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Past Tense Marking by African American English–Speaking Children Reared in Poverty

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Abstract

Purpose—This study examined past tense marking by African American English (AAE)-speaking children from low- and middle-income backgrounds to determine if poverty affects children's marking of past tense in ways that mirror the clinical condition of specific language impairment (SLI).

Method—Participants were 15 AAE-speaking 6-year-olds from low-income backgrounds, 15 AAE-speaking 6-year-olds from middle-income backgrounds who served as age-matched controls, and 15 AAE-speaking 5-year-olds from middle-income backgrounds who served as language-matched controls. Data were drawn from language samples and probes.

Results—Results revealed high rates of regular marking, variable rates of irregular marking, high rates of over-regularizations, and absence of dialect-inappropriate errors of commission. For some analyses, marking was affected by the phonological characteristics of the items and the children's ages, but none of the analyses revealed effects for the children's socioeconomic level.

Conclusions—Within AAE, poverty status as a variable affects past tense marking in ways that are different from the clinical condition of SLI.

Keywords

African American English; low-income; past tense; grammatical morphology; specific language impairment (SLI)

Children reared in poverty and children diagnosed with specific language impairment (SLI) demonstrate language abilities that are often lower than what is expected for their age and grade level. However, low overlapping test scores do not mean that these two groups of children present the same types of language learning difficulties. In fact, most would argue that the nature of their deficits must differ because the source of their problems is not identical. Children from low-income families have been shown to have limited input, in terms of volubility and quality, when compared to children from wealthier families, and these differences have been linked to delayed language abilities (Hart & Risley, 1995). In contrast, children diagnosed with SLI exhibit significant limitations in language ability that cannot be attributed to the environment, problems of hearing, neurological status, nonverbal intelligence, or other known factors relevant to language performance (Bishop, 1997; Leonard, 1998; Rice, 2004).

Unfortunately, scientists who study children reared in poverty and children with SLI work out of different theoretical frameworks and use different research designs and methods. Researchers of SLI have focused their efforts on detailing the strengths and weaknesses of these children's language systems; these efforts have resulted in data detailed enough to suggest that grammatical morphology is significantly impaired for these children (Tager-Flusberg & Cooper, 1999). In contrast, researchers of poverty have focused their efforts on explicating the many environmental and interpersonal factors that can positively and negatively impact child development (Fazio, Naremore, & Connell, 1996; Hart & Risley, 1995; Hoff-Ginsberg, 1991; Hoff, Laursen, & Tardiff, 2002; Stockman, 2000; Washington & Craig, 1994, 1999). Within these studies, measures of language have been relatively general. As a result, the specific ways in which poverty as a variable influences children's development of different aspects of language (e.g., vocabulary, grammatical morphology, etc.) are relatively unknown.

In the current study, we take a first step toward learning about the morphosyntactic systems of children reared in poverty by examining their use of regular and irregular past tense marking and by comparing their data to those of children who do not present this risk factor. Past tense has been studied extensively within the SLI literature. This work has shown that across a wide range of languages and dialects of English, children with SLI have been shown to present significant difficulty with this structure (Crago & Paradis, 2003; Jacobson & Schwartz, 2005; Leonard, Bortolini, Caselli, McGregor, & Sabbadini, 1992; Marchman, Wulfeck, & Ellis Wesimer, 1999; Oetting & Garrity, 2006; Oetting & Horohov, 1997; Paradis & Crago, 2000; Rice, Wexler, & Cleave, 1995; Seymour, Bland-Steward, & Green, 1998; for review of other cross-linguistic studies, see Leonard, in press). This literature can be used as a guide to determine whether poverty as a variable influences children's development and use of past tense in ways that are different from the clinical condition of SLI. If differences between these groups exist, then these differences are important to document to better facilitate the clinical management of children with and without SLI in low-income communities. On the other hand, if children reared in poverty present difficulties with past tense that mirror those of the clinical condition of SLI, then this also needs to be documented as overlapping profiles could contribute to the overdiagnosis (or underdiagnosis) of SLI within low-income communities.

All of the participants selected for the study were speakers of African American English (AAE). There were two reasons why we focused the work on this dialect. One was practical in nature. African American children make up over 75% of the local public school enrollment in our area (Louisiana Department of Education, 2008), and our past experiences within these schools indicated that we had a greater chance of controlling for dialectal differences between low- and middle-income children if we worked within AAE than if we tried to narrow the work to a White English variety. Second, based on the results of two studies, typically developing AAE-speaking children have been shown to mark past tense forms at high rates, and AAE-speaking children with SLI have been shown to mark past tense at low rates (Oetting & Garrity, 2006; Seymour, Bland-Steward, & Green, 1998; see also Oetting & McDonald, 2001). Unfortunately, neither of these studies examined the effects of poverty on children's development and use of this structure. For clinicians who work with AAE-speaking children reared in poverty, the above findings are of limited value, especially if the language profiles of children reared in poverty cannot be distinguished from those with SLI. This finding further underscores the need to learn more about the language strengths and weaknesses of low-income, AAE-speaking children.

In this introduction, we first review findings from two studies that have been completed on children from low-income homes. Although neither examined past tense marking, they are interesting because they lead one to make different predictions about the potential effect of

poverty on children's past tense systems. Then, we describe five characteristics of the SLI past tense deficit because the goal of the current study was to determine if children reared in poverty also exhibited these characteristics. Finally, we present information about linguistic contexts that encourage and discourage zero marking of past tense in typically developing speakers of AAE. This information was used to develop the stimuli and the coding procedures of the study.

Two Studies of Children Reared in Poverty

Dollaghan et al. (1999) examined the effect of poverty on children's development of language in a study that included 240 three-year-olds. The low-income group had mothers with fewer than 12 years of education, whereas the mothers of the other two groups had more education. Vocabulary was measured by the Peabody Picture Vocabulary Test–Revised (PPVT-R; Dunn & Dunn, 1981), and grammar was measured by mean length of utterance (MLU). For both of these measures, children in the low-income group earned lower scores than did the other two groups. These findings indicate that poverty as a variable affects children's development of language in a number of ways. From these findings, we may predict that children's development and use of past tense marking will be negatively affected by poverty.

On the other hand, Whitehurst's (1997) study of children reared in poverty revealed a different pattern of results. His participants included 521 kindergartners from low-income families in New York. Measures of vocabulary were the PPVT-R and Expressive One Word Picture Vocabulary Test (Gardner, 1981), and measures of grammar were an utterance length score and a complex syntax score derived from a story retelling task and the Word Structure subtest of the Clinical Evaluation of Language Fundamentals–Preschool (Wiig, Secord, & Semel, 1992). Results showed that 85% of the children scored below average on the two vocabulary tests, with 15% scoring lower than 2 *SDs* below the normative means. In contrast, the children's scores on all three of the syntax tools fell, on average, within 1 *SD* of the normative means. Using structural equation models, Whitehurst also showed that the number of siblings, classroom quality, and home literacy environment predicted a greater degree of the children's semantic abilities (15%) than their syntactic abilities (3%). These findings indicate that the language weaknesses of children reared in poverty may not cut across all aspects of language in the same way or to the same degree. From these findings we may predict that children's development and use of past tense marking may not be negatively affected by poverty to the same degree as other areas of language.

Five Characteristics of the Past Tense Deficit in SLI

In the current study, we wanted to know if children reared in poverty demonstrate a weak past tense system, and if so, we wanted to know if their weaknesses mirror the clinical condition of SLI. To answer this question, we needed to understand the past tense deficit of children with SLI. The SLI literature is extensive and includes data from language samples and a wide variety of experimental tasks. As shown in Table 1, these studies have revealed five characteristics of the SLI past tense system. They are as follows: (a) low rates of regular past tense marking relative to rates by age- and language-matched controls; (b) low rates of irregular past tense marking relative to rates by age- but not language-matched controls; (c) lower rates of over-regularizations than those of controls (e.g., *falled*); (d) rates of dialect-inappropriate errors of commission that are similar to controls (e.g., *to falled*); and (e) marking of regular and irregular past tense forms that is sensitive to the grammatical root of the verb (denominal = *ringed* vs. deverbal = *rang*). The last three characteristics of the SLI past tense profile are similar to what is found in typically developing controls, and this suggests typical organizational structure of these children's past tense systems, even though

their rates of marking are lower than age-matched, and in some cases language-matched, controls.

Past Tense Marking in AAE

Given that all of the participants in the current study spoke AAE, we also needed to develop the stimuli in a way that was appropriate for this dialect. There are two sets of literature that can be used to learn about past tense marking in AAE. The first involves descriptive accounts of the dialect, and the second involves quantitative studies of data from AAE speakers. Descriptive accounts such as Green (2002) highlight the role of various linguistic contexts that either encourage or discourage zero marking of past tense in typically developing speakers of AAE (*he walk* vs. *he walked*). Green states that when the past tense allomorphs [-t] and [-d] follow a stop that has the same voicing features of the allomorph (e.g., *walked*), zero marking of the past tense form is possible. This effect for context is considered a phonological constraint imposed by a consonant cluster reduction rule, rather than a zero marking rule at the level of morphology. In contrast, when the [-t] and [-d] allomorphs follow vowels (e.g., *cried*) or are preceded by a non-stop consonant (e.g., *kissed*), zero marking is less likely to occur. In addition, when the allomorph [-əd] is followed by either an infinitive phrase (e.g., *She wanted to eat*) or a gerund (*He started running*), this allomorph can be reduced. Finally, for irregular past tense, Green states that internal markers of tense are often required in AAE. However, over-regularized forms (e.g., *falled*) and forms atypical of Standard American English (e.g., *drunk*, *brung*, *had fell*, *had walked*) may be produced within these contexts.

Quantitative studies provide rate-based information about these various past tense options within AAE. Rickford (1999) found zero marking of past tense in AAE to be highest for verbs requiring the [-t] and [-d] allomorphs (31%) and for the verb *say* (25%). In contrast, zero marking was infrequent for regular verbs ending in a vowel (2%), regular verbs requiring [-əd] (2%), and irregular verbs (6%). In addition, both Seymour et al. (1998) and Oetting and McDonald (2001) showed that typically developing AAE child speakers zero mark past tense in spontaneous language samples less than 20% of the time. Together, these studies show the linguistic environments that encourage and discourage zero marking of past tense in AAE, but they also show that zero marking is less frequent than one might expect from descriptive accounts of the dialect.

Less quantitative work has been completed on AAE-speaking children's use of over-regularizations (e.g., *drinked*) and nonstandard alternative forms of past tense (e.g., *drunk*). In one recent study, however, Ross, Oetting, and Stapleton (2004) examined AAE-speaking children's use of preterite *had* + verb (e.g., *Then he had called his daddy*). As discussed by Green (2002), this structure expresses past perfect in standard English, but in AAE, this structure can express the simple past (i.e., preterite). As shown by Ross et al., the preterite *had* + verb was produced by half of the AAE child speakers studied, and the frequency at which the children produced this past tense form was tied to their development of narrative structure and the density at which they produced nonstandard structures of AAE within their language samples. In another study using the same AAE-speaking participants, Oetting and McDonald (2001) examined the children's use of past tense over-regularizations. Within that study, the typically developing AAE speakers produced 22 over-regularized past tense forms. Unfortunately, the rate of these forms as a function of the number of past tense contexts produced by the children was not calculated. Nevertheless, both of these studies document the presence of alternative past tense options within AAE, but again they show that these forms are relatively infrequent in school-based language samples.

From these studies, we hypothesized that typically developing AAE-speaking children would mark past tense at relatively high rates, especially in contexts that encourage overt marking and discourage zero marking. From these studies we also hypothesized that some of these children's overtly marked expressions of past tense would involve alternative past tense forms and over-regularizations. Whether the variable of poverty would affect the AAE-speaking children's marking of past tense was unknown given that none of the above mentioned AAE studies focused on this variable. However, from the poverty studies of Dollaghan et al. (1999) and Whitehurst (1997), we expected the poverty status of the children to negatively affect their development and use of past tense in some way (but perhaps not in a way that mirrors the clinical condition of SLI).

The Current Study

Five aspects of children's past tense systems were evaluated in the current study. To do this, data from language samples and experimental probes were collected. The tasks and nature of the analyses were adapted from the SLI literature to facilitate across-study comparisons of the findings. The study also employed a three-group design, which included the following: (a) AAE-speaking children reared in poverty (low socioeconomic status [LSES]); (b) AAE-speaking children from middle-income backgrounds who served as typically developing, age-matched controls (AM); and (c) AAE-speaking children from middle-income backgrounds who served as typically developing, language-matched controls (LM). A comparison between LSES and AM groups allowed us to examine whether children's marking of past tense was influenced by their socioeconomic status ($LSES < AM$). If a difference was detected, a comparison between LSES and LM children was needed to determine if the difference was related to an overall language weakness in the LSES group ($LSES = LM$), or to a specific weakness in the LSES group's marking of past tense ($LSES < LM$).

The five aspects of the children's past tense systems were evaluated through the development of three research questions: (a) Are there group differences between the children's rates of regular and irregular past tense marking?, (b) Are there group differences between the children's rates of past tense over-regularizations and their rates of dialect-inappropriate past tense errors of commission?, and (c) Are there group differences in the children's ability to mark verbs with different grammatical roots (i.e., denominal vs. deverbal)?

Method

Participants

Forty-five African American and AAE-speaking children participated (see Table 2). The children were recruited from schools located in and around Baton Rouge, LA. Parental consent for each of the participants was obtained following the regulations outlined by the Institutional Review Board at Louisiana State University. None of the children had a history of repeating a grade, and all of the families of the children reported no personal or family history of speech/language services. In addition, all of the children achieved 90% accuracy on an articulation screener that examined final/t/and/d/consonant and consonant blend production in mono-morphemic words. Of the 57 children tested for the study, none were excluded based on the articulation criterion (for a breakdown of the participant pool, see Pruitt, 2006).

Fifteen of the participants were 6 years old and from low-income backgrounds (LSES). These children had mothers who did not graduate from high school. All but one of the children in this group also attended public schools where 90% of the students received free

or reduced lunch, and the school's standardized test scores fell below the state average. Given that other groups of children from low-income homes have been shown to present low scores on standardized tests of vocabulary (Dollaghan et al., 1999; Washington & Craig, 1999), these children were also required to earn a standard score that was below 90 on the Peabody Picture Vocabulary Test–Third Edition (PPVT-III; Dunn & Dunn, 1997). Vocabulary score as a selection criterion, rather than a dependent variable, was implemented to increase the likelihood that our low-income group would present a language profile that was different from the middle-income age-controls. Interestingly, though, of those tested who met the maternal education criterion, only four were excluded because of a high score on the PPVT-III.

Fifteen of the participants were 6 years old and served as typically developing age-matched controls (AM). The average age difference between the LSES and AM pairs was 1.67 months ($SD = 2.13$), and this group difference was not statistically significant; $t(28) = 1.41$, $p = .17$. Children in the AM group had mothers who completed at least two years of college, and all but four attended schools where less than 10% of the students received free or reduced lunch, and the school's standardized test scores were above the state average. These children were also required to score above 90 on the PPVT-III. Of those tested who met the maternal education requirement, two were excluded because of a low score on the PPVT-III.

Fifteen of the participants were 5 years old and served as typically developing language-matched controls (LM). Raw scores of the PPVT-III were used to match the participants of the LSES and LM groups. The average raw score difference between the LSES and LM pairs was 6.07 ($SD = 3.13$), and this group difference was not significant; $t(28) = -1.69$, $p = .10$. Similar to the AM controls, children in the LM group had mothers who completed at least two years of college, and all attended either private preschools or public preschools where less than 10% of the students received free or reduced lunch. These children were also required to score above 90 on the PPVT-III. Of those tested who met the maternal education requirement, six were excluded because of a low score on the PPVT-III.

Two additional measures were used to further document the children's cognitive and language abilities. For nonverbal cognition, the Figure Ground and Form Completion subtests of the Leiter International Performance Scale–Revised (Leiter-R; Roid & Miller, 1998) were administered. All three of the group averages and all but two children in the LSES group fell within one standard deviation of the normative mean on these sub-tests. For language, Subtests IV–VI of the Test of Language Development–Primary, Third Edition (TOLD-P:3; Hammill & Newcomer, 1997) were administered to calculate a syntax quotient from this tool. For this measure, the LSES average group score was more than one standard deviation below the normative mean, whereas the control groups' average scores were within 1 SD . At the individual level, 7 (54%) of the children in the LSES group but only 2 (7%) of the control children scored more than one standard deviation below the normative mean on this measure.

Finally, the children's MLUs and density of AAE use were calculated. MLU was calculated in morphemes using the transcribed language samples that were collected as part of the experiment, and dialect density was measured using blind listener judgments of audio recorded excerpts from the language samples. The excerpts were selected at random, and each sample was independently rated by three Ph.D. students using a 7-point scale (higher ratings indicate higher densities of AAE use; for procedures, see Oetting & McDonald, 2002).

Post hoc analyses indicated that the groups did not differ on MLU, $F(2, 44) = 1.48$, $p = .24$, but given the selection criteria, the three groups did differ on their PPVT-III standard scores,

$F(2, 44) = 45.81, p < .001$. The three groups also differed on the Leiter-R, $F(2, 44) = 15.36, p = .01$; TOLD-P:3, $F(2, 44) = 12.60, p < .001$; and density of AAE, $F(2, 44) = 9.20, p = .003$. For all three standardized tests, scores of the children in the LSES group were lower than those of both control groups, PPVT-III: AM, $t(28) = -9.02, p < .001, d = -3.29$; LM, $t(28) = -7.67, p < .001, d = -2.80$; Leiter-R: AM, $t(28) = -2.05, p = .04, d = -0.75$; LM, $t(28) = -3.06, p = .01, d = -1.19$; TOLD-P:3: AM, $t(28) = -4.35, p < .001, d = 1.59$; LM, $t(28) = -3.81, p = .001, d = -1.39$. For AAE use, the LSES group earned higher nonstandard ratings than the control groups: AM, $t(28) = 3.16, p = .004, d = 0.50$; LM, $t(28) = 3.42, p = .002, d = 0.53$. This finding is consistent with studies that show the frequency of nonstandard English patterns to increase as a speaker's socioeconomic level decreases (Wolfram & Ward, 2006).

Materials

Spontaneous language samples, a productivity probe, and a denominal/deverbal probe were used to examine the five targeted aspects of the children's past tense systems. The following toys were used as prompts within the samples: gas station, cars, people, picnic/park set, Legos, baby doll, baby care items, and three Apricot pictures (Arwood, 1985). Transcription and morphological coding followed the general guidelines of Systematic Analysis of Language Transcripts (SALT) software (Miller & Iglesias, 2004). The samples totaled 6,528 complete and intelligible (C & I) utterances and averaged 145.56 ($SD = 46.69$) C & I utterances per child. SALT was used to extract the children's standard marked (e.g., *jumped*), nonstandard marked (e.g., *drunk, falled, had jumped*), and zero marked (e.g., *jump*) productions of past tense from the samples. SALT was also used to search for dialect-inappropriate past tense errors of commission (e.g., *wants to jumped*).

For the past tense productivity probe, the stimuli included 14 regular past tense verbs and seven irregular verbs. Following work by Green (2002) and Rickford (1999), seven of the regular verbs were considered more likely to result in overt marking by the children because the verb root ended with a vowel (e.g., *dry*). These seven verbs were classified as high probability items (or items that encouraged overt marking and discouraged zero marking) within AAE. The other seven regular verbs were considered less likely to result in overt marking by the children because they required the [-t] or [-d] allomorph and the verb root ended with a consonant (e.g., *walked*). These seven were classified as low probability items (or items that discouraged overt marking and encouraged zero marking) within AAE. Additionally, in an attempt to improve the reliability of coding the children's past tense productions, the target verbs were presented in a context that encouraged the use of the determiner "a" after the verb (e.g., *She bounced a ball*).

Videotaped stimuli for the probe were created to introduce the verbs and elicit past tense forms from the children. The video presented a young, African American woman acting out each action. An editing system was used to trim each action to 4 s. Before playing the tape, the directions were as follows: "Watch this videotape of a girl doing different actions. First, I'm going to tell you what the girl is doing. When she's done, I want you to tell me what she did." One action was played at a time via a computer screen while the examiner provided a prompt (e.g., "*She is bouncing a ball. She is bouncing a ball. Now she is done bouncing a ball. She ____*"). After the presentation, the picture remained frozen to provide the children with a visual reminder of the action when responding. The children were randomly assigned to one of two orders of the stimuli. Actions were repeated if children were unable to remember a particular verb stem (as indicated by "I don't know" or "I don't remember that one") or if they produced the wrong stem for a target verb (e.g., *cooked for fried*).

The focus of the denominal/deverbal probe differed from the past tense productivity probe because rate of marking was not the primary interest of the task. Instead, this type of task

allows one to examine whether children alter the nature of their past tense responses as a function of the type of verb (denominal vs. deverbal). As discussed by Kim, Marcus, Pinker, Hollander, and Coppola (1994), denominal items are derived from nouns, and because of this, they typically take regular inflectional endings within a language (e.g., *He clotheslined the quarterback*). In contrast, deverbal items contain irregular roots, and because of this, they typically take irregular inflections within a language (e.g., *He fell down on the 50-yard line*). The ideal stimuli for examining the effects of grammatical roots on children's marking of past tense involve homophonous pairs of verbs (e.g., *meet* and *meat*).

The denominal/deverbal probe included nine different homophonous pairs of verbs following the procedures of Oetting and Horohov (1997). Miniature characters, toys, and cutouts were used to introduce the verbs to each child. The examiner introduced each target verb in a sentence and provided an opportunity for the child to respond. For example, for the deverbal verb *fly*, the examiner said "*Stitch likes to fly an airplane. Let's make him fly. Watch him fly.*" For the homophonous denominal verb *fly*, the examiner said "*Stitch has some flies. He wants to put them on your arm. He wants to fly you. Watch him fly your arm.*" After presentation of each action and target verb, the action was stopped and the child was provided the prompt "*He ____.*" After the child responded, the child was asked to respond (e.g., "*Which one sounds better: He flew ____ or He flied ____*"). To control for order effects, denominal and deverbal items within the probe were counterbalanced.

General Procedures

Data collection was completed in a quiet room at each child's school. The probes and the language samples were audio taped using an external microphone that was connected to an Olympus digital voice recorder (Center Valley, PA). During all probes, the child's responses were also documented online. Families of children who completed the study received a \$10 retail gift certificate.

Reliability

Approximately 10% of the language samples and 20% of the probe data were independently transcribed and coded by a second set of examiners. From the language samples, agreement was at or above 96% for identifying C & I utterances and utterance boundaries in the samples and for identifying overtly marked and zero marked verbs in past tense contexts. The resulting inter-rater agreement rates for the past tense productivity probe and denominal/deverbal probe were 90% and 87%, respectively.

Results

Past Tense Marking Within Language Samples

Two participants (one AM and one LM) did not produce any past tense contexts within their language samples so these children were not included within the analyses. As shown in Table 3, the majority of the children's responses were classified as standard marked forms ($n = 1,563$). Nonstandard marked forms ($n = 182$) and zero marked forms ($n = 246$) were less frequent; however, of the nonstandard marked forms that were produced, 149 (82%) were generated for an irregular past tense form, and of these, 37 (25%) reflected an over-regularization. The table does not include counts of dialect-inappropriate past tense errors of commission because these were not found in the data.

To examine these data statistically, a mixed-model ANOVA was completed. The dependent variable was rate of overt marking, which was calculated using the formula: (standard marked + nonstandard marked)/(standard marked + nonstandard marked + zero marked). Group (LSES, AM, LM) was the between-subjects variable, and verb type (regular,

irregular) was the within-subjects variable. Significant main effects were observed for group, $F(2, 40) = 3.98$, $p = .03$, $\eta^2 = .17$, and verb type, $F(1, 40) = 10.70$, $p = .002$, $\eta^2 = .21$. These main effects were qualified by a Group $\times$ Verb Type interaction, $F(2, 40) = 4.04$, $p = .03$, $\eta^2 = .17$. Follow-up analyses revealed that the three groups differed only in their marking of regular past tense, $F(2, 40) = 4.05$, $p = .02$. For this verb type, the children in the LM group overtly marked regular past tense less often than did the AM group (66% vs. 88%). No other group difference was observed. In addition, post hoc t tests indicated that the children in the LM group marked regular past tense forms less often than irregular past tense forms (66% vs. 88%). Differences for verb type were not observed in the LSES and AM groups.

Past Tense Productivity Probe

For this probe, the children's responses were again classified as standard marked, nonstandard marked, or zero marked. Responses that did not fall into these three categories were classified as *other*. These included present progressive sentence frames for targets (e.g., *She washing*), the use of a different verb (e.g., *She banged a drum* for *She played a drum*), "I don't know," and no responses. Not included in the *other* category were past tense errors of commission because again these were not found in the data. Percentage of overtly marked was calculated using the same formula that was used for the language samples. Similar to the language sample data, all statistical analyses were conducted on the children's rates of overt marking. However, given that these data came from a probe and the number of opportunities for producing a marked form was fixed, arcsine transformations were conducted prior to the analyses. In addition, given that the elicitation task included high probability and low probability items within AAE, preliminary analyses were conducted to examine the potential effect of phonology on the results.

Preliminary analysis: Effects of phonology for regular items—As shown in Table 4, the majority of the children's responses to both types of verbs were classified as standard marked, and there were very few responses classified as other, and no responses classified as nonstandard marked. To determine whether the high- and low-probability verb types differed in the rate at which the children marked them for past tense, a mixed-model ANOVA with group (LSES, AM, LM) as the between-subjects variable and verb type (higher probability, lower probability) as the within-subjects variable was conducted. A significant main effect of verb type was observed, $F(1, 42) = 10.65$, $p = .002$, $\eta^2 = .20$. Marking of regular past tense was greater for the higher probability verbs (92%) than for the lower probability verbs (83%). However, a significant difference was not found for group, $F(2, 42) = 2.06$, $p = .140$, or for the Group $\times$ Verb Type interaction, $F(2, 42) = 0.06$, $p = .94$. Given this, the remaining analyses of the probe data were conducted with the two types of verbs collapsed. This allowed for a comparison between the regular and irregular past forms, as was done with the language sample data.

Regular and irregular past forms—In Table 5, the children's responses to the regular items are presented again (with low and high probability items combined) along with their responses to the irregular items. Results for the regular items remain the same as before with the majority of the children's regular responses classified as standard marked. For the irregular verbs, the children's responses were less standard. In fact, 109 were coded as a nonstandard marked form, and of these, 96 (88%) were over-regularizations.

To examine the data statistically, a mixed-model ANOVA with group (LSES, AM, LM) as the between-subjects variable and verb type (regular, irregular) as the within-subjects variable was conducted. A significant main effect for verb type was observed, $F(1, 42) = 54.15$, $p < .001$, $\eta^2 = .56$, with greater rates of overt marking for regular verbs than for the

irregular verbs (88% vs. 67%). A significant main effect for group was not found, $F(2, 42) = 2.07$, $p = .14$, and a Group $\times$ Verb Type interaction was not found, $F(2, 42) = 0.47$, $p = .63$. In other words, all three groups marked regular verbs more frequently than the irregulars.

Denominal/deverbal probe—Recall that the purpose of this task was to determine if the children would alter the nature of their responses as a function of the grammatical root of the verb (denominal vs. deverbal). Four types of responses were possible: a standard or nonstandard marked regular past tense form (e.g., *flyed*, *drinked*), a standard or nonstandard irregular past tense form (e.g., *flew*, *drank*, *rung*, *drunk*), a zero-marked form (e.g., *fly*, *drink*), and an uncodable response. Uncodable responses included statements such as “I don’t know” or the use of a different verb to explain an action. For this task, spontaneous responses were recorded along with responses following the prompt. This was done to replicate the procedures of others who have shown that uncodable responses decrease with prompting. Indeed, in the current data set, uncodable responses decreased to zero following the prompt.

Results are listed in Table 6. Across the groups, both denominal and irregular verb roots received a high percentage of regular marking. However, across all three groups, rates of regular marking were higher for verbs with denominal roots than for verbs with irregular roots. For the LSES group, rates of regular marking for the denominals, before and after the prompt, were 93% and 84%, respectively. In comparison, rates of regular marking for the irregular roots were 79% and 67%. For the AM group, rates of regular marking for the denominals, before and after the prompt, were 92% and 80%, whereas rates of regular marking for the irregular roots were 64% and 52%. Finally, for the LM group, rates of regular marking for denominals were 92% and 75%, whereas rates of regular marking on irregular roots were 71% and 57%.

To examine these data statistically, two mixed-model ANOVAs were completed. For both, the between-subjects variable was group (LSES, AM, LM), and the within-subjects variable was verb type (denominal, irregular). The dependent measure was the proportion of each child’s responses that consisted of regularly inflected forms, after excluding all zero marked forms and uncodable responses. In other words, for each verb type (denominal and irregular) the children’s regular responses were divided by the sum of their regular and irregular responses. Results were similar for data collected before and after the prompt. Before the prompt, a main effect for word was observed, $F(1, 42) = 66.94$, $p < .001$, $\eta^2 = .61$. The denominals were marked with a regular form more often than the irregular verb roots (92% vs. 71%). A main effect of group was not found, $F(2, 42) = 0.39$, $p = .68$, nor was there a significant Verb Type $\times$ Group interaction, $F(2, 42) = 0.53$, $p = .59$. After the prompt, again only a main effect for verb type was significant, $F(1, 42) = 50.46$, $p < .001$, $\eta^2 = .55$.

Correlational Analysis

To determine whether the children’s marking of regular and irregular past tense forms was related to other aspects of the children’s language and cognitive skills and to their mothers’ level of education, a correlation analysis was conducted. For the purposes of this analysis, the children’s rates of past tense marking in the language samples and probes were converted to z-scores and combined. As shown in Table 7, the children’s marking of regular past tense forms was positively related to their marking of irregular past tense forms. However, their marking of regular past tense was not related to any other measure of language, cognition, or maternal education. Results were similar for irregular past tense marking, except the children’s marking of this form was correlated, albeit at a low level, to the children’s scores on the TOLD-P:3 ($r = .30$) and their MLU ($r = .40$).

Discussion

In the current study, the past tense systems of three groups of AAE-speaking children were examined to determine whether poverty as a variable affects children's development and use of past tense marking. If it did, we also wanted to know if the effects of poverty would mirror those that have been documented for children with SLI. Based on the literature review, we expected the variable of poverty to affect the children's development and use of past tense in some way. In fact, we designed the study to maximize the likelihood that we would find some sort of past tense difference between the groups because the children in the LSES group were also required to present lower than average standardized scores of vocabulary. Post hoc analyses also showed that the LSES and control groups differed in their standardized scores of nonverbal cognition and syntax and in their rates of AAE. Instead, what we found was a different and unexpected pattern of results. Specifically, some of the analyses showed past tense marking to be affected by the phonological characteristics of the items (high vs. low probability of overt marking in AAE) and the children's ages (LSES and AM vs. LM groups), but none of the analyses revealed effects for the children's socioeconomic level. This latter null finding cannot be explained by limits in statistical power because previous studies that have used similar probes and smaller numbers of participants have repeatedly found statistical differences when the comparisons have been between children with SLI and those developing language typically (Leonard et al., 1992; Oetting & Horohov, 1997).

For children who speak AAE, the findings of the study can be summarized as follows. Within the spontaneous language samples, the LSES group marked regular and irregular past tense at high levels and at levels that were similar to those of the AM group (and higher than those of the LM group). For the past tense productivity probe, the LSES group also marked regular verbs at high rates and at rates similar to those of the controls. For irregular past tense, a slightly different result was found because rates of marking were lower for these items than for the regular items. Importantly, though, all three groups of AAE speakers showed this pattern of results. Similar findings across groups were also found for the denominal/deverbal probe because on this task, all three groups of AAE speakers varied their rate of regular marking as a function of the two verb types.

Across the language samples and elicitation probes, nonstandard alternative forms were produced for irregular items 258 times, and of these nonstandard forms, 52% (25% in the samples and 88% in the probes) were over-regularizations. Again, the poverty status of the LSES group did not affect this pattern of findings because all three groups of AAE speakers produced similar types and rates of over-regularizations. Also, none of the children studied here produced a dialect-inappropriate past tense error of commission. Finally, the results of the correlation analyses revealed that the children's markings of regular and irregular past tense forms were related to one another, but neither was related to measures of the children's vocabulary, nonverbal cognition, or maternal education. In addition, only the children's marking of irregular past tense was related to the children's scores on the TOLD-P:3 and their MLU, yet the correlation of these measures was low.

Findings from this study can be compared to the literature reviewed in the introduction. First consider the two studies that focused on children reared in poverty. Dollaghan et al. (1999) and Whitehurst (1997) showed children from low-income homes to present depressed vocabulary scores on standardized tests, but findings were mixed for depressed scores of syntax. In the current study, the children reared in poverty were selected because they presented low vocabularies. However, only four children recruited for the LSES group were excluded from the study because of a high vocabulary score, and this finding supports the vocabulary findings of Dollaghan et al. and Whitehurst. The LSES children, on average, also

showed depressed scores on the Leiter-R and TOLD-P:3, but for measures of MLU and past tense marking, these children's scores were not depressed relative to those of the two middle-income control groups. This finding offers some support for the claim that poverty does not negatively impact all aspects of children's language development in the same way or to the same degree. That the LSES children's past tense systems were not related to their vocabulary and nonverbal IQ test scores, AAE dialect ratings, and maternal education levels also suggests different (and perhaps somewhat autonomous) developmental trajectories for some aspects of language. Additional research is needed to fully explore this possibility.

Next consider the findings as they relate to previous AAE studies. Across the two 6-year-old AAE-speaking groups (LSES and AM), rates of regular past tense zero marking occurred less than 20% of the time. This finding is consistent with rates of zero marking that have been reported for other typically developing AAE-speaking children (Oetting & McDonald, 2001; Seymour et al., 1998). The consistency across these studies was found in spite of the fact that the AAE-speaking children who participated within these three studies were recruited from different regions of the country (north vs. south) and/or different types of communities (rural vs. urban).

All three groups of children studied here also showed sensitivity to the phonological patterns of regular past tense marking in AAE. The productivity task was designed so that half of the items (the high probability items) encouraged overt marking in AAE, whereas the other half (the low probability items) did not. As predicted, this manipulation affected the children's marking, with the higher probability items zero marked less often (3%–11%) than the lower probability items (12%–21%). These results are consistent with Rickford's (1999) adult data (higher = 2%, lower = 31%), even though the tasks, verbs within the tasks, and ages of the AAE participants varied across studies.

The children's marking of irregular past tense is more difficult to compare to other studies because less work has been completed on this structure. Rickford's (1999) AAE data indicated a 6% rate of zero marking for irregular verbs. Rates of irregular past tense zero marking for the AAE-speaking children studied here were higher than this, and they also varied as a function of the task (7%–12% in spontaneous language samples and 35%–39% in productivity probe). Differences in zero marking across tasks need to be further explored in a future study. In spontaneous samples, verb production is determined by the child, whereas in productivity tasks, verb production is determined by the examiner. For the current study, however, the relevant point is that when all possible comparisons are made, our AAE child data are relatively consistent with those of other AAE studies.

We now turn to the comparison of the current set of data to previous studies of children with SLI. Across tasks and analyses, the findings illustrate four differences between the past tense profiles of children reared in poverty and of children with SLI. Recall first that children with SLI have repeatedly been shown to mark regular past tense at lower rates than age- and language-matched controls. Such group differences were not detected in the current study even though the LSES group presented lower standardized language test scores and higher listener judgment ratings of AAE than did the controls. Recall also that in previous studies, rates of regular marking for AAE-speaking children with SLI (using near identical language sampling methods) have been reported to be much lower than the 85% rate of the LSES AAE-speaking children studied here (50% for children with SLI studied by Seymour et al., 1998; 61% for children with SLI studied by Oetting & McDonald, 2001). Probe data from standard English-speaking children with SLI have also shown rates of regular marking to be extremely low (36% to 63% for children with SLI; Oetting & Horohov, 1997; Rice & Wexler, 1996).

Marking of irregular past tense by AAE-speaking children reared in poverty also differs from previous reports of children with SLI. Recall that children with SLI have shown lower rates of marking for regular items than for irregular items (32% vs. 65% for children studied by Leonard et al., 1992). In the current study, only the AAE-speaking LM group presented this pattern of findings within the language samples (66% vs. 88%), but even for this group, rates of marking were higher than what has been reported for children with SLI. Moreover, for the LSES and AM groups, similar rates of marking for regular and irregular verbs were found within the language samples, and on the productivity probe, all three AAE-speaking groups produced higher rates of regular marking than irregular marking.

The rate of the children's over-regularizations reflects a third way the past tense systems of children reared in poverty differ from those of children with SLI. Recall that in previous studies, children with SLI produce rates of over-regularizations that have been lower than those of controls. For example, in the Oetting and Horohov (1997) study, rates of over-regularizations for the typically developing controls were twice as high as those of the children with SLI. In the current study, the LSES group's rates of over-regularizations were high and similar to those of the controls.

On the surface, the LSES group performed comparably to past reports of children with SLI on the denominal/deverbal task because both groups showed differential marking of the two verb types. However, when data from the LSES and SLI groups were compared directly, a fourth difference was found because the two groups demonstrated different response preferences. Specifically, on this task, 72% of the responses produced by the LSES group involved a marked regular form. In contrast, in Oetting and Horohov (1997), 78% of the responses produced by children with SLI included a marked irregular form.

Interestingly, for dialect-inappropriate past tense errors of commission, the AAE-speaking children studied here (regardless of group membership) presented a linguistic profile that is similar to what has been found for children with SLI. However, the lack of dialect-inappropriate errors of commission is not only a characteristic of children with SLI, but it is also a characteristic of children who are developing language typically (Leonard et al., 1992). Given this, we can conclude that past tense errors of commission are extremely rare in children's development of English, regardless of dialect, clinical condition, and environment.

In conclusion, the findings of this study indicate that poverty as a variable does not affect AAE-speaking children's past tense marking in a way that mirrors the clinical condition of SLI. Although the current study lacked a direct statistical test of children classified as LSES and SLI, information about the past tense systems of these two child groups is compelling. At a minimum, these findings should motivate others to further explore the unique language strengths and weaknesses of these two learner groups. This type of comparative work is important for testing different theoretical models of language development and disorders. Findings from these types of studies are also relevant to clinicians who are working to improve the language skills and academic outcomes of all children, regardless of their clinical diagnosis. To do this type of clinical work, professionals need information about the behavioral profiles of different populations of language learners (those with and without clinical conditions) and information about the range of variation that exists within each of these populations.

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Table 1

Past tense profile of children with specific language impairment (SLI).

Characteristic	Studies
Rates of regular past tense marking that are lower than age- and language-matched controls	Conti-Ramsden, Botting, & Farraegher, 2001; Leonard, Bortolini, Caselli, McGregor, & Sabbadini, 1992; Marchman, Wulfeck, & Ellis Wesimer, 1999; Oetting & Horohov, 1997; Rice, Wexler, & Cleave, 1995; Rice, Wexler, & Hershberger, 1998; Rice, Wexler, & Redmond, 1999; van der Lely & Ullman, 2001; Windsor, Scott, & Street, 2000
Rates of irregular marking that are lower than age-matched but not language-matched controls	Leonard, Bortolini, Caselli, McGregor, & Sabbadini, 1992; Leonard, Eyer, Bedore, & Grela, 1997; Oetting & Horohov, 1997
Lower rates of over-regularizations than those of controls	Leonard, Eyer, Bedore, & Grela, 1997; Oetting & Horohov, 1997
Rates of commission errors that are similar to controls	Cleave & Rice, 1997; Eadie, Fey, Douglas, & Parsons, 2002; Leonard, Bortolini, Caselli, McGregor, & Sabbadini, 1992
Differential marking of regular and irregular forms as shown in different analyses or tasks (with a denominal/ deverbal probe being one type of task)	Leonard, Eyer, Bedore, & Grela, 1997; Marchman, Wulfeck, & Ellis Wesimer, 1999; Oetting & Horohov, 1997

Table 2

Participant characteristics.

Group	Age (months) M (SD)	Articulation Screener ^a M (SD)	Maternal Ed ^b M (SD)	PPVT-III Standard ^c M (SD)	PPVT-III Raw ^d M (SD)	Leiter-Re ^e M (SD)	TOLD-P-3 ^f M (SD)	MLU ^g M (SD)	AAE rating ^h M (SD)
LSES	73.47 (4.02)	9.93 (0.26)	10.00 (1.41)	80.27 (6.60)	57.13 (8.94)	9.47 (1.55)	81.13 (15.27)	6.49 (1.38)	5.58 (1.03)
AM	71.80 (2.21)	10.00 (—)	15.60 (0.63)	102.87 (7.12)	83.93 (9.90)	10.73 (1.82)	100.27 (7.58)	6.64 (1.06)	4.24 (1.26)
LM	59.00 (5.26)	9.73 (0.46)	15.60 (0.74)	99.73 (7.29)	63.23 (11.42)	11.47 (2.00)	100.27 (12.04)	5.96 (0.92)	4.20 (1.17)

Note. Ed = education; AAE = African American English; LSES = AAE-speaking children reared in poverty (low socioeconomic status); AM = AAE-speaking children from middle-income backgrounds who served as typically developing, age-matched controls; LM = AAE-speaking children from middle-income backgrounds who served as typically developing, language-matched controls. Em dash indicates data not applicable.

^aScreening tool for final/t/and/d/, highest score = 10.

^bHighest grade completed (12 = *graduated from high school*, 16 = *graduated from college*).

^cStandard score obtained on the Peabody Picture Vocabulary Test–III (PPVT-III), used for eligibility.

^dRaw score obtained on the PPVT-III, used for matching LSES and LM groups.

^eAverage scaled scores from the Figure Ground and Form Completion subtests of the Leiter International Performance Scale–Revised (Leiter-R; $M = 10$, $SD = 3$).

^fSyntax quotient calculated from subtests IV–VI of the Test of Language Development–Primary, Third Edition (TOLD-P-3; $M = 100$, $SD = 15$).

^gMean length of utterance (MLU) is in morphemes, based on complete and intelligible utterances from language sample.

^hRating averaged across 3 listeners (1 = *no use of AAE*, 7 = *heavy use of AAE*; Oetting & McDonald, 2002).

Table 3

Regular and irregular past tense marking during spontaneous language samples.

Group	Regular past tense				Irregular past tense			
	Standard	Nonstandard	Zero marked	% Marked ^a	Standard	Nonstandard	Zero marked	% Marked
LSES	5.93 ^b (4.64)	0.60 (0.91)	1.47 (1.73)	85% (13.96)	23.60 (16.34)	3.47 (3.50)	3.40 (3.34)	87% (7.83)
	89	9	22	—	354	52	51	—
AM	7.33 (4.72)	1.40 (2.10)	1.27 (1.28)	88% (12.09)	32.87 (17.66)	3.47 (4.45)	3.40 (3.89)	93% (7.89)
	110	21	19	—	493	52	51	—
LM	7.20 (7.94)	0.20 (0.41)	3.53 (3.31)	66% (30.84)	27.27 (18.66)	3.00 (3.12)	3.33 (2.53)	88% (10.79)
	108	3	53	—	409	45	50	—

^a Calculated from (standard marked + nonstandard marked)/(standard marked + nonstandard marked + zero marked).

^b The first row reflects the group average, the second reflects the standard deviation (seen in parentheses), and the third, when given, reflects the sum of the responses. Em dashes indicate data not applicable.

Table 4

Regular past tense marking during elicitation probe: Higher probability versus lower probability verbs.

Group	Higher probability					Lower probability				
	Standard	Nonstandard	Zero marked	Other	% Marked ^a	Standard	Nonstandard	Zero marked	Other	% Marked
LSES	5.93 ^b (1.34)	0 (–)	0.80 (1.37)	0.27 (0.59)	89% (19.62)	5.60 (1.06)	0 (–)	1.27 (0.96)	0.07 (0.26)	82% (13.70)
	89	0	12	4		84	0	19	4	
AM	6.73 (0.59)	0 (–)	0.20 (0.56)	0.07 (0.26)	97% (8.01)	6.07 (1.79)	0 (–)	0.60 (0.91)	0.07 (0.26)	88% (25.82)
	101	0	3	25		91	0	9	1	
LM	6.27 (1.67)	0 (–)	0.67 (1.45)	0 (–)	90% (23.29)	10.33 (4.15)	0 (–)	1.40 (1.50)	0 (–)	79% (22.74)
	94	0	10	0		83	0	21	0	

^a% Marked = calculated from (standard marked + nonstandard marked)/Total number of obligatory contexts (standard marked + nonstandard marked + zero marked).

^bThe first row reflects the group average, the second reflects the standard deviation, and the third row, when given, reflects the sum of the responses.

Table 5

Regular and irregular past tense marking during elicitation probe.

Group	Regular past tense					Irregular past tense				
	Standard	Nonstandard	Zero marked	Other	% Marked ^a	Standard	Nonstandard	Zero marked	Other	% Marked
LSES	11.53 ^b (2.03)	0 (–)	2.07 (1.91)	0.33 (0.62)	85% (14.06)	1.73 (1.28)	2.27 (1.16)	2.00 (0.93)	0 (–)	67% (15.43)
	173	0	31	5		26	34	30	0	
AM	12.80 (1.08)	0 (–)	0.80 (1.08)	0.13 (0.52)	94% (9.16)	1.73 (0.96)	2.53 (1.30)	1.67 (1.49)	0 (–)	72% (25.69)
	192	0	12	2		26	38	25	0	
LM	11.80 (2.51)	0 (–)	2.07 (2.25)	0.07 (0.26)	85% (17.06)	1.24 (1.53)	2.47 (1.13)	2.00 (1.20)	0 (–)	67% (19.92)
	177	0	31	1		23	37	30		

^a% Marked = calculated from (standard marked + nonstandard marked)/Total number of obligatory contexts (standard marked + nonstandard marked + zero marked).

^bThe first row reflects the group average, the second reflects the standard deviation, and the third row, when given, reflects the sum of the responses.

Table 6

Proportion of regularly inflected forms on denominal/deverbal probe.

Group	Form	Spontaneous	Prompted
LSES	Denominal	93% ^a (10.40)	84% (15.27)
	Irregular verb root	79% (19.38)	67% (18.48)
AM	Denominal	92% (12.00)	80% (16.48)
	Irregular verb root	64% (31.11)	52% (27.42)
LM	Denominal	92% (17.28)	75% (16.67)
	Irregular verb root	71% (23.42)	57% (19.97)

^aThe first number in the row reflects the average proportion, and the second number reflects the standard deviation (seen in parentheses).

Table 7

Relationship between past tense and other measures.

Measure	1	2	3	4	5	6	7	8
1. Regular past tense	—	.37**	-.20	.13	.15	.26	-.18	-.09
2. Irregular past tense		—	.03	.13	.30**	.40**	.16	-.01
3. AAE rating			—	-.46**	.33*	-.12	-.03	-.43**
4. PPVT-III				—	.73**	-.06	.37*	.75**
5. TOLD-P:3					—	.29	-.03	-.20
6. MLU						—	-.03	-.20
7. Leiter-R							—	.37*
8. Maternal education								—

* $p < .05$.** $p < .01$.