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Research Article

Relations Among Children's Use of Dialect and Literacy Skills: A Meta-Analysis

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Purpose: The current meta-analysis examines recent empirical research studies that have investigated relations among dialect use and the development and achievement of reading, spelling, and writing skills.
Method: Studies published between 1998 and 2014 were selected if they: (a) included participants who were in Grades K–6 and were typically developing native English speakers, (b) examined a concurrent quantitative relationship between dialect use and literacy, including reading, spelling, or writing measures, and (c) contained sufficient information to calculate effect size estimates.
Results: Upon the removal of one study that was found to be an outlier, the full sample included 19 studies consisting of 1,947 participants, of which the majority (70%) were African American. The results showed a negative and moderate relationship between dialect use and overall literacy performance (*M* effect size = –0.33) and for dialect and reading (*M* effect size = –0.32). For spelling and writing, the relationship was negative and small (*M* effect size = –0.22). Moderator analyses revealed that socioeconomic status and grade level were not significant predictors for relations among dialect use and literacy skills.
Conclusions: Implications for practice and future research, including analyzing dialect use in a variety of contexts and examining these relations to literacy outcomes, are discussed.

The past few decades of reading research have contributed to a tremendous amount of growth in our understanding of reading development. Findings from meta-analyses conducted by the National Reading Panel (2000) and the National Early Literacy Panel (2008) have been monumental in contributing to the awareness of key components of literacy instruction and assessment and in directing efforts toward the early identification of students with reading difficulties and the prevention of reading disabilities. However, despite the wealth of knowledge that we have gained regarding the development of reading and writing skills, many students continue to struggle with literacy acquisition, a fact that is especially true for many minority students. On the most recent National Assessment of Educational Progress, 84% of African American students and 82% of Hispanic students did not meet performance criteria to obtain proficient levels that would indicate solid academic performance in reading (National Center for Education Statistics, 2011). Although African American and Hispanic students are more likely to live in low-income homes than their non-Hispanic White peers (Federal Interagency Forum on Child & Family Statistics, 2013), research has not been conclusive in determining that poverty is the sole causal variable explaining lower literacy performance among many minority students (Artiles, Kozleski, Trent, Osher, & Ortiz, 2010; Ferguson, 2007).

An existing body of research has demonstrated the importance of oral or spoken language in the acquisition and development of literacy skills (see Catts, Fey, Zhang, & Tomblin, 1999; National Institute of Child Health and Human Development Early Child Care Research Network, 2005; Storch & Whitehurst, 2002). These studies provide evidence that oral language skills contribute significantly to literacy at various stages of reading development and also predict subsequent reading performance. According to the National Research Council's (NRC) Committee on the Prevention of Reading Difficulties in Young Children, six of the 10 predictors of success or failure in reading either relate directly or indirectly to language skills (Snow, Burns, & Griffin, 1998). The NRC argued that speaking a nonstandard English dialect is one risk factor for reading difficulties. A number of students, mainly those from racial minority groups, speak a dialect of English that differs from the standard or mainstream forms of English used in schools and found in most textbooks. The purpose of this study was to synthesize existing research examining dialect and,

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specifically, relations between dialect use and literacy outcomes.

Dialects of American English that encompass features that are different from standard or Mainstream American English (MAE) are generally referred to as *Nonmainstream American English* (NMAE). Multiple language varieties have been recognized as dialects or variations of American English, including African American English (AAE), Appalachian English, Hawaiian Creole English, Latino English, Southern American English (SoAE), and Caribbean English Creoles (Nero, 2006; Wolfram & Schilling-Estes, 2006). In the United States, most studies involving dialect have focused on AAE and SoAE, which, perhaps as a result of strong historical ties, share many features (Rickford & Rickford, 2000). Investigations of the relationship between NMAE and literacy skills date back more than 40 years (e.g., Goodman & Buck, 1973; Labov, 1969). However, because of weaknesses in studies, including researchers' failure to measure dialect use specifically among children (Troutman & Falk, 1982), past studies that purported to examine a relationship between dialect use and literacy outcomes among children resulted in inconsistent findings. Several of these studies failed to find significant relationships between dialect and literacy (e.g., Harber, 1977; Steffensen, Reynolds, McClure, & Guthrie, 1982), and as a result, much of the work in the area was abandoned.

As noted by Snow et al. (1998), studying the relative effect of nonmainstream dialects on literacy acquisition has presented a challenge in past research because it is often confounded with other potential risk factors for reading difficulties, including poverty, other cultural differences, and inferior schooling. The committee recognized this problem, referring to the knowledge base at the time as "spotty" (Snow et al., 1998, p. 124). Since the publication of the NRC's report, however, amid persisting achievement gaps between minority students and their mainstream peers, renewed interest in the study of possible educational consequences of dialect differences on literacy acquisition has taken place. These more recent studies have devoted attention to the NMAE spoken by younger children seeking to describe the speech and language patterns of young children with the ultimate goal of improving ability among practitioners to design and provide clinical and educational services (Washington & Craig, 2001). These newer studies, also having potentially taken advantage of more advanced methods and quantitative analysis tools, together may provide more conclusive evidence regarding the nature of the relationship between the two factors. Likewise, the current review of recent empirical research studies that have investigated relations among dialect use and the development and achievement of reading, spelling, and writing skills was conducted in order to potentially increase our understanding of the relationship between the use of nonstandard forms of English and literacy. To be specific, a systematic review, or *meta-analysis*, was conducted. The goal of a meta-analysis, in contrast to a narrative review, is to provide a rule-based and replicable analysis of research findings on a particular topic, allowing for a more objective examination of the literature.

Dialect and Literacy

When a child's dialect differs significantly from MAE, also referred to as *Standard American English* (SAE), the mismatches between oral and written representations of phonological and morphosyntactic forms may impede the child's progress in the acquisition of literacy skills (Labov, 1995). Phonological processing skills, including phonological awareness and phonological recoding, play a large role in the development of reading (Adams, 1990). Numerous studies have highlighted the relation between early phonological awareness and concurrent or later literacy achievement (e.g., Ehri et al., 2001; Scarborough, 2001; Schatschneider, Fletcher, Francis, Carlson, & Foorman, 2004). Wagner and Torgesen (1987) provided evidence that phonological awareness plays a causal role in learning to read, above and beyond cognitive ability. Phonological awareness is also related to spelling skills (Bryant, MacLean, Bradley, & Crossland, 1990). For a person with well-developed *phonological awareness*, the English alphabet system provides a practical representation of our spoken language (Wagner & Torgesen, 1987). Subtle and obvious differences between a student's spoken language and the orthographic representations of MAE may provide challenges when the child is learning to read and write. Further, *phonological recoding*, which involves the ability to detect meaning from a written word, may also be affected adversely by dialect use.

Once a student enters upper elementary school, the primary focus of instruction usually shifts from learning to read to reading to learn (Chall, 1967). Students whose spoken language involves morphological and syntactic variations from the English encountered in their school materials may have difficulty comprehending the intended meaning of the printed words. Similar to phonological awareness, *morphological awareness* involves the ability to intentionally reflect upon and manipulate morphological units within words (Carlisle, 1995). Both reading and spelling skills relate positively to morphological awareness skills, including the ability to perform tasks such as judging the semantic relatedness of words (e.g., *moth* and *mother*) or constructing a derived word from a known base word (e.g., *farm* to *farmer*). In addition, for skillful readers, word recognition and reading comprehension are dependent upon sophisticated *syntactic* skills; once a student can accurately identify words in print, he or she must determine meaning from the words by analyzing the syntactic and semantic relationships among those words (Gough & Tunmer, 1986).

The potential mismatch between students' spoken use of dialect and the MAE that they encounter in school and in texts provides the basis for one theory that has been proposed regarding the relationship between dialect use and literacy outcomes. This theory, referred to as the *mismatch theory* or the *linguistic interference theory*

(Labov, 1995), suggests that there are phonological and morphosyntactic mismatches between NMAE and MAE that make the acquisition and development of literacy skills difficult for speakers of dialect. In other words, when a child's spoken language differs significantly from MAE, the mismatches between oral and written representations of phonological and morphosyntactic forms may impede the child's progress in the acquisition of literacy skills. The linguistic interference theory would be supported by inverse correlations between NMAE use and literacy skills in which students who speak with a greater frequency of dialect variation would tend to have lower literacy scores.

A second, more recent theory, the *linguistic awareness/flexibility hypothesis* (Terry & Scarborough, 2011), suggests that rather than the spoken use of dialect alone, it is a student's ability to dialect shift (i.e., change frequency of dialect use in various contexts) that is related to literacy achievement. According to this theory, students who possess greater *metalinguistic awareness*, or the ability to think about and manipulate language (Scarborough & Brady, 2002), as demonstrated by changes in dialect use in various situations, are more adept at literacy skills in general than those students who fail to recognize the different linguistic expectations of given contexts. More complex relations among dialect use and literacy outcomes, including curvilinear relationships (Connor & Craig, 2006) or varying correlations between dialect use in different contexts and literacy performance (Terry & Scarborough, 2011), would provide evidence supporting the linguistic awareness/flexibility hypothesis.

Although the body of work dedicated to the study of NMAE has contributed greatly to our knowledge of dialect, the precise role of NMAE in the development and attainment of reading skills remains to be determined. For instance, most research on dialect and reading has focused on participants solely from low socioeconomic status (SES) backgrounds (Washington & Craig, 2001). Because SES is confounded with both dialect use and literacy skills (Snow et al., 1998), it would be presumptuous to conclude that lower literacy skills among students from low-income backgrounds who use dialect can be attributed to NMAE. In addition, although most researchers who have contributed to the current knowledgebase on child NMAE and literacy would likely agree that linguistic differences seem to have some measurable influence on reading proficiency, the extent to which dialect differences are influential, and specifically at approximately what developmental level in the reading process, remains unclear. From the findings of extant literature, we know that many students tend to speak NMAE with great frequency at kindergarten entry, but as they gain more and more exposure to the MAE of the curriculum and classroom, some students shift toward producing fewer instances of dialect once they reach intermediate elementary grades (Terry, Connor, Petscher, & Conlin, 2012), but upper elementary students tend to produce a greater range of features (Craig & Washington, 2004). Craig and Washington (2004) also found that for students in Grades 1 through 5, there was a significant relationship between students' dialect use and reading achievement scores. However, the researchers did not analyze this relationship by grade level. Regarding the dialect–literacy relationship, it is not clear whether dialect might affect children more so in the learning-to-read primary stage or in the reading-to-learn upper elementary grades.

The importance of phonological, morphological, and syntactic awareness in reading has been well established. Therefore, with the knowledge that spoken forms of English may be perceived differently than written forms for many students who speak NMAE, it is important to investigate the nature of the relationship between dialect use and literacy skills. Moreover, if we are to effectively reduce the number of students who have reading difficulties, this relationship may need to be studied during the elementary grades, when some reading difficulties can be prevented or more easily remediated (e.g., Foorman, Francis, Shaywitz, Shaywitz, & Fletcher, 1997; Good, Simmons, & Kame'enui, 2001). As interest in the study of dialect and literacy acquisition has re-emerged, a meta-analysis of recent studies documenting relationships between dialect and various components of literacy may help lead to further understanding of the possible association that dialect may have in literacy development. To date, no such meta-analysis has been conducted. Further, analyzing these relationships while also examining student SES and grade level may provide information regarding the role of these factors within the dialect–literacy relationship. In this study, we provide a meta-analysis of the most recent correlational studies examining relations among dialect use and reading, spelling, and/or writing skills.

Present Study

In order to gain a better understanding of the relationship between dialect and the acquisition and development of literacy skills, a meta-analysis of empirical research was conducted, which was guided by two questions.

1. What is the relationship between dialect use and literacy outcomes among students in Grades K–6? To be specific, what is the relationship between dialect use and reading outcomes among students in Grades K–6? What is the relationship between dialect use and spelling and writing outcomes among students in Grades K–6?
2. Does SES or grade level moderate the relationship between dialect use and literacy outcomes?

Methods

Search Terms and Procedures

To answer the research questions, a comprehensive review of existing literature was conducted using a computer database search, a manual search, and a reference search. First, Boolean search methods were used in the *ERIC* and *PsycINFO* online databases to locate research articles.

Dialect-related keywords and phrases were used (*African American English*, *Black English*, *code switch**, *dialect**, *Ebonics*, *language vari**, *nonmainstream American English*, *nonstandard American English*, *spoken language*, *Southern American English*, *Southern White English*, *vernacular*) in conjunction with literacy-related terms (*comprehension*, *decoding*, *reading fluency*, *oral language, phonemic awareness*, *phonics*, *phonological awareness*, *read**, *vocabulary, word identification*, *spelling*, *encoding*, *writing, written language*). Only studies that were recently (1998–2014) published and printed in English were included in the search. The year 1998 was chosen because it is the year that the NRC identified dialect use as a potential risk factor for reading difficulties. Studies were selected based on meeting four criteria.

1. Participants were enrolled in Grades K–6 (or data were disaggregated for these students).
2. Participants were typically developing (TD) native English speakers and literacy outcomes were measured in English. Studies that had additional participants were included when more than 50% of the participants were TD native English speakers or data were disaggregated for those students.
3. Empirical studies examined a concurrent quantitative relationship between dialect use and literacy, including components of reading (phonological awareness, phonics/word recognition, fluency, oral language/vocabulary, and comprehension), spelling, or writing measures. Instruction/intervention studies were only included if it was possible to compute an effect size from pretest data. For longitudinal studies in which data were collected for the same children at multiple time points, effect sizes from the first wave of data collection were used for the analysis.
4. Studies provided sufficient information to calculate effect size estimates, specifically either the correlational coefficient (r) or means and standard deviations for literacy measures given to students grouped according to their dialect use that could be used to compute an r. When basic descriptive statistics were not included in a study, other statistics were used (e.g., t and F statistics).

Next, a manual search was conducted for recently published (2012–2014) articles on dialect with literacy outcomes in the following language and/or education peer-reviewed journals: *American Journal of Speech-Language Pathology*; *Applied Linguistics*; *Child Development*; *Communication Disorders Quarterly*; *Exceptional Children*; *Journal of Learning Disabilities*; *Journal of Speech, Language, and Hearing Research*; *Journal of Special Education*; *Learning Disabilities Research and Practice*; *Learning Disability Quarterly*; *Speech, Language, and Hearing Services in Schools*; and *Topics in Language Disorders.* To conclude, a search of the reference lists of all qualifying articles found in the first two steps was conducted in order to ensure the comprehensiveness of the search.

A total of 1,723 unique articles was obtained from the initial search procedure. The titles, abstracts, and keywords of these potential studies were reviewed for possible inclusion in the meta-analysis. Several studies were eliminated in the initial screening because the sample included English language learners (ELLs), the participants were not within the specified age range, or the study did not report literacy outcomes. A total of 48 articles were retained from the initial search for secondary screening of the full article. Upon analysis of the full text of each of these articles, 14 studies met inclusion criteria. No additional articles were found in the hand search of journals. Three studies were found in the reference list search for a total of 17 articles.

Coding Procedures

In order to facilitate the evaluation of data, a coding sheet, which is available as online supplemental materials, was developed for the purpose of this meta-analysis. Coded variables were organized into four main categories, including study information (authors, year, and study design), participant characteristics (e.g., race/ethnicity, SES, grade level), dialect variables (e.g., dialect classification, method of collection), and literacy outcomes. Literacy outcome measures were coded for the category of reading, spelling, or writing. Reading outcomes were further classified into specific components of phonological awareness, phonics/decoding, word identification, fluency, oral language/vocabulary, and comprehension. The technical adequacy of the measures was also coded when enough information was provided. Reported correlation coefficients between dialect and literacy outcomes were coded by each rater. In addition, scores on literacy outcomes, including means and standard deviations, for dichotomous dialect groups (e.g., NMAE speakers, SAE speakers), were coded.

Two independent researchers separately coded one study in order to establish initial reliability. On the basis of Nunnally's (1978) suggestion for reliability, initial intercoder or *interrater reliability* (agreements divided by agreements plus disagreements) was established at .90, which is commonly used as a minimally allowable threshold in meta-analyses. Disagreements were discussed and the coding sheet was modified somewhat after the initial training and coding of the first article. Specifically, the modification addressed adding the selection of "Multiple" or "Other" as forced choices on dialect variables. Seven studies (33%) were also randomly selected and double coded. Interrater reliability on the double coding was .93. Disagreements occurred on specific variables such as type of dialectal feature analyzed or literacy outcome type; these discrepancies were discussed and resolved before further coding took place.

Effect Size Calculations and Data Analysis

For this study, analyses were conducted by examining bivariate, or Pearson's r, correlations between dialect use and literacy outcomes. For some of the studies, however,

bivariate correlations between the two variables were not reported. Instead, some researchers collected language samples, analyzed student dialect use, and grouped students into categories, usually either students who used dialect in their language sample or students who used very little dialect or none at all. They then compared the two groups on a continuous literacy measure, either reporting the means and standard deviations for each group or the results of a *t* or *F* test. In instances in which dialect frequency, a continuous variable, was dichotomized, the standard product-moment correlation coefficient would not be the most appropriate statistic (Lipsey & Wilson, 2001). Therefore, standardized mean differences (Hedges's *g*; Hedges, 1981) on literacy outcomes were computed between the groups using the information provided. Hedges's *g* was then converted to an *r* using the conversion formula provided by Cox (1970), resulting in a point-biserial correlation effect size (Lipsey & Wilson, 2001).

Before the analyses, correlations were transformed using Fisher's *Z* transformation (Fisher, 1921). The variance for each study effect size was computed using the study's sample size. In addition, a 95% confidence interval was calculated around each effect size using the standard error, the square root of the variance. Next, the data were examined for potential outliers, defined as any effect size estimate more than 3 *SD*s above or below the simple mean effect size. An overall effect size for the relationship between dialect use and literacy skills was then computed. In addition, an effect size was calculated for reading outcomes and for spelling and writing outcomes combined. A weighted random effects model was used to compute the overall effect sizes in which weight was assigned to each study using the inverse of the study's variance, a metric of the study's sample size. In other words, studies with larger samples received more weight in the calculation of the overall effect size. Upon analyses, all effects were then transformed back into correlation coefficients.

Within studies, multiple outcomes were usually reported for the same participants. In such circumstances, ideally the correlations among the outcomes would be used to calculate the effect estimate (Becker, 2000). However, not all studies reported correlations among the measures. Therefore, the method suggested by Borenstein, Hedges, Higgins, and Rothstein (2009) was used to estimate a combined mean effect size for the reading component and its variance and also for spelling and writing. This procedure involved calculating a simple mean among the measures to reflect the dependency in the data and entering the resulting average and its standard error into the meta-analysis. For studies that collected dialect samples in multiple ways (e.g., two different language samples), a simple mean correlation was calculated, and for studies that reported nonsignificant results only, an effect size of zero was entered into the meta-analysis. In instances in which studies reported comparisons between multiple independent subgroups or reported correlations between dialect use and literacy for separate subgroups within the study, separate effect sizes for each group were computed and entered into the meta-analysis. For example, Terry (2006) reported group means and standard deviations on outcomes for students who spoke AAE and students who spoke SAE separately for Grades 1, 2, and 3 in word identification and spelling, resulting in a total of six computed effect sizes. In rare instances in which students' frequency of SAE (as opposed to frequency of NMAE) use was used as the independent variable with the literacy outcome as the dependent variable, in order to maintain consistency in the calculation of the effect sizes, the correlation coefficient signs were reversed. To conclude, in the analysis of relationships between dialect and reading, a sensitivity analysis was conducted in order to determine if oral language (e.g., vocabulary, listening comprehension) should be considered as a separate construct from the other components of reading involving print and phonological awareness.

Heterogeneity of the effects was examined using a *Q* test. The *Q* statistic is the sum of the squared deviations of each study's effect size estimate from the summary effect and is computed to determine whether between-studies dispersion is equal to or more than would be expected by chance (Borenstein et al., 2009). A *Q* value that is relatively large and has a significant *p* value (at the .05 level) would indicate that there is inconsistency among the effect sizes in our studies. An I^2 value, which is an additional index of heterogeneity that represents the proportion of variance attributable to variance in true effects, was also computed. The main advantage of I^2 is that, unlike the *Q* statistic, it is not dependent on the number of studies included in the meta-analysis (Rücker, Schwarzer, Carpenter, & Schumacher, 2008). An I^2 percentage of 50% would represent moderate heterogeneity, and 75% or greater is considered to indicate a high degree of heterogeneity (Higgins, Thompson, Deeks, & Altman, 2003). A significant *Q* value and an I^2 percentage of greater than 50% would suggest that moderator analyses may need to be conducted in order to examine potential interaction effects using characteristics of the studies.

When tests for heterogeneity were significant, we tested for moderator effects using SES and grade level. Several studies reported either the percentage of students within the sample who qualified for or who were receiving free or reduced price lunch (FARL) or the percentage of students eligible for or receiving FARL within the school or district in which the study took place. For moderator analyses, this percentage was used as an indicator for SES and as a continuous predictor in order to determine if effect sizes between dialect use and literacy might be related to the percentage of students within studies from low-income backgrounds. In other words, we used SES as an interaction term in order to determine if the effect of dialect might depend on the ratio of students within the study who were from lower income homes. Next, studies were categorized as either primary (Grades K–2) or intermediate (Grades 3–6) depending on the grade level of the sample or majority of the sample to examine potential differences in effect sizes for students learning to read versus those who were presumably reading to learn. The effects of the

moderators were tested using weighted regression for meta-analysis (i.e., meta-regression) for the SES moderator and mixed-model ANOVA for the grade level interaction test.

Because only peer-reviewed, published studies were included in the meta-analysis, a statistical test was also conducted to assess potential publication bias. First, a funnel plot, which is a display of an index of study size (in this case, the standard error) plotted against the observed effect sizes, was created and visually inspected for symmetry. An asymmetrical pattern would suggest the possible omission of studies that were conducted and found null or very small effect sizes, and subsequently may not have been published. Next, Egger's linear regression method (Egger, Smith, Schneider, & Minder, 1997) was used to statistically evaluate the symmetrical property of the funnel plot. If there is no evidence of publication bias, the intercept of the equation is equal to zero, and studies of various sample sizes are equally dispersed on both sides of the overall mean effect. If the intercept does not equal zero, indicating that the funnel plot is asymmetrical, with smaller studies showing effects that differ systematically from larger studies, we would conclude that publication bias might be present. The more intercept values deviate from zero, the more we are certain that there is a high degree of asymmetry within the plot.

Results

Description of Studies

A total of 17 studies ranging in publication dates from 2003 to 2014 were found in the literature search. Two separate studies (Craig, Thompson, Washington, & Potter, 2004; Craig, Zhang, Hensel, & Quinn, 2009) used a subsample of a larger study (Craig & Washington, 2004), but investigated different outcomes, and these three were combined to form one study. Another three studies provided outcomes disaggregated by grade level (Charity, Scarborough, & Griffin, 2004, Grades K–2; Kohler et al., 2007, Grades 1 and 3; Terry, 2006, Grades 1–3), resulting in a total of 20 observed study effect sizes. From these studies, 75 outcome effect sizes were coded: 59 for reading and 16 for writing and spelling; a simple mean was computed for the study's overall effect size. Study characteristics, including authors, publication date, sample size, percentage of students from low-income homes, participant grade level, and literacy outcomes, are presented in Table 1. The corpus of studies included 2,007 participants, of which 983 (49%) were male students. (One study, Champion, Rosa-Lugo, Rivers, & McCabe, 2010, $n = 33$, did not report gender of participants). Sample sizes ranged from 30 to 617 (median = 63.5). The majority of the study participants were African American, $n = 1{,}404$ (70%), and most studies included a majority of students from low-SES backgrounds as determined by participation in the FARL program, school-wide percentage of students receiving FARL, reporting of neighborhood or district general income level, or another measure including Hollingshead (1975) or Barratt's Index (Barratt, 2006). The majority of the studies included students in primary grades; almost half of the total participants were first graders ($n = 915$, 45.6%). Most of the studies analyzed students' oral production of AAE, SoAE, or general NMAE through the use of a narrative, a sentence imitation task, or the screening portion of the Diagnostic Evaluation Language Variation–Screening Test (DELV-S; Seymour, Roeper, deVilliers, & deVilliers, 2003). One study examined written use of AAE features (Craig et al., 2009).

Overall Literacy Effect Size

An outlier analysis revealed that for one study (Sligh & Conners, 2003), the observed average effect size ($r = .41$ [.15, .67]) was slightly less than 3 *SD*s above the composite mean (−.26, $SD = .23$). For this particular study, the authors matched participants (AAE-speaking students and SAE-speaking students) on age and reading ability. They then assessed the two groups of students on two phoneme deletion tasks and compared the results. The AAE-speaking students scored higher than their matched SAE-speaking peers on both of the tasks, resulting in a positive observed effect size for this study. Because this study was unique in the ability-matching component of the design, the overall analysis was performed first with the inclusion of this study and then with the deletion of this study's effect size as a method of sensitivity analysis to this particular design.

An overall effect size was computed that included all relationships reported between dialect use and various components of literacy skills. As shown in Table 2, overall, the weighted mean effect size representing the relationship between dialect use and literacy skills was negative and moderate in magnitude, $r = -.28$ (−.37, −.18), $p < .001$, indicating an inverse relationship between dialect use and the measured literacy outcomes. As determined by the Q test for heterogeneity, there was a significant amount of variation in effect sizes among the studies ($Q = 72.85$, $p < .001$), a finding that was further supported by the I^2 value of 74%. With the exclusion of Sligh and Conners (2003), the overall effect size was not significantly different than the previously calculated effect size, $r = -.33$ (−.39, −.26), $p < .001$. However, the subsequent analysis resulted in a narrower 95% confidence interval, indicating greater precision around the computed overall effect size. In addition, the Q statistic was smaller ($Q = 35.30$, $p = .009$), as was the I^2 value (49%). Therefore, a decision was made to remove the Sligh and Conners effect size from succeeding analyses because of the uniqueness of the study's design and greater amount of precision resulting from its deletion. Within these 19 studies, upon removal of Sligh and Conners, 73 individual effect sizes remained. For the overall literacy effect size, the estimate of the variance between studies was .012, indicating that 95% of population effect sizes would be expected to lie between −.54 and −.12.

For the first moderator analysis, either the reported or calculated percentage of students from low-income homes was used as an indicator for SES and was entered as a

Table 1. Summary of studies in the meta-analysis.

Study	*N*	% Low SES	Grade	Literacy outcomes	Mean ES
Apel & Thomas-Tate (2009)	30	90	4	phonological awareness, decoding & word identification, oral language (receptive vocabulary), comprehension, writing	–.17[a] –.10[b] –.32[c]
Champion et al. (2010)	33	100	1, 3	fluency (oral reading rate & accuracy), comprehension	.15[a,b]
Charity et al. (2004)	78	91	K	word identification, decoding, listening comprehension	–.41[a,b]
Charity et al. (2004)	72	91	1	word identification, decoding, listening comprehension, comprehension	–.45[a,b]
Charity et al. (2004)	67	91	2	word identification, decoding, listening comprehension, comprehension	–.29[a,b]
Craig & Washington (2004); Craig et al. (2004); Craig et al. (2009)	165	37.5	1–5	reading (nonspecific), oral reading fluency, oral language (receptive vocabulary), oral language (expressive vocabulary), reading comprehension, writing	–.22[a] –.26[b] –.08[c]
Craig et al. (2014)	82	83	K	phonological awareness, oral language (morphological awareness), oral language (receptive vocabulary)	–.41[a,b]
Jarmulowicz et al. (2012)	42	—	3	phonological awareness, decoding, word identification, oral language (morphological awareness)	–.51[a,b]
Kohler et al. (2007)	40	75	1	phonological awareness, spelling	.08[a] .14[b] –.02[c]
Kohler et al. (2007)	40	75	3	phonological awareness, spelling	–.26[a] –.20[b] –.35[c]
Mitri & Terry (2014)	119	85	K–2	phonological awareness, word identification, oral language (expressive vocabulary)	–.38[a,b]
Ortiz et al. (2012)	224	57.6	K	phonological awareness, word identification, oral language (expressive vocabulary), oral language (morphosyntactical awareness)	–.46[a,b]
Sligh & Conners (2003)	60	—	2	phonological awareness	.41[a]
Terry (2006)	31	35	1	word identification, spelling	–.46[a] –.62[b] –.47[c]
Terry (2006)	30	35	2	word identification, spelling	–.41[a] –.54[b] –.37[c]
Terry (2006)	31	35	3	word identification, spelling	–.32[a] –.08[b] –.40[c]
Terry (2014)	105	80	K–2	phonological awareness, word identification	–.32[a,b]
Terry & Connor (2010)	92	—	2	word identification, oral language (expressive vocabulary), spelling	–.28[a] –.38[b] –.17[c]
Terry & Connor (2012)	49	77.5	K	phonological awareness, word identification, oral language (receptive vocabulary)	–.33[a,b]
Terry et al. (2010)	617	45	1	phonological awareness, word identification, oral language (expressive vocabulary)	–.50[a,b]

Note. % Low SES = calculated or reported percentage of students from low-income backgrounds; ES = effect sizes (Fisher's z-transformed *r*). Em dashes indicate inability to determine low-SES percentage.

[a]Effect size for overall literacy; [b]Effect size for reading; [c]Effect size for spelling and writing.

continuous predictor for the study's observed effect size. The results of the meta-regression revealed that SES was not a significant predictor for study effect size ($Q_{\text{Model}} = 1.38$, $p = .24$), indicating that the percentage of students from low-SES backgrounds did not affect the effect size found in the study. Findings from the second moderator analysis involving an interaction between primary and intermediate grade levels indicated that there were no significant differences between the overall primary effect size, $r = -.35$ (−.41, −.27), $p < .001$, for literacy and the intermediate grade level effect size, $r = -.27$ (−.47, −.13), $p < .001$; $Q_{\text{Between}} = 0.73$, $p = .40$.

Reading

A total of 57 individual effect sizes from 19 studies were used to calculate the reading effect size estimate.

Table 2. Overall random effects weighted mean effect sizes for dialect and overall literacy, reading, and written language and moderator analyses.

			Effect size	95% Confidence interval		Test of heterogeneity	
	N	*k*	*r*	Lower	Upper	*Q*	I^2 (%)
All studies	2,007	20	−.28***	−.37	−.18	72.85***	74
All studies excluding Sligh & Conners (2003)	1,947	19	−.33***	−.39	−.26	35.30**	49
Studies with reading outcomes	1,947	19	−.32***	−.41	−.24	40.92**	56
Studies with print and/or phonological awareness outcomes	1,947	19	−.33***	−.41	−.25	38.41**	53
Studies with oral language outcomes	1,637	12	−.33***	−.41	−.23	36.69***	59
Studies with spelling and/or writing outcomes	429	8	−.22**	−.32	−.11	8.79	20
Moderators							
SES						Q_{Model}	*df*	*p* value
Overall literacy						1.38	1	.24
Reading						1.83	1	.18
			Effect size	95% Confidence interval				
Grade Level	*N*	*k*	*r*	Lower	Upper	$Q_{Between}$	*df*	*p* value
Overall literacy								
Primary (K–2)	1639	14	−.35***	−.41	−.27	0.73	1	.40
Intermediate (3–6)	308	5	−.27***	−.41	−.13			
Reading								
Primary (K–2)	1,639	14	−.35***	−.42	−.28	1.86	1	.17
Intermediate (3–6)	308	5	−.25**	−.39	−.09			

Note. *k* = number of studies.
**$p < .01$, ***$p < .001$.

First, an overall reading effect size was calculated, including all previously mentioned components of reading, and then analyzed by type of reading outcome. Measures that included phonological awareness, phonics or decoding, word recognition, fluency, and comprehension were combined to form a print and/or phonological awareness outcome effect size, and measures that did not involve print or phonological awareness (e.g., receptive or expressive vocabulary, listening comprehension) were categorized as oral language. Separate effect sizes for these two constructs were then estimated. No effect sizes were found to be outliers for the overall simple mean reading effect size. Under the random effects model, the overall reading effect size was similar to the effect size computed for the overall literacy effect size, $r = -.32$ (−.41, −.24), $p < .001$. A significant amount of heterogeneity among the studies was evident ($Q = 40.92$, $p = .002$; $I^2 = 56\%$). In separate analyses of reading and oral language effect sizes, it was found that the weighted effect size estimate for print and phonological awareness, $r = -.33$ (−.41, −.25), $p < .001$, was not significantly different than the effect size for oral language, $r = -.33$ (−.41, −.23), $p < .001$. Thus in moderator analyses, the overall reading effect size was used as the outcome variable (see Table 2). The estimate of the variance between studies for the reading effect size was .026; 95% of population correlations between dialect and reading would be expected to fall between −.65 and −.01. The moderator analysis for SES level revealed that SES was not a significant predictor for effect size outcomes ($Q_{Model} = 1.83$, $p = .18$). In addition, there were no significant differences between grade levels on the reading effect size ($Q_{Between} = 1.86$, $p = .17$): overall effect size for primary grades, $r = -.35$ (−.42, −.28), $p < .001$, and intermediate grades, $r = -.25$ (−.39, −.09), $p < .01$.

Spelling and Writing

Nine studies reported a total of 16 outcome effect sizes on the relationship of students' dialect use and written production of language, in which some aspect of students' spelling and/or writing skills was measured. The majority of the studies included measures of spelling, and two studies analyzed a relationship between dialect and writing outcomes. No outliers were found. The random effects weighted effect size for the spelling and writing component was significant and negative, but small in magnitude, $r = -.22$ (−.32, −.11), $p < .01$ (see Table 2). Results of the Q test and the I^2 value suggested that there was not a significant degree of heterogeneity among the effect sizes ($Q = 8.79$, $p = .27$; $I^2 = 20\%$). Because the tests for homogeneity were not significant,

moderator analyses were not conducted for the relation between dialect use and spelling and writing. The estimate of the variance between studies analyzing a relationship between dialect use and spelling and/or writing was .005, which would indicate that population correlation effect sizes would fall between −.36 and −.08 in 95% of studies.

Publication Bias

In order to assess the possibility that publication bias might be a threat to the validity of our results, an Egger's (Egger et al., 1997) regression test was conducted. One study (Terry, Connor, Thomas-Tate, & Love, 2010) was considered an outlier ($N = 617$) and was subsequently removed from the analysis. For the overall literacy effect, which included effect sizes from all measures, the Egger's test indicated that the intercept value was not significantly different from zero ($p = .10$). For the reading effect size, the intercept value was not different from zero ($p = .14$). The intercept value for the spelling and writing effect size also was not significantly different from zero ($p = .09$). The results of the Egger's tests indicate that publication bias is not a plausible threat to the analyses.

Discussion

For this study, a meta-analysis of studies investigating relations among young children's dialect use and literacy skills was conducted in order to synthesize the most recent findings of the extant literature. Overall, the meta-analysis revealed a negative and moderate relationship between children's dialect use and literacy outcomes. The more dialect a student tends to use in the production of language, the lower his or her literacy scores tend to be. On the other hand, a student who produces little or no dialect tends to have higher scores on the measures of literacy that were included. The relationship was negative, moderate, and significant in the overall literacy examination and in the investigation of the relationship between dialect use and reading. In the separate analysis of spelling and writing, the relationship between dialect and the written production of language was negative, small, and significant.

The test for heterogeneity among the effect sizes for the overall literacy examination and the examination of the dialect and reading relationship were both significant. However, moderator analyses revealed that the percentage of students within studies from low-income backgrounds was not associated with differences found among the studies' effect sizes in the overall literacy relationship or the reading specific relationship, indicating that SES did not interact with the effect of dialect on literacy in general or on reading. This finding indicates that there is a potential negative and moderate relationship between dialect use and literacy achievement regardless of student SES background. In addition, to examine the possibility of differences at different development levels, grade level was also examined as a potential moderator among the studies. Grade level was not a significant predictor in any of the models. This finding implies that throughout the elementary grades, the relationship between dialect and literacy skills may be negative and moderate.

The results of the meta-analysis suggest that dialect variation does appear to relate to literacy outcomes. Because the current meta-analysis resulted in an overall moderate and significant negative average effect size between dialect and literacy skills, one might conclude that the linguistic interference theory is supported by this synthesis. However, because a significant amount of heterogeneity remained in all but one of the analyses, coupled with the finding that the study moderators did not explain variability in any of the analyses, it is reasonable to conclude that the relationship may not be that simple. Rather, the meta-analysis provides evidence that a more complex relationship between dialect use and literacy exists, one that cannot be explained simply by differences, or mismatches, in speech and print, as suggested by the mismatch/linguistic interference theory.

According to the linguistic awareness/flexibility theory, it is not the use of dialect features alone that presents an obstacle in reading acquisition and achievement, but rather it is a student's ability or inability to vary dialect use in different contexts that is more highly related to literacy performance. We recognize that it would be premature to conclude that the current meta-analysis supports the linguistic awareness/flexibility hypothesis. However, because of the significant amount of heterogeneity among the study's effect sizes, even after the inclusion of our moderators of SES and grade level, the findings provide some implications for further investigation into this hypothesis. The studies included in the meta-analysis collected language samples using several different methods (e.g., oral narrative, a sentence imitation task, the DELV-S, written language samples). Nonetheless, moderator analyses to test whether method of data collection was associated with the study's effect size were not possible because there were not enough studies that used a particular approach to compare to effect sizes from other methods. For example, six studies used the DELV to analyze dialect use. The remainder of the studies, however, used varying methods, but an insufficient number of studies used one particular task to collect the dialect sample to allow for a comparison to the DELV.

Implications for Future Research and Practice

In the current meta-analysis, the association between dialect and reading was stronger than the association between dialect production and spelling and writing. In addition, there was no significant variation among the studies that examined relations among dialect and spelling and writing. However, fewer studies analyzed a relationship between students' dialect use and spelling and writing outcomes than reading outcomes. Further, of the studies that investigated spelling and dialect use, all but one had an examiner orally dictate words and nonwords to students. The use of a dictated list might be preferred in spelling assessments because it allows examiners to assess specific orthographic features.

However, an elicited sample may not be representative of vocabulary a child may typically use and also prohibits an investigation of a more natural context of spelling ability such as what might be found in a writing sample. It may be that a child's spontaneous written language would provide a better representation of not only a child's lexical storehouse of words but also pronunciations of those words, which might be perceived differently by that child because of his dialect use. Research studies that examine students' written language through the elicitation of spontaneous writing samples, as opposed to dictated spelling lists, may provide more information regarding associations between dialect and children's written production of language.

In the current meta-analysis, one study, Sligh and Conners (2003), was identified as an outlier on the basis of its effect size and was removed from subsequent analyses. However, this particular study is noteworthy because of its unique design in matching AAE-speaking and SAE-speaking students on reading ability. The AAE-speaking students outperformed their matched SAE-speaking peers on two phoneme deletion tasks. The authors concluded that further research was needed in order to investigate what might have accounted for the unexpected findings. Future research may benefit from exploring phonological processing abilities specifically among students who speak nonmainstream dialects and a simultaneous examination of other reading components (e.g., word recognition, reading comprehension) in order to analyze the role of phonological processing in their reading abilities. An analysis of phonological processing skills among dialect users was not possible for this study because no studies included only speakers of nonmainstream dialects with phonological processing as an outcome variable. Further, because of the dependency among outcome variables within studies, it was not possible to conduct moderator analyses comparing phonological awareness measures to other literacy variables.

The fact that only one study reported including students with disabilities also highlights a gap in existing research regarding the relationship between dialect use and literacy skills among special populations. In a recent study, DeThorne, Petrill, Schatschneider, and Cutting (2010) found that children's conversational language predicted reading achievement above and beyond vocabulary scores, particularly for children with language difficulties. Although DeThorne et al. (2010) did not examine dialect as a component of their study, this finding indicates that relationships between spoken language and literacy may differ for students with language and reading difficulties. Extending the current research that largely includes only TD students in order to examine associations between dialect and literacy for struggling readers or those who have been identified with a language or reading disability may provide insight and direction for future research studies, including intervention research.

As noted previously, the current meta-analysis also provides implications for future research exploring the linguistic awareness/flexibility hypothesis. Some studies have begun to examine dialect shifting among young children (Terry et al., 2012) and have found that as early as preschool, children use dialect differently in various contexts (Connor & Craig, 2006; Terry, 2012). Analyzing dialect within students' written language samples in comparison to their oral language samples and examining these relationships along with reading, spelling, and other writing outcomes may provide further information on the role of dialect shifting in the acquisition and development of literacy skills. Although research has provided evidence that young children demonstrate dialect-shifting abilities, suggesting that the use of nonmainstream dialect may be malleable among this age group, only intervention research that explicitly targets dialect use would provide compelling evidence for the malleability of nonmainstream dialect use and its relation to literacy achievement.

Limitations

Although the current meta-analysis provides a synthesis of the most recent research investigating relations among dialect and literacy, it is not without limitations. The relationships examined were correlational in nature and do not imply causal relationships between dialect use and literacy outcomes. The correlational findings of the study do, however, provide implications for possible future studies, including intervention research. In addition, the inclusionary criteria of published studies, established mainly to ensure the inclusion of high-quality research studies, limited the corpus of studies to only peer-reviewed, published work. Dissertation studies and other unpublished work, which may have included additional studies, were therefore not included in the synthesis, though resulting publications from this work were included. Tests for publication bias were performed and indicated that a threat for publication bias was not evident.

Nine of the 20 studies included in this meta-analysis dichotomized dialect use by assigning students to one of two groups, either students using little or no dialect and students who used moderate to high amounts of dialect, normally using a mean or median split. Point-biserial correlations were calculated in these instances. However, the loss of information resulting from the artificial dichotomization of a continuous variable—frequency of dialect use—is recognized as a limitation of the study. In addition, for the purpose of this study, dialect use was broadly categorized and effect sizes were computed with literacy outcomes regardless of how the language samples were collected. As noted previously, studies included within the meta-analysis collected dialect samples using various methods. Because we were not able to analyze differences between dialect and literacy in various contexts, it is not possible to determine whether or not the data collection method might account for differences in relationships. For this study, SES was also determined by the percentage of students in the study who were from low-income homes, as indicated usually by the study percentage of students or school percentage of students participating in FARL. We recognize the potential limitation of this operationalization of SES in that income

only represents one aspect of SES and also because most studies included a majority of students from lower income homes. However, as is a limitation in all meta-analyses, the research study was limited by what was reported in existing literature. Future studies that examine dialect and literacy may purport to include other aspects of SES, including parent education or occupation.

In conclusion, this meta-analysis synthesized the most recent research analyzing relations among dialect use and literacy skills. Overall, the synthesis provides evidence that a small to moderate and negative correlation between young children's production of dialect in various language samples and reading, spelling, and writing outcomes may exist. The findings suggest that students who produce higher frequencies of nonmainstream dialect features in language tend to have lower scores on literacy outcomes, a relationship that appears to exist regardless of SES or grade level. Future research analyzing dialect use across a variety of contexts and examining these relations to literacy achievement may provide further information regarding the association between dialect use, dialect shifting, and literacy skills. In addition, extending previous research to include participants with language and reading difficulties may be beneficial in informing intervention research and practice.

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