NIH Public Access

Author Manuscript

J Speech Lang Hear Res. Author manuscript; available in PMC 2015 January 21.

Published in final edited form as:

J Speech Lang Hear Res. 2012 February ; 55(1): 55–69. doi:10.1044/1092-4388(2011/09-0257).

Dialect Variation and Reading: Is Change in Nonmainstream American English Use Related to Reading Achievement in First and Second Grades?

Nicole Patton Terry[a], **Carol McDonald Connor**[b], **Yaacov Petscher**[c], and **Catherine Ross Conlin**[d]

[a]Georgia State University and the Center for Research on Atypical Development and Learning, Atlanta, and Haskins Laboratories, New Haven, CT

[b]Florida State University and the Florida Center for Reading Research, Tallahassee

[c]Florida Center for Reading Research, Tallahassee

[d]Florida State University, Tallahassee

Abstract

Purpose—In this study, we examined (a) whether children who spoke Nonmainstream American English (NMAE) frequently in school at the beginning of 1st grade increased their use of Mainstream American English (MAE) through the end of 2nd grade, and whether increasing MAE use was associated with (b) language and reading skills and school context and (c) greater gains in reading skills.

Method—A longitudinal design was implemented with 49 children who spoke NMAE moderately to strongly. Spoken production of NMAE forms, word reading, and reading comprehension were measured at the beginning, middle, and end of 1st and 2nd grades. Various oral language skills were also measured at the beginning of 1st grade.

Results—Results indicate that most children increased their MAE production during 1st grade and maintained these levels in 2nd grade. Increasing MAE use was predicted by children's expressive vocabulary and nonword repetition skills at the beginning of 1st grade. Finally, the more children increased their MAE production, the greater were their reading gains from 1st grade through 2nd grade.

Conclusions—The findings extend previous reports of a significant association between NMAE use and specific reading skills among young children and have implications for theory, educational practice, and future research.

Keywords

Nonmainstream American English; reading; dialect

Correspondence to Nicole Patton Terry: npterry@gsu.edu.

The notion of an educationally significant relation between Nonmainstream American English (NMAE) dialect use and reading skill is not a new one, and it is not solely an American one. Researchers in many countries have been investigating how dialect variation should be considered in reading achievement and instruction for children whose spoken dialect differs significantly from standard orthographies (Connor, 2008; Siegel, 1999). In the United States, most of these studies have focused on African American English (AAE) and have revealed much about the characteristics of young children's AAE use (e.g., Charity, 2008; Craig & Washington, 2004; Green, 2004; Horton-Ikard & Miller, 2004; Oetting & Garrity, 2006; Oetting & McDonald, 2001; Thompson, Craig, & Washington, 2004; Washington & Craig, 1998).

Subsequently, several investigations have been conducted to explore the links between children's NMAE use and early reading achievement (e.g., Charity, Scarborough, & Griffin, 2004; Conlin, 2009; Connor & Craig, 2006; Craig & Washington, 2004; Craig, Zhang, Hensel, & Quinn, 2009; Terry, 2010; Terry, Connor, Thomas-Tate, & Love, 2010; Terry & Scarborough, 2011). Generally characterized by large samples of typically developing children in preschool through the primary grades, these investigations have revealed significant, moderate, and often negative correlations between frequency or amount of NMAE use and measures of word reading, decoding, vocabulary, phonological awareness, and reading comprehension skill.

For instance, Charity et al. (2004) investigated the relationship between AAE use and reading skill among 217 African American children in kindergarten, first grade, and second grade. They found significant negative correlations (rs = .32–.61) between frequency of NMAE production and measures of letter identification and word reading, passage comprehension, and non-word reading, after controlling for differences in region of the United States and school poverty levels. Terry et al. (2010) examined the relationship between NMAE use, school context (as indicated by school poverty), and reading skills among White and African American first graders (n = 617). They found significant associations between children's NMAE use and word reading, phonological awareness, and vocabulary skills. Overall, the results of these studies provide evidence of a significant relation between dialect differences and early reading achievement that is above and beyond socioeconomic status (SES) and race differences.

Although the scope and depth of these findings are exciting, and perhaps far reaching in their implications for research and instruction with children from diverse linguistic backgrounds, they are also troublesome for one very important reason: In general, the children who spoke more NMAE in these studies had weaker language and literacy skills. This finding is consistent across several studies, irrespective of the instrument used to measure NMAE use (e.g., sentence imitation, dialect density) or the oral language or reading skill in question (e.g., word reading, phonological awareness). This outcome is particularly striking in the only published longitudinal study (to our knowledge) conducted to examine these associations. Conlin (2009) investigated gains in reading skills during the first-grade year among a large (n = 694), racially and socioeconomically diverse sample of children who varied in their NMAE use. Several important findings emerged from the analyses. First, on average, children's NMAE use decreased significantly from fall to spring of first grade.

Second, NMAE use was related significantly and negatively to receptive oral language, expressive vocabulary, word reading, and passage comprehension measures. Third, and perhaps most importantly, children who began first grade using NMAE more frequently had poorer word reading and passage comprehension scores at the end of first grade than did children who began first grade using NMAE less frequently.

Such daunting findings beg the question of whether children who begin formal reading instruction speaking NMAE frequently in school (especially those from low-income households or who attend high-poverty schools) are destined to experience reading failure. To be clear, we do not suggest that NMAE use is akin to a language disorder or a reading disability. However, findings from these studies do suggest that children who speak NMAE frequently in school seem to be at risk for having difficulty acquiring basic reading skills in the early elementary years. It is plausible that instruction should be designed specifically to address dialect differences in oral and written language so that children can acquire knowledge of Mainstream American English (MAE) before or during early literacy instruction. Although the rush to intervene is understandable, we suggest that three important concepts are worthy of exploring: first, the association of changing dialect use with reading gains; second, the characteristics of children who are increasing their use of MAE compared with children who are not; and third, the malleability of dialect use. In this study, we focus on the first two.

Change in Dialect Use

First, we question whether students' changing NMAE use over time is critical to understanding the relationship between dialect use and reading. This early shift from more to less frequent NMAE use in speech has been documented in the literature, both in Conlin (2009) and in Craig and Washington (2004), in which a marked decrease in AAE production was observed between kindergarten and first grade in a large, cross-sectional sample of African American children (n = 400). Meanwhile, most children begin formal decoding and word reading instruction in the first grade, and proficiency with these skills relies, in large part, on children's oral language knowledge (Connor, Morrison, & Katch, 2007). Taken together, these findings suggest that children's NMAE use is changing at the very same time that their knowledge of English orthography and the language skills necessary to access it are increasing rapidly. Thus, it is plausible that change in NMAE use is related to gains in reading skill. That is, if children who begin first grade speaking NMAE frequently increase their MAE use in school over the school year, then their reading outcomes may be improved.

Second, we question why children who speak NMAE dialects seem to increase their MAE use around the first grade. Perhaps children's early interactions with print, growing sensitivity to language, and increasing oral language and orthographic skill encourage them to notice and compare differences between their speech patterns and print and support their awareness and use of more MAE in school (Siegel, 1999). For instance, change in an individual's dialect use, a pragmatic phenomenon linguists refer to as *code switching* or *style shifting*, may be an indicator of one's metalinguistic skill. Wolfram and Schilling-Estes (2006) described style shifting as a speaker's use of various speech styles and noted that shifting can occur when a speaker increases or decreases production of features in his or her native dialect (i.e., within dialect style shifting) or replaces features of his or her native dialect with features of another dialect (i.e., between dialect style shifting). The catalysts for shifting may arise with the speaker (e.g., shifting as one gets older) or the listener (e.g., shifting to speak with one's parent vs. one's peers). Importantly, Wolfram and Schilling-Estes noted that, irrespective of the reasons, successful shifting requires some degree of metalinguistic awareness—"to engage in style shifting, speakers must be aware of the various registers and styles around them, as well as the social meanings associated with each style" (p. 269). Thus, if both dialect use (which is governed by specific linguistic contexts) and change in dialect use (as exhibited through style shifting) are indicative of pragmatic awareness, then both may be markers for a speaker's metalinguistic skill in general. Moreover, if style shifting is indicative of a speaker's metalinguistic awareness, then change in dialect use may capture some aspects of the metalinguistic skills that are necessary for both style shifting and reading acquisition.

Contextual factors might also encourage dialect shifting in young children. Perhaps interacting in linguistically diverse environments (e.g., communicative contexts experienced at home vs. at school) or more formal sociolinguistic contexts (e.g., formal reading instruction in first grade) supports shifting. It is also possible that the instruction children receive might be driving dialect shifting from NMAE to MAE. Interactions between contextual variables and NMAE use are reported in the literature. For instance, Terry et al. (2010) observed that children who spoke NMAE more frequently and who attended schools with a low percentage of children who qualified for the U.S. Free and Reduced Price Lunch (FARL) programs had higher word reading and vocabulary scores than children who also spoke NMAE more frequently but who attended schools with a higher percentage of children who qualified for FARL programs. Perhaps communicative context facilitates the development of the kind of pragmatic knowledge necessary for dialect shifting because children in more diverse linguistic environments may have more opportunities to notice differences between dialects and to practice shifting between them.

Only two previous studies have examined change in young children's NMAE use and reading-related skills directly. Both Connor and Craig (2006) and Craig et al. (2009) examined change in dialect use across context (but not over time) by comparing children's performance on two tasks that differed in their expectation for MAE and NMAE production. Connor and Craig observed variation in preschoolers' AAE production on a sentence imitation and a storytelling task—the former requiring MAE production for verbatim imitation, and the latter assuming MAE production for storytelling from a wordless storybook with an unfamiliar adult at school. They found that children who produced AAE features frequently on the narrative task not only produced MAE features more frequently on the imitation task but also performed better on rhyming and letter–word recognition measures than did children who produced AAE less frequently. Applying a cross-sectional design with children in first grade through fifth grade, Craig et al. examined change in dialect use by comparing children's AAE production in oral versus written narratives—the latter task calling for MAE production explicitly. They also found that children used less AAE in the writing sample than in the spoken sample and that written AAE production (and not spoken AAE production) was directly related to reading achievement. In addition, the researchers noted that although 85% of children shifted their dialect use (i.e., used less AAE in the written narrative than the spoken narrative), the students with above average reading skills tended to shift more often than the students with weaker reading skills; however, this effect was marginally significant ($p = .056$). Findings from these studies indicate that change in dialect use among young children may be a critical factor to consider in early reading achievement. However, a more stringent test would be to examine production of NMAE forms over time, which would also allow for examinations of the predictive nature of NMAE production in reading performance.

Purpose of the Study

Specifically, we wanted to explore whether children who produced many NMAE forms in speech increased their MAE use in school significantly from first grade through second grade and, if so, whether this change in NMAE use (hereafter referred to as Δ*DVAR*) would be associated with and predictive of gains in word reading and reading comprehension skills. We chose to explore this relationship among first graders moving into second grade both because of previous reports of significant increases in MAE use in first grade (Conlin, 2009; Craig & Washington, 2004) and because the first grade and second grade years are critical for children experiencing reading difficulty, as it is important for them to make significant progress during this year before falling too far behind (Spira, Bracken, & Fischel, 2005). Finally, our sample was restricted to include only children who demonstrated moderate-to-strong NMAE use in school on a standardized measure of dialect variation at the beginning of first grade. We chose to focus on this group of children for two reasons. First, because we wanted to examine ΔDVAR, it seemed most likely that noticeable change would be observed among children who were moderate-to-strong NMAE speakers compared with children who were already using MAE more frequently as they entered first grade. Second, the research findings indicate that children in this group are more at risk for experiencing reading failure; thus, the implications of the findings may be most important for children who began first grade speaking NMAE frequently. To summarize, we posed the following research questions:

1. Considering children whose spoken dialect use in school varies from MAE moderately to strongly in the fall of their first grade year, what changes are observed in their NMAE use (ΔDVAR) in school through first and second grades?
2. Are children's oral language and reading skills and school SES at the beginning of first grade associated with the extent to which they increase their use of MAE in school?
3. Does increasing MAE use in school in first and second grades predict gains in reading skills in first and second grades?

Method

Participants

Children ($n = 49$) were selected to participate in this study using the following criteria: (a) They were participating in a larger longitudinal study on instruction and literacy development in both first and second grades for school years 2005–2007 (n = 235), and (b) they used dialect that varied moderately or strongly from MAE according to Part I of the Diagnostic Evaluation of Language Variation—Screening Test (DELV–S; Seymour, Roeper, & de Villiers, 2003). No other selection criteria were applied, including children's race or ethnicity. Two of the children had been retained in first grade and, thus, were participating in their second year of first grade and then were promoted to second grade during the second year of the study. They were not substantially older than the other children in the sample, with birth-dates for the sample ranging from October 1998 to August 2000. Of the 49 children, 24 were boys, and 25 were girls; 34 (69%) were African American, 10 (20%) were Caucasian, one (2%) was Hispanic, two (4%) were multiracial, and two (4%) were Asian. Of the children, five were receiving services for speech-language impairment, and one was receiving services for a learning disability; however, the specific nature of their disabilities or remediation services was unknown. Thirty-three (67%) qualified for FARL, and the remaining 16 (33%) did not.

Thirty-one parents (63%) returned the parent questionnaire, which included information about parents' educational levels and languages spoken at home. With regard to highest educational level attained, of these parents, for mothers, two (6%) reported some high school education, 12 (39%) graduated from high school, three (10%) received their General Educational Development (GED) diploma, three (10%) attended some college but did not graduate, six (19%) graduated from 2-year colleges, and five (16%) graduated from 4-year colleges. Fathers showed highly similar educational levels: Four (13%) attended some high school, 10 (32%) graduated from high school (no GED), five (16%) attended some college, two (6%) graduated from 2-year colleges, seven (23%) graduated from 4-year colleges, and three (10%) received their advanced degrees (one master's degree and two doctoral degrees). Twenty-nine parents reported the language spoken in the home: Twenty-six (90%) spoke American English only, and three (10%, which was verified by school records and was representative of the entire sample) spoke another language in the home as well (Gujarati, Igbo, and Mandarin).

Children attended nine different public schools from a single, large school district in the southeastern region of the United States in first and second grades. All but three of the schools were located in urban communities. The percentage of children who qualified for FARL at these schools ranged from 6% to 94%. The percentage of children who were African American in these schools ranged from 6% to 90%. In first grade, 27 teachers had children in the study (1–4 students per class), and in second grade, 26 teachers had children in the study (1–6 students per class).

Measures

Dialect variation—We assessed dialect variation using Part I of the DELV–S. Part I of this screening instrument is used to determine whether the child is speaking with strong, some, or no variation from MAE. On these items, children were asked to describe actions in pictures or to respond to questions about pictures (e.g., they were asked to identify a picture of "teeth"), and their responses were recorded (e.g., "teef " or "teeth") and scored for the production of mainstream or non-mainstream forms.

Reading achievement—Children's overall reading skills were measured using the Letter–Word Identification and Passage Comprehension subtests of the Woodcock–Johnson Tests of Achievement—Third Edition (WJ3; Woodcock, McGrew, & Mather, 2001). In the Letter–Word Identification subtest, children read increasingly unfamiliar words. The Passage Comprehension subtest, which is a cloze task, asks children to read increasingly difficult sentences and passages silently and to provide the missing word. Recent research indicates that, especially in early elementary school, this task is highly dependent on children's decoding skills as well as their comprehension and language skills (Keenan, Betjemann, & Olson, 2008). Thus, we use it here as an omnibus measure of reading achievement.

Oral language skills—Children's oral language skills were measured with four tasks. First, expressive vocabulary skill was assessed with the Picture Vocabulary subtest of the WJ3. This test asks students to name pictures of increasingly unfamiliar words. Second, morphosyntactic use and nonword repetition were assessed with Part II of the DELV–S, which has two parts. The first part asks the children several questions that require appropriate use of morphosyntactic features (e.g., copula, possessive pronouns) as well as response to *wh*- questions (who, what, where, etc.). The second part asks children to repeat nonsense words. Finally, one type of metalinguistic skill, phonological awareness, was assessed using the Sound Awareness subtest of the WJ3. This test assesses children's oral rhyming, segmenting, blending, and elision skills. Fall first grade Sound Awareness subtest scores were available for only 41 of the children. Missing data analyses using *t* tests (Bonferroni correction $p = .005$) revealed no significant differences in reading achievement scores or ΔDVAR for children with or without Sound Awareness subtest scores. Missing data were imputed for Question 3 using SAS multiple imputations.

School SES—In this study, school context was indicated by school SES, which represented the published percentage of children at the school who qualified for the FARL program. Children who are eligible come from families with incomes at or below 130% of the poverty level for free lunch or 185% for reduced price lunch, which is $26,000 and $37,000 for a family of four, respectively (www.fns.usda.gov/cnd/lunch/AboutLunch/NSLPFactSheet.pdf).

Procedure

Children were assessed at the beginning, middle, and end of the school year by trained research staff in a quiet location at their school. The Picture Vocabulary, Letter–Word Identification, and Passage Comprehension subtests of the WJ3 were administered at all three times, whereas the DELV–S and Sound Awareness sub-test were administered only in the fall and spring (school year August–May). All measures were administered and scored in standardized format according to test manuals. On the WJ3, raw scores from subtests were transformed into W scores, which are a variation of the Rasch ability scale, in which a score of 500 represents the achievement of a typically developing 10-year-old and in which the *SD* = 15. Such scaled scores (including the DELV Development Scale [DS] score described below) are preferred for statistical analyses because there are equal intervals between each point in the total score. This means that a 5-point difference represents the same skill difference whether the gain in W scores is 1–6 or 10–25. This is not the case with raw scores, in which the difference between 1 and 6 may represent skill gains that differ from raw scores that go from 10 to 15. For example, it might be easier to move from 1 to 6 than from 10 to 15 if 13 and 14 are particularly difficult items.

On the DELV–S Part I, using the method reported in Terry et al. (2010), we computed a percentage of dialect variation score, which represents children's NMAE use at one point in time and is hereafter referred to as *DVAR*. DVAR was computed by dividing the number of items that varied from MAE (i.e., NMAE, column A) by the total number of scoreable items (i.e., NMAE + MAE, column A + B) and multiplying by 100. We did not include items that could not be judged to be one or the other (column C). Thus, DVAR represents the percentage of items in Part I in which the child used NMAE. In this sample, the mean scores for column A were 8.51 (SD = 2.70) in the fall of first grade, 6.89 (SD = 4.20) in the spring of first grade, 6.23 (SD = 3.96) in the fall of second grade, and 5.81 (SD = 3.68) in the spring of second grade. The mean scores for column B were 4.22 (SD = 2.15) in the fall of first grade, 6.74 (SD = 4.43) in the spring of first grade, 7.53 (SD = 4.09) in the fall of second grade, and 8.04 (SD = 4.19) in the spring of second grade. Children provided very few C responses. Comparing criterion reference scores from the DELV–S, we found that students who used dialect that was judged *to vary somewhat from MAE* achieved a fall of first grade DVAR of 59%; those whose dialect *varied strongly from MAE* achieved a DVAR of 73%.

The change in children's DVAR score, which represents change in their NMAE use over time and is referred to as ΔDVAR, is the empirical Bayes residuals of the slopes from the cross-classified random effects models described for Research Question 1. Essentially, empirical Bayes residuals are similar to the residuals generated in a regression analysis. However, because they are generated by hierarchical linear models (HLMs), the residuals are specific to the students, with the shared classroom variance partialled out.

On the DELV–S Part II, we computed DS scores for each child using procedures described in Petscher, Connor, and Al Otaiba (2012), which yielded two scores for each child: the Morphosyntactic scale and the Non-word Repetition scale (analyses revealed that Part II had two distinct and nonoverlapping constructs). Standard scores (SS) were also computed. On average, children in the sample who were identified as being at low risk for language disabilities achieved DS of 590 and SS of 102 on the Morphosyntactic scale and DS of 607 and SS of 111 on the Nonword Repetition scale. Those at moderate risk achieved lower Morphosyntactic scale (DS = 533, SS = 91) and Nonword Repetition scale (DS = 547, SS = 100) scores. Students at greatest risk on Part II achieved lower scores still (Morphosyntactic scale, DS = 539, SS = 92; Nonword Repetition scale, DS = 495, SS = 92).

Analytic Strategies

Our longitudinal analysis of children's dialect use presents a complex data structure because children are nested in classrooms in first grade and in a different set of classrooms with different teachers and classmates in second grade (Raudenbush & Bryk, 2002). Moreover, we hypothesized that children's ΔDVAR would be different in first and second grades. Plus, rates of change may differ for the summer between first and second grades. Hence, we use piecewise latent growth cross-classified random effects models in which repeated measures

(DVAR) over time are nested in children, who are nested in Grade 1 and Grade 2 classrooms, to answer Research Question 1. In this model (see Appendix), theta (θ_0) represents the mean DVAR for all Grade 1 students, whereas θ_1 is the difference between scores at the same point in time (i.e., marginal deflection) of Grade 2 students' mean DVAR. The coefficients for θ_2 and θ_3 describe the rate of growth for students in Grades 1 and 2, respectively. As discussed previously, HLM software provides empirical Bayes residuals for both intercepts and slopes for each student. Empirical Bayes residuals of the slope for each student represented their ΔDVAR from the beginning of first grade to the end of second grade. These values were used to answer the remaining questions.

To answer Research Question 2, we created a two-level HLM with ΔDVAR as the outcome. Children's race (1 = *African American*, 0 = *other*) and oral language skills in the fall of first grade were entered at Level 1. School SES was entered at Level 2. For Research Question 3, we modeled student reading growth curves in first and second grades because repeated measures of students' reading were nested in students. Again, we used a piecewise growth curve model because it allowed us to create a two-rate model of growth curves for students in first and second grades, respectively, within the same model.

Student reading performance (either letter–word reading or passage comprehension) over the course of the academic year was centered at the spring of first grade so that the intercept in this model represented the mean reading W score at the end of the first-grade year, keeping in mind that the variables can be centered at any point in time within the range of the data. Because only three time points were available within each year, a linear growth model was fitted to the data.

The two-level models for both outcomes are reported in the Appendix, in which the Grade 1 growth curve serves as the fixed reference growth curve and in which the Grade 2 coefficients represent the fitted deflection from that curve for second-grade students. Thus, the intercepts and coefficients π_{0j} and π_{1j}, which are latent variables and are expressed in the Level 2 models as β_{00} and β_{10}, together represent the first-grade student trajectory (intercept and linear growth). The second-grade coefficients, β_{20} and β_{30}, are added to β_{00} and β_{10} coefficients, respectively, to obtain the second-grade student growth trajectory. The coefficients for ΔDVAR represent the effect of increasing or decreasing use of MAE. The Appendix also includes the procedures for model fitting and the equation used to calculate the proportion reduction in variance by modeling student characteristics.

Results

Descriptive statistics for all child assessments are provided in Table 1, and correlations are provided in Table 2. In general, children demonstrated increasing letter–word reading and passage comprehension skills from the beginning of first grade through the end of second grade when we examined their W scores. Comparing their SS indicated that children showed anticipated growth for all skills, with some exceptions. They exhibited greater than anticipated growth in skills relative to the test standardization sample on letter–word reading in first grade but not in second grade. SS for both reading measures were generally greater in first grade than in second grade, suggesting that children were losing ground relative to the test standardization sample. Cross-tabulation indicated that although some African American children attended schools with a low percentage of children who qualified for FARL, they were significantly more likely to attend schools with a high percentage of children who qualified for FARL (percentage of students qualifying for FARL > 50%), $\chi^2(1) = 6.7$, $p = .010$.

Examining Changes in DVAR in First and Second Grades

Results of piecewise latent growth cross-classified random effects modeling are provided in Table 3 and reveal that, on average, children who were strong-to-moderate users of NMAE at the beginning of first grade demonstrated significantly lower DVAR scores by the end of first grade and that DVAR rates did not change significantly during the summer or during second grade (see Table 1 for descriptive statistics; Table 3 and Figure 1 provide the results). Thus, generally, children were increasing their use of MAE during first grade and maintaining these levels through the end of second grade.

Computing ΔDVAR

Examination of Grade 1 empirical Bayes residuals for intercept and slope revealed no significant correlation ($r = -.213$, $p = .133$). The fitted mean DVAR for this group of children was 77%, and the fitted mean DVAR Grade 1 slope was −1.9 percentage points per month. The fitted mean DVAR Grade 2 slope was essentially 0. The empirical Bayes residuals for the slope, which is ΔDVAR, ranged from −8.51 to 0.66 percentage points per month, with a mean of −4.50 (*SD* = 2.44). Thus, if a child had a ΔDVAR at 2 *SD*s above the fitted mean (i.e., −4.50 + 4.88 = 0.38 percentage points per month, a positive ΔDVAR), then his or her DVAR would have increased 6.85 percentage points from the beginning of first grade to the end of second grade, which is 18 months. A child with a ΔDVAR 1 *SD* below the mean would have decreased his or her DVAR 4.5 percentage points per month, or 81% from the beginning of first through the end of second grade. Thus, most children used more MAE by the end of second grade, some stayed about the same, and very few children actually decreased their use of MAE (i.e., increased NMAE). The intraclass correlation, which is the proportion of between-classroom variance explained, for first grade was .16 and for second grade was .002. Thus, classrooms accounted for about 16% of the variance in students' scores in first grade but explained very little of the variance (only 0.2%) in second grade.

Variables Predicting Children's Increasing Use of MAE

Given that children's MAE use increased significantly during first grade and that this continued through the end of second grade, we next examined predictors of that shift using HLMs with ΔDVAR as the outcome. On the basis of previous research, plausible predictors of the shift included the following: race, school SES, special education status, oral language skills (measured here with the Expressive Vocabulary subtest of the WJ3, the Morphosyntactic scale and Nonword Repetition scale DS from the DELV–S, and the Sound Awareness subtest of the WJ3), and experience with print (measured here with the Letter–Word Identification subtest of the WJ3). Because the sample size was relatively small, the model was built systematically, and variables that did not significantly predict the outcome were trimmed to preserve parsimony unless they were theoretically important.

The final HLM results with ΔDVAR as the outcome are provided in Table 4 and Figure 2. Preliminary models revealed that, in general, children's morphosyntactic use, phonological awareness, and letter–word reading skills were not significantly associated with the extent to which children increased their use of MAE and, thus, were trimmed from the model. However, whether a child was African American and children's expressive vocabulary and nonword repetition skills were significant predictors, even after accounting for whether the children were receiving special education services. In general, children with stronger vocabulary skills in the fall of first grade were more likely to increase their use of MAE (more negative ΔDVAR) than were children with weaker vocabulary skills (see Table 4). This was the case regardless of school SES.

Additionally, there were Child × School SES interactions. The relation between children's increasing MAE use and their race (African American or other) depended on school SES. In general, African American children decreased their NMAE use by about 4 percentage points per month, and this did not vary greatly with varying school SES. In contrast, Caucasian, Hispanic, and Asian children who used NMAE at the beginning of first grade were much more likely to increase their MAE use by the end of second grade if they attended schools with a lower percentage of children who qualified for FARL than if they attended schools with a higher percentage of children who qualified for FARL.

The impact of school SES on children's ΔDVAR also depended on their nonword repetition skills. On average, if children attended a school with a low percentage of children who qualified for FARL, then they were more likely to decrease their NMAE use, and this was the case regardless of their nonword repetition skills. However, if they attended schools with a higher percentage of children who qualified for FARL, then their nonword repetition skills at the beginning of first grade mattered. Using modeled results, children with stronger nonword repetition skills (e.g., whose skills fell at the 75th percentile for the sample; DS = 568) decreased their use of NMAE at a greater rate than did children whose nonword repetition skills were more typical or weaker (e.g., fell at the 50th and the 25th percentiles of the sample; DS of 498 and 442, respectively). Thus, both school SES and children's individual nonword repetition skills were significantly associated with the extent to which they changed their NMAE use by the end of second grade. Of note, school SES and children's nonword repetition skills were not significantly correlated ($r = -.25$, $p = .083$), suggesting that children with stronger or weaker nonword repetition skills were not more or less likely to attend a school with high or low percentages of children who qualify for FARL.

ΔDVAR and Gains in Reading Skills

Results of piecewise growth models show that ΔDVAR was systematically associated with gains in letter–word reading and passage comprehension skills from first grade through second grade (see Tables 5 and 6). Students who increased MAE use more sharply were more likely to show greater growth and stronger outcomes in first and second grades for both letter–word reading and passage comprehension than were children whose NMAE use changed very little over time. Figure 2 shows modeled results for children whose ΔDVAR fell at the 25th and 75th percentiles of the sample, or slopes of −3.59 percentage points per month (steep negative slope) and −0.78 percentage points per month (almost no change in slope), respectively.

By adding ΔDVAR to the model, the variance in students' letter–word reading initial status was reduced by 14% and 3% in first and second grades, respectively. Variance in growth dropped 17% in first grade and dropped 19% in second grade. The proportion of variance falling between students for passage comprehension was .62 for first-grade initial status and was .033 for both first- and second-grade growth. No significant variability was observed in second-grade initial status, so this parameter was fixed in the model. ΔDVAR explained an additional 21% of the variance in passage comprehension skills.

Discussion

Three primary findings emerged from the analyses. First, we found that children generally increased their spoken production of MAE forms during first grade and maintained these levels in second grade. Second, although ΔDVAR was correlated with oral language (e.g., vocabulary, morphosyntax, nonword repetition, and phonological awareness) and orthographic (e.g., letter–word reading) skills in first grade, children's expressive vocabulary and nonword repetition skills at the beginning of first grade, race, and school SES remained significant independent predictors of whether children would increase their MAE use. Specifically, across school types, children with stronger vocabulary skills at the beginning of first grade increased their MAE use more quickly than did children with weaker skills; the same was true for nonword repetition, but this varied by school SES. Effects of nonword repetition were magnified as the percentage of students qualifying for FARL attending the school increased. Moreover, race and school SES interacted, such that African American children in all schools generally increased their MAE use, and this was slightly greater at schools with a higher percentage of children who qualified for FARL, whereas other children were more likely to do so if they attended schools with a lower percentage of children who qualified for FARL. The third primary finding from this study was that children who increased their MAE production at a greater rate exhibited greater growth in reading skills between first and second grades than did children whose MAE use either decreased or remained the same (see Figure 2). Keep in mind that results in Figure 2 are modeled results at the 25th and 75th percentiles and are well within sample ranges. We could have modeled ±1 *SD* and shown greater achievement differences.

These results add new evidence to the literature. Our finding that increasing use of MAE (i.e., ΔDVAR) predicted growth in reading skills over and above the students' reading performance earlier in first grade and second grade is particularly significant, given that previous reading performance is one of the best predictors of an individual's later reading achievement. The results related to the prediction of change in NMAE use are also enlightening and provide a first look at the oral language skills that may support the malleability of NMAE use in young children. Finally, it is noteworthy that these findings come from a longitudinal study, which not only allows for confirmation of previous findings from cross-sectional and correlational studies (Charity et al., 2004; Conlin, 2009; Connor &

Craig, 2006; Craig et al., 2009; Terry et al., 2010) but also provides more specific evidence that children's NMAE use changes noticeably in first grade and perhaps not in second grade and that the relationships between children's NMAE use and various language and literacy skills are significant and slightly moderate in strength.

Theoretical Implications

The findings from this study have implications for a developing hypothesis that has been proposed recently in the literature. Referred to as *linguistic awareness*/*flexibility* or *dialect awareness* (Charityetal., 2004; Connor & Craig, 2006; Terry, 2010; Terry et al., 2010; Terry & Scarborough, 2011), proponents of this hypothesis suggest that poorer language sophistication may impede reading performance above and beyond NMAE use itself. Some important aspects of this hypothesis are worth discussing further. First, within this framework, the term *language sophistication* is meant to include both linguistic and metalinguistic skills. The acquisition of literacy skills is dependent not only on children's ability to think about language to manipulate it purposefully but also on their ability to understand and use language to communicate effectively (hence, the significant relationships observed between reading and phonological awareness and oral vocabulary skills). Further, dialects can vary quite significantly in each domain of language, and it is plausible that this variation could be noticeable at both linguistic and metalinguistic levels.

A second, fundamental aspect of this hypothesis is the attempt to understand how dialect variation might interact with language, literacy, and contextual variables that are known to contribute to reading (and writing) achievement. For instance, researchers have posited that children's NMAE use in specific communicative contexts is a marker for metalinguistic skill in general (Charity et al., 2004; Connor & Craig, 2006; Terry, 2010; Terry et al., 2010; Terry & Scarborough, 2011). Specifically, lesser production of NMAE forms or change in production of NMAE forms in contexts that presuppose MAE (e.g., testing in school with an unfamiliar adult) may be indicative of greater pragmatic awareness (perhaps dialect awareness) and linguistic flexibility. Further, because children who have stronger metalinguistic skills (most notably phonological awareness) tend to have less difficulty learning how to read (National Early Literacy Panel, 2009; National Reading Panel, 2000; Scarborough, 2001; Snow, Burns, & Griffin, 1998), these researchers argue that it is a lack of sensitivity to and awareness of language that is interfering with reading achievement more so than spoken NMAE use itself.

Finally, it is also important to acknowledge the developmental nature of the linguistic awareness/flexibility hypothesis. This aspect may seem intuitive because this hypothesis attempts to incorporate dialect variation into current models of reading acquisition, which do account for age-/grade-related effects in emergent and conventional literacy skills as well as the linguistic, cognitive, and academic skills that support them. It is plausible that the relationship between dialect variation and reading is very different for children who have mastered basic word reading and comprehension skills or, conversely, for older struggling readers who have not. For example, observations of strong language skills among preschoolers who use NMAE frequently (e.g., Craig & Washington, 1994) and weak language and literacy skills among school-age children who use NMAE frequently (e.g., Charity et al., 2004) have led researchers to posit that increasing MAE use may be particularly critical to the literacy achievement of older children and not younger emergent readers.

Given these tenets, the results of this study could be interpreted as support for the linguistic awareness/flexibility hypothesis. For example, one prediction from this hypothesis is that if ΔDVAR is associated with the pragmatics of language and akin to code or style shifting, then it should be sensitive to changes both in the speaker and the sociolinguistic contexts. Moreover, if children's NMAE production in specific contexts is an indicator of their metalinguistic skill that is akin to the kind of metalinguistic ability that is known to facilitate reading development, then ΔDVAR would be related to other measures of metalinguistic skill and reading skill. ΔDVAR should also be predictive of reading skill. Findings from this study appear to confirm each of these predictions.

Although the evidence from this study supports each of these claims, it is not without some complexity. For instance, it is not clear why NMAE production rates do not seem to change significantly after first grade, at least among younger children (there is evidence of shifts in production among older adolescents and adults; e.g., Jackson, Renn, Van Hofwegen, & Wolfram, 2009; Labov, 1972; Myhill, 1988). It is also puzzling that, when examining possible predictors of ΔDVAR, effects for children's letter–word identification (a measure of orthographic skill and/or experience with print), phonological awareness, and morphosyntactic use did not remain independently significant. Rather, children's initial expressive vocabulary and nonword repetition skills predicted whether they would increase their MAE use. On the one hand, this finding seems strange because it has often been discussed in the literature that NMAE speaker's interactions with and awareness of print would alleviate any interference caused by speech–print mismatches. Therefore, stronger initial reading skills seem a likely predictor of shifting. Further, as discussed earlier, if ΔDVAR captures some of children's metalinguistic insight, then one might expect that another measure of metalinguistic skill would account for significant variance in children's changing MAE use. On the other hand, observing that children's increasing MAE use is predicted by oral language measures known to be related to reading skill is reassuring because it provides even further evidence that the underlying skills that support reading achievement among American English speaking children are important for all American English speaking children, irrespective of their spoken dialect use. It also focuses our attention on skills that are fairly malleable in young children, such as oral vocabulary.

Educational and Research Implications

Again, it bears repeating that we do not suggest that children's NMAE use in school is akin to a language impairment or a learning disability, and we do not suggest that frequent NMAE use in school will cause children to develop language or literacy disorders. Rather, we suggest that the findings from this study and other recent investigations do indicate that dialect variation might be an important factor to consider in the design and implementation of early language and literacy instruction for children who speak NMAE dialects. For instance, Terry (2008) and Terry and Scarborough (2011) have argued that, according to the linguistic awareness/flexibility hypothesis, instruction for young children need not highlight dialect differences specifically. Rather, instruction that encourages children to become more attuned to language itself—how usage changes in different contexts as well as how it can be manipulated—would support the acquisition of literacy skills. Findings from this study qualify these claims by suggesting that such instruction would be most helpful for emergent and beginning readers who use substantial NMAE in speech. They also bring context into the discussion. The degree to which children increased their MAE use, especially children who were not African American, was largely dependent on school SES. Thus, any intervention should consider school context and the culture of the community and of the students.

Experimental investigations are needed to confirm whether the instruction described above is most effective for specific groups of children under specific instructional conditions. Yet, it is heartening to know that the language skills in question (e.g., oral vocabulary, phonological awareness) are malleable among young children if they are provided with appropriate instruction (National Early Literacy Panel, 2009; National Reading Panel, 2000) and that, keeping in mind that all of the children in this study used NMAE at least moderately, children who were producing substantial numbers of NMAE features on the DELV–S at the beginning of first grade were less likely to do so by the end of first grade. If both are malleable during this time, then it seems likely that most NMAE speakers, irrespective of their levels of NMAE use in school, could benefit from this kind of instruction.

Limitations of the Study

This study is not without limitations that might impact the generalizability of the findings. For example, the sample size was small, was diverse, and included a few students who were receiving services for speech-language impairments and learning disabilities (although we did not find disability group effects). In addition, the results may be very different for children in earlier or later stages of reading acquisition, for different oral language and reading skills, for different language sampling techniques, or for children who produced very little NMAE forms in speech (e.g., MAE speakers). Additionally, the results may be different for children who speak different social or regional NMAE dialects in the United States. Finally, many factors known to be associated with reading achievement were not included in the analyses (Connor, Morrison, Fishman, Schatschneider, & Underwood, 2007; Snow et al., 1998). Although the growth models for letter–word reading and reading comprehension and their interpretation are strengthened by our inclusion of children's initial reading status, future investigations exploring the interactions among other predicting variables, dialect variation, and reading achievement would be illustrative.

Future Research and Conclusions

Although we acknowledge the complexity of the analytical strategies taken to answer these questions, we would argue that these questions are very complex, and hence more sophisticated analyses are warranted. Further, Terry et al. (2010) argued that the complexity of this relation may prevent the development of broad assumptions about how dialect variation is related to reading acquisition or how this variation might be considered in educational contexts. Certainly, the findings from this study suggest that future research in this area is warranted. Longitudinal research with larger samples is necessary to form a consensus on the scientific and educational importance of dialect variation to models of literacy acquisition. In addition, experimental or quasi-experimental investigations of different instructional approaches to improving language sophistication of NMAE speakers would be helpful in determining not only whether these techniques can be implemented effectively but also whether specific strategies are causally related to increased MAE use, improved language skills, stronger literacy outcomes, or all of the above. Importantly, these studies should be implemented with younger, novice readers and older skilled and struggling readers. Given that children from racial minority groups and children living in poverty often speak dialects that vary from MAE and that many of these children tend to have difficulty achieving proficient reading and writing skills, it seems plausible that dialect variation may be one of several critical factors to consider in children's literacy acquisition. Greater attention to children's explicit and implicit awareness of the links between oral and written language in general, and perhaps differences between MAE and the dialect that children use at home specifically, may offer additional avenues of instructional support and increase our ability to ensure that all children learn to read and write proficiently.

References

Charity AH. African American English: An overview. Perspectives on Communication Disorders and Sciences in Culturally and Linguistically Diverse Populations. 2008; 15:33–42.

Charity A, Scarborough H, Griffin D. Familiarity with school English in African American children and its relation to early reading achievement. Child Development. 2004; 75:1340–1356. [PubMed: 15369518]

Conlin, C. Unpublished doctoral dissertation. Florida State University; Tallahassee: 2009. Non-mainstream American English and first grade children's language and reading skills growth.

Connor CM. Language and literacy connections for children who are African American. Perspectives on Communication Disorders and Sciences in Culturally and Linguistically Diverse Populations. 2008; 15:43–53.

Connor C, Craig H. African American preschoolers' language, emergent literacy skills, and use of African American English: A complex relation. Journal of Speech, Language, and Hearing Research. 2006; 49:771–792.

Connor CM, Morrison FJ, Fishman BJ, Schatschneider C, Underwood P. The early years: Algorithm-guided individualized reading instruction. Science. 2007 Jan 26.315:464–465. [PubMed: 17255498]

Connor CM, Morrison FJ, Katch P. A second chance in second grade? The independent and cumulative impact of first and second grade reading instruction and students' letter–word reading skill growth. Scientific Studies of Reading. 2007; 11:199–233.

Craig HK, Washington JA. The complex syntax skills of poor, urban, African-American preschoolers at school entry. Language, Speech, and Hearing Services in Schools. 1994; 25:181–190.

Craig HK, Washington JA. Grade related changes in the production of African American English. Journal of Speech, Language, and Hearing Research. 2004; 47:450–463.

Craig HK, Zhang L, Hensel SL, Quinn EJ. African American English-speaking students: An examination of the relationship between dialect shifting and reading outcomes. Journal of Speech, Language, and Hearing Research. 2009; 52:839–855.

Green, L. African American English: A linguistic introduction. Cambridge, England: Cambridge University Press; 2004.

Horton-Ikard R, Miller J. It is not just the poor kids: The use of AAE forms by African-American school-aged children from middle SES communities. Journal of Communication Disorders. 2004; 37:467–487. [PubMed: 15450436]

Jackson, S.; Renn, J.; Van Hofwegen, J.; Wolfram, W. The development of African American English in childhood and adolescence. Paper presented at the annual meeting of the American Speech-Language-Hearing Association; New Orleans, LA. 2009 Nov.

Keenan JM, Betjemann RS, Olson RK. Reading comprehension tests vary in the skills they assess: Differential dependence on decoding and oral comprehension. Scientific Studies of Reading. 2008; 12:281–300.

Labov, W. Language in the inner city: Studies in the Black English vernacular. Philadelphia, PA: University of Pennsylvania Press; 1972.

National Early Literacy Panel. Developing early literacy: Report of the National Early Literacy Panel. Jessup, MD: National Center for Family Literacy, the National Institute for Literacy, U.S. Department of Health and Human Services; 2009.

National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction (NIH Publication No. 00-4769). Washington, DC: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute of Child Health and Human Development; 2000.

Oetting J, Garrity A. Variation within dialects: A case of Cajun marking within child SAAE and SWE. Journal of Speech, Language, and Hearing Research. 2006; 49:16–26.

Oetting J, McDonald J. Nonmainstream dialect use and specific language impairment. Journal of Speech, Language, and Hearing Research. 2001; 44:207–223.

Petscher Y, Connor CM, Al Otaiba S. Item-level psychometric analysis, vertical equating, and scaling of the Diagnostic Evaluation of Language Variation Assessment. Journal of Psychoeducational Assessment. 2012 Advance online publication. 10.1177/1534508411413760.

Raudenbush, SW.; Bryk, AS. Hierarchical linear models: Applications and data analysis methods. 2. Thousand Oaks, CA: Sage; 2002.

Scarborough, HS. Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In: Neuman, SB.; Dickinson, DK., editors. Handbook of early literacy research. New York, NY: Guilford Press; 2001. p. 97-110.

Seymour, H.; Roeper, T.; de Villiers, J. Diagnostic Evaluation of Language Variation—Screening Test. San Antonio, TX: Harcourt Assessment; 2003.

Siegel J. Stigmatized and standardized varieties in the classroom: Interference or separation? TESOL Quarterly. 1999; 33:701–728.

Snow, CE.; Burns, MS.; Griffin, P., editors. Preventing reading difficulties in young children. Washington, DC: National Academy Press; 1998.

Spira EG, Bracken SS, Fischel JE. Predicting improvement after first-grade reading difficulties: The effects of oral language, emergent literacy, and behavior skills. Developmental Psychology. 2005; 41:225–234. [PubMed: 15656751]

Terry NP. Examining relationships among dialect variation and emergent literacy skills. Communication Disorders Quarterly. 2010 Advance online publication. 10.1177/1525740110368846.

Terry NP, Connor CM, Thomas-Tate S, Love M. Examining relationships among dialect variation, literacy skills, and school context in first grade. Journal of Speech, Language, and Hearing Research. 2010; 53:126–145.

Terry, NP.; Scarborough, HS. The phonological hypothesis as a valuable framework for studying the relation of dialect variation to early reading skills. In: Brady, SA.; Braze, D.; Fowler, CA., editors. Explaining individual differences in reading: Theory and evidence. New York, NY: Taylor & Francis Group; 2011. p. 97-120.

Thompson C, Craig H, Washington J. Variable production of African American English across oracy and literacy contexts. Language, Speech, and Hearing Services in Schools. 2004; 35:269–282.

Washington JA, Craig HK. Socioeconomic status and gender influences on children's dialectal variations. Journal of Speech, Language, and Hearing Research. 1998; 41:618–626.

Wolfram, W.; Schilling-Estes, N. American English. 2. Malden, MA: Blackwell; 2006.

Woodcock, R.; McGrew, K.; Mather, N. Woodcock–Johnson Tests of Achievement. 3. Rolling Meadows, IL: Riverside Publishing; 2001.

Appendix. Models used in analyses

Growth Model – DVAR (i.e., ΔDVAR)

Level 1 Model

$DVAR_{ijk} = \Pi_{0jk} + \Pi_{1jk}(G2_{ijk}) + \Pi_{2jk}(TIMEMG1G_{ijk}) + \Pi_{3jk}(G2 \times TIME_{ijk}) + e_{ijk}$

Level 2 Model

$\Pi_{0jk} = \theta_0 + b_{00j} + c_{00k}$

$\Pi_{1jk} = \theta_1$

$\Pi_{2jk} = \theta_2 + b_{20j}$

$\Pi_{3jk} = \theta_3$

Growth Model – Letter-Word Identification

Level 1 Model

$LWID_{it} = \Pi_0 + \Pi_1$ (Grade 1 Month) $+ \Pi_2$ (Grade 2) $+ \Pi_3$ (Grade 2 Month) $+ \varepsilon$

Level 2 Model

$\Pi_0 = \beta_{00} + \beta_{01}(DVAR) + r_0$

$\Pi_1 = \beta_{10} + \beta_{11}(DVAR) + r_1$

$\Pi_2 = \beta_{20} + \beta_{21}(DVAR) + r_2$

$\Pi_3 = \beta_{30} + \beta_{31}(DVAR) + r_3$

Growth Model – Passage Comprehension

Level 1 Model

$PC_{it} = \Pi_0 + \Pi_1$ (Grade 1 Month) $+ \Pi_2$ (Grade 2) $+ \Pi_3$ (Grade 2 Month) $+ \varepsilon$

Level 2 Model

$\Pi_0 = \beta_{00} + \beta_{01}(DVAR)$

$\Pi_1 = \beta_{10} + \beta_{11}(DVAR) + r_1$

$\Pi_2 = \beta_{20} + \beta_{21}(DVAR)$

$\Pi_3 = \beta_{30} + \beta_{31}(DVAR) + r_3$

Model fitting: A series of sequential models were initially tested to examine which model best fit the data: (a) fixed intercept–fixed slope, (b) random intercept–fixed slope, (c) fixed intercept–random slope, and (d) random intercept–random slope. Following this test, the better fitting model was examined for variability in intercepts and slopes. Results from the −2 log likelihood test suggest that the random intercept–random slope model improved the description of growth for letter–word identification, $\chi^2(7) = 40.22$, $p < .001$, whereas the fixed intercept-random slope model was a better descriptor for growth in reading, $\chi^2(7) = 80.45$, $p < .001$. We then entered ΔDVAR into the model at Level 2. Nonsignificant variance components were fixed to achieve greater power in model estimation.

Proportion Reduction in Variance

$$\frac{\hat{\tau}_{qq}(UC) - \hat{\tau}_{qq}(C)}{\hat{\tau}_{qq}(UC)},$$

where $\hat{\tau}_{qq}(UC)$ represents the tau estimate for a given parameter (e.g., intercept) for the unconditional model and $\hat{\tau}_{qq}(C)$ is a tau estimate for the conditional model (Raudenbush & Bryk, 2002).

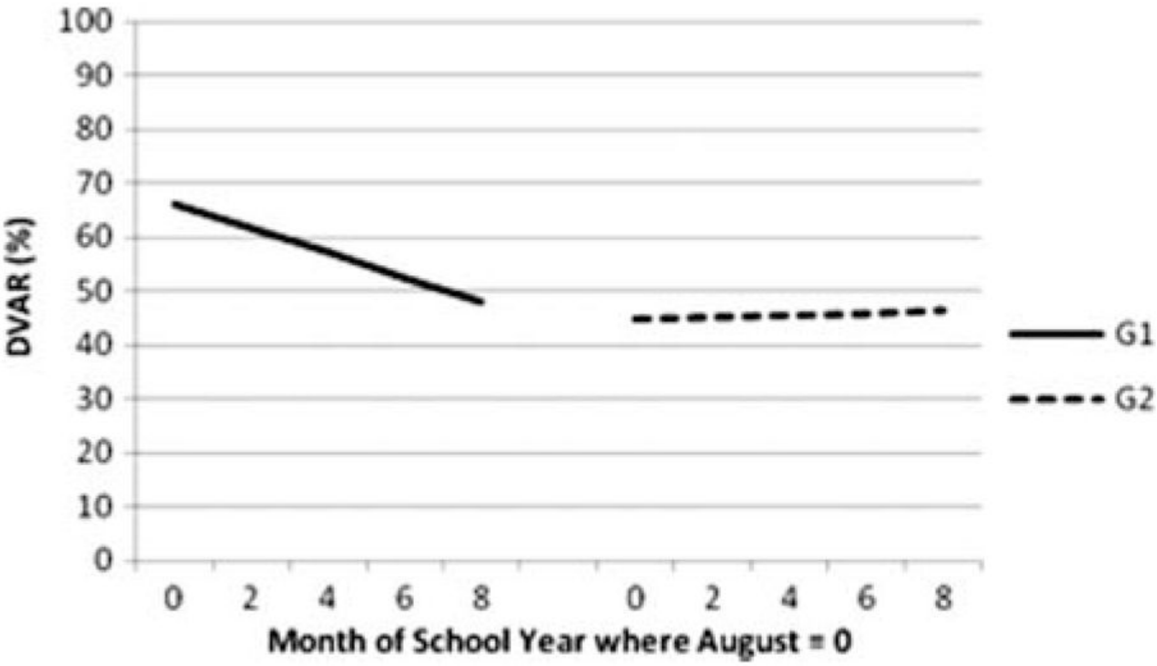

Figure 1.

Change in Nonmainstream American English (NMAE) dialect use from first grade (G1, solid line) through second grade (G2, dotted line). The gap represents summer. DVAR = a percentage of dialect variation score, which represents children's NMAE use at one point in time.

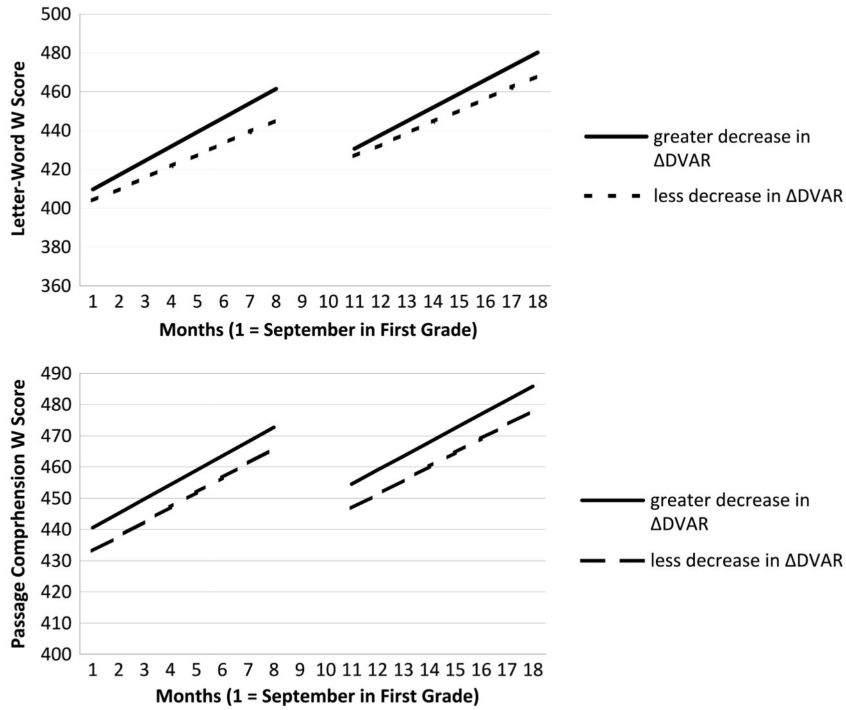

Figure 2.

Growth in letter–word W scores (which are a variation of the Rasch ability scale in which a score of 500 represents the achievement of a typically developing 10-year-old and in which the *SD* = 15) in first (Months 1–7, *x*-axis) and second (Months 11–18) grades (top) and growth in passage comprehension W scores in first and second grades (bottom) as a function of ΔDVAR (the change in percentage of dialect variation score from first through second grade) in which greater decreases in slope are associated with stronger reading skills overall. ΔDVAR is modeled at the 25th and 75th percentile for the sample or ΔDVAR scores of −3.6 points per month (solid line) and −0.8 points per month (dotted line), respectively (mean ΔDVAR = −2.24).

Table 1

Means (and standard deviations) for child variables, including standard scores (SS), W scores (W), and Developmental Scale scores (DS).

Variable	Fall G1	Spring G1	Fall G2	Spring G2
% DVAR	66.42 (17.26)	51.65 (31.21)	44.60 (28,07)	43.21 (29.12)
WJ3 Letter–Word Identification SS	98.20 (17.02)	103.86 (16.89)	95.57 (15.95)	95.97 (15.23)
WJ3 Letter–Word Identification W	430.59 (25.93)	445.63 (34.32)	437.97 (34.99)	460.10 (33.06)
WJ3 Passage Comprehension SS	91.23 (16.09)	98.09 (13.95)	87.83 (13.54)	88.83 (14.01)
WJ3 Passage Comprehension W	430.59 (25.93)	462.94 (18.11)	461.07 (19.15)	471.38 (20.84)
WJ3 Sound Awareness SS	100.02 (14.81)			
WJ3 Sound Awareness W	475.69 (13.16)			
WJ3 Picture Vocabulary SS	98.24 (8.50)			
WJ3 Picture Vocabulary W	475.29 (9.26)			
DELV-S Morphosyntactic SS	86.04 (14.65)			
DELV-S Morphosyntactic DS	503.86 (86.65)			
DELV-S Nonword Repetition SS	94.92 (17.63)			
DELV-S Nonword Repetition DS	513.61 (101.72)			

Note. G1 = first grade; G2 = second grade; DVAR = a percentage of dialect variation score, which represents children’s Nonmainstream American English (NMAE) use at one point in time; WJ3 = Woodcock–Johnson Tests of Achievement—Third Edition; DELV–S = Diagnostic Evaluation of Language Variation—Screening Test.

Table 2

Correlations among child variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. ΔDVAR	—												
2. WJ3 Passage Comprehension W (Fall, G1)	−.37*	—											
3. WJ3 Letter–Word Identification W (Fall, G1)	−.29*	.78**	—										
4. WJ3 Passage Comprehension W (Spring, G1)	.43**	.76**	.69***	—									
5. WJ3 Letter–Word Identification W (Spring, G1)	−.36*	.71***	.80***	.82***	—								
6. WJ3 Passage Comprehension W (Fall, G2)	−.23	.64***	.64**	.87***	.88***	—							
7. WJ3 Letter–Word Identification W (Fall, G2)	.02	.72***	.76***	.83***	.98***	.83***	—						
8. WJ3 Passage Comprehension W (Spring, G2)	−.19	.58**	.63***	.79***	.83***	.85***	.78***	—					
9. WJ3 Letter–Word Identification W (Spring, G2)	−.07	.61**	.69***	.75***	.93***	.87***	.92***	.87***	—				
10. WJ3 Sound Awareness W (Fall, G1)	−.33*	.71**	.69***	.66***	.78***	.73***	.80***	.75***	.86***	—			
11. DELV–S Morphosyntactic DS (Fall, G1)	−.26†	.36*	.32*	.31*	.41**	.49**	.37*	.46*	.49**	.61***	—		
12. DELV–S Nonword Repetition DS (Fall, G1)	.40**	.24	.19	.27	.30*	.51**	.38*	.55**	.54**	.47**	.43**	—	
13. WJ3 Picture Vocabulary W (Fall, G1)	.51***	.40**	.31*	.21	.36*	.32	.28	.28	.33	.44***	.35*	.43**	—

Note. ΔDVAR = a percentage of dialect variation score, which represents children's change in NMAE use from G1 through G2.

† $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3

Results of piecewise cross-classified random effects growth model for changes in DVAR from G1 through G2.

Fixed effect	Coefficient	*SE*	*df*	*p*
Intercept DVAR, θ_0	68.07	3.38	184	<.001
G2 intercept, θ_1	−24.29	4.48	184	<.001
Time (months), θ_2	−2.07	0.55	184	<.001
G2 × Time, θ_3	2.15	0.75	184	.005

Final estimation of row and Level 1 variance components

Random effect	Variance	*df*	χ^2	*p*
Intercept β_{00}	132.74	48	246.11	<.001
Time β_{20}	2.77	48	197.28	<.001
Level 1, *e*	294.37			
Final estimation of column level variance components				
Intercept c_{00}	14.93	51	62.07	.120

Note. Deviance = 1738.233586. The intercept (θ_0) represents the mean end of G1 student DVAR score (68.07%). Adding the G2 intercept (θ_1) to θ_1 (68.07 – 24.29) yields the mean end of G2 score (43.78%). The time coefficient (θ_2) represents the change in DVAR score per month (so in G1, DVAR decreases 2.07 percentage points per month).

Table 4

Classroom level, child level, and Child Level × Classroom Level interactions predicting ΔDVAR.

Fixed effect	**Coefficient**	***SE***	***df***	***p***
Intercept, fitted mean ΔDVAR	−5.28	0.44	25	<.001
School socioeconomic status (SES)	0.06	0.01	25	<.001
Special education status	0.67	0.76	40	.381
African American (AA = 1)	1.20	0.51	40	.024
AA × School SES	−0.07	0.01	40	<.001
Vocabulary	−0.08	0.03	40	.016
Vocabulary × School SES	−0.001	0.001	40	.655
Nonword Repetition DS	−0.005	0.002	40	.047
Nonword Repetition × School SES	−0.0002	0.0001	40	.025

Random effect	**Variance**	***df***	χ^2	***p***
Intercept (u_0)	0.002	25	12.30	>.500
Level 1 (r)	3.400			

Note. Deviance = 243.137.

Table 5

Growth model results for WJ3 Letter–Word Identification predicted by ΔDVAR.

Fixed effect	**Coefficient**	***SE***	***df***	***t***	***p***
Intercept, β_{00}	450.45	4.25	45	105.91	<.001
G2, β_{10}	21.94	2.51	45	8.73	<.001
ΔDVAR, β_{01}	−3.92	1.81	45	−2.16	.036
Month, β_{20}	6.83	0.43	45	15.84	<.001
G2 × ΔDVAR, β_{11}	1.09	1.28	45	0.86	.398
G2 × Month, β_{30}	−3.64	0.51	45	−7.13	<.001
ΔDVAR × Month, β_{21}	−0.35	0.1	45	−3.25	.003
G2 × Month × DVAR, β_{31}	0.39	0.16	45	2.42	.020

Random effect	**Variance**	***df***	χ^2	***p***	**reduction in variance**
Intercept, r_0	823.64	35	322.90	<.001	0.137
G2, r_1	5.25	35	63.36	.003	0.171
Month, r_2	145.32	35	57.33	.010	0.031
G2 × Month, r_3	5.75	35	41.82	.199	0.187
Error, e	83.57				

Table 6

Growth model results for passage comprehension predicted by ΔDVAR.

Fixed effect	Coefficient	*SE*	*df*	*t*	*p*
Intercept, β_{00}	465.80	1.96	45	237.86	<.001
G2, β_{10}	13.56	1.48	45	1.48	<.001
ΔDVAR, β_{01}	−1.82	0.71	45	−2.58	.014
Month, β_{20}	4.71	0.39	45	12.16	<.001
G2 × Month, β_{30}	−3.35	0.44	45	−7.59	<.001
ΔDVAR × Month, β_{21}	0.03	0.11	45	0.31	.758
G2 × Month × DVAR, β_{31}	0.11	0.13	45	0.84	.408

Random effect	Variance	*df*	χ^2	*p*	reduction in variance
Intercept, r_0	113.08	36	129.31	<.001	0.390
Month, r_1	4.93	36	111.95	<.001	
G2 × Month, r_2	5.53	36	100.31	<.001	
Error, e	78.23				