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ABSTRACT

Once they begin kindergarten, America's children are taught by professionals with at least a four-year college degree. Prior to kindergarten, their teachers are far less prepared. Fewer than half of preschool teachers hold a bachelor's degree, and many have never even attended college. Noting that new research finds that young children's learning and development clearly depend on the educational qualifications of their teachers, this policy brief examines the relationship between student achievement and teacher qualifications, and offers recommendations for improving teacher qualifications. The brief summarizes the kinds of qualifications preschool teachers actually need, and reviews research indicating the relationship between teacher qualifications and program quality. The brief concludes with policy recommendations, including the following: (1) require preschool teachers to have a four-year college degree and specialized training; (2) design professional development programs enabling current early education teachers to acquire a four-year degree; and (3) pay preschool teachers salaries and benefits comparable to those of similarly qualified teachers in K-12 education. (Contains 31 endnotes.) (HTH)

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Better Teachers, Better Preschools: Student Achievement Linked to Teacher Qualifications

by W. Steven Barnett

Once they begin kindergarten, America's children are taught by professionals with at least a four-year college degree. Prior to kindergarten their teachers are far less prepared. Fewer than half of preschool teachers hold a bachelor's degree, and many never even attended college.

New research finds that young children's learning and development clearly depends on the educational qualifications of their teachers. The most effective preschool teachers have at least a four-year college degree and specialized training in early childhood. Despite overwhelming evidence in its favor, Americans have yet to fully recognize the value of well-educated, professional, early education teachers.

What We Know

- Better-educated preschool teachers with specialized training are more effective.
- Preschool programs employing teachers with four-year college degrees have been shown to be highly effective and good economic investments for the taxpayer.
- Low educational qualifications and a lack of specific preparation in preschool limit the educational effectiveness of many preschool teachers.
- In 17 states, educational requirements for prekindergarten teachers are lower than for kindergarten teachers.
- The federal government's Head Start program has lower educational requirements for teachers than most state prekindergarten programs.
- Leading educators and researchers have called for improved educational standards for preschool teachers.
- Better compensation is required to hire and retain more effective teachers.

Policy Recommendations

- Require preschool teachers to have a four-year college degree and specialized training in order to increase the educational effectiveness of publicly-funded programs.
- Design professional development programs enabling current early education teachers to get a four-year degree.
- Pay preschool teachers salaries and benefits comparable to those of similarly qualified teachers in K-12 education.
- Encourage higher education institutions to develop the faculty and programs required for the professional development of early childhood teachers.
- Support the National Association for the Education of Young Children (NAEYC)/National Council for Accreditation of Teacher Education (NCATE) standards for new programs to prepare preschool teachers.

This brief defines preschools as center-based programs that provide educational experiences for children during the years preceding kindergarten. They can be located in a child care center, state prekindergarten, private nursery school, or Head Start center.

Better Teachers, Better Preschools: Student Achievement Linked to Teacher Qualifications by W. Steven Barnett

Summary

High-quality preschool education produces substantial long-term educational, social, and economic benefits. But research finds large benefits occur only when teachers are professionally qualified and adequately compensated. Unfortunately, most of America's preschool programs are not required to hire teachers who meet even the most basic professional requirements, nor could they afford to without increased funding.

This brief looks at current educational requirements for preschool teachers, reviews the evidence on the importance of qualifications, and provides key recommendations for policy makers.

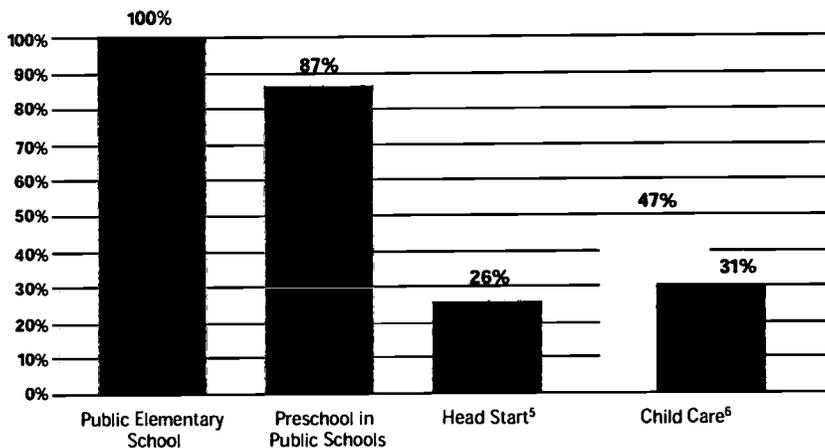
Professional Qualifications

Numerous studies have found that the education levels of preschool

teachers and specialized training in early childhood education predict teaching quality and children's learning and development.¹ However, fewer than half of all early education teachers hold a four-year degree, and many have no college education.² In most states, a high school diploma is all a person needs to teach in a licensed child care center.³ As a result, many preschool programs are educationally ineffective.

If a college degree is considered essential for teaching 5-year-olds in kindergarten, why isn't it required for teaching 3- and 4-year-olds? Apparently, many people are unaware of the evidence, and there is a reluctance to view preschool teachers as professionals and pay them accordingly.⁴ Yet, analyses of what we expect of preschool teachers

Percentage of Teachers with BA Degrees



Estimates of the percentage of teachers with a BA degree in Child Care centers range from 31% to 47%.

and their actual performance suggest that the minimum qualification for a preschool teacher should be a four-year degree with specialized training teaching young children.

Adequate Compensation

Research confirms that preschool teacher quality is strongly linked to compensation. Poor pay and benefits make it difficult to recruit and hire professionally-qualified early education teachers. In addition, poor compensation contributes to high turnover, which harms educational quality and wastes the resources spent on teacher preparation and continuing education.⁷ We stand to lose far more in educational benefits than we save by underpaying preschool teachers.

What qualifications do preschool teachers need now?

The nation has yet to fully appreciate the importance of high standards for preschool teacher knowledge and expertise, as it does for K-12 teachers. This is evident in the minimal requirements for early childhood teachers in Head Start and many state preschool and child care programs. Early childhood teacher qualifications are low relative to other professions and have not been improving over time.⁸

Other industrialized countries have more rigorous qualifications for their preschool teachers than we do in the United States. For example, most 3- and 4-year-olds in France attend public schools in which teachers are required to have the equivalent of a master's degree.⁹

America's preschools vary widely in teacher education requirements, to some extent because standards vary across the different government agencies that sponsor and regulate Head Start, public school, and other preschool and child care programs.

The consequence is that preschool education is less effective than it should be, and educational effectiveness varies depending on the government agency responsible.¹⁰

Rhode Island is *the only state that requires a bachelor's degree* for teachers in all early education programs, including licensed child-care centers. All its teachers must have a four-year degree and early childhood education teacher certification.¹¹

Preschool programs operated by public schools employ the best-educated teachers. Nearly 90% of preschool teachers in public school programs have at least a four-year college degree.¹² Typically they have degrees that require specialized preparation in early childhood education. Most early childhood teachers in public schools have a teaching credential or license that has requirements beyond completing a bachelor's degree, such as taking additional courses in teaching methods, having had supervised teaching experiences, and passing a test of teaching knowledge and skills.

State-funded prekindergarten programs are not always provided through the public schools, however, and vary in whether they require a four-year degree or a teaching credential. For example, Georgia's universal prekindergarten program has yet to fully implement a requirement that teachers have even a two-year college degree.

Until recently, the federal government's Head Start program did not require teachers to have any higher education. Only a quarter of Head Start's teachers have four-year college degrees.¹³ Others have some college and many have a Child Development Associate (CDA) credential, which may not require

Current qualifications for early education teachers

- **Only one state (Rhode Island) requires a bachelor's degree.**
- **Half of Head Start teachers must have a two-year college degree by 2003.**
- **Forty states require no more formal education than a high school diploma for teachers in child care centers.**
- **France requires the equivalent of a master's degree.**





college coursework. Congress has increased the accountability of Head Start for enhancing children's school readiness. However, it was reluctant to substantially increase standards for Head Start teachers, requiring only that half of all teachers have a two-year college degree by 2003. Until Head Start teacher qualifications and compensation are raised, Americans won't see the large educational gains for disadvantaged children that was the impetus for the creation of Head Start, based on studies of high-quality preschool programs.¹⁴

Government regulation and funding for child care provide little support for teacher quality, with the lowest teacher education standards of any early childhood program. As a result, compensation is poor and teacher qualifications are highly variable. Less than half the teachers in child care centers have four-year college degrees, and many teachers have just a high school education. More teachers in child care centers have just a high school education than in Head Start and other programs.¹⁵

Forty states require no formal education beyond a high school diploma for teachers in child care centers. Many of the states require some kind of early childhood-specific preparation, but this can be as little as a few hours of training. Only three states (California, Massachusetts and Vermont) require training to be obtained through college courses.

What does research tell us about the link between teacher qualifications and child development?

A preschool teacher with a college education is more effective. Studies have found teacher education to be related to the quality of preschool education

and the development of children in preschool classrooms. Both general education and specific preparation in early childhood education have been found to predict teaching quality. Better-educated teachers have more positive, sensitive and responsive interactions with children, provide richer language and cognitive experiences, and are less authoritarian, punitive and detached. The result is better social, emotional, linguistic, and cognitive development for the child.¹⁶

*Several studies of state-supported preschool programs have found that quality is higher in programs where more teachers have at least a four-year college degree.*¹⁷ The higher quality of preschool programs in the public schools is plausibly related to better pay and benefits that enables them to hire teachers with at least a BA. Teachers with four-year degrees also have been found to be better teachers in Head Start.¹⁸

Multi-state studies of child care lead to similar conclusions. In a study of 521 preschool classrooms, Phillipsen and colleagues found that the percentage of teachers with a four-year college degree was related to preschool classroom quality as measured by the Early-Childhood-Environment-Rating Scale (ECERS) and to teacher warmth, attentiveness, and engagement.¹⁹

Using data from two massive studies, Howes examined the effects of four levels of teacher education on teaching quality and child development. She found that higher education was associated with better teaching and better language acquisition. Also, children whose teachers had four-year degrees engaged in more creative activities.

Overall, "teachers with the most advanced education and training appear to be the most effective."²⁰

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Another study compared the teaching of teachers who had four different levels of education and training (including one with four semesters of specific college coursework in early education).

Teacher preparation in early childhood education was effective in improving teacher behavior, but teachers with four-year degrees in early education were found to be distinct from all three other groups. "They expressed greater warmth for the children and greater enthusiasm for the activities they engaged in, they communicated more clearly with children, and they encouraged children to share and cooperate with their peers. They were less punitive with the children. . . [and] exhibited less apathetic and uninterested behavior."²¹

Disadvantaged children have less access to high-quality teachers though they may benefit the most from teacher quality.

All studies have limitations, and not every study finds that teacher education and training influence educational quality and child development. However, many studies with a variety of strengths and weaknesses confirm this conclusion including those with the largest samples and most rigorous analyses.²²

One recent report from the NICHD child care study found that teacher's educational attainment predicted teacher behaviors that in turn predicted children's achievement and social development controlling for the direct and indirect effects of mother's education, parenting behavior, and family economic circumstances.

The United States will provide its children with the quality of preschool education they deserve only when it raises the qualifications needed to teach at this level and offers compensation consistent with our expectations for these teachers and the importance of their work.

Another recent NICHD report found that teacher education influences children's achievement at age 4 controlling for a prior achievement, type of child care, and a wide range of child and family characteristics.²³

Confidence in this conclusion also derives from the simple logic that explains this pattern of findings. Better-educated teachers have more knowledge and skills. This makes them more effective teachers for many reasons. For example, they:

- have larger vocabularies to which young children are exposed
- are better at constructing and individualizing lesson plans
- are better problem solvers when they encounter challenges in the classroom such as a child with a learning difficulty or a child upset by a death in the family.

And, teachers who have been taught what young children need to learn and how to teach them will spend more time conducting rich learning activities that address each child's needs and less time in unproductive and inappropriate activities.

Better-educated teachers have more positive, sensitive and responsive interactions with children, provide richer language and cognitive experiences, and are less authoritarian, punitive and detached.



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NAEYC Standards (2001)

Early Childhood Professionals
Must Know How To:

- *Promote child development and learning by creating learning environments based on a deep understanding of children's needs and development.*
- *Build relationships with family and community that support and involve them in children's education.*
- *Systematically employ observation, documentation and assessment to positively influence children's development and learning.*
- *Promote learning and development by integrating knowledge of: relationships with children and families; a wide array of effective educational approaches; content knowledge in each area of young children's learning; and how to build a meaningful curriculum.*

Support for the conclusion that preschool teacher education is important for educational effectiveness is also provided by other closely related research literatures. Research on families has established strong links between parental education, parenting practices, and the preschool child's learning and development.²⁴

Research on programs specifically developed to study the effects of high-quality preschool education on disadvantaged children demonstrates that such programs produce large gains in children's knowledge and abilities.²⁵

Low quality is linked to poor compensation. Poor pay and benefits make it difficult to recruit and hire good early education teachers. And poor compensation contributes to high turnover, which harms educational quality and wastes the resources spent on teacher preparation and continuing education.²⁷

Benefit-cost analyses demonstrate that preschool programs employing well-paid, highly qualified teachers can be sound public investments.²⁶ Two rigorous long-term studies with "gold standard" experimental designs and another with a strong quasi-experimental design found that preschool programs for children from economically disadvantaged families produced economic benefits that far exceed costs. Two programs were operated by the public schools and served children at ages three and four. They employed only certified teachers with at least a BA degree.

The third was the Abecedarian program, which served children from birth to age five in a university-based child development center. Some Abecedarian teachers had MA and BA degrees, others had demonstrated skill and competencies as teachers of young children in lieu of formal qualifications.

In all three studies, preschool teacher compensation was comparable to that of K-12 teachers in the public schools. Yet, all three generated positive economic returns for society.

Lower quality preschool programs with less qualified, more poorly paid teachers have much smaller effects on learning and development and may not pay-off. Thus, the question taxpayers should be asking is whether America can afford *not* to pay for highly qualified preschool teachers.

*As the Abecedarian program illustrates, good teaching depends on the teacher's knowledge and skills and not formal education. Formal education and training are one way to acquire these knowledge and skills, but similar abilities may be acquired through informal education including on-the-job learning experiences. However, there is ample evidence that experience *per se* is not an effective method of teacher preparation.*

Although the Abecedarian program employed some teachers without formal higher education, the program provided constant, intensive training and supervision by curriculum experts and others. Clearly, employing teachers without formal educational qualifications is not a means to cut costs because attracting and retaining good teachers still requires adequate compensation, and it may increase supervision costs.

From a policy perspective, it makes sense to rely on a combination of formal educational requirements and demonstrations of knowledge and skills to assure a minimum of quality in new teachers.

Disadvantaged children have less access to high-quality teachers, even though they may benefit the most from teacher quality. Studies from around the nation show that preschool education quality is lower for children from the most disadvantaged families. While there is evidence that quality makes a difference for all children, a number of studies suggest that quality may have larger impacts on the learning and development of children from disadvantaged families.²⁸

What should good preschool teachers know?

The knowledge and skills required of an effective preschool teacher have increased as science has revealed more about the capacities of young children, how they learn best, and the importance of early learning for later school success.

In addition, the public expects to enable disadvantaged children in highly diverse classrooms to close the achievement gap with their more advantaged peers despite the challenges posed by poverty or limited knowledge of English.

The National Research Council (NRC) report, *Eager to Learn*,²⁹ recommends that the minimum standard for teachers of 3- and 4-year-olds should be a four-year-college-degree, with specialized training in early childhood education. The report says preschool teachers need to know:

- How young children learn and what they need to learn based on an understanding of child development and knowledge in specific subject areas.

- How to individualize teaching based on the temperament, responsiveness, learning style, ability, home language and culture, and other characteristics of each child.
- How to establish effective relationships with young children and their families.
- How to best work with groups of young children.

In 2001, NCATE and NAEYC approved standards to prepare early childhood professionals. They require a four-year college degree and practical experience in which teacher candidates learn and demonstrate the abilities of effective teachers.

The NAEYC standards and a U.S. Department of Education (2000) report, "The Future of Early Childhood Professional Education," emphasize the importance of preparing teachers to educate - in regular early childhood programs - a highly diverse population that includes increasing numbers of children with disabilities and children who speak a language other than English at home.³⁰

The knowledge and skill required of an effective preschool teacher have increased as science has revealed more about the capacities of young children, how they learn best, and the importance of early learning for later school success.

Recommendations for Policy Makers and Educators

Qualifications for New Teachers

Require a four-year college degree and specialized training for teachers in Head Start, state prekindergarten programs, and licensed child-care centers serving as the primary providers of education for 3- and 4-year-olds outside the home.

Professional Development Support for Current Teachers

Design and subsidize professional development programs that will enable current teachers and assistant teachers to obtain four-year degrees within a reasonable time.

Certification and Regulation

Encourage policy makers and schools of education to use NAEYC/NCATE standards in designing new programs to prepare preschool teachers.

Salary and Benefits

Pay preschool teachers salary and benefits comparable to those of similarly qualified teachers in K-12 education, whether they work in public schools, Head Start, or child care centers. The cost will be offset of savings from reduced teacher turnover and the economic returns to taxpayers from educationally effective public programs.

Education and Training Institutions

Support institutions of higher education in developing the faculty and programs required to provide the professional development early childhood teachers need. These programs must meet high standards for preparing teachers with knowledge of child development, best teaching practices, and the knowledge and skills required to teach a highly diverse population.



Minimum Post-Secondary Degree Requirements For Preschool Teachers, By State³¹

State	Kinder-garten	State Financed Pre-K	Child Care ^{**}
ALABAMA	BA*	AA*	None
ALASKA	BA	N/A	None
ARIZONA	BA	CDA	None
ARKANSAS	BA	BA	None
CALIFORNIA	BA	24 credits****	6 credits***
COLORADO	BA	CDA	None
CONNECTICUT	BA*	CDA	None
DELAWARE	BA*	CDA	CDA
DISTRICT OF COLUMBIA	BA*	BA	CDA
FLORIDA	BA	CDA	None
GEORGIA	BA	AA*	None
HAWAII	BA	N/A	CDA
IDAHO	BA	N/A	None
ILLINOIS	BA	BA*	CDA or CCP
INDIANA	BA	N/A	None
IOWA	BA*	CDA	None
KANSAS	BA	BA*	CDA
KENTUCKY	BA*	BA*	None
LOUISIANA	BA*	BA	None
MAINE	BA	BA	None
MARYLAND	BA*	BA*	None
MASSACHUSETTS	BA*	CDA	3 credits****
MICHIGAN	BA	BA	None
MINNESOTA	BA	BA	CDA
MISSISSIPPI	BA	N/A	None
MISSOURI	BA*	CDA	None
MONTANA	BA	BA*	None
NEBRASKA	BA	BA	None
NEVADA	BA*	BA	None
NEW HAMPSHIRE	BA	N/A	None
NEW JERSEY	BA	BA*	CDA*
NEW MEXICO	BA	None	None
NEW YORK	BA	BA	None
NORTH CAROLINA	BA*	AA*	None
NORTH DAKOTA	BA	N/A	None
OHIO	BA*	AA by 2008	None
OKLAHOMA	BA	BA*	None
OREGON	BA	CDA	None
PENNSYLVANIA	BA	BA*	None
RHODE ISLAND	BA*	BA*	BA*
SOUTH CAROLINA	BA	BA*	None
SOUTH DAKOTA	BA	N/A	None
TENNESSEE	BA	BA*	None
TEXAS	BA	BA*	None
UTAH	BA*	BA	None
VERMONT	BA	CDA	12 credits****
VIRGINIA	BA*	CDA	None
WASHINGTON	BA	AA*	None
WEST VIRGINIA	BA	BA	None
WISCONSIN	BA*	BA	None
WYOMING	BA	N/A	None

AA - Associates Degree; BA - Bachelor's Degree; CDA - Child Development Associates Credential; Pre-K - Prekindergarten; CCP - Certified Childcare Professional.

* with courses or certification in early childhood.

** many states require professional training or ongoing development.

*** 2 year vocational child care course or 6 credits in early childhood education.

**** in topics related to early childhood education or child development.

Endnotes

- ¹ Arnett, J. (1989). Caregivers in day care centers: Does training matter? *Journal of Applied Developmental Psychology*, 10, 522-541. Barnett, W. S., Tarr, J., Lamy, C., & Frede, E. (1999). *Children's educational needs and community capacity in the Abbott Districts*. New Brunswick, NJ: Center for Early Education, Rutgers University. Berk, L. (1985). Relationship of caregiver education to child-oriented attitudes, of satisfaction, and behaviors toward children. *Child Care Quarterly*, 14 (2), 103-129. Burchinal, M. R., Roberts, J. E., Riggins, R., Zeisel, S. A., Neebe, E., & Bryant, D. (2000). Relating quality of center child care to early cognitive and language development longitudinally. *Child Development*, 71, 339-357. Cost, Quality and Outcomes Study Team. (1995). *Cost, Quality, and Child Outcomes in Child Care Centers*. Denver, CO: Economics Dept., University of Colorado at Denver. Dunn, L. (1993). Proximal and distal features of day care quality and children's development. *Early Childhood Research Quarterly*, 8(2), 167-192. Finkelstein, N. (1982). Aggression: Is it stimulated by day care? *Young Children*, 37, 3-9. Howes, C. (1997). Children's experiences in center-based child care as a function of teacher background and adult: child ratio. *Merrill-Palmer Quarterly*, 43, 404-425. Howes, C., Smith, E., & Galinsky, E. (1995). *The Florida child care quality improvement study: Interim report*. New York: Families and Work Institute. Marshall, N. L., Creps, C. L., Burstein, N. R., Glantz, F. B., Robeson, W. W., and Barnett, W. S. (2001). *The cost and quality of full day, year-round early care and education in Massachusetts preschool classrooms*. Cambridge, MA: Wellesley Center for Women and Abt Associates. NICHD Early Childcare Research Network (2002). Child-care structure, process, outcome: Direct and indirect effects of child care quality on your children's development. *Psychological Science*, 13 (3), 199-206. Tizard, B., Phillips, J., & Plewis, I. (1976). Play in preschool centers - II: Effects on play of the child's social class and of the educational orientation of the center. *Journal of Child Psychology and Psychiatry*, 17, 265-274. Whitebook, M., Howes, C., & Phillips, D. (1990). *Who Cares? Child Care Teachers and the Quality of Care in America* (First report of the National Child Care Staffing Study). Washington, DC: Center for the Child Care Workforce. Zill, N., Resnick, G., Kim, K., Hubbell McKey, R., Clark, C., Pal-Samant, S., Connell, D., Vaden-Kiernan, M., O'Brien, R., & D'Ello, M. (2001). *Head Start FACES: Longitudinal Findings on Program Performance, Third Progress Report*. Washington, DC: Research, Demonstration and Evaluation Branch & Head Start Bureau, Administration on Children, Youth and Families, U.S. Department of Health and Human Services.
- ² Saluja, G., Early, D. M., & Clifford, R. M. (2002, Spring). Demographic characteristics of early childhood teachers and structural elements of early care and education in the United States. *Early Childhood Research and Practice*. [On line] 4 (1). <http://ecrp.uiuc.edu/v4n1/saluja.html>. Although this is the most comprehensive recent survey, comparison to Head Start records and other data indicate that it substantially overestimates the education levels of preschool teachers. Thus, the percentage of preschool teachers with a BA is likely to be much lower than the 49.9% estimated by Saluja et al. One probable cause of overestimation is that the survey asked program directors to select the teacher who "was best qualified to answer" to respond to questionnaire.
- ³ Edwards, V. (Ed.) Building blocks for success: State efforts in early childhood education, Quality Counts 2002. *Education Week*, 21, (17).
- ⁴ Peter. D. Hart Research Associates/Market Strategies Inc. (2001.) *National Institute for Early Education Research state study #6400*. New Brunswick, NJ: Rutgers University.
- ⁵ The percentage of teachers with a BA degree in Head Start centers is 26% in the Head Start Performance Information Report, 2001. Two surveys of samples of Head Start programs provide higher estimates: 37% in FACES 2000, Resnick, G., & Zill, N. (2002) *Relationships of teacher beliefs and qualifications to classroom quality in Head Start*. (paper presented at the Head Start National Conference, Washington, DC.), and 40% from Saluja, et al. (2002). The survey method used by Saluja et al. plausibly leads to overestimation. It is unclear why the FACES estimate would overestimate the percentage to this extent.
- ⁶ Study findings on the percentage of teachers with a BA degree in child care centers range between 31% in the National Child Care Staffing Study (Whitebook et al., 1990) to 33% in the Cost, Quality and Child Outcomes Study (Helburn, 1995), 46% in Saluja, et al. (2002) and 47% in *A Profile of Child Care Studies*, (Miller et al., 1991).
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- ⁹ Helburn & Bergmann (2002).
- ¹⁰ Saluja et al. (2002). Howes (1997). Kisker et al. (1991). Barnett, W. S. (1998). Long term effects on cognitive development and school success. In W. S. Barnett and S. S. Boocock (Eds.) *Early care and education for children in poverty: Promises, programs, and long-term results*. (pp. 11-44) Albany, NY: SUNY Press. Barnett, et al. (1999). Barnett, W.S., Tarr, J., Lamy, C., & Frede, E. (2001). *Fragile lives, shattered dreams: A report on implementation of preschool education in New Jersey's Abbott districts*. New Brunswick, NJ: National Institute for Early Education Research, Rutgers University.
- ¹¹ Edwards (2002).
- ¹² Kisker et al. (1991), Saluja et al. (2002).
- ¹³ Special tabulation, Head Start Performance Information Report for 2001, September 19, 2002.
- ¹⁴ Barnett (1998). Bowman, B., Donovan, S., & Burns, S. (Eds.) (2001). *Eager to Learn: Educating our Preschoolers*. Washington, DC: National Academy Press. Zill et al. (2001).
- ¹⁵ Burton, A., Whitebook, M., Brandon, R., Maher, E., Young, M., Bellm, D., & Wayne, C. (2002). *Estimating the size and components of the U.S. child care workforce and caregiving population*. Washington, DC: Center for the Child Care Workforce. Kisker et al. (1991). Saluja et al. (2002). Accurate data are difficult to obtain on private programs, and the percentage of teachers in licensed child care centers with BA degrees may be considerably less than half.
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¹⁷ Barnett et al. (1999). Marshall (2001). Marshall, N.L., Creps, C.L., Burstein, N.R., Glantz, F.B., Robeson, W.W., Barnett, W.S., Schimmenti, J., & Keefe, N. (2002) *Early care and education in Massachusetts public school preschool classrooms*. Cambridge, MA: Wellesley Center for Women and Abt Associates. Roach, M., Adams, D., Riley, D., & Edie, D. (2002). *Wisconsin Child Care Research Partnership Issue Brief #8: What characteristics relate to child care quality?* Madison, WI: University of Wisconsin-Extension.

¹⁸ Zill et al. (2001).

¹⁹ Phillipsen, et al. (1997). The relationship with quality was stronger for a four-year degree than for some college. Controlling for teacher wage, teacher education had an independent effect on teacher sensitivity, but not total ECERS score. This is to be expected as teacher wage determines teacher qualifications including educational level.

²⁰ Howes (1997). The samples included 655 classrooms from the Cost, Quality and Outcomes study and 410 classrooms from the Florida Quality Improvement study. The teacher education levels tested were high school only, some early childhood education, an AA degree or CDA (depending on the study), and a BA in early childhood education.

²¹ Arnett (1989).

²² Limitations in research on the effects of preschool teacher qualifications on education quality and children's learning and development include to varying degrees: less than ideal sample size; samples that are not randomly selected or nationally representative; imperfect measures of teacher characteristics, quality, learning and child development; inadequate controls for child and family characteristics; and, incorrectly specified statistical models. Some limitations could lead to overestimates of the importance of teacher qualifications, others to underestimates. Examining the strongest studies and comparing their results to those of randomized trials of high-quality preschool education, this reviewer concludes that underestimation is the most common result. At least one researcher, Blau (2001) appears to disagree. He concludes that teacher education does not contribute to teacher effectiveness. However, this view is based on an analysis that considers only variation within a child care center. His analysis also implies that wages do not affect quality, which seems implausible. An alternative view is that Blau's favored analysis mistakenly focuses on variation where the link between teacher education and teacher quality is broken because centers seek to hire teachers of uniform quality regardless of their qualifications on paper (due to financial constraints, market niche, and other factors).

²³ One study employed structural equation models to test for the effects of teacher education on child care quality and the effects of quality on outcomes. NICHD Early Child Care Research Network (2002). Child-care structure, process, outcome: Direct and indirect effects of child-care quality on young children's development. *Psychological Science*, 13(3), 199-206. Another study estimated the effects of caregiver education and care quality on achievement at 54 months employing statistical models that varied in their assumptions and in the (ultimately quite large) number of child and family variables controlled. NICHD Early Child Care Research Network & Duncan, G. (2003). Modeling the impacts of child care quality on children's preschool development. Rockville, MD: NICHD Early Child Care Research Network, NICHD. Both studies seem likely to underestimate the effects of preschool teacher qualifications due to sample restrictions, error in the measurement of child outcomes and teacher qualifications, sample restrictions, and because of the very low pay in child care that leads higher ability teachers with college degrees to find jobs elsewhere (e.g., in the public schools). Note that the NICHD study includes all kinds of child care, including home-based care that does not appear to produce the same benefits for child achievement as center-based programs between the ages of 36 and 54 months.

²⁴ Collins, W., Maccoby, E., Steinberg, L., Hetherington, E., & Bornstein, M. (2000). Contemporary research on parenting. *American Psychologist*, 55, 218-232. Duncan, G. & Brooks-Gunn, J. (2000). Family poverty, welfare reform, and child development. *Child Development*, 71, 188-196.

²⁵ Barnett (1998).

²⁶ Barnett (1998). Burchinal, M. R., Roberts, J. E., Nabors, L. A., & Bryant, D. M. (1996). Quality of center child care and infant cognitive and language development. *Child Development*, 67, 606-620. Campbell, F. A., & Ramey, C. T. (1995). Cognitive and school outcomes for high-risk African-American students at middle adolescence: Positive effects of early intervention. *American Educational Research Journal*, 32, 743-772. Reynolds, A. (2000). *Success in early intervention: The Chicago Child-Parent Centers*. Lincoln, NE: University of Nebraska Press. Schweinhart, L. J., Barnes, H. V., Weikart, D., Barnett, W.S., & Epstein, A. (1993). *Significant benefits: The High/Scope Perry Preschool study through age 27*. Monographs of the High/Scope Educational Research Foundation No. 10. Ypsilanti, MI: High/Scope Educational Research Foundation. Ramey, C., McGinniss, G., Cross, L., Collier, A., Barrie-Blackley, S. (1982). The Abecedarian approach to social competence: Cognitive and linguistic intervention for disadvantaged preschoolers. In K. Borman (ed.), *The social life of children in a changing society* (pp. 145-174). Hillsdale, NJ: Erlbaum Associates.

²⁷ Whitebook et al. (1990). Whitebook et al. (1993). Howes & Brown (2000).

²⁸ Adams, D., Roach, M., Riley, D., & Edie, D. (2001). Wisconsin Child Care Research Partnership Issue Brief #3: Are program characteristics linked to child care quality? Madison, WI: University of Wisconsin-Extension. Barnett et al. (2001). Caughy, M.O., DiPietro, J.A., & Strobino, D.M. (1994). Day care participation as a protective factor in the cognitive development of low income children. *Child Development*, 65, 457-471. Marshall et al. (2001). Peisner-Feinberg et al. (1999). Zill et al. (2001). Phillips, Voran, et al. (1994).

²⁹ Bowman et al. (2001).

³⁰ Buyse, V., Wesley, P., Bryant, D., & Gardner, D. (1999). Quality of early childhood programs in inclusive and noninclusive settings. *Exceptional Children*, 65(3), 301-314. Kushner, M. & Ortiz, A. (2000). The preparation of early childhood education teachers to serve English language learners. In D. Horm-Wingerd, M. Hyson, & N. Karp (Eds.) *New Teachers for a New Century: The Future of Early Childhood Professional Development* (pp. 123-154). Washington, DC: US Department of Education. Miller, P., Fader, L., & Vincent, L. (2000). Preparing early childhood educators to work with families who have exceptional needs. In D. Horm-Wingerd, M. Hyson, N. Karp (Eds.) *New Teachers for a New Century: The Future of Early Childhood Professional Development* (pp. 93-122). Washington, DC: US Department of Education.

³¹ Ackerman, D. J., *States Efforts in Improving the Qualifications of Early Care and Education Teachers*, National Institute for Early Education Research, Rutgers University Graduate School of Education, 2002. www.nieer.org/docs/index.php?DocID=21; LeMoine, S. (2002). *Center child care licensing requirements: Minimum pre-service qualifications and annual ongoing training hours for teachers and master teachers*. From the National Child Care Information Center website: <http://nccic.org/pubs/ccir-teachers2002.html>.

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