# Child Care Factors and Kindergarten Outcomes: Findings from a National Study of Children

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Society for Research in Child Development
April 19 - 22, 2001
Minneapolis, Minnesota

# Background

Since the 1970s, there has been an increase in the participation rates of women in the workforce. This can be attributed to many factors, including the pursuit of higher education and careers, increases in the prevalence of single-parent families, the necessity of a dual income, and welfare reform (Hofferth, Shauman, Henke, & West, 1998; Vandell, 1998; Vandell & Wolfe, 2000). This trend has led many parents to consider alternative arrangements for the care of their children (Hayes, Palmer, & Zaslow, 1990; Hofferth, 1992; Howes & Hamilton, 1993; Leslie, Branson, & Anderson, 1989) and many researchers to examine the effects of child care on children's developmental outcomes (Belsky, 1984; Love, Schochet, & Meckstroth, 1996).

A plethora of research has demonstrated positive relationships between child care quality and children's outcomes (e.g., Burchinal, Roberts, Nabors & Bryant, 1996; Zaslow, 1991); however, there are likely other factors that relate to children's outcomes. Even though quality is frequently discussed as the more important factor (Howes & Hamilton, 1993), previous studies have suggested that the type of child care (e.g., center-based or family day care) and the age at which children first enter care may effect children's early development (e.g., Andersson, 1989). Consequently, this study will address the effect of the type of child care children received prior to kindergarten and the age at which they first entered care on their reading and mathematics knowledge and skills as they enter kindergarten.

# Research Questions

- What is the distribution of children across different child care arrangements the year prior to kindergarten entry?

- Does being in a regular nonparental care arrangement the year prior to kindergarten relate to children's reading and mathematical knowledge and skills at kindergarten entry, while controlling for family socioeconomic status (SES)?

- Does being in a regular nonparental care arrangement the year prior to kindergarten relate to children's reading and mathematical knowledge and skills at kindergarten entry, within family SES (i.e., lowest 20 percent, middle 60 percent, highest 20 percent)?

# Research Questions (continued)

- What is the average age at which children across the nation first enter child care?

- What is the relationship of the age children first enter care to their reading and mathematical knowledge and skills at kindergarten entry, while controlling for family SES?

# The Study

Information on children's kindergarten reading and mathematics knowledge and skills comes from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K).

In the fall of 1998, the U. S. Department of Education's National Center for Education Statistics (NCES) embarked on a study of the early education of young children. The ECLS-K captures information on these children, their families, teachers and schools. The design is guided by an ecological systems perspective, in which the child's physical, cognitive and socio-emotional development is considered across multiple contexts, including the home, classroom, school and community.

Across the life of the study, children's reading and mathematics knowledge and skills are assessed 6 times: fall and spring kindergarten, fall and spring first grade, spring third grade, and spring fifth grade.

# The Sample

- This research examines the developmental status of 18,097 children entering kindergarten in the U.S. in the fall of 1998.
- These children are part of a nationally representative sample of children enrolled in about 1,000 kindergarten programs during the 1998-99 school year.
- When appropriately weighted, the sample is representative of the 3,866,000 children enrolled in kindergarten in the fall of 1998.

## Table 1. Distribution of U.S. kindergartners by child and family characteristics

| Characteristic | Population Percentage |
|---|---|
| Gender | |
| Male | 51 |
| Female | 49 |
| Race/ethnicity | |
| White, non-Hispanic | 57 |
| Black, non-Hispanic | 16 |
| Hispanic | 19 |
| Asian | 3 |
| Other | 4 |

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, Public-use data file.

# Procedures

The ECLS-K gathered information on children's child care history and arrangements as part of a computer-assisted telephone interview with the children's parents. Measures of family SES were also obtained during the parent interview.

Information on children's cognitive development (i.e., mathematics and reading knowledge and skills) was measured through a one-on-one direct assessment. Trained assessors worked with the children in a quiet area with minimal distractions (e.g., in the school library as opposed to the classroom).*

*Procedures were developed to increase the participation of children with language problems and special needs (e.g., untimed assessment, allowing a child's assistant to be present). However, the ECLS-K cognitive assessment was designed to be administered in English. If the children's English skills were not adequate, they did not receive the ECLS-K's English cognitive assessment. If a child's home had a language other than English, children's English skills were determined through a language proficiency screener - the Oral Language Development Scale (OLDS) from the PreLAS 2000 (Duncan & DeAvila, 1998). Based on the English demands of the ECLS-K assessment and children's score on the OLDS, 7 percent of children were excluded from the English cognitive battery.

# Measures

Children's cognitive development was assessed directly in a one-on-one, untimed assessment. The cognitive battery used a two-stage approach. For each domain, the child was administered a routing test (the first stage), which determined a child's approximate skill level. After completing the routing test, the child was administered the appropriate skill level assessment for that domain (the second stage). The reading and mathematics domains had three skill levels (low, middle, high). Scale scores for each domain were developed using Item Response Theory (IRT), which produced scores that can be compared regardless of which second stage form a child was administered.

The reading assessment included questions designed to measure basic skills (e.g., print familiarity, letter recognition, rhyming sounds), receptive vocabulary and comprehension. The mathematics assessment measured skills in conceptual knowledge, procedural knowledge and problem solving.

Family SES was calculated based on information about parental education level, parental occupation and household income.

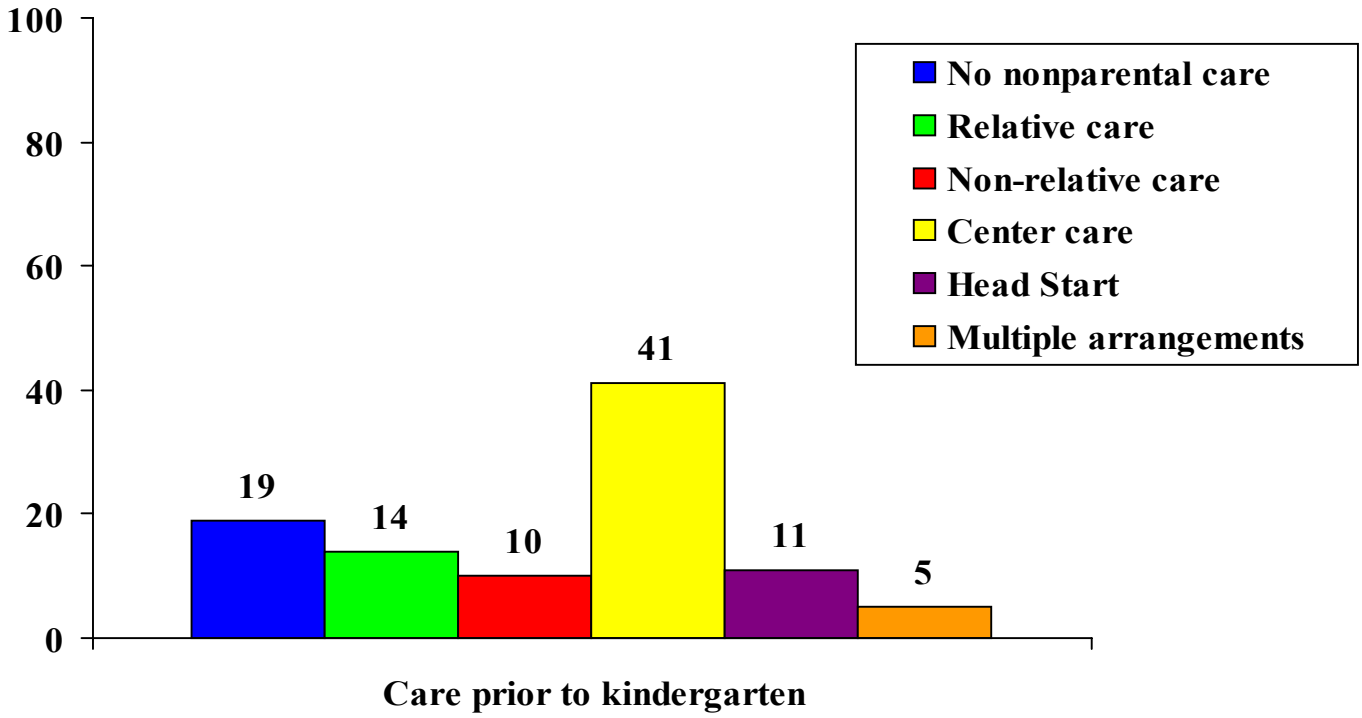
# Results

*What is the distribution of children across different child care arrangements the year prior to kindergarten entry?*

- There were six types of child care identified for children enrolled in the ECLS-K study including no nonparental care, relative care (either in the child's home or someone else's home), non-relative care (either in the child's home or someone else's home), center-based care, Head Start*, and multiple care arrangements.
- Center-based care was the most frequently used primary care arrangement in the year prior to kindergarten (41 percent). This was followed by no nonparental care (19 percent), relative care (14 percent), Head Start (11 percent), non-relative care (10 percent), and multiple care arrangements (5 percent) (see figure 1).
- The type of care in which children are enrolled the year prior to kindergarten differs by characteristics, such as the socioeconomic status of the family. For example, children in low SES families (the lowest 20 percent of the SES distribution) are more likely not to be enrolled in a regular nonparental care arrangement the year prior to kindergarten than children in the other SES categories. And, children in the highest SES families (the highest 20 percent of the SES distribution) are more likely to be enrolled in a center-based care arrangement than children in the other SES categories. See table 2 for more detail on the distribution of children across these various types of primary care arrangements.

* Information about Head Start enrollment was obtained by parental report.

## Figure 1. Percentage distribution of children's primary care arrangements the year prior to kindergarten




SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, Public-use data file.

# Table 2. Percentage distribution of children's primary type of care the year prior to kindergarten

| Characteristic | No nonparental care | Relative Care | Non-relative Care | Center care | Head Start | Multiple arrangements |
|---|---|---|---|---|---|---|
| Total | 19 | 14 | 10 | 41 | 11 | 5 |
| Sex | | | | | | |
| Male | 20 | 14 | 9 | 42 | 10 | 5 |
| Female | 19 | 14 | 11 | 41 | 11 | 5 |
| Race | | | | | | |
| White | 17 | 11 | 13 | 49 | 6 | 5 |
| Black | 14 | 18 | 4 | 34 | 23 | 8 |
| Hispanic | 29 | 17 | 8 | 28 | 14 | 5 |
| Asian | 21 | 18 | 4 | 43 | 10 | 4 |
| Other | 20 | 18 | 7 | 30 | 18 | 6 |
| SES | | | | | | |
| Lowest quintile 1 | 31 | 16 | 5 | 19 | 24 | 5 |
| 2 | 23 | 18 | 8 | 30 | 15 | 6 |
| 3 | 18 | 16 | 11 | 41 | 9 | 6 |
| 4 | 15 | 12 | 11 | 51 | 4 | 6 |
| Highest quintile 5 | 10 | 7 | 14 | 64 | 1 | 4 |

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, Public-use data file.

# Results (continued)

*Does being in a regular nonparental care arrangement the year prior to kindergarten relate to children's reading and mathematical knowledge and skills at kindergarten entry, while controlling for family SES?*

- Once the variation accounted for by SES was considered (see table 3, regression I and II, model 1), the presence of a care arrangement the year before kindergarten accounted for about 2 percent of the variance in children's reading and mathematics knowledge and skills at kindergarten entry (see table 3, regression I and II, model 2).
- To include the categorical variable *type of care* in the regression, we dummy coded each arrangement, with *no nonparental care* as the omitted category. The only type of care that made a significant contribution to the model was center-based care (see table 3, regression I and II). Children in non-Head Start center-based care arrangements are likely to score about 2 points higher on the reading and mathematics assessments than children not in care.

# Table 3. Regression summary for type of child care, control variables, and math and reading knowledge and skills

| | $R^2$ | $R^2$ Change | Sig. of F Change | B |
|---|---|---|---|---|
| I. Reading Knowledge and Skills | | | | |
| Model 1 – controls (SES) | .151 | .151 | .000 | --- |
| Model 2 – controls and type of care | .170 | .019 | .000 | --- |
| Relative | -- | -- | -- | -.40 |
| Nonrelative | -- | -- | -- | .43 |
| Head Start | -- | -- | -- | -1.08 |
| Center | -- | -- | -- | 2.19* |
| Multiple arrangements | -- | -- | -- | .42 |
| | | | | |
| II. Math Knowledge and Skills | | | | |
| Model 1 – controls (SES) | .192 | .192 | .000 | --- |
| Model 2 – controls and type of care | .207 | .016 | .000 | --- |
| Relative | -- | -- | -- | -.19 |
| Nonrelative | -- | -- | -- | .93 |
| Head Start | -- | -- | -- | -.75 |
| Center | -- | -- | -- | 1.87* |
| Multiple arrangements | -- | -- | -- | .46 |

*p<.05.

NOTE: Primary type of care the year prior to kindergarten was dummy coded for these regressions. No nonparental care was the omitted category.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, Public-use data file.

# Results (continued)

*Does being in a regular nonparental care arrangement the year prior to kindergarten relate to children's reading and mathematical knowledge and skills at kindergarten entry, within family SES (i.e., lowest 20 percent, middle 60 percent, highest 20 percent)?*

- To include the categorical variable *type of care* in the regression, we dummy coded each arrangement, with *no nonparental care* as the omitted category.

- **Low SES:** For children in the lowest 20 percent of SES, the presence of care (across all types) had no significant effect on children's reading and mathematics knowledge and skills (i.e., the overall regression model was not significant) (see table 4, regression I and II). However in terms of a specific type of care arrangement versus no care arrangement, children in center-based are likely to score about 2 points higher in reading and mathematics than children not in care.

# Table 4. Regression summary for type of child care and math and reading knowledge and skills: Low SES children (lowest 20 percent)

| | $R^2$ | Sig. of F | B |
|---|---|---|---|
| I. Reading Knowledge and Skills | .022 | .085 | -- |
| Relative | -- | -- | .12 |
| Nonrelative | -- | -- | .47 |
| Head Start | -- | -- | -.15 |
| Center | -- | -- | 1.96* |
| Multiple arrangements | -- | -- | .89 |
| | | | |
| II. Math Knowledge and Skills | .017 | .096 | -- |
| Relative | -- | -- | .32 |
| Nonrelative | -- | -- | .50 |
| Head Start | -- | -- | .31 |
| Center | -- | -- | 1.77* |
| Multiple arrangements | -- | -- | 1.20 |

*p<.05.
NOTE: Primary type of care the year prior to kindergarten was dummy coded for these regressions. No nonparental care was the omitted category.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, Public-use data file.

# Results (continued)

*Does being in a regular nonparental care arrangement the year prior to kindergarten relate to children's reading and mathematical knowledge and skills at kindergarten entry, within family SES (i.e., lowest 20 percent, middle 60 percent, highest 20 percent)?*

- **Middle SES:** For children in the middle 60 percent of SES, type of child care had a significant effect on children's reading and mathematics knowledge and skills (see table 5, regression I and II). In reading and math, children in center-based care are likely to score about 2 points higher than children in no care, and children in Head Start* are likely to score about 2 points lower than children in no care. Children in nonrelative care are likely to score 1.5 points higher in math than children in no care.

* Parents provided information about children's Head Start attendance. The ECLS-K also conducted an independent verification of whether the child actually attended Head Start. The verification study indicated that parent reports of attendance at Head Start were very similar to verified Head Start attendance. The two groups of children (those verified as attending Head Start and those identified by their parents as attending Head Start) are similar in terms of their poverty status, parent education, and race/ethnicity. However, it is important to remember that information about SES was measured while the children were in kindergarten and not while they were enrolled in Head Start. SES tends to be a "fluid" measure and may have changed between enrollment in Head Start and enrollment in kindergarten. Thus, these findings should be interpreted in context.

# Table 5. Regression summary for type of child care and math and reading knowledge and skills: Middle SES children (middle 60 percent)

| | $R^2$ | Sig. of F | B |
|---|---|---|---|
| I. Reading Knowledge and Skills | .039 | .000 | -- |
| Relative | -- | -- | -.60 |
| Nonrelative | -- | -- | .98 |
| Head Start | -- | -- | -2.08* |
| Center | -- | -- | 2.41* |
| Multiple arrangements | -- | -- | .44 |
| | | | |
| II. Math Knowledge and Skills | .039 | .000 | -- |
| Relative | -- | -- | -.45 |
| Nonrelative | -- | -- | 1.46* |
| Head Start | -- | -- | -1.79* |
| Center | -- | -- | 2.06* |
| Multiple arrangements | -- | -- | .50 |

*p<.05.
NOTE: Primary type of care the year prior to kindergarten was dummy coded for these regressions. No nonparental care was the omitted category.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, Public-use data file.

# Results (continued)

*Does being in a regular nonparental care arrangement the year prior to kindergarten relate to children's reading and mathematical knowledge and skills at kindergarten entry, within family SES (i.e., lowest 20 percent, middle 60 percent, highest 20 percent)?*

- **High SES:** For children in the highest 20 percent of SES, the presence of a child care arrangement had a significant effect on children's reading and mathematics knowledge and skills (see table 6, regression I and II). Although the overall regression was significant for both reading and mathematics, no single type of care accounted for a significant amount of variation.

# Table 6. Regression summary for type of child care and math and reading knowledge and skills: High SES children (highest 20 percent)

| | $R^2$ | Sig. of F | B |
|---|---|---|---|
| I. Reading Knowledge and Skills | .021 | .028 | -- |
| Relative | -- | -- | -.17 |
| Nonrelative | -- | -- | -.11 |
| Head Start | -- | -- | -5.12 |
| Center | -- | -- | 2.56 |
| Multiple arrangements | -- | -- | .72 |
| | | | |
| II. Math Knowledge and Skills | .025 | .010 | -- |
| Relative | -- | -- | -.16 |
| Nonrelative | -- | -- | .44 |
| Head Start | -- | -- | -5.73 |
| Center | -- | -- | 2.19 |
| Multiple arrangements | -- | -- | .02 |

*p<.05.
NOTE: Primary type of care the year prior to kindergarten was dummy coded for these regressions. No nonparental care was the omitted category.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, Public-use data file.

# Results (continued)

*What is the average age at which children across the nation first enter child care?*

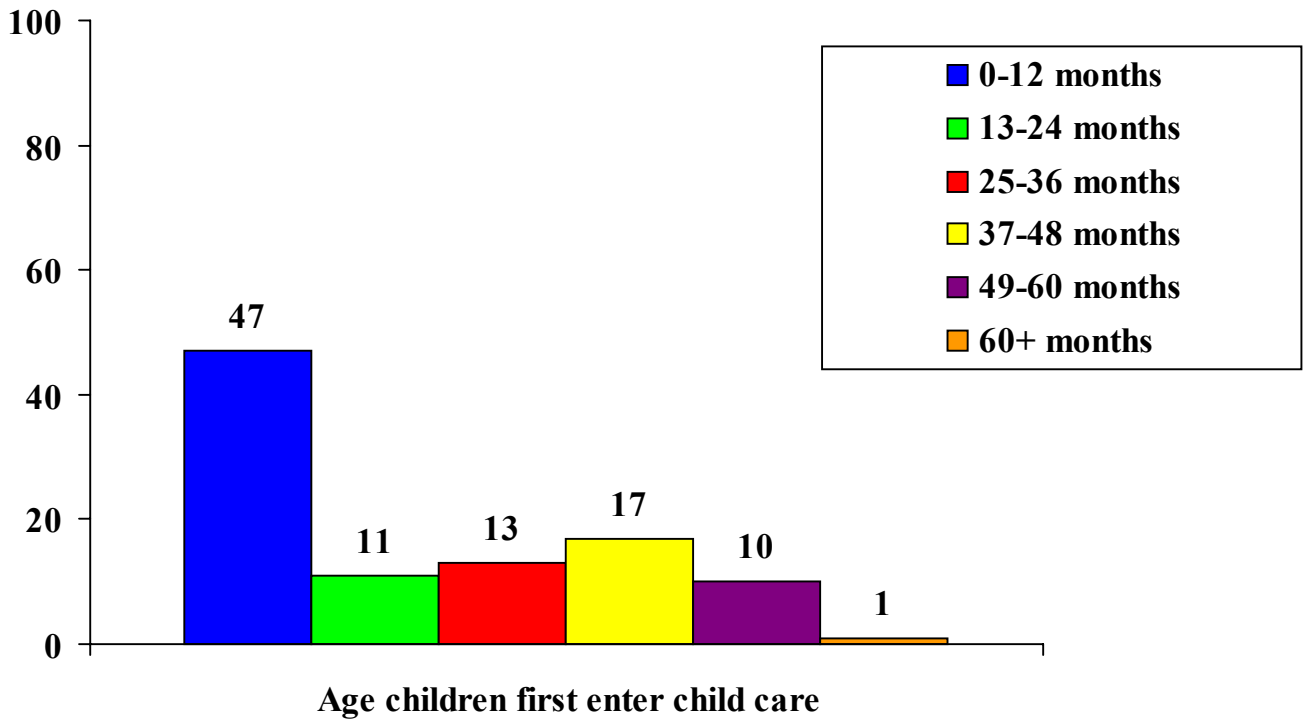
- About 81 percent of children enrolled in some type of regular nonparental care arrangement prior to entering kindergarten.

- Among kindergarten children who enrolled in child care, the average age children first entered care was about 2 years (M = 22 months).

- Almost half of children (47 percent) first entered a regular nonparental care arrangement before the age of one.

- See figure 2 for a detailed distribution of the age at which children across the nation first enter child care.

## Figure 2. Percentage distribution of age at which children across the nation first enter a regular nonparental care arrangement




SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, Public-use data file.

# Results (continued)

*What is the relationship of the age children first enter care to their reading and mathematical knowledge and skills at kindergarten entry, while controlling for family SES?*

- Once the variation accounted for by SES was considered (see table 7, regression I and II, model 1), the age at which children entered non-parental care on a regular basis did not significantly relate to children's reading and mathematics knowledge and skills at kindergarten entry (see table 7, regression I and II, model 2).

# Table 7. Regression summary for age of first entry into child care, control variables, and math and reading knowledge and skills

| | $R^2$ | $R^2$ change | Sig. of F change |
|---|---|---|---|
| I. Reading knowledge and skills | | | |
| Model 1 - controls (SES) | .150 | .150 | .000 |
| Model 2 - controls and age of entry | .150 | 0 | .907 |
| | | | |
| II. Mathematics knowledge and skills | | | |
| Model 1 - controls (SES) | .185 | .185 | .000 |
| Model 2 - controls and age of entry | .185 | 0 | .779 |

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, Public-use data file.

# Summary

- Enrollment in child care prior to kindergarten makes a difference to children's reading and mathematics knowledge and skills at kindergarten entry.
    - After the variation associated with SES is accounted for, the only type of child care that made a consistent positive difference to children's reading and mathematics knowledge and skills was center-based care.
    - Within the different levels of family SES, center-based care makes a difference for low and middle SES children; and, no single type of care appears to make a difference to high SES children.
- The age at which children first enter a regular nonparental care arrangement is not associated with their reading and mathematics knowledge and skills at kindergarten entry.

# Conclusions

- This national study of children suggests that child care does not necessarily have detrimental effects on children's reading and mathematics knowledge and skills at kindergarten entry. In some cases, and for some groups of children, it is beneficial.

- Some contend that child care is detrimental for children's development, especially if they are placed in care at a very young age. However, previous studies have demonstrated that children enrolled in center-based care often do better than children enrolled in other types of care or no nonparental care, and that there are mixed results with regard to the effect of age of entry into child care on children's outcomes.

- Many parents enroll children in non-parental care (81 percent of children have had experience in a regular non-parental care arrangement prior to entering kindergarten). Enrollment is often due to necessity; however, some parents enroll their children for enrichment and socialization purposes.

- This study shows that children in center-based care perform better on reading and mathematics knowledge and skills at kindergarten entry and that age of entry into care does not have a significant effect on children's reading and mathematics knowledge and skills at kindergarten entry. This could be because nearly half of children are entering a regular nonparental care arrangement prior to one year of age, and may have experienced many child care settings prior to entering kindergarten.

# Future Directions

Future research should continue to study more complex models, which:

- provide information about the quality of child care settings
- collect information across a variety of settings (not simply concentrating on center-based care)
- provide information on children's social, as well as cognitive outcomes
- result in a better understanding of what type of care works best for certain groups of children

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