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# Influence of Culture-Related Experiences and Sociodemographic Risk Factors on Cognitive Readiness Among Preschoolers

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A national sample of 4-year-old preschoolers ( $N = 1,710$ ) extracted from the 1993 National Household Education Survey (National Center for Education Statistics) was analyzed to investigate factors that influence cognitive readiness. Results indicated that exposure to culture-related activities may ameliorate the absence of a center-based program for low-risk children. For children typically considered to be "at risk," culture-related experiences were associated with (a) higher levels of cognitive development, regardless of program attendance and (b) lower variability in cognitive readiness. This suggests that culture-related activities are potentially more beneficial for at-risk children with initially lower levels of cognitive readiness. Results also suggest that parental involvement is more likely to enhance a child's cognitive development when the activities consist of culture-related activities. This may be attributed to (a) culture-related activities being better ways to enhance the cognitive skill of a child, or (b) a lack of such activities in center-based programs.

Most administrators and directors associated with arts councils and agencies across the United States agree that arts education and the development of "cultural capital" is of great importance; however, the issue of who should fund such activities, facilities, and events is still heavily debated. To address this issue, it is essential to know the extent to which participation in arts education and other culture-related activities influences the development of young children. Jeffers (1999) recommended more research that establishes the effects of arts education

on the academic performance of students, especially those placed at risk (Murfee, 1997). Thus, determining correlates and consequences of young children's participation in the arts and experience with other culture-related activities is a preliminary step for collecting quantitative results that could aid in the establishment of guidelines for arts education and preschool program policies. Despite the noted effects of arts education on individuals and the specific skills gained, considerable debate remains over the general effects of participation in arts education and exposure to other culture-related activities. According to Goodman (1976), the kind of cognition that occurs in both the perception and creation of art is "medium-specific." Parsons (1998) noted that the emphasis on medium-specific learning has dominated research in arts education to the extent that it has restricted the type of research conducted and delegitimized any notions of cross-media connection. This is consistent with Arnheim (1954), who contended that problem solving is the same wherever it is found, whether it occurs in the context of mathematics, language, science, or art.

In support of this more general and eclectic perspective, Seidel (1996) reviewed several research studies and evaluations that have demonstrated that many arts programs have been effective in directly teaching math, science, reading, writing, general language development, history, and social studies. Furthermore, Seidel reported evidence suggesting that when the arts are connected in meaningful ways with other subject areas, students comprehend and retain (i.e., transfer) more about the subjects involved. This is also supported by Hale and Boozer's (1998) findings that suggest that children's artwork offers insight into their literacy development and by Freeman (1996), who proposed that arts education helps develop the understanding of spatial relations. Furthermore, arts programs make education more interesting for children because from a Lowenfeldian perspective they typically provide more age-appropriate activities than do academic-oriented programs. Therefore, arts programs make learning accessible to many students for the first time (Seidel, 1996), which may be especially important for at-risk children (Hamblen, 1992).

Aside from the production of artwork, exposure to art and culture-related events should be expected to have social influences on the content and process of development. Dewey extolled the value of experiencing art as a means of education and much the same could be said for other culture-related activities. The Vygotskian emphasis on the necessary collaboration between the child and the culture in learning, as well as the Deweyan emphasis on experience as education, imply the benefits of exposure to the arts. One program that featured enrichment through opportunities for culture-related experiences (i.e., field trips to the zoo, a museum, and an orchestra performance) produced positive changes in attitudes toward school among at-risk adolescents (Gruenhagen & Leslein, 1993). Yet, exposure to the arts and culture-related activities has not been demonstrated to affect the cognitive skills of young children.

Research in arts education has been criticized for being predominantly anecdotal. Seidel's (1996) review consisted of primarily qualitative studies. Similarly, many studies dealing with at-risk factors, parental demographics, and school readiness have been criticized because they are limited to anecdotal interpretations, or at best, simple descriptive statistical analyses. As evidenced with action taken by task forces such as Goals 2000, an ongoing quest permeates our society for solid quantitative evidence of effective strategies that ameliorate the learning and performance deficits associated with at-risk factors. Likewise, Jeffers (1999) contended that the field of arts education must undertake new research on various approaches to art instruction, learning outcomes, and curriculum design and thus must conduct more systematic analyses and evaluations to develop sound educational policy concerning the role of the arts and other culture-related activities, centers, and events.

This study took a policy perspective in that variables that can be changed through policy (i.e., exposure to culture related events, attendance in preschool programs, program quality) were of main interest while variables that are not actionable through public policy (i.e., family background and income) were incorporated as context variables. Specifically, nationally representative data were analyzed to investigate the relation that preschoolers' participation in culture-related activities, outside of their attendance in center-based programs, had with their school readiness (i.e., cognitive skills), while statistically controlling for context variables such as parental involvement and family background. Currently, the experiences that preschoolers have with culture-related activities are primarily the choice of their parents. Unfortunately, the factors related to at-risk status (i.e., family income, parental education, parents' primary language) may create a cultural boundary that limits the at-risk child's access to these events and activities (i.e., America's cultural capital). Therefore, the relation between participation in culture-related activities and school readiness may be different for at-risk preschoolers. Determining the influence that participation in culture-related activities (outside of preschool programs and their associated features) has on school readiness for children of varied backgrounds will provide valuable evidence for making decisions concerning the potential addition of arts education components to preschool and kindergarten curricula and ultimately produce information for guiding governmental policy concerning the role of the arts in early childhood education.

## SCHOOL READINESS

There is no consensus within the educational community as to the criteria for defining or assessing a child's readiness for school. Indeed, both educators and researchers question the utility of a school readiness construct (e.g., Crnic & Lamberty, 1994; Eisenhart & Graue, 1990). Many teachers have reported that academic readi-

ness (i.e., cognitive skills) is not the most important issue in dealing with preschoolers. Furthermore, Nelson (1995) reported that views of readiness were influenced by social context. For example, teachers in urban, poor, and minority contexts tended to reject the school readiness view and support a more contextualist view.

Despite these perspectives, there is consensus that how a child does in school depends in part on things that happen before he or she enters kindergarten (Zill, Collins, West, & Germino Hausken, 1995) and that early accomplishments are predictive of later academic performance (Henderson, 1991). Therefore, knowing what skills children have and have not yet learned is important for curriculum planning and the allocation of instructional resources (Zill et al.). Five domains of development, which should be considered in making policy decisions concerning young children, have been identified as important to a child's readiness for school:

1. Physical well-being and motor development.
2. Social and emotional development.
3. Approaches to learning.
4. Language usage.
5. Cognition and general knowledge (Goal One Technical Planning Group, 1993).

This study focuses primarily on school readiness in terms of the cognitive domain.

### SOCIODEMOGRAPHIC RISK

The developmental accomplishments and difficulties that children bring with them when they arrive at kindergarten are correlated with sociodemographic risk factors. Five family risk factors have been commonly elaborated:

1. The mother has less than a high school education.
2. The family is below the official poverty line.
3. The mother's primary language is not English.
4. The mother was unmarried at the time of the child's birth.
5. Only one parent is present in the home (Zill et al., 1995).

Recent data estimate that approximately half of America's preschoolers are affected by at least one of these risk factors, and 15% are affected by three or more of them (Wright, Germino Hausken, & West, 1994).

Although not all pupils with one or more of these characteristics are low achievers, those with such risk factors are on average more likely to do poorly in school. Children from "multiple-risk families" may be in most danger of school failure. Researchers have found a linear relation between cumulative risk and measures of

verbal IQ and social adjustment in 4-year-old children (Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987) and with vocabulary and math test scores in 4- and 5-year-olds (Nord, Zill, Prince, Clarke, & Ventura, 1994). Importantly, these risk factors were found to be associated with fewer accomplishments and more difficulties in children even after other child and family characteristics were statistically controlled (Zill et al., 1995). Thus, these results have led some to speculate that the number of risk factors, rather than the nature of the particular risk(s), may be more important (Meisels & Wasik, 1990). More recently, Zill et al. reported that the more risk factors to which the child is subject, the lower the number of accomplishments and the higher the number of difficulties he or she is likely to exhibit. For example, compared to children from families with none of the risk factors, children with three or more risk factors are five times more likely to be in less than optimal health, three times as likely to have speech difficulties, and twice as likely to display physical activity or attention difficulties. On average, these at-risk youngsters display one and a half fewer signs (out of five) of emerging literacy than do preschoolers with no risk factors. Risk factors must be included in any comprehensive analysis of school readiness.

## CENTER-BASED PRESCHOOL PROGRAMS AND EXPOSURE TO CULTURE-RELATED ACTIVITIES

Along with the household environment, the types of preschool experiences that children bring to kindergarten differ greatly. Approximately 73% of children come to kindergarten with some experience in center-based programs such as daycare centers or preschools (Zill et al., 1995); however, the percentage of children with such experiences varies across groups with different backgrounds or risk factors. Children from disadvantaged households have been reported to be less likely to participate in early childhood programs (West, Germino Hausken, Chandler, & Collins, 1993).

Attending Head Start, pre-kindergarten, or other center-based preschool programs has been linked to higher emerging literacy scores in 4-year-olds (Zill et al., 1995). Furthermore, attending center-based preschool or child care programs reduces a child's chances of having to repeat kindergarten or first grade, even after socioeconomic differences are controlled (Bianchi & McArthur, 1993). Although the benefit of preschool attendance accrues for children from both high-risk and low-risk family backgrounds, preschool attendance is not always associated with a broad spectrum of positive outcomes (Zill et al., 1995). Sizable differences between young children from high-risk families and more advantaged children persist, suggesting that attempts to "level the playing field" by providing early interventions and compensatory resources have not gone far enough or are not succeeding for other reasons.

Youngsters who show substantially fewer accomplishments and more difficulties as preschoolers may well require more challenging instruction and special education resources as elementary and secondary students. Schools must be prepared to offer a broad array of activities and materials to the students or risk having some be unchallenged and bored, while others struggle to keep up with the class (Knapp, Shields, & Turnbull, 1992). To that extent, the need for schools to be ready for children has been emphasized (Crnic & Lamberty, 1994). Thus, Nelson (1995) recommended that to reach the readiness goal, the link between developmentally appropriate preschool programs and public school kindergarten programs must be enhanced. Taking this in context with the Lowenfeldian perspective, arts education and culture-related activities would seem to provide age-appropriate components for preschool programs.

For a young child, participation in culture-related activities may fill a void in preschool programs for developing some of the accomplishments necessary for academic advancement (see Seidel, 1996, for review). But to provide such a diverse set of learning activities, the child-to-staff ratio must be relatively small. Currently, many existing kindergarten classes have child-to-staff ratios that exceed federal guidelines for kindergarten classrooms. The extent of this staffing problem for preschool programs (center-based or otherwise) is even more varied. This suggests that teachers in such classes may have a difficult time coping with pupils with widely varying accomplishments or difficulties. Adding an arts or cultural component could potentially exacerbate these problems. Therefore, the impact of providing culture-related activities for young children must also address staffing and quality issues (i.e., child-staff ratios, type of program available), which also impact funding policies.

Because of funding problems related to the cost of staffing and quality, many preschool programs do not have an arts component, and thus, it has been incumbent on parents to expose their children to culture-related activities. Therefore, the influence that participation in culture-related activities (outside of attendance in center-based programs) has on the relation between risk factors and developmental accomplishments may be a fruitful and interesting area of investigation. That is, there is the possibility that participation in arts education or other culture-related activities may lessen the negative impact of risk factors on the school readiness of young children. If this is the case, then policy-based preschool initiatives in arts education may provide a potential outlet for serving the needs of children from high-risk families. However, because it is a parent or other family member that often exposes the child to the arts, there is the possibility that a child's participation in culture-related activities (i.e., cultural capital) may also represent a "parental involvement" construct (i.e., social capital; see Coleman, 1991). Therefore, the level of parental involvement must be statistically controlled to obtain unbiased estimates for the influence of exposure to culture-related activities.

Regardless of these technical issues, the current political climate leaves exposure to the arts to the parent(s). Thus, the issue ultimately confronting policymakers is what kind of choice to promote (Elmore & Fuller, 1996). Determining the influence that participation in culture-related activities has on school readiness over and above family background and other relevant experiences should be vital to making educated choices and sound educational policy.

## METHOD

This study examines factors that influenced developmental accomplishments in a national sample of 4-year-olds that had not started kindergarten and had no specific physical disabilities. The data were collected via telephone interviews that occurred between January and April 1993 as part of the National Household Education Survey (NHES). The sample is nationally representative of all civilian, non-institutionalized children in the United States. The overall response rate for the school readiness file was 74%. The item nonresponse was less than 1% for most variables.

Initial investigations focused on outcomes, such as the accomplishments of preschoolers, as a measure of school readiness. These analyses focused specifically on children who had turned 4 years old by the end of the previous year and were about 6 months away from starting kindergarten at the time of the survey. It was believed that the analysis of the accomplishments and difficulties of this 4-year-old preschool sample ( $N = 1,710$ ) provided the best overview of school readiness. Furthermore, restricting the sample to 4-year-olds was an important control for limiting extraneous variance associated with maturation. The variables employed for this study were screened for outliers, missing data, and any other unusual characteristics such as unequal spread, nonlinearity, and asymmetry (Hoaglin, Mosteller, & Tukey, 1983) before they were analyzed. The results of these preliminary analyses and variable definition procedures follow.

### Preliminary Analyses

A preliminary investigation using the 1993 School Readiness data from the NHES showed that attending culture-related centers (e.g., libraries, museums) and participating in culture-related events was correlated to income. More importantly, participation in these culture-related activities was correlated to several developmental variables (e.g., whether the children can identify colors, recognize letters, or write their name). These developmental variables were also related to income level and center-based program (i.e., Head Start, preschool) attendance. From this preliminary analysis, a three-way interaction was indicated, suggesting that low-income children who did not participate in center-based programs showed substantially lower capacities to

perform these developmental tasks, especially when they did not attend any culture-related events or centers. This finding implied that participation in culture-related activities ameliorated the developmental difficulties of low-income children in the absence of a center-based program. These preliminary findings gave impetus for further analyses in a more comprehensive and systematic manner.

### Data Reduction and Variable Definitions

*School readiness.* Based on criteria set by NHES (see Zill et al., 1995), 18 developmental variables were considered to measure school readiness constructs. The determination of whether the child displayed each of these accomplishments and difficulties was based on reports from one of the child's parents, usually the mother. The stability coefficients for the items ranged from  $r_{xx} = .49$  to  $r_{xx} = .79$  with a median of .65 (Brick, Rizzo, & Wernimont, 1993).

After data were screened, a truncated principal component analysis was performed. Based on a scree plot and the "eigenvalues greater than one" (Tabachnick & Fidell, 1996) methods, six factors that accounted for 49% of the total variance among the 18 variables were extracted. The first eight eigenvalues were 2.85, 1.56, 1.29, 1.13, 1.05, 1.00, 0.93, and 0.93. Varimax rotation was used to aid in the interpretation of these factors. The first factor accounted for 13.4% of the total variance and was interpreted as a "cognitive readiness" factor. The five items that loaded on this factor assessed whether children could (a) "recognize letters," (b) "write their first name," (c) "identify colors," (d) "count to 20," and (e) "write rather than scribble." The second factor extracted was more difficult to interpret because it included items such as, "child fidgets frequently" and "child has frequent tantrums"; it seemed to index emotional development. The third factor involved "language difficulty" items such as "child stutters or stammers" and "child began speaking late." The fourth extracted component was interpreted as "perceptual difficulties" because items such as "child turns TV to high volume" and "child bends to look at pictures" loaded on this factor. Variables related to motor development, such as "child can button clothes" and "child holds pencil properly," loaded on the fifth factor. Finally, the sixth factor was interpreted as "social development," because such items as "child is afraid to speak to strangers" and "child can be left with sitter" loaded on this factor. It should be noted that a three-factor solution was completed in which similar Cognitive Readiness and Language Usage factors emerged; however, the third factor was less interpretable. Also, the six extracted components were rotated obliquely to determine whether these factors were correlated. In general, no factor correlation exceeded .20. A six-factor solution performed for

all preschoolers ages 3 through 5 ( $N = 3,781$ ) led to a similar interpretation of factors. Thus, it appears that school readiness as a multi-dimensional construct had factorial validity.<sup>1</sup>

Using these items should have practical implications because they were drawn from several widely used early childhood data collection and diagnostic instruments, including a screening inventory and a readiness checklist used by public school teachers. The accomplishments that define the cognitive readiness factor include behaviors that can be observed and reported objectively and that give credence to its construct validity (Henderson, 1991). Furthermore, early accomplishments are predictive of later academic performance and knowing what skills children have and have not yet learned is important for curriculum planning and the allocation of instructional resources (Zill et al., 1995). Therefore, for the purposes of this study, only the cognitive readiness factor was used as a dependent variable.

### Policy and Context Variables

The policy issue of primary focus employed variables associated with participation in culture-related activities (i.e., attending libraries, museums, and concerts) outside of preschool program attendance as measures for the potential benefits of arts education and cultural capital. Based on the questions in the NHES data, participation in culture-related activities was a choice left to the parent(s). The questions in the NHES asked whether a parent or family member had taken the child to a culture-related event. Thus, there is the possibility that these variables may also represent a parental involvement or social capital construct. Therefore, other variables related to how much time and how many activities the child shares with the parent(s) were employed for purposes of statistical control.

Attendance at a center-based program was also analyzed as a policy variable. Furthermore, sociodemographic risk factors were analyzed for the purposes of investigating potential relationships to cognitive readiness and interactions with other policy variables.

*Culture-related activities.* After theoretical consideration and preliminary analyses, a cumulative variable was created based on whether the parent or other family member had taken the child to one or more of the following events or sites: (a) library; (b) play, concert, or live show; or (c) art gallery, museum, or historical site. Thus, scores on this experience with culture-related activities variable ranged

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<sup>1</sup>All factor analytic results were disclosed in a final report for NSF Grant RED-9452861 and were approved by the Governing Board of the AERA Grants Program. Tables of the factor analytic results are available from Beasley.

on a continuum from 0 to 3. Based on this operational definition, this policy variable was an index of a child's exposure to cultural capital. It is limited, however, because although it crudely measures amount, there is no way of knowing how many times a child experienced each of these activities. Therefore, it was more a measure of variety than amount.

*Sociodemographic risk.* Thirteen variables were considered to be measures of sociodemographic risk. Some relevant variables such as (a) primary language spoken at home by the parent, (b) whether the family received food stamps, and (c) whether the mother was the only parent in the home were excluded because of their high correlations with other variables and the large amount of systematically missing data.

After consideration of diverse options, a five-factor solution that accounted for 86.2% of the total variance among the 13 variables was employed. The first eight eigenvalues were 4.05, 2.58, 2.02, 1.62, 0.93, 0.49, 0.36, and 0.24. The first factor accounted for 22.3% of the total variance and was interpreted as "education and income." Items such as "father's highest grade completed," "mother's highest grade completed," and "total household income" loaded on this factor. The second factor accounted for 21.2% of the total variance seemed to index the "mother's job status" (i.e., employed or unemployed). Variables related to the parents' use of "English as a primary language" loaded on the third factor that accounted for 20.8% of total variance. The fourth factor was interpreted as "father's job status." Finally, a specific (one variable) factor involved whether the mother was married at the time of the child's birth. Oblique rotations of these structures showed little correlation among these factors. These factor analytic results contradict the notion of a cumulative risk factor to some extent.

*Parental involvement.* As potential measures of a parental involvement construct, I analyzed eight variables that assessed how recently the parent had engaged in activities with their child (e.g., told child a story in the last week, involved child in chores in the last week, played with child indoors in the last week). Using a scree plot methodology, the eigenvalues (1.75, 1.04, 0.96, 0.93) suggested the presence of a general unidimensional Parental Involvement factor that accounted for 22% of the total variance.

## RESULTS

The initial goal of this analysis was to statistically control for parental involvement, center-based preschool program attendance, and the five sociodemographic risk

factors to examine the unique influence of exposure to culture-related activities on cognitive readiness. These relations, however, were not expected to apply for all children in the data set. Furthermore, center-based program attendance and participation in culture-related activities are potentially actionable through public policy. Because of the strong possibility for interactions among these factors, context variables were incorporated as “independent” attribute variables and their interactions with the policy variables were examined through moderated regression (Aiken & West, 1991).

### Cognitive Readiness: Major Findings

The cognitive readiness factor was regressed on all sociodemographic risk factors,<sup>2</sup> the parental involvement factor, the cumulative number of culture-related activities, center-based programs attendance, and several higher order interactions. All variables were centered to reduce multicollinearity among the predictors and their interactions and to obtain more interpretable standardized regression coefficients (Aiken & West, 1991). Because of the large sample size, very small partial relations could be statistically significant. Therefore, only extremely small  $p$  values were considered statistically significant (i.e.,  $\alpha = .001$ ). Based on an ordinary least squares (OLS) regression analysis of this model, nonsignificant interactions and predictors were removed. However, nonsignificant predictors remained in the model if their interactions with other predictors were statistically significant (Aiken & West, 1991). Using the final raked weight,<sup>3</sup> a weighted least squares (WLS) regression yielded a statistically significant model ( $R^2 = .20$ ). Subsequently, the residuals from this model were transformed by taking the reciprocal of the absolute value for each residual (i.e.,  $1/|\text{residual}|$ ) to perform a least absolute residual (LAR) regression through WLS. This form of robust regression is suggested as an alternative method for examining multivariate relations when data violate the assumptions of normality and homoscedasticity (Huynh, 1992) as was the case for many of the variables in the model. This process of (a) OLS regression followed by (b) WLS regression with

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<sup>2</sup>Because mother’s marital status at the child’s birth was the only variable that loaded on Factor 5, the original variable rather than the factor score was used in the regression analyses.

<sup>3</sup>The objective of the NHES is to make inferences about the entire civilian, district-wide population and to produce reliable estimates for subdomains defined by race and ethnicity. To accomplish this goal, minority and other relatively rare groups were sampled at higher rates than they exist in the population. Therefore, these subdomains are over-represented, which typically leads to an underestimation of standard errors and an increase in the probability of Type I errors. The final raked weight was used to adjust for this sampling design (see Kish & Frankel, 1974, for details). Also, the criterion for statistical significance was stringent in this study ( $\alpha = .001$ ) because of the increased probability of Type I errors.

the final raked weight and then (c) LAR regression was used in subsequent ad hoc analyses.

The LAR regression yielded a better fitting model ( $R^2 = .52$ ) than the initial OLS or WLS solutions. Of the sociodemographic risk factors, the parents' language and education-income factors were statistically significant, accounting for 14.7% and 7.2% unique variance, respectively. Also, center-based preschool program attendance and the parental involvement factor were significantly related to cognitive readiness and accounted for 11.8% and 5.2% of unique variance, respectively. A statistically significant two-way interaction between the education-income factor and number of culture-related activities accounted for 0.3% of unique variance (see Table 1).

The mother's marital status at the child's birth was not a statistically significant predictor; however, this variable showed two-way interactions with center-based preschool program attendance and involvement in culture-related activities (see Table 1). Also, three-way interaction between the mother's marital status at the child's birth, participation in culture-related activities, and center-based preschool program attendance was statistically significant and accounted for a small amount of unique variance (1.5%) in cognitive readiness.

Thus, center-based program attendance and parents' language were the best predictors in that they accounted for greater percentages of "unique" variance; however, these semi-partial coefficients could be misleading because of the LAR regression methodology. That is, when absolute values of residuals are fit-

TABLE 1  
Least Absolute Residual Regression Results for Cognitive Readiness

<i>Predictor Variables</i>	<i>Standardized Regression Coefficient</i>	<i>Unique Contribution</i>
Mother's marital status	0.1083	0.0014
Center-based preschool program attendance	0.1380**	0.1183
Parental involvement	0.0388**	0.0521
Culture-related activities	0.0177*	0.0024
Education/income	0.0738**	0.0717
Parents' language	-0.1697**	0.1467
Culture-related activities × Education/income	0.0206**	0.0038
Mother married × Center-based attendance	-0.3812**	0.0161
Mother' marital status × Culture-related activities	0.2176**	0.0044
Center-based attendance × Culture-related activities	-0.0172*	0.0018
Center-based attendance × Culture-related activities × Mother's marital status	-0.4629**	0.0150

\* $p < .01$ . \*\* $p < .001$ .

ted the regression sum of squares is not truly based on squared values (Huynh, 1992). In using the standardized regression coefficients as an alternative way to interpret the results (Tabachnick & Fidell, 1996), the interactions with the mother's marital status, especially the three-way interaction with a standardized regression coefficient of  $-0.4629$ , appeared to be the most "important" predictors of cognitive readiness (see Table 1).

To describe the two-way interaction between mother's marital status and center-based program attendance and the three-way interaction of these factors with exposure to culture-related activities, four groups based on the cross-classification of the mother's marital status at the child's birth (married or unwed) and the child's center-based program attendance (attended or did not attend) were elaborated. Children who are born to unwed mothers are typically considered "high risk" because of various related factors; however, this situation as such is not actionable through educational public policy.<sup>4</sup> Whether a child attends a center-based program, however, could be influenced through policy. To obtain partialled and unbiased cognitive readiness scores for the analysis of this three-way interaction, all other significant predictors (excluding the three-way interaction) were entered into a regression model. Unfortunately, this residualization process also led to many missing values, a loss of data, and potentially misleading results. Thus, as a second approach for displaying this three-way interaction, cognitive readiness was residualized only for the parental involvement factor and an income variable that served as a "proxy" variable for the education-income factor as well as many other sociodemographic risk factors. Income, rather than the education-income factor, was chosen because it indexes the construct (risk factor) that is to be controlled while leading to less missing data. Furthermore, education is typically related to participation in culture-related activities but also is potentially actionable in the sense that effort could be made to educate parents about children's involvement in such activities.

Among the highest risk children, those who did not attend a center-based preschool program and whose mothers were not married at the time of their birth ( $N = 161$ ), only three experienced all three culture-related activities while 56.8% participated in none of them. The residualized cognitive readiness factor scores of these children were the lowest with an average of  $-0.56$  with a standard deviation of 1.17. Children of unwed mothers who were attending center-based programs ( $N = 199$ ) had a mean residualized cognitive readiness factor score of 0.07 ( $SD = 0.96$ ). Only 10 of these children (5%) had experienced all three of the culture-related activities and 39.7% had experienced none of the culture-related activities. Of the children who did not attend a center-based preschool program and whose mothers were married at the time of their birth ( $N =$

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<sup>4</sup>This issue is potentially addressable through sex education and health public policies.

496), only 3% experienced all three culture-related activities while 45.6% participated in none of them. The average residualized cognitive readiness was  $-0.32$  ( $SD = 1.07$ ). Among the lowest-risk children, those whose mothers were married at the time of their birth and who were attending center based programs ( $N = 853$ ), the mean residualized cognitive readiness was  $0.23$  ( $SD = 0.82$ ). Only 32.9% had experienced none of the culture-related activities.

These results indicate that children who attended center-based preschool programs were more likely to participate in culture-related activities and had generally higher levels of cognitive readiness. Also, children with the at-risk factor of being born out of wedlock had lower levels of cognitive readiness and experienced fewer culture-related activities. Attending a center-based program seemed to ameliorate the deficit in cognitive readiness and also seemed to influence whether the parent exposed the child to cultural capital.

To further analyze the three-way interaction, the relation between the residualized cognitive readiness scores and the number of culture-related activities was examined through Pearson correlations and mosaic boxplots for each of the four previously elaborated groups (see Figure 1). In this analysis, the relation between culture-related activities and residualized cognitive readiness was positive in all cases. However, this relation was near zero for the lowest risk children (i.e., those whose mothers were married and who attended center-based programs). This indicates that additional participation in culture-related activities by the lowest risk children did not necessarily lead to additional gains in cognitive readiness. The relation was similar ( $r \simeq .16$ ) for both the higher risk children (unwed mother) who attended center-based programs and the lower risk children (married mother) who did not attend some form of preschool, suggesting that participation in cultural-related activities ameliorated the effects of certain risk factors or lack of preschool (see Figure 1).

For the highest risk children (i.e., those whose mothers were unwed and who did not attend center-based programs), the relation between experience in culture-related activities and cognitive readiness over and above parental involvement was also positive ( $r = .11$ ). In close examination of the first boxplot, however, the 25th, the 50th (median), and 75th percentiles increased to about the same extent from 0 to 1 activities. For participation in two activities, however, the median actually declined, while the 25th percentile increased slightly, indicating that culture-related activities reduced the variability in cognitive readiness. This suggests that culture-related activities were potentially more beneficial for children with initially lower levels of cognitive readiness. In general, these results suggest that for low-risk children, culture-related activities ameliorated the absence of a center-based program. For children typically considered to be at risk, participation in culture-related activities was generally associated with higher levels of cognitive development regardless of whether a center-based program was attended.

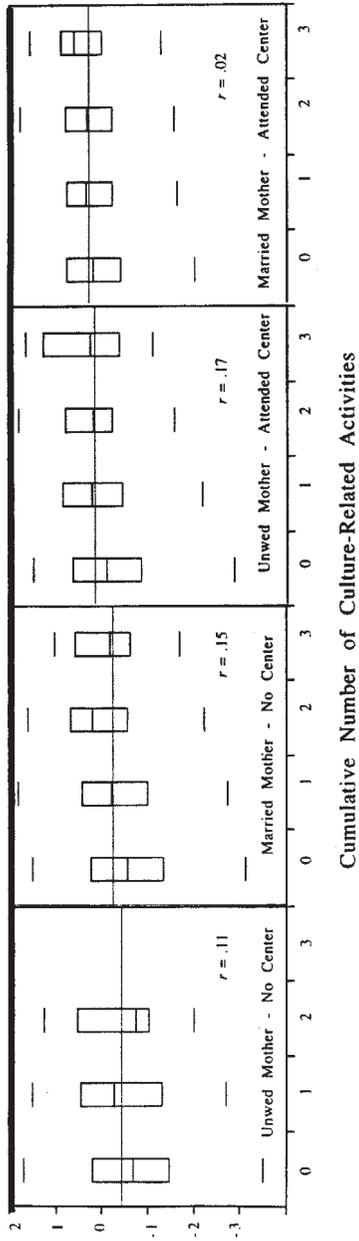


FIGURE 1 Mosaic Boxplots of residualized cognitive readiness scores as a function of the cumulative number of culturally related activities for children with differing preschool experiences.

### INFLUENCE OF PROGRAM CHARACTERISTICS: AD HOC ANALYSIS

Because center-based preschool program attendance accounted for a relatively large amount of variance in cognitive readiness (11.8%, see Table 1) an ad hoc regression analysis of center characteristics was performed for the 760 children who attended some kind of center-based program. All variables and interactions (excluding the center-based preschool program attendance variable) were used as predictors along with center characteristics such as

1. Child–adult ratio.
2. Attendance in hours per week.
3. Whether the center was publicly or privately funded.
4. Whether the center provided any educational programs.

As before, a multiple regression using WLS with the final raked weight was performed, nonsignificant ( $\alpha = .001$ ) or unnecessary predictors or interactions were removed, and the model was refit using LAR regression.

Table 2 shows the results of the LAR regression analysis. The four center characteristics were significantly related to cognitive readiness and accounted for small amounts of unique variance. In terms of standardized regression coefficients, however, (a) private versus public funding and (b) having education programs were “important” predictors indicating that children who attended privately

TABLE 2  
Least Absolute Regression Results for Cognitive Readiness for Children who Attend  
Center-Based Programs ( $N = 760$ )

<i>Predictor Variables</i>	<i>Standardized Regression Coefficient</i>	<i>Unique Contribution</i>
Parental involvement	0.0479**	0.0547
Culture-related activities	0.0178	0.0018
Education/income	0.0714**	0.0339
Culture-related activities × Education/income	0.0376*	0.0077
Culture-related activities × Parental involvement	0.0290**	0.0152
Child/adult ratio	0.0054**	0.0239
Hours per week	0.0002**	0.0109
Private versus public	0.2429**	0.0200
Education programs	-0.5294**	0.0119

\* $p < .01$ . \*\* $p < .001$ .

funded centers or centers with education programs, which is actionable through public policy, showed higher levels of cognitive readiness. Of the other predictors, the parental involvement and education–income factors accounted for 5.5% and 3.4% of unique variance, respectively. However, both of these variables interacted with participation in culture-related activities.

To illustrate the culture-related activities by parental involvement interaction, the cognitive readiness factor scores were residualized for all other effects in the model. Interestingly, for children who have experienced less than two types of culture-related activities, there was almost no correlation between cognitive readiness and parental involvement with other relevant variables statistically controlled. However, when two or more types of culture-related activities were experienced, parental involvement had a slight positive ( $r = .15 - .17$ ) influence on cognitive readiness. This suggests that for children who attended a center, some types of parental involvement (i.e., exposure to cultural capital) were more effective.

## DISCUSSION

Similar to previous analyses (e.g., Zill et al., 1995), factor analytic procedures established school readiness as a multidimensional construct. For the purposes of this study, cognitive readiness was used as a dependent variable.

The major policy variable under investigation was exposure to culture-related activities (i.e., cultural capital), which was found to be a separate factor from parental involvement (i.e., social capital). Exposure to culture-related activities was a significant predictor of cognitive readiness when several other relevant factors were statistically controlled. This supports both Vygotskian and Deweyan implications concerning the effects of exposure to the arts. This finding also supports other theoretical work (e.g., Parsons, 1998) and empirical studies (e.g., Hale & Boozer, 1998; Seidel, 1996) concerning the general effects of participation in the arts on child development of academic and cognitive skills. However, there were statistical interactions between exposure to culture-related activities and other factors that moderate this general interpretation.

Of the sociodemographic risk factors, Parents' Primary Language and the Education–Income factor were directly associated with Cognitive Readiness, whereas the mother's marital status at the time of the child's birth interacted with whether the child attended a preschool program and whether the child was exposed to Culture-Related Activities. In general, the results indicated that culture-related activities may ameliorate the absence of a center-based program for low-risk children. For children typically considered to be at risk, participation in culture-related activities was generally associated with higher levels of cognitive development regardless of whether a center-based program was attended. Moreover, the results suggest that culture-related experiences reduced the variability in cognitive readi-

ness (i.e., leveled the playing field) among high-risk children. Thus, exposure to culture-related activities was potentially more beneficial for at-risk children with lower levels of cognitive readiness. However, this does not mean that the differences between children from high-risk families and more advantaged children have been “leveled.” Although many educators feel that early interventions, compensatory resources, and center-based programs targeted at at-risk children have not gone far enough or are not succeeding for other reasons, these results indicate that at-risk children who attend a preschool program or experience culture-related activities have better cognitive skills than low-risk youths who have not had such experiences.

The results also indicated that children who attended center-based preschool programs were more likely to have been exposed to culture-related activities and had generally higher levels of cognitive readiness. An analysis of the children who attended preschool programs indicated that children who attended privately funded centers or centers with education programs (a feature actionable through public policy) showed higher levels of cognitive readiness over and above the influence of child–staff ratios and hours attended per week. However, one must consider that these program quality factors are likely to be related.

Of the other predictors, parental involvement and the education–income factor accounted for significant amounts of unique variance. However, both of these variables interacted with participation in culture-related activities. Not only does this indicate that parents who provided their children with culture-related activities were also more involved in other ways, it suggests that their involvement was more likely to enhance their child’s cognitive development when the parent–child interactions involved more of these culture-related activities. Furthermore, this indicates that for children who attended a center-based program, some types of parental involvement were more effective than others. This supports the Lowenfeldian perspective that culture-related activities are better or more age-appropriate ways to enhance a child’s cognitive readiness than conventional academic skills activities. There is the possibility, however, that this finding may be attributed to the status of such activities in center-based programs. Again, from a Lowenfeldian perspective, this could support Seidel’s (1996) conjecture that culture-related activities may make learning more accessible to many preschoolers. In either case, public policy may be influenced by such interpretations.

The long-term consequences of the sociodemographic risk factors must still be considered. Unfortunately, these issues cannot be disentangled in the school readiness data set. Such investigations require analyses with a longitudinal database, which is not possible with the NHES data. It does appear from this analysis that low income or high-risk families have limited access to America’s cultural capital in terms of whether the family takes the child to cultural centers or participates in culture-related activities. Should this imply a public policy for at-risk children who attend preschool?

Despite the growing interest in arts-across-the-curriculum (Parsons, 1998), Ross' (1986) observation that there is a dearth of preparation to teach arts education remains valid (see Seidel, 1996). Therefore, Ross suggested the creation of one nongovernmental body to facilitate interaction among classroom teachers, arts educators, and artists, as well as communication among federal, state, and local constituencies at "the most critical time of development of successful arts experiences—the beginning" (p. 11). Based on Bruner's spiral curriculum, Elfland (1995) agreed with this position, noting that early learning in the arts provides the foundation for later learning, implying the need for arts education at an early age. The results of this study support these positions as well.

Ross (1986) also suggested that curriculum guides for art education could be created at the state and local levels. Until public policy mandates participation in culture-related activities in center-based preschools, the choice is left to the parent(s). Thus, the issue confronting policymakers is what kind of choice to promote, especially for the parents of children placed at risk, who may have limited access to America's cultural capital.

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