

THE IEA PREPRIMARY STUDY:

FINDINGS AND

POLICY IMPLICATIONS

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Executive Summary

The IEA Preprimary study examined the relationships between preschool experiences of children at age 4 and cognitive outcomes and language development of children at age 7. It also looked at if such relationships occur across countries studied. Seventeen nations participated in one or more of the three phases of the study.

The International Association for the Evaluation of Educational Achievement (IEA) sponsored the study. The High/Scope Educational Research Foundation directed it through three phases:

- **Phase 1:** Researchers analyzed official documents to determine the nations' official policies for providing care and educational services to young children. They also conducted a household survey to determine what types of early childhood services parents in the various countries most often used.
- **Phase 2:** Researchers interviewed families and preprimary teachers to determine the level of agreement between the two groups about what young children should learn. They observed the actual child care and education settings and the activities the children engaged in those settings. They administered instruments to determine cognitive and language development at age 4.
- **Phase 3:** Researchers administered instruments to determine cognitive and language development at age 7 and analyzed the data to determine what aspects of settings and activities at age 4 had had an influence on developmental level at age 7.

Some findings varied across nations and these conditional findings are described later. Controlling for family and cultural influences, researchers found that the following four findings applied to all nations:

1. Children who had better educated teachers at age 4 had higher language scores at age 7.
2. Children who had more varied materials to interact with at age 4 had higher cognitive scores at age 7.
3. Children who spent less time in whole-group activities at age 4 had higher cognitive scores at age 7.
4. Children who had more opportunities to choose their own activities at age 4 had higher language scores at age 7.

These four findings suggest that government policies should encourage and support early childhood teachers to have the highest practical level of education and early childhood programs to have many varied materials. In addition, these findings suggest that government policies should support programs in which children choose their own activities and discourage programs from grouping all the children together most of the time.

Introduction

Many research journal articles have a subsection labeled “Limitations” where the authors describe factors that limit generalizations from their study, such as “The study contained only middle class students,” “The study did not assign students randomly to treatments,” or “The study took place at one point in time.” These sections never say “This study was conducted only in the United States of America. It cannot be generalized to humanity in general.” Yet that is true for many studies and especially true for studies of young children.

This is an important limitation. Child-rearing techniques vary greatly among cultures, and learning opportunities vary greatly as well. And even the same child-rearing technique might produce different results in different countries because it interacts differently with some other aspect of the culture.

The Preprimary Project of the International Association for the Evaluation of Educational Achievement (IEA) sought to determine if there are indeed dimensions of early child care and educational settings and activities that produce similar later outcomes across nations. Does group size matter? Does teacher education level matter? Do the materials children play with matter?

This is a project unparalleled in scope and intensity. While some studies have administered standardized tests involving a larger number of nations, the efforts to determine what kind of preprimary child care and education was available, what kind of early childhood services parents made use of, what parents and teachers thought important for young children to learn, the actual observation of settings and children’s activities in those settings, the administration of cognitive and language instruments to young children on four continents, the tracking of those children over a 3-year period, and the subsequent administration of instruments 3 years later are unprecedented.

This paper summarizes Phases 1 and 2 and reports the Phase 3 findings on the relationships between settings and activities of children at age 4 and subsequent cognitive and language development of children at age 7. The complete results from Phases 1 and 2 of this project have been reported elsewhere (see the “Resources” section of this paper).



Greece

The IEA Preprimary Project

Over the last century, psychologists and educators have debated the impact of early experience on later development, with some theorists giving it great weight and some virtually no influence at all. The IEA suspected that early experience did, in fact, affect later development. If true, it would be important for government policy makers and educational planners to develop high-quality early childhood programs. The IEA established a steering committee for this project with the High/Scope Educational Research Foundation serving as the International Coordinating Center and High/Scope president David P. Weikart acting

as project coordinator. Nations that accepted invitations to participate designated one person as the National Research Coordinator (NRC).

There had not been a study quite like this one before. Seventeen nations¹ on four continents took part in one or more of the three phases:

Phase 1

- Analyzed official documents about the nation's early childhood care and education policies.
- Conducted a survey of households to identify the types of child care most frequently used by families with 4-year-olds.

Phase 2

- Observed the early childhood settings that children found themselves in and the activities that occurred in those settings.
- Interviewed families and teachers to see how much the two groups agreed on what is important for young children to learn.
- Administered instruments to determine cognitive and language development at age 4.

Phase 3

- Administered outcome measures to determine cognitive and language development at age 7.
- Examined what characteristics of the child care and educational experiences at age 4 were related to children's cognitive and language outcomes at age 7.

Phase 1

► **Analyzing national policies.** At the start of Phase 1, the NRCs expressed great skepticism that their nations' official government records would provide an accurate account of what early childhood services parents actually received. As the study progressed, though, it became clear that in most cases the records did reflect actual usage.

Laws and policies varied greatly among countries. A Finnish law, for example, requires municipalities to provide publicly organized and supervised care. If demand exceeds capacity, students are admitted on the basis of "social or educational grounds." Children who are eligible for admission on the basis of social grounds are those whose parents work outside the home, who are students, or who are ill or otherwise unable to care for their children. "Educational grounds" refers to children that many countries would categorize as "special education needs" children.

The United States, by contrast, has no comprehensive national law or policy. Children attend a wide range of home- and center-based programs. The federal Head Start program and Child Care and Development Fund subsidize services to low-income children, and special education law subsidizes services for young children with special needs.

¹ Finland, Hong Kong, Italy, Nigeria, Spain, Thailand, and the United States participated in all three phases. Greece, Indonesia, Ireland, Poland, Romania, and Slovenia took part in Phases 2 and 3. Belgium and China took part in Phases 1 and 2. Participation of the German Federal Republic and Portugal was limited to Phase 1.

Unlike either Finland or the United States, Nigeria, at the time of the survey, had policies on child care but provided no governmental support. Given this situation, it was not surprising that one study found 86% of the children in child care were offspring of professionals such as lawyers, architects, and professors, while the remaining 14% came from the homes of business executives and entrepreneurs.

► **Identifying types of child care used by families.** Surveys seldom found more than half of parents taking care of children at home exclusively. This occurred only in a few rural areas of China, Nigeria, and Thailand. Parents expressed a surprising level of satisfaction with the services provided, and their comments were quite specific, not just general statements of satisfaction. Many parents who did keep their children at home did so because they lacked any alternative. Children spent on average anywhere from 17 hours a week in an out-of-home setting (Hong Kong) to 55 hours a week (China). Further survey results revealed that children would have spent even more time away from home but their mothers had



Indonesia

difficulties finding programs whose duration matched the work day. The lack of programs that matched the work day meant many children attended a second center and a few attended a third and even a fourth setting during the course of a week.

Still, most 4-year-olds spent most of their waking day with their mother, either alone or with their father present. The time ranged from an average 8.4 hours a day in Belgium to 11 hours a day in Germany and Thailand. By contrast, children spent as little as 6 minutes a day with their father present in Hong Kong and no more than 54 minutes a day in China.

The two volumes produced by Phase 1 of the study are listed in the “Resources” section at the end of this paper.

Phase 2

► **Observing early childhood settings.** Some of the studies discussed earlier defined ahead of time what they meant by “quality” child care. The IEA study did not. It established observational systems to describe teacher and child behavior making no assumptions about what behaviors constituted good practice and what behaviors did not. After extended discussions among the research teams of the participating countries, the project extracted five groups of variables to examine:

- **Family characteristics:** household composition, parental education and occupation, and parental beliefs about the relative importance of various areas of development for 4-year-olds

- **Setting characteristics:** teacher education and experience, equipment and materials, group size, and staff-child ratio
- **Teacher characteristics:** beliefs about the importance of various areas of development and the expectations that flow from the beliefs, management of children's time, types of groupings used, and behaviors and interactions with children
- **Children's activities:** what do children do in the child care setting, and how they interact with other children and adults
- **Children's developmental status:** cognitive, language, and social development²

Researchers also faced a choice between methods for observing process in the early childhood settings: They could use rating scales (such as the Early Childhood Environment Rating Scale-Revised [ECERS-R]) or make systematic observations of what was taking place, a method known as time sampling. Rating scales tend to evaluate settings and since the project declined to make assumptions about what constituted high quality, time sampling seemed more appropriate. The researchers also felt that a sample of observations over time would be more sensitive to changes in behavior.

Obtaining appropriate samples of children, developing or choosing instruments that would produce valid data across a diverse array of nations, and actually collecting the data all posed daunting challenges to the project. Each country provided descriptions of the types of child care arrangements that many families used. Project directors then worked with sampling specialists and achieved a sample of more than 5,000 children in 1,800 settings in the 15 nations. The project managed to keep track of, on average, 86% of the 4-year-olds in Phase 2 in order to assess them in Phase 3.

► **Discovering what parents and teachers think about children's learning.** Phase 2 also asked "What do teachers and parents think children should learn in their early years?" If parents are increasingly surrendering their children to external caregivers, then it is important to know if what the parents think is important for the children to learn is also what the teachers think is important.

Parents and teachers were asked to rank, in order of importance, eight categories of young children's development: language, motor/physical, preacademic, self-assessment, self-expression, self-sufficiency, social skills with adults, and social skills with peers. A list of between 7 and 11 subskills defined each skill. Parents and teachers generally agreed, both groups ranking social skills with peers, language skills, and self-sufficiency skills as the most important.

The two groups showed less agreement on what skills were least important, but the results were not uniform across countries. For example, generally teachers tended to play down preacademic skills while parents gave them more importance. In Finland, though, both parents and teachers listed them as least important while in Nigeria both parents and

² Not all participating countries chose to administer the social development measure; therefore, it is not included in the analysis of this report.

teachers listed them as most important. Teachers more accurately predicted parental priorities than vice versa. Parents tended to assume the teachers had priorities similar to their own.

► **Developing and administering outcome measures.** The project researchers started with existing instruments, choosing from them items that appeared to be valid across the participating nations. They sought instruments that

- Contained items developmentally appropriate for 4-year-olds.
- Contained clear and culturally appropriate illustrations.
- Contained items suitable for one-on-one administration.
- Contained items that could be administered with a moderate amount of training.
- Required few materials and used materials available to all participating countries.
- Included items to make responding enjoyable for the children.

A study team from various nations reviewed the items, deleting some items and modifying others. Revisions in an instrument could well affect reliability and validity, thus the project field-tested the revised instruments. Representatives of the 15 nations examined the results of the field test at a 1990 meeting. They inspected the results to determine if the order of difficulty of items was similar for all countries, if the items were neither too easy nor too hard, if the pass rates on individual items did not vary greatly from country to country, and if the scoring systems accurately reflected children's competencies. Another pilot study then field-tested the second revision of the instruments.

Because it is difficult to compile a set of instruments that are completely compatible and culturally suitable for such a wide range of cultures, specific adaptations were permitted to some items that were thought not to affect the accuracy or validity of the item.

For example, several developmental-measure items included pictures of girls and boys playing together. After one NRC pointed out that in her country, preschool-aged boys and girls play separately, appropriate adaptations were made to the pictures. In another item,



Italy

children were asked to identify a picture showing the position of a chicken relative to a chicken coop, which many national research teams did not recognize. Although chickens and chicken coops existed in all countries, the appearance of chicken coops was very different from country to country and each research team drew a chicken coop appropriate for its country. For some items, it was not possible to develop functionally equivalent translations (e.g., translations were much longer and more complicated). Since this meant that the various forms of these items would not be equivalent, the items were deleted from the measure.

Although the project sought instruments that required at most modest amounts of training, some training was necessary. Those who would supervise training and data collection in each country were first trained at the International Coordinating Center (ICC). Back on site in their various nations, the trainers then explained the instruments to data collectors and demonstrated the procedures. Data collectors were first asked to follow along, then to administer the instrument to another data collector. Finally, they administered the instrument to a child who was not part of the project sample. Collectors in each country coded the data and sent them to the ICC for analysis.

Phase 2 also gathered information about the structural characteristics of child care in terms of licensing requirements, staff training, days and weeks and hours of operation, and kind and variety and number of materials (books, toys, costumes, dolls, blocks, music-making materials, etc.).

Phase 3

Phase 3 consisted of administering instruments to 7-year-olds and determining which aspects of child care and education settings, if any, that they had experienced as 4-year-olds were linked to their performance as 7-year-olds. Because of limits on the number of variables possible, only the structural variables of teacher education, group size and number, and variety of materials were analyzed for their relationship to outcome variables. (Details of the methodology and statistical analysis of Phase 3 can be found in sources listed in the “Resources” section of this paper).

The results are divided into language outcomes and cognitive outcomes, but clearly these are not fully independent domains. The results are divided as well between outcomes found in all nations and outcomes that varied according to country characteristics.

Findings That Apply Across Nations

► **Children who had better educated teachers at age 4 had higher language performance at age 7.** This result makes intuitive sense. Teachers and parents who have higher levels of education use more words and more complex language when communicating with children. More highly trained teachers are also more effective teachers.

► **Children who interacted with a larger number and variety of materials in their age-4 settings had higher cognitive scores at age 7.** This result also makes intuitive sense. Hands-on manipulation of materials fosters cognitive development. A wider variety and larger number of materials means children have more opportunity to discover aspects of the world around them.

► **The less time children spent in whole-group activities at age 4, the better they scored on the cognitive tasks at age 7.**

► **The more that children chose their own activities at age 4, the higher their language scores at age 7.** Consider these last two findings together. Whole-group activities are useful in teaching children some aspects of the national culture, but whole-group activities also deprive children of choice. By definition, whole-group activities are not tailored to any particular child's interest or learning level. Activities that children find too easy or too difficult or not interesting will result in little meaningful learning. In addition,



Ireland

whole-group activities place children in an essentially passive role.

Learning occurs when children engage in activities that pique their interest and stretch their imaginations, and this is more likely to happen when children choose what to do.

Children who spend less time in whole-group activities will be spending more time in activities that they choose, often interacting with other children. They assign roles for dramatic play, establish rules for games, make plans for block

building, and so forth. Teachers interacting with children in activities that the children have chosen are not constrained by the formalities of whole-group activities. They can converse with the children about their play and introduce new vocabulary relevant to the activity.

It should be kept in mind that when the study speaks of children choosing their own activities, the reference is not to a setting where free play is the sole activity. Instead, it refers to settings where free-choice activities occur more often than any other single type of activity. The study defined “whole group” as time when all of the children in the classroom participate in the same activity. They might be learning about weather, visiting a fire station, or listening to a story or a recording. Whole-group activities, on average, accounted for 81% of all classroom time.

Findings That Vary Across Nations

These results pose a challenge to explain clearly because they are conditional — different results were found in different countries, depending on countries' characteristics.

► **The frequency of adult-child interactions at age 4 does not, when looking at the findings overall, relate to outcomes in language and cognition outcomes at age 7.** In some countries, however, it is linked to both, but sometimes positively and sometimes negatively. It is positively linked in countries where teachers give children their choice of activities and have fewer whole-group activities. It is negatively linked in countries where instruction often occurs in whole groups and with adult-centered instruction and where teachers propose few free-choice activities for children.

One can surmise that teacher-child interactions will have quite different dynamics when the child has chosen the interaction than when the adult has chosen it or is directing it.

► **The frequency of child-child interactions at age 4 does not relate, when looking at the findings overall, to outcomes in language at age 7.** Again, this finding differs among the countries. In countries that had many whole-group activities and teachers who did not consider language important, it related negatively, but in countries where teachers valued language development and where there were relatively few whole-group activities, it was positive.

One variable that has often shown up as affecting outcomes, group size, did not have any effect in the IEA study. We can only speculate on why, but we can note that the importance of group size has been found largely in studies conducted in the United States. Smaller groups give teachers more opportunities to address individual needs, something valued in education in the United States. As noted earlier, most of the proposed activities in the current study reflected adult-centered, whole-group instruction.

Policy Implications

Three themes emerge from the study: teacher education, equipment and materials, and free-choice versus whole-group activities.

Teacher Education

► **Government policies should encourage and support early childhood teachers to have the highest level of education that is practical in their country.** As was noted earlier, teacher education contributed to children's achievement at age 7. This finding aligns with a number of other studies but contrasts against the recent analysis of seven studies (called the Teacher Education study; see the "Resources" section [Early et al., 2007] for more information). The difference could well lie in the definition of "teacher education." The analysis of seven studies established an index of teacher education with four levels: high school diploma or GED,³ associate's degree,⁴ bachelor's degree, or graduate degree (master's or doctorate).

The IEA Preprimary study defined level of teacher education by the number of years of full-time education. About 20% of the teachers had fewer years of full-time education than would be required for an American high school diploma. The amount of full-time education ranged from 4 years to 21 years.

Such a large discrepancy between the least well formally educated and the best educated could well lead to differences in children's achievements that would not be seen with a more restricted-range scale such as used in the Teacher Education study.

From a policy standpoint, sponsoring agencies should examine their national policies on the education of early childhood caregivers. They may find it important to retrain existing

³ The GED, or General Educational Development, is a program in the United States run by the American Council on Education. Its intent initially was to provide a certificate to people in their 20s or older somewhat equivalent to a high school diploma. In recent years it has been used more by younger people as an alternative to a diploma.

⁴ Awarded in the United States with successful completion of a 2-year program at a community college.

teachers, and/or to promote, even require, more teacher education, or more focused teacher education than currently required.

The Teacher Education analysis called for new measures of the quality and quantity of teacher education and to capture the complexity of teaching and specific teacher behaviors related to positive child outcomes. The results of the present study are in line with such recommendations. “Teacher education” as defined by degrees attained is not synonymous with “education for teaching.”

Materials

► **Government policies should encourage and support early childhood programs to have many, varied materials.** That the number and variety of materials contributes to positive outcomes is consonant with other studies. From a policy standpoint, the finding means that sponsoring and controlling agencies should ensure that preschools have an abundance of materials of many types.

These materials need not be commercial products from professional materials producers. Anyone who has observed children has watched them transform the most mundane objects such as boxes into houses, forts, or spaceships. Locally constructed and found materials work well. It is important only that there be many of them in many varieties.

Choice

► **Government policies should guide and support early childhood programs to encourage children to choose their activities and discourage them from grouping all the children together most of the time.** The study found that when children at age 4 chose many of their activities and spent less time in whole-group activities, they showed higher language and cognitive scores at age 7. Children should be able to choose activities for 45 minutes to 1 hour of each day.

Sponsors should encourage adult-child interactions that extend children’s thinking and expression of thought, opinion, and questions. The amount of time adults spend giving orders or instructions or having children respond as a group should be minimized. Similarly, sponsors should encourage child-child interactions that promote conversations as children solve problems or plan their play. The amount of time children spend in interactions that require rote responses should be minimized.

Overall, the findings might indicate to sponsoring agencies that they need observation instruments and a program of research to document and describe the activities in preschool settings. The instruments could reveal the amount of whole-group instruction with the ultimate aim of reducing that amount should it prove to be too dominant. Such a program would require earmarked money for program monitoring and teacher training to purchase the instruments and money and time to train observers, make observations, analyze and interpret data, and monitor any changes deemed desirable. Funds are also needed to retrain existing teachers and alter teacher training programs.

Conclusion

This was a naturalistic study. It manipulated no variables nor imposed treatments. Future research might look to see if the factors found to be related to children's later achievements can be manipulated and if manipulations generate effects. For example, in a nation found to have many whole-group activities, one might train instructors to use less of these activities while increasing the amount of choice available to children. Would children educated under these circumstances show later language and cognition gains? Or, one might provide professional development courses to child care providers and determine if such courses led to improved outcomes.

The IEA Preprimary Project began with two implicit questions: Are there factors in childhood care and education settings that have effects in later years? If so, do these factors have potency in all nations or are they nation specific? The answer to the first question is "yes." The answer to the second question is that some apply to all nations in the study but others are found only if certain other factors exist. They therefore have an impact, but it is positive in some nations and negative in others.

The IEA Preprimary Project was unprecedented in size and scope. It is not clear when a study that rivals it in size and scope will come again. The fact that it found dependable relationships between manipulable characteristics of early childhood settings and important child outcomes 3 years later adds to the growing evidence of the importance of early childhood experience, the accessibility of this experience to policy influence, and the durability of these relationships across the countries and cultures of the world.

Resources

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