

C h a p t e r 03



Language environments and language outcomes: Results from the NICHD study of early child care and youth development

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Abstract

An overview of the purpose, methods, and findings from the NICHD Study of Early Child Care and Youth Development is presented in this paper. This study is a prospective, longitudinal study of more than 1,000 children, followed from birth through sixth grade. Child care quality, including language stimulation, was observed in child care settings ranging from a child's home, to a child care home, to centre-based care, when children were six, 15, 24, 36 and 54 months of age. Observed language stimulation provided by caregivers and participation in centre-based programs were each significant predictors for language outcomes. This paper concludes with a discussion of these findings with respect to the direction of effects between children and caregivers, the practical importance of these results, and the challenges research poses for practitioners.

Introduction

In the last 40 years, two lines of research on child care have developed in parallel. Policy-directed research addresses questions concerning child care as an intervention for children and as a support for parents. Development-directed research addresses questions about the child care setting as a pervasive context in which development unfolds, second only to the immediate family (Phillips & McCartney, in press). Child care settings – both informal and formal – offer a context for establishing bonds with adult caregivers who are not parents; for interacting with peers in a myriad of activities, both structured and unstructured; and for acquiring cognitive and language skills. Thus, the study of child care offers researchers an opportunity to investigate applied questions concerning policy as well as the chance to explore basic questions concerning the role of early experience in development. A third line

of research has been noticeably missing: namely, research that informs practice. In light of this gap, this conference is indeed timely.

Motivation and purpose of the study

The NICHD Study of Early Child Care and Youth Development is a prospective, longitudinal study of more than one thousand children, followed from birth through sixth grade. It is the most comprehensive study of child care ever conducted in the United States. The study is directed by a research network, and all of the findings presented here reflect the collaborative efforts of the members of this network. The primary purpose of the study is to examine how variations in non-maternal care are related to children's development, where non-maternal care is defined as regularly-occurring care by anyone other than a child's mother, including the child's father, other relatives, and non-relatives. Non-maternal care may be provided in the child's home, in someone else's home, or in a child care centre or preschool.

Bronfenbrenner's ecological framework (Bronfenbrenner, 1979, 1995, 1999) has guided the design of the study. This framework takes into account the complex interactions between non-maternal care experiences, family circumstances, and child characteristics, while placing individuals and families in social, cultural, and economic contexts. The family and home environment, child care settings, school, out-of-school settings, parents' work, and socioeconomic factors are all included in the study as contexts with potential influences on development. Bronfenbrenner's recent addition of time to his ecological model emphasizes the importance of tracking developmental outcomes and trajectories over time and in historical context.

Main questions

Since the study is prospective and longitudinal, it provides an opportunity to test competing hypotheses about the connections between early child care experiences and development. The five major hypotheses that guide the study are:

- *The primacy of early experience hypothesis:* The contexts to which a child is exposed early in development have continuous and long-term influences that outweigh many of the influences of contexts encountered later in life.
- *The contemporaneous effects hypothesis:* At any point in time in development, current contexts have a stronger influence on developmental status than do early experiences.
- *The incremental hypothesis:* Early experience produces effects on development that are maintained, enhanced, or deflected by exposure to later contexts.
- *The magnification of small differences hypothesis:* The initial effects of early environments may be small, but they are magnified as children get older.

- *The sensitive period hypothesis*: Contexts have especially important effects at particular ages or junctures in development.

Clearly, this study was designed to address development-directed research. Nevertheless, the data set, because it is comprehensive, offers an opportunity to address policy-relevant questions as well as practice-relevant questions, including those related to children's language development.

Method

An overview of the study appears in a recent paper published in *Applied Developmental Psychology* (NICHD Early Child Care Research Network, 2001). A brief overview of the methods follows. First, note that the NICHD Study of Early Child Care and Youth Development is distinguished by its breadth, detail, and complexity of design. The unique features of the study are:

- sites located across major regions of the country in urban, suburban, and rural areas, representing different populations and widely varying state child care regulations
- inclusion of ethnic/minority, single-parent, and low-education families at every site
- a large sample
- children followed from birth through a wide range of child care experiences
- assessment of combinations and changes in child care arrangements over time
- extensive direct observation of home, child care, and school experiences
- multiple measures of social-emotional development, cognitive and language development, achievement, and physical growth and health
- use of multiple quality-of-care indexes: individual children's observed experiences, observed global quality of the care setting, and structural features such as caregiver training

Participants in the study were recruited from 24 hospitals in the vicinity of 10 data collection sites. The site selection was based on competitive grants. A stratified, random sampling strategy was employed to recruit 1,364 one-month-old children and their parents as participants reflecting racial and economic diversity..

Educational settings

During their first year of life, the children in the study experienced high rates of non-maternal care, with early entry into care and relatively long hours of care. The educational settings were both informal and formal – homes and child care centres or nursery schools. The distribution of settings varied over time, such that children were more likely to be in informal settings when they were younger. Many measures of child care quality have been designed to assess formal settings (e.g., *Early Childhood Environment Rating Scale*; Harms & Clifford, 1980). Therefore, the network decided to design a measure of quality that could be used in any child care setting. The *Observational Record of the Caregiving Environment (ORCE*; NICHD ECCRN, 1996) was designed to assess the quality of caregiver-child interaction experienced by a focal child. Four 44-minute observations were made across two half-day periods at six, 15, 24, 36, and 54 months of age. Behaviours, such as *asks questions of child*, were time sampled, and then qualitative scales, such as *stimulation of cognitive development*, were used to create a positive caregiving composite. Since language stimulation is central to cognitive and language development, a subset of observed caregiving behaviors was identified as constituting language stimulation: *asks questions of child*, *responds to child's vocalizations*, and *other (non-negative) talk to child*. The internal consistency of these composites was high ($\alpha = .88, .92, \text{ and } .90$ at 15, 24, and 36 months).

Key findings on language

The first set of language findings can be found in a paper appearing in *Child Development* (NICHD ECCRN, 2000). We measured children's cognitive and language ability with the *Bayley Mental Development Index* (Bayley, 1993) at 15 and 24 months; the *MacArthur Communication Development Inventory (CDI)* (Fenson, Dale, Reznick, Bates, Thal, & Pethick, 1994) at 15 and 24 months; the *Bracken Basic Concepts Scale* (Bracken, 1984) and the *Reynell Development Language Scales* at 36 months (Reynell, 1991).

Since children are not randomly assigned to child care, it is critical to control for family selection variables that co-vary with child care quality. Based on the extant literature, we selected four family controls: maternal *PPVT-R IQ* (Dunn & Dunn, 1981); family income-to-needs ratio; home environment, as measured by the *HOME Inventory* (Caldwell & Bradley, 1984); and maternal stimulation, as measured by ratings of mother-child interaction. We regressed each of the cognitive and language measures separately on the set of family controls, gender, and five measures of child care experience: average hours/week in care; number of epochs (i.e., three-month intervals) in centre-based care; number of epochs in child care homes; overall positive caregiving; and language stimulation. For seven of the nine outcomes, language stimulation was a significant predictor. In contrast, overall positive caregiving was a significant predictor of only one outcome, specifically, Reynell Verbal Comprehension at 36 months. Participation in centre-based programs also was a sig-

nificant predictor of language scores, specifically seven of nine language outcomes. Note that the amount of care, measured by the cumulative number of hours in child care, did not contribute to the prediction of children's cognitive or language development in any analysis.

To determine the magnitude of differences associated with child care, we computed adjusted means on language measures for four groups of children – differing in levels of the child care quality that they experienced – as well as for an exclusive maternal care group. *CDI* scores increased dramatically as quality increased. It should be noted that exclusive maternal care did not offer any particular benefit to *CDI* language measures.

We replicated these same results at 54 months using the *Preschool Language Scale (PLS-3; Zimmerman, Steiner, & Pond, 1979)*, which assesses a range of language behaviours, including vocabulary, morphology, syntax, and integrative thinking. Again, child care quality as well as the number of epochs in centre care positively predicted language skills, while the quantity of care and the number of epochs in home child care were not significant predictors. The consistency of these findings with earlier findings suggests robust associations, at least across the preschool period.

Implications

These findings are indeed consistent with earlier research demonstrating the importance of child care quality, particularly language stimulation (McCartney, 1984; Melhuish, Mooney, Hennesey, & Martin, 1992). Of course, these results leave open the question of the direction of effect. Are children's cognitive and language development influenced by language stimulation provided by caregivers, or do children who are more linguistically advanced elicit more language stimulation from their child care providers? The naturalistic design of the study does not permit one-way causal inferences. Since the hierarchical regression analyses controlled for several known sources of individual differences in children's verbal abilities (e.g., child gender, maternal vocabulary, etc.), the observed association between language stimulation in child care and children's cognitive and language outcomes seems likely to have been due at least partially to the language environment and cognitive stimulation provided by caregivers. Of course, some of the variance in observed associations may also be due to children's elicitation of language stimulation from caregivers. Nevertheless, these findings are consistent with prior research showing that cognitive and language stimulation are associated with cognitive and language gains (e.g., Hoff-Ginsberg, 1991).

The results presented here also provide some insight into the relative merits of centre care versus child care homes, under conditions of equivalent quality of care. Consistent with other research (Broberg, Wessels, Lamb, & Hwang, 1997;

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Burchinal, Ramey, Reid, & Jaccard, 1995; Caughy, DiPietro, & Strobino, 1994; Clarke-Stewart, Gruber, & Fitzgerald, 1994; Helburn, 1995), children in centres performed at higher levels on a variety of language tests than children in child care homes. Centre care appears to provide some advantages over child care homes for cognitive and language development, perhaps because children in centres are typically exposed to a more diverse array of language models, a richer language environment, and greater opportunities to encounter developmentally stimulating materials and events than are children in less formal settings. This seems especially probable in view of the fact that centre-based caregivers are more likely to be trained in early childhood education than are home-based caregivers. Children in centres are also more apt than those in child care homes to be exposed to same-age peers, and the group setting may make more demands on children to use language to meet their needs. At the same time, on average, the caregiving quality and frequency of language stimulation in centres were somewhat lower than those found in child care homes, in part because the typical number of children per adult is considerably larger in centres (NICHD ECCRN, 1996). The most advantageous environment for cognitive and language development thus appears to be in a child care centre with high levels of sensitive care and language stimulation.

Often, child care effect sizes are dismissed as small because they account for little variance. Following McCartney and Rosenthal's (2000) recommendation, we compared child care quality effect sizes to family effect sizes believed to be important for development. The quality effect size was about half that for mother's education and for parenting. Although these kinds of comparisons are difficult to make because the measures changed across setting, they nevertheless suggest that effects are not trivial. The practical importance of these effects is further underscored by the fact that the majority of young children in the US are in child care for a substantial number of hours (West, Denton, & Germino-Hausken, 1999) and that much of this care is not of a high quality (NICHD ECCRN, 2000). Even modest effects may aggregate when large numbers of children are affected.

One of the surprising findings from this study was that we were able to differentiate among some indicators of child care quality. In early papers, I argued that it was difficult to disentangle indicators of quality because good things tend to go together, as do bad things, of course (McCartney, Scarr, Phillips, Grajek, & Schwarz, 1982; McCartney, 1984). Using the NICHD child care data set, we were able to disentangle the effects of language stimulation from positive caregiving. Although the two variables are certainly related (r s ranged from .58 to .71 p s < .001), they were nevertheless each significant predictors of language performance. It is important to be able to differentiate among quality indicators, especially for practitioners who wish to apply the knowledge gained from this and other studies.

Challenges

From the viewpoint of practice, these findings provide only very global recommendations about the role of language stimulation for children's language development. Although it is hardly surprising to learn that children profit from a rich language environment, whether at home or in child care, these data should nevertheless provide a source of encouragement for practitioners working with young children. Specifically, asking children questions, responding to children's vocalizations, and engaging children in conversations promotes young children's language development.

Following the recommendations of the US National Research Council on scientific research in education (2002), I recognize the importance of replication of these findings using a variety of scientific methods, from randomized experiments to ethnographic case studies. Like my colleague, Howard Gardner (2002), I also respect the value of practices that have evolved over time. For example, the importance of reflective practice has been convincingly demonstrated by teachers in Reggio Emilia (Edwards, Gandini, & Forman, 1998). Finally, I appreciate the synthetic work on early childhood programs, exemplified most recently by the US National Research Council (2000) in their volume, *Eager to Learn*. They have identified features of quality programs in the US. Two of them are relevant here. First, "responsive interpersonal relationships with teachers nurture young children's dispositions to learn and their emerging abilities" (p. 7). No doubt, this is as true for social competence and school achievement as for language skills. Second, "While no single curriculum or pedagogical approach can be identified as best, children who attend well-planned, high-quality early childhood programs in which curriculum aims are specified and integrated across domains tend to learn more and are better prepared to master the complex demands of formal schooling" (pp. 7-8). I find this thought liberating, because it implies that there are many means to any aim, including the promotion of children's language abilities.

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