
White	0.695	0.0000	0.435	0.0000
Black	0.140	0.2287	0.305	0.3519
Asian	0.030	–0.1115	0.027	0.0627
American Indian	0.009	. 0.3974	0.021	0.6112
Other	0.002	–0.0049	0.003	0.2675
Immigrant status				
Nonimmigrant	0.938	0.0000	0.094	0.0000
Immigrant	0.062	–0.1504	0.906	–0.0896
Linguistically isolated (LI)				
Non-LI	0.949	0.0000	0.894	0.000
LI	0.051	–0.0381	0.106	–0.048
Family type				
Married couple	0.778	0.0000	0.396	0.0000
Single parent	0.222	0.2388	0.604	0.2416
Parent work				
Working	0.904	0.1444	0.606	0.1249
Not working	0.096	0.0000	0.394	0.0000
Parent education				
Less than high school	0.148	0.0000	0.408	0.0000
High school graduate	0.581	0.3763	0.545	0.3220
College graduate	0.272	0.9333	0.047	0.8635
Urbanicity				
Large cities	0.200	0.4103	0.242	0.2171
Small cities and suburbs	0.469	0.3396	0.420	0.2300
Small towns	0.083	0.2080	0.114	0.2291
Rural areas	0.248	0.0000	0.224	0.0000

(continued)

Characteristic	Model 1: All children		Model 2: Children under poverty	
	Proportion	Model coefficient	Proportion	Model coefficient
State				
Alabama	0.015	0.1443	0.019	-0.0629
Alaska	0.003	-0.1988	0.002	0.1950
Arizona	0 016	-0.2112	0.020	-0.2794
Arkansas	0.009	-0.1892	0.013	-0.3611
California	0.126	0.1081	0.007	0.0513
Colorado	0.014	-0.0403	0.013	-0.0404
Connecticut	0.012	0.4121	0.007	0.3699
Delaware	0.003	0.2192	0.002	-0.1916
District of Columbia	0.002	0.5963	0.002	0.5415
Florida	0.046	0.3019	0.046	0.1494
Georgia	0.026	0.1211	0.029	-0.2173
Hawaii	0.004	0.4191	0.003	0.3814
Idaho	0.005	-0.2949	0.004	-0.3226
Illinois	0.046	0.1355	0.043	0.2861
Indiana	0.022	-0.2153	0.018	-0.2297
Iowa	0.011	0.0023	0.009	-0.0208
Kansas	0.011	-0.1401	0.009	-0.1160
Kentucky	0.014	-0.2343	0.019	-0.1786
Louisiana	0.019	0.3076	0.031	0.0499
Maine	0.005	0.0417	0.004	0.0408
Maryland	0.019	0.2188	0.012	0.3000
Massachusetts	0.023	0.2612	0.017	0.4913
Michigan	0.039	0.1872	0.041	0 2532
Minnesota	0.019	-0.2908	0.014	-0.1310
Mississippi	0.011	0.3682	0.019	0.3678
Missouri	0.020	-0.1034	0.021	-0.1964
Montana	0.003	-0.3080	0.004	0.0922
Nebraska	0.007	-0.1735	0.006	-0.0928
Nevada	0.005	-0.2277	0.004	-0.3157
New Hampshire	0.005	-0.0399	0.002	-0.1018
New Jersey	0.029	0.3672	0.017	0.2946
New Mexico	0.007	-0.1164	0.011	-0.1560
New York	0.067	0.3549	0.069	0.3924
North Carolina	0.024	0.0627	0.023	-0.1817
North Dakota	0.003	-0.6440	0.003	-0.3438

(continued)

Characteristic	Model 1: All children		Model 2: Children under poverty	
	Proportion	Model coefficient	Proportion	Model coefficient
Ohio	0.044	-0.1542	0.045	-0.2650
Oklahoma	0.013	-0.1639	0.015	-0.3482
Oregon	0.011	-0.1063	0.011	-0.2470
Pennsylvania	0.044	0.0860	0.039	0.0781
Rhode Island	0.004	0.0183	0.003	0.3176
South Carolina	0.014	0.3977	0.016	0.3190
South Dakota	0.003	-0.5027	0.004	-0.4115
Tennessee	0.018	-0.1658	0.022	-0.2436
Texas	0.077	0.0170	0.098	0.0140
Utah	0.009	-0.1455	0.007	0.0326
Vermont	0.002	0.0659	0.002	0.3664
Virginia	0.024	0.0718	0.017	-0.1258
Washington	0.020	-0.0133	0.017	0.0132
West Virginia	0.006	-0.3217	0.009	-0.0763
Wisconsin	0.021	-0.1323	0.018	0.0217
Wyoming	0.002	-0.1526	0.002	-0.1624

[a]Family income is not applicable because this model is for poor children only.

Note: In some instances, reference group used in model (Beta coefficient is equal to 0) differs from reference group used to compute differences in adjusted probabilities (see table I.2).

Table I.2: Model Results: Percentage Difference in Adjusted Probabilities Between Each Independent Variable Subgroup and Corresponding Reference Group (Ref)

Variables	Model 1: All children	Model 2: Poor children
Family income		
Poor	-16.3	[a]
Near-poor 1	-19.9	[a]
Near-poor 2	-19.9	[a]
Middle-income	Ref: 0.0	[a]
Upper middle-income	25.1	[a]
Highest income	50.0	[a]
Race/ethnicity		
Hispanic	-10.6	2.0
White	Ref: 0.0	Ref: 0.0
Black	17.4	32.0
Asian	-7.9	5.2
American Indian	31.3	59.6

(continued)

Variables	Model 1: All children	Model 2: Poor children
Other	-0.4	3.7
Immigrant status		
Nonimmigrant	Ref: 0.0	Ref: 0.0
Immigrant	-10.5	6.9
Linguistically isolated (LI)		
Non-LI	Ref: 0.0	Ref: 0.0
LI	-2.7	-3.8
Family type		
Married couple	Ref: 0.0	Ref: 0.0
Single parent	18.5	21.3
Parent work		
Working	Ref: 0.0	Ref: 0.0
Not working	-10.1	-9.5
Parent education		
Less than high school diploma	-25.3	-22.8
High school graduate	Ref: 0.0	Ref: 0.0
College graduate	46.4	48.3
Urbanicity of Residence		
Large cities	35.1	19.2
Small cities and suburbs	28.6	20.4
Small towns	17.0	20.3
Rural areas	Ref: 0.0	Ref: 0.0
State[b]		
Alabama	5.4	-7.4
Alaska	-18.3	13.6
Arizona	-19.1	-22.6
Arkansas	-17.7	-27.8
California	2.7	1.5
Colorado	-7.9	-5.7
Connecticut	26.4	29.6
Delaware	11.0	-16.7
District of Columbia	42.0	46.6
Florida	17.5	9.6
Georgia	3.6	-18.4
Hawaii	27.0	30.7
Idaho	-24.2	-25.4
Illinois	4.7	21.7
Indiana	-19.4	-19.3

(continued)

Variables	Model 1: All children	Model 2: Poor children
Iowa	-4.9	-4.2
Kansas	-14.6	-11.3
Kentucky	-20.6	-15.8
Louisiana	18.0	1.4
Maine	-2.1	0.7
Maryland	11.0	23.0
Massachusetts	14.3	41.5
Michigan	8.6	18.7
Minnesota	-24.0	-12.4
Mississippi	23.0	29.4
Missouri	-12.1	-17.0
Montana	-25.0	4.9
Nebraska	-16.7	-9.7
Nevada	-20.1	-24.9
New Hampshire	-7.9	-10.3
New Jersey	22.8	22.5
New Mexico	-13.0	-14.2
New York	21.8	31.7
North Carolina	-0.6	-16.0
North Dakota	-43.1	-26.7
Ohio	-15.5	-21.6
Oklahoma	-16.1	-27.0
Oregon	-12.3	-20.4
Pennsylvania	1.1	3.7
Rhode Island	-3.8	24.6
South Carolina	25.2	24.8
South Dakota	-35.9	-30.8
Tennessee	-16.2	-20.2
Texas	-3.9	-1.5
Utah	-14.9	0.0
Vermont	-0.4	29.2
Virginia	0.0	-12.0
Washington	-6.0	-1.5
West Virginia	-25.8	-8.4
Wisconsin	-14.0	-0.9
Wyoming	-15.4	-14.6

(Table notes on next page)

[a]Family income is not applicable because this model is for poor children only.

[b]State differences were computed relative to the national average rather than relative to a reference group

Note: In some instances, reference group used to compute differences in adjusted probabilities differs from reference group used in model (see table I.1).

Data Points for Report Figures

Tables in appendix II provide data points for figures in the letter.

Table II.1: Data for Figure 1: Poor and Near-Poor Children Less Likely to Participate

Family income	Preschool participation relative to middle-income group (percent difference)
Poor	-16
Near-poor 1	-20
Near-poor 2	-20
Upper middle-income	25
Highest income	50

Table II.2: Data for Figure 2: Parents With Low Education Less Likely to Send Children to Preschool

Education status of most educated parent	Preschool participation relative to those with high school diploma (percent difference)
Less than high school diploma	-25
College degree or more	46

Table II.3: Data for Figure 3: Likelihood of Participating Relative to White Children

Race/ethnicity	Preschool participation relative to white children (percent difference)
Black	17
Hispanic	-11
American Indian	31
Asian	-8
Other	0

Table II.4: Data for Figure 4: Likelihood of Participating Relative to Children in Rural Areas

Urbanicity of residence	Preschool participation relative to rural children (percent difference)
Largest cities	35
Smaller cities and suburbs	29
Small towns	17

Table II.5: Data for Figure 5: State Preschool Participation Varies

State	Preschool participation relative to national average (percent difference)
Alabama	5
Alaska	-18
Arizona	-19
Arkansas	-18
California	3
Colorado	-8
Connecticut	26
Delaware	11
District of Columbia	42
Florida	18
Georgia	4
Hawaii	27
Idaho	-24
Illinois	5
Indiana	-19
Iowa	-5
Kansas	-15
Kentucky	-21
Louisiana	18
Maine	-2
Maryland	11
Massachusetts	14
Michigan	9
Minnesota	-24
Mississippi	23
Missouri	-12
Montana	-25
Nebraska	-17
Nevada	-20
New Hampshire	-8
New Jersey	23
New Mexico	-13
New York	22
North Carolina	-1
North Dakota	-43
Ohio	-15
Oklahoma	-16

(continued)

State	Preschool participation relative to national average (percent difference)
Oregon	-12
Pennsylvania	1
Rhode Island	-4
South Carolina	25
South Dakota	-36
Tennessee	-16
Texas	-4
Utah	-15
Vermont	0
Virginia	0
Washington	-6
West Virginia	-26
Wisconsin	-14
Wyoming	-15

Note: Differences rounded to the nearest whole number. See table I.2 for specific percentages.

Table II.6: Data for Figure 6: State Preschool Participation Varies for Poor Children

State	Preschool participation for poor children relative to national average (percent difference)
Alabama	-7
Alaska	14
Arizona	-23
Arkansas	-28
California	2
Colorado	-6
Connecticut	30
Delaware	-17
District of Columbia	47
Florida	10
Georgia	-18
Hawaii	31
Idaho	-25
Illinois	22
Indiana	-19
Iowa	-4
Kansas	-11
Kentucky	-16

(continued)

State	Preschool participation for poor children relative to national average (percent difference)
Louisiana	1
Maine	1
Maryland	23
Massachusetts	41
Michigan	19
Minnesota	-12
Mississippi	29
Missouri	-17
Montana	5
Nebraska	-10
Nevada	-25
New Hampshire	-10
New Jersey	23
New Mexico	-14
New York	32
North Carolina	-16
North Dakota	-27
Ohio	-22
Oklahoma	-27
Oregon	-20
Pennsylvania	4
Rhode Island	25
South Carolina	25
South Dakota	-31
Tennessee	-20
Texas	-1
Utah	0
Vermont	29
Virginia	-12
Washington	-2
West Virginia	-8
Wisconsin	-1
Wyoming	-15

Note: Differences rounded to the nearest whole number. See table I.2 for specific percentages.

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Acknowledgments

In addition to those named above, the following individuals made important contributions to this report: Steve Machlin comanaged the project. Joan K. Vogel assisted with the computer programming. Beatrice F. Birman advised the project. Wayne Upshaw provided technical advice on the statistical modeling.

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Infants and Toddlers: Dramatic Increases in Numbers in Poverty (GAO/HEHS-94-74, Apr. 7, 1994).

Rural Children: Increasing Poverty Rates Pose Educational Challenges (GAO/HEHS-94-75BR, Jan. 11, 1994).

School Age Demographics: Recent Trends Pose New Educational Challenges (GAO/HRD-93-105BR, Aug. 5, 1993).

Poor Preschool-Aged Children: Numbers Increase but Most Not in Preschool (GAO/HRD-93-111BR, July 21, 1993).

Childhood Immunization: Opportunities to Improve Immunization Rates at Lower Cost (GAO/HRD-93-41, Mar. 24, 1993).

Early Intervention: Federal Investments Like WIC Can Produce Savings (GAO/HRD-92-18, Apr. 7, 1992).

Children's Issues: A Decade of GAO Reports and Recent Activities (GAO/HRD-90-162, Sept. 21, 1990).

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