

Rhyme and Alliteration Sensitivity and Relevant Experiences Among Preschoolers From Diverse Backgrounds

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There exists a well-established positive relation between phonological awareness and learning to read. Experiences with linguistic routines like nursery rhymes may provide one route through which children gain phonological awareness. The phonological awareness and home experiences of 59 prekindergartners from different sociocultural groups were examined. Performance differences favoring middle-income children over their low-income counterparts were obtained on tasks assessing rhyme and alliteration sensitivity and nursery-rhyme knowledge. Middle-income children also engaged more frequently than low-income children in word games and book interactions at home. The only significant difference among children of the same income level was that African-American low-income children displayed lower levels of nursery-rhyme knowledge than European-American low-income children. Two demographic variables, maternal education and ethnicity, made significant contributions to rhyme sensitivity. Among the experiential variables, the strongest correlates of rhyme sensitivity were nursery-rhyme knowledge and frequency of engagement in word games and book interactions. The results suggest that children's rhyme sensitivity may be influenced by engagement in word games and book interactions that foster knowledge of linguistic routines containing rhyme.

A TREMENDOUS AMOUNT OF EVIDENCE has accumulated over the past 20 years demonstrating the powerful connection between phonological awareness and learning to read (Bryant, Bradley, MacLean, & Crossland, 1989; Bryant, MacLean, Bradley, & Crossland, 1990; Cardoso-Martins, 1995; MacLean, Bryant, & Bradley, 1987; McGuinness, McGuinness, & Donohue, 1995; Shankweiler, Crain, & Brady, 1992; Stanovich, 1992; Vandervelden & Siegel, 1995; Yopp, 1995). The term *phonological awareness* refers to awareness of any of the phonological units of the spoken language, including syllables, intrasyllabic units (rimes and onsets), and phonemes (Treiman, 1991). The more sensitive a child is to the component sounds in words, the more likely he or she is to read well. Goswami and Bryant (1992) suggested that rhyme and alliteration sensitivity may be the kind of phonological awareness that is the first to arrive and the easiest to demonstrate in young children. Given our interest in studying nascent phonological awareness in 4-year-old children, we chose to focus on rhyme and alliteration.

Numerous empirical studies provide evidence that rhyme and alliteration sensitivity contribute to reading. For example, MacLean et al. (1987) reported that the rhyme and alliteration scores of 3-year-old preschoolers were related to beginning word reading over the next year. Bryant, MacLean, and Bradley (1990) found that children's rhyme and alliteration scores at ages 3 and 4 were significantly related to reading 2 years later, even after controlling for differences in linguistic ability. Bradley and Bryant (1991) demonstrated that training in rhyme and alliteration beginning at ages 5 and 6 has positive effects on reading and spelling 3 years later. Gathercole, Willis, and Baddeley (1991) reported that preschoolers' performance on a rhyme-oddity detection task was significantly related to a multiple-choice measure of reading ability, even after controlling for age, phonological memory, and intelligence. Sensitivity to rhyme and alliteration also relates to literacy acquisition in languages other than English, such as Portuguese (Cardoso-Martins, 1995). Thus, a number of studies have come to the same conclusion: Rhyme and/or alliteration knowledge is a precursor of early reading in alphabetic orthographies. It is important to acknowledge the evidence for a reciprocal relation between phonological awareness and reading (McGuinness et al., 1995; Vandervelden & Siegel, 1995; Wagner & Torgesen, 1987), but in the earliest phases of reading development, the direction of causality is probably strongest from phonological awareness to better reading (Stanovich, Cunningham, & Cramer, 1984).

What are the origins of preschoolers' rhyme and alliteration sensitivity? In answering this question, it makes sense to consider factors in the home that may influence sensitivity to rhyme and alliteration. Recent evidence suggests that many preschoolers are exposed to linguistic games involving rhyme and alliteration, as revealed through parental reports that children regularly engage in activities involving songs, rhymes, and rhyming games (Baker, Fernandez-Fein, Scher, & Williams, in press; Chaney, 1994; Marvin & Mirenda, 1993; Raz & Bryant, 1990). Young children appear to enjoy listening to rhymes and often pro-

duce them in their own poems and songs, as Dowker (1989) discovered through analysis of poems composed by 2- to 6-year-old children from various sociocultural groups. Forty-two percent of their poems contained rhyme, and 26% contained alliteration.

Language play may help children develop their rhyme and alliteration skills (Cunningham, 1992; Marvin & Mirenda, 1993). MacLean et al. (1987) proposed that young children may learn about rhyme and alliteration with the help of linguistic routines, because such games often include awareness of the component sounds in words. Treiman (1991) similarly speculated that an informal but useful kind of phonological awareness training may take place when children learn nursery rhymes at home or at preschool. These routines involve rhyme (shared rimes) and, to a lesser extent, alliteration (shared onsets). Treiman proposed that nursery rhymes may pave the way for eventual awareness of phonemes by helping children become aware of onsets and rimes.

MacLean et al. (1987) investigated, in a longitudinal study, whether there is a relation between children's knowledge of nursery rhymes and their phonological awareness, as measured by rhyme and alliteration-detection and alliteration-production tasks. These researchers found a "strong highly specific relationship" (p. 255) between knowledge of nursery rhymes and the detection and production of rhyme and alliteration. Furthermore, knowledge of nursery rhymes and of rhyme and alliteration was related to early reading measured 15 months later. Bryant et al. (1989) reported that the relationships found after 15 months continued to apply over a 3-year period. Again, there was a strong connection between early knowledge of nursery rhymes, rhyme and alliteration sensitivity, and reading and spelling over the next 3 years, even when differences in social background were taken into account. The authors suggested that nursery rhymes enhance children's sensitivity to rhyme which in turn helps them learn to read, and path analysis of their data supported this view. As the authors concluded, "whatever the nature of the pathway, it is now quite clear that knowledge of linguistic routines such as nursery rhymes constitutes an important aspect of children's linguistic development" (p. 426).

The importance of rhyme sensitivity to literacy development is further highlighted by indications that many children with reading difficulties are strikingly insensitive to rhyme (Bryant, MacLean, et al., 1990; Stanovich, 1992; Wright, Fields, Keating, & Newman, 1989). It is well documented that US youngsters from low-income backgrounds and some ethnic minorities, including African-Americans, perform below their European-American middle-income counterparts on tests of reading ability from the earliest grades (Dahl, 1989; Mullis, Campbell, & Farstrup, 1993). Examining predictors of reading such as rhyme and alliteration sensitivity can yield insight into possible reasons for this performance difference. Wallach and Wallach and their colleagues (Wallach & Wallach, 1976; Wallach, Wallach, Dozier, & Kaplan, 1977) found that compared to middle-income children, kindergarten children from low-socioeconomic backgrounds had low levels of phonemic awareness as measured by tests

requiring the comparison of the initial phonemes of a word to a target phoneme. They suggested that this weakness was a major cause of poor children's reading difficulties. Similar income-related differences in phonological awareness have been reported among British children (Chaney, 1994; Raz & Bryant, 1990).

This study was designed to compare the phonological awareness of children from various groups known, historically, to differ in later reading ability. Few studies have systematically explored this issue. Tasks assessing rhyme and alliteration sensitivity were used because of the established relation between these types of early phonological awareness and reading. Information was gathered from mothers and from observations of the children to explore the children's home experiences with respect to rhyme and alliteration. Participants in the study included four groups of 4-year-old children attending preschool in an Eastern city: low-income African-American, low-income European-American, middle-income African-American, and middle-income European-American. Based on prior research suggesting that low-income children may have poor phonological awareness (MacLean et al., 1987; Raz & Bryant, 1990; Wallach et al., 1977) and that low-income children's reading skills are below those of middle-income children (Dahl, 1989; Mullis et al., 1993), it was hypothesized that income-group differences would be found in performance on tasks assessing rhyme and alliteration sensitivity and nursery-rhyme knowledge. For all groups, nursery-rhyme knowledge and engagement in activities involving rhyme and alliteration were expected to be strong correlates of rhyme and alliteration sensitivity.

Method

Participants

Fifty-nine 4-year-old children enrolled in prekindergarten classes in Baltimore participated in this study. Thirty-nine of these children were part of an ongoing longitudinal project examining similarities and differences in the home and school contexts within which children from different sociocultural groups develop literacy (Baker, Serpell, & Sonnenschein, 1995; Baker, Sonnenschein, Serpell, Fernandez-Fein, & Scher, 1994; Baker et al., 1996; Sonnenschein et al., 1996). These children were all enrolled in prekindergarten classes offered by the public school system. The sampling strategy was explicitly designed to draw from urban neighborhoods with distinctive populations representing the "social reality" of Baltimore. Thus, we selected schools meeting particular demographic characteristics (e.g., low-income predominantly African-American population; low-income predominantly European-American population). Because part of this social reality is that there are relatively few public schools with prekindergarten programs that serve middle-income families, the sample had a majority of low-income families. For this study, we extended the sample to obtain a more bal-

anced representation of middle-income families. Thus, an additional 20 children enrolled in private prekindergarten programs were recruited.

All children were recruited through letters sent to their homes that described the project and requested permission to participate from parents. All of the middle-income children were recruited from four schools with a mix of African-American and European-American students; all but 8 of the low-income children were recruited from four schools that were homogeneous with respect to ethnicity (the fifth school served a low-income, heterogeneous neighborhood). Among the children attending public schools, children considered to be low income lived in low-income areas and received free lunches, whereas children considered middle income lived in a middle-income neighborhood and paid in full for their lunch. Children recruited from private preschools were all considered middle income; those who attended on day-care subsidies were excluded. Children's ethnicity was determined based on the designation in their official school record.

The total sample included 14 (6 girls and 8 boys) low-income African-American children; 15 (10 girls and 5 boys) low-income European-American children; 11 (6 girls and 5 boys) middle-income African-American children; and 19 (5 girls and 14 boys) middle-income European-American children. Table 1 presents the mean ages of the children at the time of testing, as well as maternal ages and years of education. Maternal ages and years of education were obtained through mothers' self-reports.

Analyses of variance revealed that middle-income mothers were significantly older, $F(1, 46) = 19.73$, $p < .001$, and had more years of education, $F(1, 46) = 72.01$, $p < .001$, than the low-income mothers.¹ There were no significant differences in maternal age and years of education among the African-American and European-American mothers. Although one middle-income African-American father served as his child's primary caregiver and provided the home activities information, mothers were the self-identified primary caregivers in all other cases. For ease of exposition, we use the term "mother" throughout the article.

1. Further demographic analyses were conducted among the middle-income group, because this group comprised children attending both public and private preschools (6 European-American and 4 African-American children from public preschools; 13 European-American and 7 African-American children from private preschools). No significant difference was found in the maternal age of families from these two subgroups. However, a significant difference in years of education was found, with mothers of children attending public preschools averaging 12.57 years of education, and mothers of children attending private preschools averaging 17.1 years of education, $F(1, 25) = 46.22$, $p < .001$. Despite this significant difference, children attending public and private preschools were grouped together as middle income in all analyses. The original criterion for considering a child as coming from a middle-income background was that the family was not receiving school lunch assistance, and all these families met this criterion. Additionally, the middle-income public-school mothers were significantly more educated, $F(1, 29) = 8.80$, $p < .01$, and older, $F(1, 29) = 4.28$, $p < .05$, than the low-income mothers. Thus, the middle-income public-school group alone was distinguishable from the low-income group.

TABLE 1. Mean Child Age, Maternal Age, and Maternal Years of Education

	<i>N</i>	<i>Child age</i>	<i>Maternal age</i>	<i>Maternal years of education</i>
European-American low income	15	4.83 (0.25)	30.27 (6.00)	9.42 (1.83)
African-American low income	14	4.87 (0.28)	30.92 (4.50)	11.08 (1.93)
European-American middle income	19	4.81 (0.20)	38.11 (5.83)	15.89 (2.63)
African-American middle income	11	4.80 (0.30)	36.56 (3.84)	16.00 (2.40)

Measures

Five tasks were used to assess the children's competencies: rhyme detection, rhyme production, alliteration detection, alliteration production, and nursery-rhyme knowledge. Information about children's exposure to rhyme and alliteration was obtained from their mothers.

Numerous tasks have been used to assess phonological awareness, making comparability across studies difficult (McBride-Chang, 1995; Yopp, 1988). Our decision to focus on rhyme and alliteration sensitivity was motivated by the desire to assess phonological competencies that emerge during the preschool years (Treiman, 1991) and that are most likely to be associated with home language experiences. Moreover, studies comparing a variety of different phonological awareness tasks have consistently shown that rhyme tasks are easiest for young children and that alliteration tasks are also among the easier (Stanovich et al., 1984; Yopp, 1988). Although there are a variety of different ways to assess rhyme and alliteration sensitivity, we originally decided to use tasks administered by MacLean et al. (1987) for the sake of replicability. In that study, two types of detection tasks were used, one involving detection of the "odd one out" from a set of three, and the second involving forced choice. Our own pilot testing, using both forced-choice and oddity tasks, revealed that 4-year-old children better understood the task demands within the forced-choice format. However, additional modification of the MacLean et al. procedure was made to ensure better comprehension and performance. All phonological awareness tasks impose additional processing demands on children over and above phoneme detection or manipulation. At a minimum, additional demands include speech perception, short-term memory, comparison processing, and response production (McBride-Chang, 1995; Yopp, 1988). Thus, a pure measure of phonological awareness does not exist. There is unfortunately always the possibility that poor performance on a phonological awareness task reflects limitations in one of the

component processes instead. However, through careful task selection and pilot work, we strove to ensure that children comprehended the task demands and that additional processing demands were minimized.

Given our concern with assessing knowledge of linguistic routines that are a part of children's everyday lives, an attempt was made to include culturally familiar rhymes in the competency testing. Based on Heath's (1983) ethnographic work, we suspected that children might be familiar with a variety of "street rhymes." Therefore, during pilot testing with local children from neighborhoods similar to those in this study, children were asked to tell the experimenter some rhymes that they knew. Attempts were made to elicit any known rhymes by prompting children for rhymes that they might say while playing hand-clap games, while jump roping, or while singing rap songs. Both African-American and European-American research assistants participated in this pilot testing, working with children of the same ethnicity. These efforts were not successful in eliciting any "nontraditional" rhymes from children. Despite encouragement, the children may have been hesitant to produce "nontraditional" rhymes potentially unknown to the research assistants. Alternatively, it is possible that 4-year-old children living in an urban area are simply too young to interact with peers in a setting conducive to the transmission of street rhymes. At this age, children may be exposed to mostly "traditional" rhymes in school and through television programs aimed at preschoolers.

Rhyme and alliteration detection. The rhyme- and alliteration-detection tasks, adapted from MacLean et al. (1987), consisted of forced-choice test items. Each task consisted of two practice items for which the children were given corrective feedback followed by 10 test items. In the rhyme-detection task, the children were orally presented with a word and asked if it rhymes with or sounds like either of two other words, only one of which rhymes. The form of the question asked was, for example, "Does car rhyme with far or does car rhyme with hen?" Similarly, in the alliteration-detection task, the children were orally presented with a word and asked if it starts with the same sound as either of two other words, only one of which is correct. The experimenter asked, for example, "Does pin start with the same sound as pig or does pin start with the same sound as tree?" To increase the salience of the three key words in both of these tasks, the question was asked as above for the two practice items and the first test item, then it was shortened to emphasize the two pairs of words involved in the comparisons. For instance, for the above alliteration item, the simplified phrasing was "pin and pig, or pin and tree?" If the child missed two items in a row, the experimenter returned to the longer version of the question to remind the child of the focus of the task. Practice and test items are listed in the Appendix.

Rhyme and alliteration production. The rhyme and alliteration-production tasks were also based on tasks used by MacLean et al. (1987), though additional items were added and the format of the practice items was modified to be like that of test items. In administering these tasks, the experimenter initially provided an

example of two words that rhymed, for the rhyme task, and two words that started with the same sound, for the alliteration task. Two practice items were then given and corrective feedback was provided. These items were followed by eight test items. In the rhyme-production task, the child was asked to tell the experimenter a word that rhymed with a word provided by the experimenter. Similarly, in the alliteration-production task, the child was asked to tell the experimenter a word that started with the same sound as a word provided by the experimenter. See the Appendix for practice and test items.

Nursery-rhyme knowledge. In the nursery-rhyme knowledge task, adapted from MacLean et al. (1987) for the sake of replicability, the child was asked to recite five nursery rhymes: *Twinkle, Twinkle Little Star*; *Humpty Dumpty*; *Jack and Jill*; *Baa Baa Black Sheep*; and *Hickory Dickory Dock*. These rhymes were selected by MacLean et al. because they were familiar to children in England, and pilot testing revealed that they were familiar to children locally as well.

The nursery-rhyme knowledge task consisted of telling children the name of each of the five rhymes listed above and asking them to say it to the experimenter. In a modification of the technique used by MacLean et al, which did not allow prompting, if the child hesitated, the experimenter said the beginning of each line slowly, with pauses, so that the child could take over. The final rhyming word at the end of each line was not prompted in order to allow the child the opportunity to produce this word. However, if the child did not produce the final word, it was provided before moving on to the next line of the rhyme.

Home experiences questionnaire. Mothers were asked several questions pertaining to their children's exposure to activities that may foster rhyme and alliteration sensitivity. Mothers estimated how often their child engaged in word games, hand-clap games, singing, and book interactions, with separate questions focusing on preschool books (e.g., ABC-type books); picture books (i.e., books without a printed story), storybooks, and nonfiction books. Information about children's book experiences was gathered because many books for children contain rhyme and/or alliteration. Furthermore, exposure to books could affect rhyme and alliteration sensitivity by enhancing the child's awareness of the sounds in words. Mothers indicated the frequency of their child's participation in each activity using a four-point scale: 0 – never; 1 – rarely, less than once a week; 2 – occasionally, at least once a week; and 3 – often, almost every day.

Mothers were also asked to respond to several questions that dealt more specifically with rhyme and alliteration: (a) Are there any rhymes you know of that your child is familiar with? These could be anything where there are words that end with the same sounds, like songs, poems, word games, etc. If so, what? (b) Are there any tongue twisters you know of that your child is familiar with, where the words start with the same sound? If so, what? (c) What are the titles of two songs your child knows how to sing?

Diaries of children's everyday activities. Diaries kept by the mothers of the children in the longitudinal project provided additional information about

children's oral language experiences. Mothers were instructed to describe, either orally into a tape recorder or in written form in a notebook, each activity their child engaged in over a 1-week period and to provide details about other participants, materials, and so on (see Baker et al., 1994). Diaries were not requested from the mothers of children recruited only for the present study.

Procedure

Competency measures. The four measures of rhyme and alliteration sensitivity and the measure of nursery-rhyme knowledge were given to children in individual testing sessions at their school during the spring of their prekindergarten year. Because these measures were a subset of the measures used in the longitudinal project, two testing sessions were necessary for the 39 children who were participants in the larger study. The rhyme-detection and rhyme-production tasks, in this order, were given near the end of the first of these half-hour sessions. The alliteration-detection, nursery-rhyme knowledge, and alliteration-production tasks were administered, in this order, in the middle of the second half-hour session. The two sessions were approximately 1 week apart. The 20 children who were participants solely in the present study were administered these five tasks in the same order in one session.

In all cases, a research assistant who was ostensibly the same ethnicity as the child and was unknown to the child served as tester. A total of four research assistants, two European-American and two African-American, served as testers. These assistants attended several training sessions in which they practiced the administration of the competency measures through role-playing and discussions. Additionally, all research assistants rehearsed the administration of the tasks with children in pilot testing. An ethnicity match was made between the tester and child in order to elicit the best possible performance from each child, consistent with the recommendation of Labov (1972). All sessions were videotaped and/or audiotaped to facilitate scoring.

Language-play observation. The children's rhyme and alliteration skills were also assessed within a less structured context. Thirty-two of the children who participated in the larger project were asked to demonstrate their knowledge of rhyme and alliteration at home. In this observation, each child was paired with an older playmate, usually his or her older sibling. Prior to beginning the session with the children, mothers were asked for examples of rhymes or tongue twisters familiar to the child and were then encouraged to leave the room. The children were invited to "play some games" that involved sensitivity to rhyme and alliteration. These included reciting rhymes that they knew, finishing a rhyme begun by the experimenter, making up a rhyme of their own, reciting tongue twisters that they knew, and making up a tongue twister of their own. The names of rhymes and tongue twisters provided by the mothers were used as

prompts if the children hesitated. The entire session was videotaped to facilitate later scoring.

A modified version of the language-play observation was conducted at school with the 20 additional children who were recruited for the present study. Following the administration of the competency measures, the children were asked to engage in the same forms of language play, but without the collaboration of a playmate.

Home experiences questionnaire. For the children in the larger study, the questions about the frequency of participation in word games, hand-clap games, singing, and book interactions, as well as the question about favorite songs, were asked of the mother in a home visit that occurred prior to the language-play visit and prior to the testing at the child's school. These questions were part of a larger set of inquiries about the child's activities (see Baker et al., 1994). These interviews with mothers were audiotaped.

For the additional children in the present study only, these questions were sent home in a written questionnaire after the child had been visited at the school. Questions asking for examples of rhymes or tongue twisters familiar to the child (asked during the language-play observation for the other children) were also contained in the questionnaire. Because all these families were middle-income and the parents were literate, requesting this information in written form was not regarded as a problem. To allay possible concerns about the comparability of responses provided in written or oral form, we compared the frequency data provided orally by the middle-income mothers in the larger project with the frequency data provided in writing by the other middle-income mothers. There were no significant differences on any of the activity measures with the exception of hand-clap games and word games, which were rated as lower in frequency by the mothers of children in the larger project.

Scoring

Rhyme and alliteration detection and production. The number of items, out of 10, that each child answered correctly on the rhyme- and alliteration-detection tasks comprised the child's score on each of these two tasks. The rhyme- and alliteration-production tasks were scored by counting the number of correct responses out of eight. Nonsense words that rhymed with the target word, in the case of the rhyme task, or that started with the same sound as the target word, in the case of the alliteration task, were scored as correct. Responses that involved modifying the target word, for instance *billy goat* for *goat*, or in the case of alliteration, *sailing* for *sail*, were not scored as correct because such responses were essentially a repetition of the target word.

Nursery-rhyme knowledge. Performance on each of the five nursery rhymes was scored using a four-point scale. The four values on this scale were:

0 – no knowledge of the rhyme; 1 – some knowledge; 2 – more knowledge, including some of the key rhyming words; and 3 – knowledge of most of the rhyme. This scoring system is a refinement of MacLean et al.'s (1987) three-point system that included knowledge of the whole rhyme, part of it, or none of it. Our system distinguishes between knowledge of part of the rhyme that does *not* include the rhyming words and knowledge of part of the rhyme that *does* include the rhyming words. For example, a child who recited *Humpty Dumpty* as, "Humpty Dumpty fell and they couldn't put him together" clearly has some knowledge of the rhyme, but did not include any of the rhyming words. Therefore, this child would receive a score of 1. A child who said, "Humpty Dumpty had a great fall off the wall and the men couldn't put him together again," has partial knowledge of the rhyme that does include the rhyming words – *fall*, *wall*, *men*, and *again*. This child would receive a score of 2. The scores on each of the five rhymes were summed and divided by five to arrive at each child's nursery-rhyme knowledge score, which could range from 0 to 3. An independent scorer rated the rhymes produced by 20% of the children. There was 95% agreement between scorers, with disagreements resolved through discussion.

Language-play observation. The focus in scoring the language-play observation was on the production of original rhyme and alliteration by the focal child. The first word in a rhyme or alliterative string was viewed as the "target" word, and the child was given one point for each word that rhymed with, or was alliterative to, this word. For instance, a child who said, "There once was a boy who had a *hat* and a *cat* and a *bat*" was given credit for two instances of rhyme production. Similarly, a child who made up an original alliterative string received an alliterative-production score reflecting the number of words that started with the same sound as the target word in the sequence. Interrater reliability was calculated on the responses of 20% of the children by determining the percentage of rhyme and alliteration instances recognized by either coder that were recognized by both. This figure was 88% for rhymes and 91% for alliterations; disagreements were resolved through discussion.

Results

The presentation of the results is organized around three main foci: children's performance on the competency measures, children's home experiences, and correlates of rhyme and alliteration sensitivity.

Performance on Competency Measures

The children's performance on the phonological sensitivity measures and on the

nursery-rhyme knowledge task is presented in Table 2.² As can be seen, performance on the alliteration-production task was uniformly low; in fact, 64% of the children had zero items correct. Because of this floor effect, the alliteration-production task was not included in subsequent analyses. Floor effects were not a problem for the other measures. No children earned scores of zero on the rhyme-detection and alliteration-detection tasks; 7% of the children earned scores of zero on the nursery-rhyme knowledge task, and 26% of the children earned scores of zero on the rhyme-production task.

Analyses of variance were used to compare the performances of children from the four different sociocultural groups on each of the tasks. These analyses indicated significant effects of sociocultural group for the three phonological measures: rhyme detection, $F(3, 55) = 10.50$, $p < .001$; rhyme production, $F(3, 55) = 10.98$, $p < .001$; and alliteration detection, $F(3, 53) = 5.91$, $p < .01$. There was also a significant group effect for nursery-rhyme knowledge, $F(3, 55) = 12.68$, $p < .001$.³ Follow-up tests using Scheffe's procedure revealed the locus of the group differences (shown in Table 2 via superscripts). In sum, there were a number of significant differences in performance involving children from different income levels both within and across ethnicity, but only one significant difference involving ethnicity within the same income level: the African-American low-income children's performance on the nursery-rhyme task was significantly lower than that of the European-American low-income children.

Home Experiences

Table 3 presents reported frequencies of engagement in activities with the potential to foster rhyme and alliteration sensitivity. Analyses of variance were again used to examine possible differences with respect to sociocultural group. Significant effects were obtained in frequency of interactions with word games, $F(3, 53) = 6.61$, $p < .001$; ABC-type books, $F(3, 53) = 6.34$, $p < .001$; picture books, $F(3, 54) = 3.50$, $p < .05$; story books, $F(3, 54) = 4.63$, $p < .01$; nonfiction

2. In considering performance on the detection tasks, note that because these tasks consist of 10 two-choice trials, chance-level performance would be 5 correct. On the rhyme-detection task, 37 children (63%) scored above 5, whereas on the alliteration-detection task, 22 children (39%) scored above 5. However, on both tasks, a score of 9 or more would be considered *significantly* above chance ($p < .05$) according to the binomial test. On the rhyme-detection task, 22 children (37%) attained this level of performance, whereas 7 children (12%) did so on the alliteration-detection task. Because a score significantly above chance requires a near-perfect performance, a ceiling effect would have resulted if all children performed at this level. The fact that a substantial number of children scored greater than 5 indicates that these were viable tasks for these children that nevertheless allowed enough variability in performance to permit analyses.
3. Sample sizes vary slightly in these analyses because we were unable to administer every task to all children, largely because of absences on scheduled testing days. Eliminating children with missing data from all analyses would have resulted in a decreased sample size. All available data are used in each analysis to optimize power.

TABLE 2. Mean Number of Correct Responses on Competency Measures

	<i>European-American low income</i>	<i>African-American low income</i>	<i>European-American middle income</i>	<i>African-American middle income</i>
Rhyme detection	6.53 ^{a,b} (2.67)	4.36 ^a (1.39)	8.47 ^{b,c} (1.98)	7.18 ^{b,c} (2.18)
Rhyme production	2.80 ^{a,b} (3.41)	0.92 ^a (1.61)	6.33 ^c (2.43)	4.91 ^{b,c} (3.33)
Alliteration detection	4.79 ^a (1.85)	4.46 ^a (1.20)	6.95 ^{b,c} (2.51)	4.91 ^{a,b} (1.38)
Alliteration production*	0.43 (0.65)	0.54 (0.66)	1.35 (2.42)	1.18 (2.40)
Nursery-rhyme knowledge	1.61 ^b (0.63)	0.73 ^a (0.52)	2.06 ^b (0.63)	2.00 ^b (0.87)

Note. Detection figures are based on 10 items, production figures are based on 8 items, and nursery-rhyme knowledge scores are based on a 0 to 3 scale. Superscript letters are used to indicate which means are significantly different from one another. If two or more means share a superscript, those means are not significantly different. If the superscripts differ, the means are significantly different.

*Due to children's poor performance on this measure, these scores were not included in any analyses.

books, $F(3, 53) = 6.83$, $p < .001$; and books in general (a composite measure), $F(3, 53) = 13.34$, $p < .001$. Follow-up tests using Scheffe's procedure revealed the locus of the group differences (shown in Table 3 via superscripts). In sum, all significant differences in frequency of exposure to activities with the potential to foster rhyme and alliteration sensitivity involved children from different income levels. Some of these significant differences involved children of the same ethnicity, whereas others involved children of different ethnicities. There were no significant differences among children of the same income level.

The children's experiences with rhyme and alliteration were also examined by cataloguing the routines mentioned by parents and/or recited by children during the language-play observations. In general, children from all four sociocultural groups tended to be familiar with a similar set of rhyming routines. At least some families from each group mentioned the *ABC Song*, *Eenie Meenie*, *Humpty Dumpty*, *Miss Mary Mack*, *Itsy Bitsy Spider*, *Jack and Jill*, and *Barney's "I Love You" Song*. In fact, *Barney's "I Love You" Song* was mentioned by all of the European-American low-income families and by approximately half of the families in the other groups. The nursery rhymes included in the nursery-rhyme task seemed to be roughly equally familiar across groups, with over half of the families in each group spontaneously mentioning at least one of these rhymes. Children were not as familiar with tongue twisters, routines which contain alliteration. Peter Piper was the only tongue twister mentioned by a substantial

TABLE 3. Mean Reported Frequency of Activity Engagement

Activities	European-American low income	African-American low income	European-American middle income	African-American middle income
Word games	0.73 ^a (1.10)	0.75 ^a (1.06)	1.63 ^{a,b} (1.07)	2.27 ^{b,c} (0.79)
Hand-clap games	1.13 ^a (1.30)	1.08 ^a (1.11)	1.00 ^a (0.75)	1.91 ^a (0.83)
Singing	2.40 ^a (0.74)	2.54 ^a (0.97)	2.42 ^a (0.69)	2.73 ^a (0.47)
ABC-type books	0.80 ^a (1.01)	1.25 ^{a,b} (1.06)	2.00 ^{b,c} (1.05)	2.36 ^{b,c} (1.03)
Picture books	0.33 ^a (0.90)	0.69 ^a (0.95)	1.32 ^a (1.11)	1.55 ^a (1.51)
Story books	2.33 ^{a,b} (0.82)	2.00 ^a (0.91)	2.68 ^{a,b} (0.67)	3.00 ^{b,c} (0.00)
Nonfiction books	0.57 ^{a,b} (1.02)	0.38 ^a (0.96)	1.47 ^{b,c} (1.02)	2.00 ^c (1.18)
Composite book exposure*	0.96 ^a (0.55)	1.10 ^a (0.64)	1.87 ^b (0.63)	2.23 ^b (0.54)

Note. Figures are based on caregiver ratings of engagement on a scale of 0 (child never engages in activity) to 3 (child engages in activity often, almost every day). Superscript letters are used to indicate which means are significantly different from one another. If two or more means share a superscript, those means are not significantly different. If the superscripts differ, the means are significantly different.

*Represents the mean of the frequencies of exposure to all types of books.

percentage of mothers (25%). Based on these data, it seems that children this age have more opportunity to learn about rhyme from routines than they do to learn about alliteration.

To further characterize children's experiences, mothers were also asked to list two songs familiar to their child. There was a tendency for middle-income groups to mention traditional children's songs (e.g., *Happy Birthday*, *You Are My Sunshine*), whereas the low-income groups more often mentioned contemporary songs (e.g., *Achy Breaky Heart*, *I will Always Love You*). A subsample of mothers representing all four sociocultural groups from the larger project was also specifically asked about their children's interactions with books that contain rhyme. Of the 27 mothers asked this question, 67% noted that their child experienced books that contain rhyme at least occasionally. This evidence that children are exposed to rhymes in songs and books indicates these are likely sources from which children can learn about rhyme.

Information about children's home experiences potentially relevant to rhyme and alliteration sensitivity was also obtained from diaries kept by the

mothers in the longitudinal study. These diaries revealed that most children in all groups engaged in relevant oral language activities during the diary week. The most common oral activity mentioned in the diaries was singing. Other oral activities mentioned by a number of parents were reciting the ABCs (which could also be sung) or counting. Rhyming activities were specifically mentioned by 10% of the families. These activities involved saying rhyming words and saying or reading nursery rhymes. In most of these cases, the child initiated the rhyming activity. It is evident from the diaries that oral activities with the potential to foster phonological awareness are a part of the lives of nearly all of these preschoolers.

Correlates of Rhyme and Alliteration Sensitivity

Competency measures. The correlations among the four phonological sensitivity tasks and the nursery-rhyme task are presented in Table 4. With the exception of the alliteration-production task, which yielded floor effects, performance on the tasks was generally highly correlated.

The scores obtained during the language-play observation were correlated with scores on the competency measures to see how the children's performance in a relatively less structured context related to their performance on the formal tasks. The alliteration-production scores were extremely low on this task as well (range, 0–0.11) and were not analyzed further. The means (and standard deviations) of the rhyme-play scores were 1.20 (1.93) for the low-income European-American group, 0.92 (1.61) for the low-income African-American group,

TABLE 4. Correlations Among Competency Measures

	<i>Rhyme detection</i>	<i>Rhyme production</i>	<i>Alliteration detection</i>	<i>Alliteration production</i>	<i>Nursery-rhyme knowledge</i>
Rhyme detection	—	.87**	.51**	.18	.60**
Rhyme production		—	.38**	.20	.67**
Alliteration detection			—	.28*	.33*
Alliteration production				—	.26
Nursery-rhyme knowledge					—

*p < .05

**p < .01

2.35 (2.18) for the middle-income European-American group, and 2.11 (2.00) for the middle-income African-American group. Analysis of variance of the rhyme scores revealed no significant sociocultural differences. Children's production of original rhymes during the observation was significantly correlated with their performance on the rhyme-detection ($r = .58, p < .01$) and rhyme-production tasks ($r = .62, p < .01$).

Home experiences. To explore the relations between the children's home experiences and their sensitivity to rhyme and alliteration, a correlation matrix was derived that yielded the correlations between frequency of engagement in word games, hand-clap games, singing and book interactions, and performance on the phonological sensitivity and nursery-rhyme tasks (see Table 5). Significant correlations were found between frequency of participation in word games and performance on the rhyme-detection task ($r = .39, p < .01$), the rhyme-production task ($r = .47, p < .01$), and the nursery-rhyme knowledge task ($r = .32, p < .05$). Rhymes were explicitly mentioned to mothers as an example of a type of word game and therefore they had rhymes in mind when responding to this item. Examples of rhyming word games that were mentioned included playing a game that entails matching pictures of items that rhyme, reciting Mother Goose rhymes, and most commonly, making up words that rhyme with other words.

Frequency of engagement with books also related to rhyme sensitivity and nursery-rhyme knowledge. A composite score reflecting frequency of interactions with various kinds of books (derived by calculating the mean of the frequencies of exposure to preschool, picture, story, and nonfiction books) was related to the rhyme-detection task ($r = .44, p < .01$), the rhyme-production task ($r = .45, p < .01$), and the nursery-rhyme knowledge task ($r = .38, p < .01$). Frequencies of interactions with each of these types of books individually were also

TABLE 5. Correlations Between Frequency of Activity Engagement and Performance on Competency Measures

	<i>Rhyme detection</i>	<i>Rhyme production</i>	<i>Alliteration detection</i>	<i>Nursery-rhyme knowledge</i>
Word games	.39**	.47**	.16	.32*
Hand-clap games	-.15	-.08	-.13	.12
Singing	.02	-.01	-.09	.27*
ABC-type books	.28*	.30*	.18	.31*
Picture books	.36**	.34*	.11	.24
Story books	.28*	.31*	.08	.27*
Nonfiction books	.34*	.34*	.00	.30*
Book Total	.44**	.45**	.11	.38**

* $p < .05$

** $p < .01$

significantly correlated with performance on the rhyme and nursery-rhyme knowledge tasks. Frequency of engagement in singing was significantly correlated with performance on the nursery-rhyme knowledge task ($r = .27, p < .05$). Frequency of engagement in hand-clap games was not related to their performance on any of the competency measures.

Predictors of rhyme sensitivity. To increase the power of our regression analyses, a composite score for rhyme sensitivity was calculated, based on performance on the rhyme-detection and rhyme-production tasks. The alliteration tasks were not included in this composite measure because of the floor effects on alliteration production and because the tasks were not as highly correlated with other measures as the rhyme measures. The performance composite was derived by first obtaining z scores for the rhyme tasks, summing them, and then calculating the mean.

A preliminary regression analysis was designed to determine which of the variables found to be important through analyses of variance and correlational analyses were, in fact, the most powerful predictors of rhyme sensitivity. The predictor variables were the demographic variables of maternal education, income, and ethnicity, and the experiential variables of nursery-rhyme knowledge, frequency of interactions with books (a composite averaging exposure to each type of book), and frequency of engagement in word games. This regression analysis was conducted using stepwise selection. Maternal education entered the regression equation first and accounted for 45% ($p < .001$) of the variance in rhyme sensitivity. Nursery-rhyme knowledge entered the equation next and accounted for 12% ($p < .01$) of the variance. Ethnicity, the third variable to enter this equation, accounted for an additional 5% ($p < .05$) of the variance in rhyme sensitivity. None of the other variables accounted for significant variance. These results indicate that, among the demographic variables, maternal education was the most powerful predictor of rhyme sensitivity and that, among the experiential variables, nursery-rhyme knowledge was the most powerful predictor.

The relations among children's knowledge of nursery-rhymes, their home experiences, and sensitivity to rhyme were further explored in a second regression analysis. Once again, rhyme sensitivity served as the criterion variable. Nursery-rhyme knowledge, frequency of engagement with books, frequency of engagement in word games, maternal education, and ethnicity served as the predictor variables. The first three variables were entered first, as a set using forward selection, to explore the contribution of these relevant home experiences. Maternal education and ethnicity were entered last, as a set using forward selection, to determine if these demographic variables, which explained significant variance in the stepwise regression, explained any additional significant variance once the contributions of home experiences had been accounted for. This analytical strategy for order of entry is consistent with our theoretical orientation on literacy development. There is precedent for entering the variables believed to be the most potent sources of influence first into a regression equation and entering "marker" variables subsequently (Chaney, 1994). Certainly no one would argue that a person's education or ethnicity is a direct cause of a particular

outcome; rather, experiential variables that may be highly correlated with demographic variables are more likely the proximal causal agents.

The variables entered the equation in the order in which they are listed in Table 6. Nursery-rhyme knowledge accounted for 35% of the variance in sensitivity to rhyme. Frequency of participation in word games accounted for an additional 6% of the variance, indicating that, as expected, engagement in activities that involve rhyme fosters sensitivity to rhyme. Once these variables were controlled, interactions with books did not account for a significant amount of variance. Maternal education accounted for 13% of the variance, and ethnicity accounted for 5% of the variance, suggesting that these demographic variables relate to children's rhyme sensitivity in a manner independent of their nursery-rhyme knowledge and experiences with word games and books.

To explore the relations between the demographic variables and the experiential variables, three other regression analyses were conducted. These stepwise regressions used each of the experiential variables as the criterion variable in an equation that used the three demographic variables as predictors. Income was the best predictor of children's nursery-rhyme knowledge ($\Delta R^2 = .38$, $p < .001$) and children's frequency of engagement with books ($\Delta R^2 = .45$, $p < .001$). Neither maternal education nor ethnicity accounted for significant variance in these regression equations. Maternal education was the most powerful predictor of children's frequency of engagement in word games ($\Delta R^2 = .29$, $p < .001$), with neither ethnicity nor income accounting for significant variance. These analyses indicate that income and/or maternal education, which are highly correlated ($r = .78$), were more powerful predictors of these home experiences than ethnicity.

TABLE 6. Hierarchical Regression Results for Rhyme Sensitivity

	Variable	B	SE B	Beta	ΔR^2	Sig. Lev.
Block 1						
Step						
1	Nursery-rhyme knowledge	.35	.14	.30	.35	**
2	Word games	.02	.11	.03	.06	*
3	Books	.07	.15	.06	.02	NS
Block 2						
Step						
4	Maternal education	.13	.04	.51	.13	**
5	Ethnicity	-.45	.20	-.23	.05	*

* $p < .05$

** $p < .001$

The relations between engagement in relevant activities, knowledge of nursery rhymes, and rhyme sensitivity were examined for each sociocultural group separately in exploratory analyses. The rhyme sensitivity composite score was used, and a second composite score of activity engagement was derived by calculating the mean of mothers' estimates of frequency of participation in word games and the composite figure for book interactions. As expected, based on results reported earlier, these variables were all highly correlated when the full sample was considered: Sensitivity to rhyme was significantly related to both nursery-rhyme knowledge ($r = .65, p < .01$) and activity engagement ($r = .52, p < .01$). Nursery-rhyme knowledge and activity engagement were also significantly correlated with each other ($r = .42, p < .01$). A particularly strong correlation existed for the middle-income African-American group between nursery-rhyme knowledge and rhyme sensitivity ($r = .80, p < .01$). The magnitudes of the correlations between activity engagement and rhyme sensitivity ($r = .53$) and activity engagement and nursery-rhyme knowledge ($r = .58$), though failing to reach significance, were also quite high. In contrast, the relations between these pairs of variables were near zero for the African-American low-income group. The magnitude of the correlations for the European-American children fell in between these extremes. The data must be interpreted cautiously because of limited sample size and differential variability in scores among the groups. Nevertheless, they suggest a trend toward relatively stronger relations among these variables for African-American children from middle-income backgrounds and weaker relations for low-income African-American children.

Discussion

The results reveal that middle-income preschoolers have higher levels of rhyme and alliteration sensitivity than preschoolers from low-income backgrounds. Middle-income children also have more knowledge of traditional nursery rhymes and more frequently engage in interactions involving word games and books, factors which are strong correlates of rhyme sensitivity. These findings and their implications are discussed in this section.

Results favoring middle-income children in performance were consistent with a growing body of evidence of income-related differences in phonological awareness (Chaney, 1994; Raz & Bryant, 1990; Wallach & Wallach, 1976). The close relation that has been demonstrated between sensitivity to rhyme and alliteration and later reading (Bradley & Bryant, 1983; Bryant et al., 1989; Bryant, MacLean, & Bradley, 1990; Bryant, MacLean, et al., 1990; Gathercole et al., 1991; MacLean et al., 1987) leads to the suggestion that one reason for the problems encountered by low-income youngsters in learning how to read (Dahl, 1989; Heath, 1983; Ninio, 1990; Purcell-Gates, 1989) is their relatively poor sensitivity to rhyme and alliteration. However, the role of rhyme sensitivity in early

reading has been challenged on the grounds that measures of rhyme are not strongly correlated with other measures of phonological awareness (Stanovich et al., 1984; Yopp, 1988) and are based on evidence that it is phonemic awareness rather than rhyme knowledge that predicts reading ability (Cardoso-Martins, 1994, 1995; Lundberg, Frost, & Peterson, 1988). Nevertheless, the issue is not yet resolved and remains a fruitful area of further inquiry.

This study characterized the children's home experiences by examining frequency of participation in activities thought to foster rhyme and alliteration sensitivity. The results revealed that middle-income children engaged in such activities more frequently than low-income children. This is consistent with many other studies showing that middle-income children have more exposure to books than low-income children (Bus, van Ijzendoorn, & Pellegrini, 1995; Scarborough & Dobrich, 1994), as well as recent evidence of income-related differences in exposure to rhyming activities (Chaney, 1994; Elliott & Hewison, 1994; Marvin & Mirenda, 1993). In our sample, African-American and European-American children of the same income level participated in relevant activities with about the same frequency.

It is of course possible that some of the differences in children's performance may be attributable to experiences at school rather than at home. One limitation of the present study is that we did not do observations in the classrooms of these students, so we do not have firsthand knowledge of the extent of activities that might promote phonological awareness. However, we conducted interviews with the seven teachers of the children in the longitudinal project and learned that singing was a daily activity in all of their classrooms, as was storybook reading. We do not have comparable information from the three teachers of the middle-income children selected for this study, but it is probably safe to assume that such activities also occurred regularly given the commitment to developmentally appropriate practice espoused in informal conversation.

The specific linguistic routines containing rhyme and alliteration familiar to the children in each sociocultural group overlapped considerably. All of the routines mentioned by the mothers are popular, mainstream (middle-income European-American) children's routines. It seems clear that the influence of the majority culture is present in the lives of all children, even those who are themselves members of a minority group. A common routine mentioned by mothers in all groups was the theme song for the television show *Barney*, the "I Love You" Song, suggesting that many children watch the show. It is not uncommon for mainstream children's routines to be performed on this show. Perhaps the media provides one vehicle through which children from different income-level and ethnic backgrounds come to know a common set of linguistic routines.

As expected, based on the work of Bryant and his colleagues (Bryant et al., 1989; MacLean et al., 1987), nursery-rhyme knowledge was highly correlated with sensitivity to rhyme. Children may gain sensitivity to rhyme when they learn to recite nursery rhymes; alternatively, correct recitation of nursery rhymes may depend on rhyme sensitivity. An examination of children's home

experiences revealed that frequency of participation in word games and in book interactions was related both to rhyme sensitivity and nursery-rhyme knowledge. Additionally, engagement in singing was related to nursery-rhyme knowledge. At least some of the activities that children engage in at home may enhance their phonological awareness; but to acknowledge alternative pathways, children who are more advanced in phonological awareness may be more inclined to participate in word games.

As with all correlational research, direction of causality cannot be determined from these data (Scarborough & Dobrich, 1994). It is possible that children's home experiences influence their phonological awareness or that children's phonological awareness influences the experiences they have at home. Indeed, causality may flow in both directions. Alternatively, a third variable could influence the relation between home experiences and phonological awareness. For example, as mentioned earlier, school experiences likely play a role in children's development of phonological awareness. Children's letter knowledge may also contribute to their phonological awareness (Ehri, 1984; Wagner, Torgesen, & Rashotte, 1994). Information about the letter knowledge of children in the larger project was available to us; number of letters identified was significantly related to rhyme detection, rhyme production, and nursery-rhyme knowledge. To clarify the direction of influence among these variables, it would be necessary to conduct an experimental intervention study in which children were systematically exposed to rhyming games and activities, and performance on pretest and posttest measures of phonological sensitivity was compared to that of a control group with similar school experiences and letter knowledge.

Multiple regression analyses extended the correlational findings. Nursery-rhyme knowledge accounted for a substantial portion (35%) of the variance in sensitivity to rhyme, consistent with the results of MacLean et al. (1987) and Bryant et al. (1989). Frequency of engagement with word games accounted for 6% of the variance, even after controlling for the contribution of nursery-rhyme knowledge. This indicates that although nursery-rhyme knowledge is the stronger of the two predictors, exposure to word games does make an additional contribution to children's rhyme sensitivity. Both nursery rhymes and word games provide children with opportunities to learn about the sounds in words.

The multiple regression analyses also provided information about the contributions made by maternal education, income, and ethnicity to children's rhyme sensitivity and rhyme experiences. Maternal education was the most powerful of these predictors, accounting for 45% of the variance in rhyme sensitivity when allowed to enter the regression equation first. Once the contribution of maternal education was accounted for, income did not contribute significantly to rhyme sensitivity. This is to be expected given that maternal education and income are highly correlated. However, either maternal education or income accounted for significant variance in nursery-rhyme knowledge, frequency of engagement with word games, and frequency of engagement with books. Ethnicity did not account for significant variance in children's rhyme

experiences, but did account for 5% of the variance in children's rhyme sensitivity, even after the contributions of home experiences and maternal education were controlled. Thus, ethnicity contributed to rhyme sensitivity independent of the home experiences measured in this study. More research is needed to identify the variables mediating the relation between ethnicity and rhyme sensitivity.

Among the factors that might mediate this relation is the possibility that although African-American and European-American children may engage in relevant activities with the same frequency, other aspects of these interactions may differ. For instance, there is some evidence from this study that African-American children participate in such activities with other children, whereas European-American children more often engage in these activities with adults. Mothers were asked to indicate who most frequently participated in word games and book interactions with their child. Among mothers who reported that their child engaged in word games at least once a week with either adults or children, 67% of European-American mothers and 56% of African-American mothers reported that their child most frequently played word games with an adult. Among mothers who indicated that their child engaged with different types of books at least once a week with either adults or children, the percentage of mothers reporting adults as the primary coparticipants with ABC-type books was 73% and 45% for European-American and African-American families, respectively; with picture books, 100% and 25% for European-American and African-American families, respectively, $\chi^2(1, N = 7) = 3.95, p < .05$; with story books, 73% and 64% for European-American and African-American families, respectively; and nonfiction books, 89% and 71% for European-American and African-American families, respectively. Although only the comparison involving picture books is statistically significant, these data show a consistent trend toward more interactions with adults during these activities among European-American children than African-American children. Engagement in such activities with more knowledgeable adults may make them more conducive to fostering rhyme sensitivity, just as interactions with adults rather than peers facilitates learning in other cognitive domains (Rogoff, 1990).

The exploratory correlational analyses involving individual sociocultural groups suggest that the relations between rhyme sensitivity, nursery-rhyme knowledge, and engagement with word games and books may be relatively weaker in children from low-income backgrounds and stronger in children from middle-income backgrounds, particularly among African-American children. Low-income children performed at lower levels than their middle-income counterparts on the rhyme and nursery-rhyme knowledge tasks, and they less frequently participated in word games or book interactions. Their low scores and reduced variability on these measures may have contributed to weak relations among the variables. On the other hand, these weaker relations may indicate that the factors that relate to rhyme sensitivity are different for low-income children. Correlations were near zero among the low-income African-American

children, suggesting that other factors are especially influential in this group. In contrast, the strong relations among these variables for the African-American middle-income children suggest that activities involving word games, books and nursery rhymes are particularly important in these children's development of rhyme sensitivity.

Thus, there are indications that the home variables related to the development of rhyme sensitivity are different for children from different sociocultural backgrounds, consistent with a multicultural perspective on literacy (Au, 1995). An expanded understanding of children's home experiences that may be relevant to phonological awareness is crucial in understanding the development of phonological awareness among children from different backgrounds and in coordinating efforts to improve it. In designing our study, we sought through pilot work to identify linguistic routines that might be differentially familiar to children from different sociocultural groups to include among the competency measures. As noted earlier, our elicitation attempts were unsuccessful, suggesting that preschoolers may have not yet learned a repertoire of "street rhymes." Based on these self-reports, it seems that young children growing up in the United States may learn rhymes common to the shared "American" culture first and gain familiarity with other rhymes as they get older. Our study therefore tapped the knowledge that children from different sociocultural groups have of traditional rhymes from the popular culture. For the sake of replicability, we chose to use only the nursery rhymes tested by Bryant and his colleagues, which pilot work showed were also familiar to Baltimore preschoolers. Nevertheless, the fact that low-income African-American children in the sample were less knowledgeable of these mainstream nursery rhymes suggests that these rhymes were not as salient a feature of their early literacy experiences as they were for children from the other sociocultural groups. Because the rhymes children are most likely to be interested in learning will likely be those that are common and valued in their community, ethnographic research aimed at characterizing such routines would be an important first step in designing an intervention program for promoting phonological awareness that is grounded in everyday cultural practices.

Parents and teachers of young children are routinely given advice to engage children in rhyming activities on the grounds that sensitivity to the sounds of the language will facilitate understanding of the alphabetic principle, which in turn will help children learn to read (Cunningham, 1992; Hannon, 1995; Yopp, 1995). Although the results of this study and those of Bryant et al. (1989) suggest a link between engagement in such activities and the development of phonological sensitivity, the results are of course correlational. We know that phonemic awareness can be taught through formal instruction involving drill and practice (e.g., Ball & Blachman, 1991; Lundberg et al., 1988), but what is still needed is a demonstration that language play as it is embedded within everyday experiences at home and school is itself valuable in promoting phonological awareness.

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APPENDIX
Competency Measure Items

Rhyme Detection

Practice items:

bat	pig	mat
sail	nail	boot

Test items:

cat	hat	bell
fish	dish	book
arm	bus	farm
sand	hand	cup
hen	car	pen
wall	dog	ball
boat	goat	head
hill	pill	duck
sock	bed	rock
sun	toy	fun

Alliteration Detection

Practice items:

shell	shop	band
jump	read	juice

Test items:

pin	pig	tree
sing	bird	soft
gate	game	box
card	frog	coat
dog	doll	sun
man	fish	moon
bed	hair	bell
teeth	toast	girl
hand	book	hat
leaf	light	rain

Rhyme Production

Practice items:

bed
top

Test items:

cat
goat
tail
bell
fun
hit
light
nap

Alliteration Production

Practice items:

run
sock

Test items:

door
fox
sail
cook
gate
tap
ball
lake