The Relationship between Language Skills and Writing Outcomes for Linguistically Diverse

Students in Upper Elementary School

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Abstract

The purpose of this study was to explore relationships between language variables and writing outcomes with linguistically diverse students in Grades 3-5. The participants were 197 children from three schools in one district in the Mid-Atlantic U.S. We assessed students' vocabulary knowledge and morphological and syntactical skill as well as narrative writing ability in the spring of the academic year. The importance of language skills was investigated in two separate sets of models predicting contextual conventions and story composition. Controlling for grade level, language status, and transcription skills, syntactical skill was related to contextual conventions. Additionally, the relationship between syntactical skill and contextual conventions differed for English Learners (ELs) and non-ELs such that at higher levels of syntactic skill non-ELs showed better performance in contextual conventions. There was also a relationship between vocabulary breadth and story composition. Controlling for vocabulary breadth, ELs performed better than non-ELs on the story composition task.

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Recently, there has been intensified focus on the importance of writing for academic

success (Graham, 2006). The role of writing becomes increasingly central in schools as students

enter the upper elementary grades where they are expected to express their ideas and demonstrate

their understanding of content through writing (Brisk, 2012). However, many students struggle

to develop writing proficiency, and, in turn, struggle in school. For example, analyses of data

from national assessments suggest that nearly three-fourths of all fourth graders write at or below

a basic level, and only two percent of all fourth graders write at an advanced level (National

Center for Education Statistics [NCES], 2003). Students from low income, minority, and

English learner (EL) backgrounds, in particular, tend to struggle with writing tasks (NCES,

2003).

Over the past fifteen years, research on writing development and instruction has

flourished, as evidenced by recent volumes summarizing progress in the field (e.g., Grigorenko,

Mambrino, & Preiss, 2012; MacArthur, Graham, & Fitzgerald, 2006; Troia, 2009). In particular,

a body of research has accumulated identifying skills needed for writing proficiency and

isolating skills that may be related to writing difficulties (Graham, 2006). For example, research

has established that handwriting and spelling are important for proficient writing, and some

studies have investigated how individual language skills are related to writing proficiency

(Berninger, et al., 2006; Olinghouse & Wilson, 2013; Wagner et al., 2011; Williams, Larkin, &

Blaggan, 2013). Yet, there are few studies that, controlling for spelling and handwriting,

simultaneously investigate multiple language skills (e.g., vocabulary knowledge and

morphological and syntactical skills) in relation to writing outcomes, and there are even fewer

studies that investigate these relationships with linguistically diverse students in upper elementary school.

While there is a need for research on the role of language skills in writing proficiency among all student populations, there is a pressing need for research on language and writing with a specific focus on EL students (Miller & McCardle, 2011). The population of ELs, particularly Spanish-speaking ELs, in U.S. schools is growing, and an overwhelming number of ELs are not proficient in writing (NCES, 2003). Writing is a complex process, which is further complicated for ELs because they must negotiate English writing tasks in a second language. Given that difficulty in writing could have an impact on success in school and beyond, research on how language is related to writing and whether the role of language is similar or different for non-ELs and ELs is sorely needed. Thus, in the present study, we explore relationships between language variables and writing outcomes in a sample of non-EL and EL students in grades 3, 4 and 5. The objective of this exploratory study is to identify instructionally malleable language skills that are related to writing achievement.

Language Skills and Writing Outcomes

Theory and research on writing development has evolved considerably in the last 20 years. An early cognitive model of skilled writing that includes planning, translating, and revising (e.g., Hayes, 1996; Hayes & Flower, 1980) provided the foundation for subsequent models more sensitive to how children develop writing skills (e.g., Berninger & Swanson, 1994; Bereiter & Scardamalia, 1987; Juel, Griffith, & Gough, 1986). Building on this earlier theoretical work, Berninger and her colleagues advanced a model that identified key processes for developing writers (e.g., Berninger, Nagy, & Beers, 2011; Berninger, et al., 1992; Whitaker, Berninger, Johnston, & Swanson, 1994). Two of these processes, text generation and

transcription, explain how ideas are ultimately inscribed on paper (Berninger, Fuller, & Whitaker, 1996). Text generation entails translating ideas into linguistic form. The text generation process involves multiple levels of linguistic skill at the word, sentence, and discourse levels as writers take ideas and represent them through increasingly complex linguistic structures. Language skills that may be implicated in text generation include vocabulary, morphological and syntactical skill (Apel & Apel, 2011).

Once ideas are encoded in a linguistic form, transcription, which is the process of transcribing ideas from thought onto paper or screen, can occur. Accordingly, transcription involves orthographic knowledge (i.e., spelling) and writing fluency skills (i.e., handwriting or keyboarding). Transcription skill can constrain writing quality (Limpo & Alves, 2012) and may limit the ability of young writers to translate their ideas into writing (McCutchen, 2006). In Berninger's model, text generation and transcription are considered to be separate processes that draw on different skills. However, they are complementary. It is through the text generation process that the writer transforms ideas into a linguistic form, and it is through transcription that the writer represents those ideas on paper.

Theoretically, specific language skills may prove to be more or less important in writing development depending on which facets of writing quality are under consideration. In a recent study with bilingual elementary school students, Bae and Bachman (2010), using Confirmatory Factor Analysis, found support for a model of writing performance that included four related yet separate factors (i.e., *grammar, spelling, content*, and *length)*. It is likely that different language skills are related to different facets of writing. The Bae and Bachman (2010) study also provides evidence for the typical distinction in writing rubrics between *Conventions* and *Composition*. *Conventions* refers to components of writing such as grammar, spelling, and punctuation.

Composition refers to components of writing related to content, style, and word choice. In order to assess the relationship between language skills and different aspects of writing, we explore these relationships with measures of conventions and composition. Specifically, we assess writing using the Contextual Conventions and Story Composition subtests of the Test of Written Language, Fourth Edition (TOWL; Hammill & Larsen, 2009), which measures narrative writing quality and has been used in a range of studies to estimate students' writing proficiency (e.g. Gillespie, Olinghouse, & Graham, 2013; Harris, Graham & Mason, 2006; Olinghouse & Leaird, 2009). Note that narrative writing quality is seen as an important genre for students, as evident in the Common Core State Standards (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010), which delineate grade level standards for this genre. In the present study, we investigate how specific language skills (i.e., vocabulary knowledge and semantic, syntactic, and morphological skills) are related to particular aspects narrative of writing quality (i.e., Contextual Conventions and Story Composition). Below we discuss previous research on the association between language skills and writing outcomes that guide our approach.

Vocabulary

To communicate ideas effectively in writing, students need to use words appropriately. Thus, it stands to reason that children with greater vocabulary knowledge would have better outcomes in writing. Though few studies investigate the relationship between *oral vocabulary* and writing, research by Coker (2006) showed that beginning of first grade vocabulary breadth as measured via a receptive picture vocabulary task was related to end of first grade writing quality on a measure of descriptive writing. However, beginning of first grade vocabulary breadth was not related to end of third grade writing quality. Much more research has been

conducted examining relationships between *written vocabulary* and writing. For example, Olinghouse and Leaird (2009), in a study of students in second and fourth grade, and Olinghouse and Wilson (2013), in a study with students in fifth grade, found that written vocabulary diversity (i.e., the breadth of words used in writing) was a unique predictor of overall narrative writing quality. Other research has uncovered relationships between writing quality and written vocabulary maturity (i.e., the sophistication of words used in writing) in grades 3-6 (Deno, Marston, & Mirkin, 1982) and vocabulary diversity in grades 5, 9, and 11 (Grobe, 1981).

Most of the previous research in this area has explored only one aspect of vocabulary in relation to writing quality. However, vocabulary is multidimensional (Nagy & Scott, 2000), and, as such, different aspects of vocabulary may be more or less important to writing outcomes. For example, knowing a range of words (i.e., vocabulary breadth) and knowing how words are related (i.e., word relations) might both be important to expressing ideas in writing and writing texts with varied and mature language. Additionally, expressive and receptive measures of vocabulary may show different relations with writing. Since writing is an expressive task, writing quality may be more sensitive to differences in expressive rather than receptive measures of vocabulary. In the present study, we explore vocabulary measured via two different types of tasks that tap vocabulary breadth through a receptive task and word relations through an expressive task. Previous research on the relationship between vocabulary and writing quality also tends to include broad measures of writing quality. However, it seems likely that vocabulary would be more important to aspects of writing such as word choice, style, and narrative features rather than spelling, grammar, and punctuation. Thus, in this study, we explore relationships between vocabulary and writing specifically on the Story Composition subtest of the TOWL.

Morphological Skill

In addition to vocabulary, morphological skill, which includes the ability to manipulate meaningful word parts and includes sensitivity to inflections, compound words, and derivations, may be another component of language associated with quality of writing. Specifically, morphological skill may play a role in transcription through its association with spelling. For example, Nagy, Berninger, and Abbott (2006) found that, for students in fourth through ninth grade, morphological skill explained variability in spelling performance even after controlling for phonological awareness. These results were consistent with findings from previous research with third and fourth graders by Green et al., (2003), and they have been replicated in recent research with second and third graders by Apel, Wilson-Fowler, Brimo, and Perrin (2012). However, in a previous study by Nagy, Berninger, Abbott, Vaughan, and Vermeulen (2003), morphological skill did not predict spelling for struggling students in second or fourth grade. Nagy and colleagues (2003) suggest that the morphological skills of the struggling writers in their sample may have been insufficiently developed to predict spelling and reading outcomes independently of phonological and orthographic skills. At lower levels of morphological skill, students know less about how to recognize and manipulate word parts, and students are unable to spell more complex words. Given that findings on the role of morphological awareness in spelling are inconclusive yet some studies suggest that morphological awareness is important to spelling, we explored the role of this language skill on the Contextual Conventions subtest of the TOWL, which measures written mechanics, including spelling, syntax and punctuation.

Syntactical Skill

A third area of language skill connected to writing quality is syntactical skill. Coherent writing relies heavily on the use of accurate and varied grammatical constructions. The

relationship between syntactical skill and writing can be seen throughout schooling. For example, a cross-sectional study in kindergarten found that, even controlling for vocabulary knowledge and spelling ability, grammatical skills predicted writing quality (Kim, et al., 2011). And, positive and significant correlations between grammatical understanding and writing were identified in a study of adolescent students with a history of language impairment (Dockrell, Lindsay, & Palikara, 2011). While few studies have investigated the relationship between syntactical skill in oral language and writing outcomes for students in upper elementary school, several studies have explored students' use of syntactical structures in writing and their overall writing quality. For example, research with students in upper elementary school shows that children with language difficulties have particular problems with syntax in writing (e.g., Mackie & Dockrell, 2004). Furthermore, Berninger, Nagy, and Beers (2011), in a recent study with students in grades one to four, found that students' sentence writing skills were related to their grammatical usage skills, suggesting the important role of syntax in writing. Given the relationships between syntactical awareness and writing in previous studies, we explored the relationship between syntactical awareness and the TOWL Contextual Conventions subtest, which measures spelling, grammar, and punctuation, in the present study.

Language Background and Writing

While research on the relationship between language skills and writing outcomes among non-ELs is growing, there is little research on ELs and writing. Given that ELs have, by definition, lower levels of English language knowledge and skill (though they may have more or less native language knowledge and skill depending on their background), considering the relationship of language skills and writing for this population is essential. In a review of research, Lesaux, Koda, Siegel, & Shanahan (2006) found that ELs and non-ELs develop

similarly in precursor skills (e.g., phonological awareness and concepts of print) and word level skills (e.g., word reading and spelling), but ELs experience particular difficulties with text-level skills (e.g., reading comprehension), likely due to limited English language proficiency and relevant background knowledge. Since writing of connected text is a text-level skill, it could be inferred that ELs experience particular difficulty on this outcome as well. However, Lesaux et al. (2006) found few studies on writing with ELs, and even fewer studies that included both ELs and non-ELs, so these authors were unable to make firm conclusions about the development and predictors of writing for ELs and how ELs and non-ELs compare in writing.

Given the emerging research on the relationship between language skills and writing for non-ELs, a logical hypothesis would be that EL students' linguistic competency might be related to their writing outcomes as well. In fact, there is some recent research on writing and ELs that shed light on the role of language skills and writing for this population. For example, though with slightly older (age 11-14) ELs than the ELs under investigation in the present study, Danzak (2011) found that, overall, across lexical, syntactic, and discourse-level domains, ELs exhibited "unsophisticated" word choices, grammatical structures, and overall quality across narrative and expository texts. For example, ELs relied heavily on concrete rather than abstract nouns; they "produced sentences with independent clauses and single subordinate clauses rather than multiple, embedded subordinate clauses" (p. 501); and, based on results of an analytic assessment, ELs "produced written texts that could be considered marginally competent in English and Spanish" (p. 501). In another study, of fourth and fifth grade writing among EL students, Crosson, Matsumura, Correnti, and Arlotta-Guerrero (2012) suggest that EL students have difficulty in writing, at least in part, due to challenges with syntax. Specifically, Crosson et al. (2012) found that EL students rarely used advanced syntactical constructions such as

embedded clauses or causal connectives, though Crosson and colleagues note that teachers' writing prompts were not optimal for eliciting such complex language structures in writing. For a final example, in a qualitative study of grade 3-5 EL students' writing, Brisk (2012) examined the relationship between students' understanding of first, second and third person grammatical markers and their ability to write in multiple genres. She found that EL students made successful attempts to write in multiple genres, but they used incorrect grammatical person in certain genre contexts (e.g., personal recounts, autobiographies, biographies, reports, and persuasive essays).

While these studies provide important indications of the role of language in writing, they have not explored whether the relationship between language skills and writing outcomes is the same for ELs and non-ELs. Theoretically, the relationship between language skills and writing outcomes could be similar for ELs and non-ELs alike in that lower levels of English language skills would be related to lower levels of English writing skills. However, considering that ELs must navigate the complexities of transcribing and translating in a language that is not native to them, language skills may play a more important role in writing for this population. In other words, the relationship between specific language skills and writing outcomes could be greater for ELs than for non-ELs. Accordingly, without controlling for language skills, ELs may perform much worse on writing tasks than non-ELs, but controlling for language skills ELs and non-ELs may perform similarly on these tasks. Given the limited research on the role of language in writing with ELs, in this study we explore the role of language in writing with both non-ELs and ELs and investigate whether relationships between language skills and writing outcomes are similar for students from these language backgrounds.

Present Study

Emerging research suggests an important relationship between language skills and writing; however, before implications for instruction are clear, there is more empirical work that needs to be done. First, few studies have investigated the relationships between specific language skills and particular aspects of writing quality. Second, there is a paucity of research on writing that includes both non-ELs and ELs and investigates whether relationships between language measures and writing outcomes differ for students from these language backgrounds. In order to investigate the questions of interest and given the known role of both transcription skills (i.e., spelling and handwriting ability) and grade level on writing outcomes (e.g., Olinghouse & Graham, 2009), we held these variables constant in this study. Thus, the present study focuses on two primary research questions:

(1) Controlling for grade level and transcription skills, what are the relationships between (a) vocabulary and Story Composition and (b) morphological and syntactic awareness and Contextual Conventions among non-EL and EL students in grades 3-5?

(2) Do the relationships above depend on students' language status (i.e., whether students are non-EL or EL)?

In this study, we hypothesized that vocabulary knowledge would be related to the quality of students' written stories as indexed by the use of language, style and narrative components (i.e., Story Composition). Similarly, we also hypothesized that morphological and syntactical knowledge would be related to students' written mechanics, including spelling, punctuation, and sentence structure (i.e., Contextual Conventions). Further, given that ELs must juggle the complexities of writing along with the difficulty of operating in a second language and research suggests that greater cognitive demands may impede writing ability (McCutchen, 1988), we

expected that ELs would not perform as well as non-ELs on writing outcomes and language skills would be more strongly associated with writing outcomes for ELs than for non-ELs.

Methods

Sample

The present study is part of a larger project on the language and literacy development of linguistically diverse children in upper elementary school. The larger project included four time points and two data collection sites (i.e., one site in the Mid-Atlantic region of the U.S. and one site in the Northeast region of the U.S.), but data collection for the present study occurred at only one time point and in only one site (i.e., the Mid-Atlantic site). For the larger study, we used stratified random sampling to identify a sample with comparable numbers of English monolingual and Spanish-English bilingual students, targeting eight students per classroom. The original sample was identified in the fall of the first year of the larger study. In the Mid-Atlantic site the original sample included 220 students. Data collection for the present study occurred in the spring of the second year of the larger study. From the fall of the first year to the spring of the second year, the attrition rate was roughly 10%.

The sample for the present study was drawn from three schools in one district in the Mid-Atlantic site. The sample included 197 students from 29 different classrooms across grades 3 (36.5%), 4 (35.5%), and 5 (28%). Demographic information on the sample, obtained from school records, is provided in Table 1. In the present study, we categorized as English learners (ELs) children who have been identified as Limited English Proficient (LEP) by their schools based on school personnel-administered language assessments (i.e., LAS Links by CTB McGraw Hill) and are, therefore, eligible for extra support services to access academic content in school. All EL students in this sample spoke Spanish as their home language. Other students in the

sample also spoke Spanish in the home, but since they were not identified as EL by their school (i.e., they exhibited English language proficiency above the threshold for classification as EL), we included these students in the non-EL group along with their monolingual English speakers.

Measures

We administered assessments of children's language and literacy skills in the spring of the academic year. Trained research assistants administered all assessments. Before testing began, research assistants reached above 90% fidelity on assessment administration. Also, during assessment administration, research assistants showed fidelity of administration above 90%, as evaluated through analyzing audiotapes of testing sessions. We used raw scores from measures below in all analyses.

Vocabulary. We administered the Woodcock-Munoz Language Survey-Revised (WMLS, Woodcock, Muñoz-Sandoval, Ruef, & Alvarado, 2005) Picture Vocabulary subtest (Form B) as a measure of vocabulary breadth. On the Picture Vocabulary task, research assistants prompted students to verbally identify names of pictured objects that increased in difficulty. We derived the raw score following basal and ceiling rules for the assessment. In the technical manual, the internal reliability for children between 7 and 13 years old on the Picture Vocabulary task is reported as .88 through .92 (Woodcock et al., 2005). In our sample, Cronbach's alpha was .86.

We also administered the Clinical Evaluation of Language Fundamentals, fourth edition (CELF; Semel, Wiig, & Secord, 2003) Word Classes 2 subtest, hereafter referred to simply as Word Classes, as a measure of children's knowledge of word relations. In this assessment, the test administrator orally presents four words and students choose the two words that are semantically related. For all children in the sample, we began at item 1 and continued until the

discontinue rule set for the assessment was met. Test-retest correlations ranged from .72

through.84 and internal consistency ranged from .72 through .82 for children ages 7 to 12. In our

sample, Cronbach's alpha was .77.

Morphological Skill. The Extract the Base test (August, et al., 2001), based on work by

Anglin (1993) and Carlisle (1988), was developed by the Center for Applied Linguistics to

assess children's morphological knowledge. Children are given a worksheet, which is read

orally by the examiner, and students follow along. The examiner first reads a word (e.g., *farmer)*

and then reads a cloze sentence (e.g. "My uncle works on a _____."). Students respond by writing

the correct response in the blank. Responses are typically scored on a scale of 0 (i.e., incorrect),

1 (i.e., misspelled but phonologically plausible response), or 2 (i.e., correctly spelled response).

Rasch-based reliability for the Extract the Base measure under the typical scoring convention is

reported at .92 (Goodwin et al., 2012). In the present study, we rescored the responses such that

0 = incorrect and 1 = morphologically correct (i.e., both misspelled but phonologically plausible

responses and correctly spelled responses received a score of 1) so that scores would not depend

as much on spelling as in the original scoring scheme. In our sample with the recoded scores,

Cronbach's alpha was .83.

Syntactical Skill. We administered the CELF Formulated Sentences subtest to measure

students' syntactical skill. Students are given a word or phrase and, for all but four items, a

picture and are asked to provide a sentence orally. Sentences are scored on a scale of 0 (i.e.,

incomplete sentence, inaccurate use of the target word), 1 (i.e., complete sentence demonstrating

understanding of the word with only one or two deviations in syntax or semantics), or 2 (i.e.,

complete and correct sentence). All students were given all items on this assessment, despite

discontinuation rules, due to difficulty determining when students reached ceiling during

administration in our previous use of this measure. According to the technical manual, test-retest correlations ranged from .62 to .74 and internal consistency was .76 to .82 for children ages 7.0 through 12.11 (Semel et al., 2003). In our sample, Cronbach's alpha was .87.

Handwriting. We administered the Process Assessment of the Learner-Second Edition (PAL-II) Paragraph Copying subtest (Berninger, 2007) as a measure of students' handwriting skills. Students were given a paragraph containing 94 words and were instructed to copy the sentences on a lined piece of paper. Students were given 90 seconds to complete the activity. Students' work was scored according to the manual, such that students were given one point for each lowercase letter, one point for each capital letter, and one point for each punctuation mark written in the appropriate format and position, with a maximum of 358 possible points. The total raw score for copying accuracy was used in analysis. As reported in the technical manual, the PAL-II Paragraph Copying subtest test-retest reliability is .67 through .80 between grades kindergarten to 6. The handwriting was scored following the procedures outlined in the manual. Research assistants were trained until they achieved at least 90% reliability for scoring. All of the samples were double scored, and inter-rater reliability was calculated for each score. Exact agreement ranged from 92% to 96%.

Spelling. Curriculum Based Measurement (CBM) Spelling Fluency (Fuchs, Fuchs, Hamlett, & Allinder, 1991) was administered to measure students' spelling skills. On this measure, students are given two spelling lists containing 12 words each at their respective grade level (e.g., *perfect*, *anchor*, and *attendant* for grade 3). Examiners read each word aloud and students were given 10 seconds to write each target word. For the present study, students' work was scored for the number of correct words written, such that students received one point for each correctly (i.e., conventionally) spelled word on the assessment. Students' scores were

averaged across the two spelling lists. As with the handwriting assessment, research assistants were trained until they achieved at least 90% reliability. All of the samples were double scored, and inter-rater reliability was calculated for each score. Exact agreement across scorers was from 95% to 97%. According to previous research in which CBM Spelling Fluency has been used, test/re-test reliability, parallel forms reliability, and criterion-referenced validity exceed .80 across studies (Shinn & Shinn, 2002). In our study, Cronbach's alpha was .91.

Writing. Two subtests (Story Composition and Contextual Conventions) from the Test of Written Language-Fourth Edition (TOWL) were administered to assess students' written composition skills (Hammill & Larsen, 2009). These subtests require a spontaneous writing sample, which is seen as more authentic than contrived writing formats where students write isolated words or sentences. For these subtests students are asked to write a story based on a picture. According to the TOWL manual, "Contextual Conventions measure the ability to spell words properly, to apply the rules governing punctuation of sentences, and to write complex sentences and grammatical forms such as subject-verb agreements" (p. 50). Meanwhile, "Story Composition measures the ability to write in a logical, organized fashion; to generate a specified theme or plot; to develop a character's personality; to employ an interesting and engaging prose; and to use mature and appropriate vocabulary" (p. 50).

The TOWL was administered according to the standard procedures prescribed by the manual. First, the examiner presented the students with a sample picture and read aloud a model passage. Then, students were given another picture, which contained multiple characters interacting in the context of a larger situation (i.e., a car accident). Students were provided with five minutes to brainstorm and then fifteen minutes to write a story based on the picture. TOWL scoring was conducted according to the methods prescribed by the publisher, though we scored

all writing samples and not just samples with more than 40 words, as suggested by the publisher,

in order to be able to include the full range of writing proficiency of our sample in our dataset.

(Note that we ran analyses with and without the students who wrote fewer than 40 words, and the

results did not change when those students were excluded.) Each student's written work was

scored across 21 items on the Contextual Conventions subtest and 11 items on the Story

Composition Subtest.

Under the direction of the investigators, the research assistants individually scored the

sample student passages provided by the manual until they reached agreement with the master

codes as indicated in the manual (above .90 Cohen's Kappa). The research assistants discussed

scoring discrepancies with the principal investigator and clarified the criteria as needed. Next,

the research assistants independently scored five student samples from the participants in the

present study, followed by a discussion with the principal investigators. Independent scoring

continued until at least 90% reliability was achieved on each item (i.e., 32 items total) for each

research assistant. Finally, the research assistants scored the remainder of the student samples

collected, with a minimum of 20% of the samples scored across all research assistants, to ensure

reliability across the team members. The research team met to discuss any discrepancies and

reached agreement on each instance, with direction from the principal investigators. Note that

since the TOWL technical manual does not specify whether or not the assessment was normed

with a sample that included ELs, we decided not to use norm-referenced scores in the present

study. Instead, for each subtest we summed the scores across items on that particular subtest for

the total score on the subtest. The total raw score for each subtest was used in analysis.

Overall inter-rater reliability was between .90 and .99 Cohen's Kappa, with an average

of .92 across all 32 items on the measure. According to the TOWL manual (Hammill & Larsen,

2009), Cronbach's alpha for the Contextual Conventions and Story Composition subtests are .78 to .80 and .69 to .72, respectively, for ages 9 through 13. Test-retest reliability for ages 9 to 12 was .80 for Contextual Conventions and .70 for Story Composition. Additionally, the Contextual Conventions and Story Composition subtests are moderately correlated with the Written Language Observation Scale (Hammill & Larsen, 2009). In our study, Cronbach's alpha was .74 for Contextual Conventions and .77 for Story Composition.

Analysis

We examined the relationship between language skills and writing outcomes for Contextual Conventions and Story Composition separately in two sets of analyses. For each set of analyses, we explored three models. First, we wanted to establish a baseline model to account for key background variables and transcription skills. Second, to answer our research questions regarding the relationship between language skills and writing outcomes, we added in the language skills variables. Third, to answer our research questions regarding whether the relationships between language skills and writing outcomes depend on language status, we explored interactions between language skills and language status on writing outcomes.

For both sets of analyses, we included two background variables as covariates: Grade (i.e., a dummy (0/1) variable for Grade 4 and a dummy (0/1) variable for Grade 5) and Language Status (i.e., EL = 1 and non-EL = 0). The transcription variables we included were Spelling and Handwriting. For the Contextual Conventions outcome, the language variables we explored were Formulated Sentences, a measure of syntactical skill, and Extract the Base, a measure of morphological skill. For the Story Composition outcomes, the language variables we examined were Picture Vocabulary, which assesses vocabulary breadth, and Word Classes, which taps knowledge of word relations.

Given that students were nested within classrooms in our dataset, we wanted to account for the clustering of students at the classroom level. However, with only 29 classrooms with an average of 7 students per classroom in the dataset, we fell short of the benchmark of 30 groups with 30 individuals per group suggested by Kreft's (1996) simulation studies as necessary for multilevel modeling. Thus, the sample size precluded the use of Hierarchical Linear Modeling (HLM)—a model-based method of handling dependencies among observations. However, given that moderate clustering was observed (i.e., the intraclass correlation was 10.83% and 10.03% for the Contextual Conventions and Story Composition Subtests, respectively), we decided to employ a design-based adjustment, namely using robust (empirical sandwich estimator) standard errors as described by Huber (1967) in Proc Mixed in SAS as a way to address the dependencies among the residuals (http://v8doc.sas.com/sashtml/stat/chap41/sect8.htm). (Results were fairly consistent across analyses using HLM and Ordinary Least Squares regression without empirical standard errors.) To compare models, we report the AIC and ΔAIC. Note that Burnham and Anderson (2002, p. 70) suggest that ΔAIC < 2 does not suggest adequate improvement of the model, 4 < ΔAIC < 7 suggests some improvement of the model, and ΔAIC > 10 suggests considerable improvement of the model.

Results

Descriptive statistics are provided in Table 2. As expected, non-ELs outperformed ELs across measures, though the difference between non-ELs and ELs on Story Composition was slight. Though only raw scores on English measures as presented in Table 2 were used in analyses, we provide here the standard scores for non-ELs and ELs in English and Spanish Picture Vocabulary as a point of reference. The norm-referenced mean of these measures, which have been validated with bilingual students, is 100 and the standard deviation is 15. On the

English Picture Vocabulary assessment, non-ELs scored slightly above the norm-referenced mean ($M = 102.67$, $SD = 9.36$) and ELs scored a standard deviation below the norm-referenced mean ($M = 85.97$, $SD = 15.8$). On the Spanish Picture Vocabulary measure, ELs scored more than one standard deviation below the norm-referenced mean ($M = 80.21$, $SD = 15.62$), suggesting that ELs in this sample were not strong in English or Spanish language skills.

Correlations are provided in Table 3. All correlations were significant, and correlations among the language variables were consistently strong. The language measures most highly correlated with Contextual Conventions were Formulated Sentences and Extract the Base, and the language measure most highly correlated with Story Composition was Picture Vocabulary. These correlations support our hypotheses that morphological and syntactical skill would be related to students' written mechanics, including spelling, punctuation, and sentence structure, and vocabulary knowledge would be related to the quality of students' written stories as indexed by the use of language, style and narrative components.

Contextual Conventions. Models for the Contextual Conventions subtest are shown in Table 4. In the first model for Contextual Conventions (i.e., Model 1), which we used to evaluate the relationship between our covariates and the outcome, all variables (i.e., Grade, EL, Spelling, and Handwriting) were all significant at the .05 level set in this exploratory study. ELs scored significantly below their non-EL peers, even when controlling for Spelling, Handwriting, and Grade. In the second model for Contextual Conventions (i.e., Model 2), which we used to examine the association between Formulated Sentences and Extract the Base with the outcome, Formulated Sentences showed a significant and positive relationship with the outcome, such that higher scores on Formulated Sentences were related to Higher Scores on Contextual Conventions. Even when controlling for these language skills and Grade, Spelling, and Handwriting, ELs still

scored below their non-ELs peers on this measure. In the third model for Contextual

Conventions (i.e., Model 3), which we used to explore the role of interactions between language

skills and language status, we found that the relationship between Formulated Sentences (i.e.,

syntactic awareness) and Contextual Conventions differed for ELs and non-ELs.

In order to understand this interaction, we explored four hypothetical scenarios using

prototypical data points: (a) a non-EL student with high (i.e., at the third quartile) Formulated

Sentences, (b) an EL student with high Formulated Sentences, (c) a non-EL student with low (i.e.,

at the first quartile) Formulated Sentences, and (d) an EL student with low Formulated Sentences.

Least square means for these prototypical data points were, respectively: 12.82, 11.21, 10.63, and

10.29. Post-hoc comparisons suggest that there is no significant difference between ELs and

non-ELs at low levels of Formulated Sentences on Contextual Conventions, but there is a

significant difference between ELs and non-ELs at high levels of Formulated Sentences on

Contextual Conventions such that non-ELs perform higher then ELs. This finding suggests that

non-ELs may have less difficulty translating higher levels of Formulated Sentences (i.e.,

syntactical awareness) from language into writing skills than ELs. Note that using ΔAIC

benchmarks, Model 2 was an improvement on Model 1, and Model 3 was an improvement on

Models 1 and 2.

Story Composition.   Models for the Contextual Conventions subtest are shown in Table

5. In the first model for Story Composition (i.e., Model 1), which we used to evaluate the

relationship between our covariates and the outcome, only Grade and Spelling were significant at

the .05 level set in this exploratory study. Thus, there was no difference between ELs and non-

ELs controlling for the other variables in the model. There was also no relationship between

Handwriting and Story Composition. In the second model for Story Composition (i.e., Model 2),

which we used to examine the association between Picture Vocabulary and Word Classes with the outcome, Picture Vocabulary showed a significant and positive relationship with the outcome, such that higher scores on Picture Vocabulary were related to Higher Scores on Story Composition. Interestingly, controlling for Picture Vocabulary and the other variables in the model including Grade, EL, Spelling, Handwriting, and Word Classes, there was a difference between ELs and non-ELs on Story Composition such that ELs scored higher than non-ELs. In the third model for Story Composition (i.e., Model 3), which we used to explore the role of interactions between language skills and language status, we found that the relationships between language skills and Story Composition did not differ for ELs and non-ELs. Note that using ΔAIC benchmarks, Model 2 was an improvement on Model 1, but Model 3 was not an improvement on Models 1 or 2 suggesting that the model that included Picture Vocabulary and Word Classes but not the interactions between these variables and language status was the best fitting model of Story Composition.

Discussion

In this study the primary research question was whether students' language skills predicted their narrative writing performance. Previous research has suggested that measures of vocabulary, morphology, and syntax are related to measures of written production and quality (Berninger & Abbott, 2010; Kim et al., 2011; Hooper, Roberts, Nelson, Zeisel, & Kasambira Fannin, 2010; Olinghouse & Leaird, 2009; Nagy, Berninger, & Abbott 2006). However, there is limited research investigating influences on various aspects of writing using multiple measures of language with upper elementary school non-EL and EL students. This study is unique because the role of students' language status was investigated. The importance of language skills was assessed in two separate models predicting Contextual Conventions, which evaluates

grammar, spelling, and punctuation, and Story Composition, which assesses content, style, and word choice. Controlling for grade level, transcription skills, language status, and morphological skill (i.e., Extract the Base), syntactical skill as measured by Formulated Sentences was related to quality of Contextual Conventions. While there was no difference in the relationship between syntactical skill and Contextual Conventions at lower levels of syntactical skill, non-ELs performed better than ELs on Contextual Conventions at higher level of syntactical skill, suggesting that non-ELs may find it easier to translate their syntactical skill into their writing than ELs. Controlling for grade level, transcription skills, language status, and knowledge of word relations (i.e., Word Classes), vocabulary breadth as measured by Picture Vocabulary was related to quality of Story Composition for ELs and non-ELs alike. These results will be discussed in more detail below.

Contextual Conventions

There are several potential explanations for why syntactic skill is related to the use of Contextual Conventions. The TOWL Contextual Conventions subtest contains twenty-one items, and of those items seven assess features related to syntax. These include items sensitive to the presence of sentence-level grammatical mistakes such as sentence fragments, run-on sentences, and noun-verb disagreements. In addition, three other items reward writers for the inclusion of more sophisticated syntactic features such as sentence construction, introductory phrases and clauses, and the use of coordinating conjunctions other than "and". Since 30% of the items in the Contextual Conventions subtest assess some form of syntactic skill, it is not surprising that students' syntactic skill is related to their ability to avoid grammatical mistakes and to include higher-level syntactic elements in their writing. The Contextual Conventions subtest also measures some elements of written production such as total number of sentences per paragraph

and total number of compound sentences. In Kim et al.'s (2011) study, variation in children's language skills (i.e. vocabulary, grammatical knowledge, and sentence imitation) was positively related to children's written production (total number of words, ideas, and sentences) controlling for spelling and transcription fluency. Another potential explanation for the positive relationship between syntactical skill and students' performance on the Contextual Conventions subtest could be related to an increased ability to produce text as a function of general fluency with sentence construction. The finding that oral syntactic skill is related to performance on written contextual conventions has both research and instructional implications. One important area for future research includes the investigation of longitudinal relations between syntactic skill and the development of students' mastery of written conventions. In addition, research designed to assess causal relationships between syntactic skill and written conventions deserves attention. As our understanding of the contribution of syntactic knowledge to writing achievement grows, classroom interventions designed to strengthen students' syntactic skill may be warranted.

Though there have been few studies on the effect of syntax-related intervention on writing performance, a recent review of the literature on intervention to support writing showed no significant effects of grammar-based intervention on writing outcomes (Graham, McKeown, Kiuhara, & Harris, 2012). However, as Berninger, Nagy, and Beers (2011) point out, the intervention research on the effect of syntax-focused instruction on writing outcomes is limited in that instruction has focused on the syntactic level, but its effectiveness has been evaluated at the discourse level. Much more research is needed on these types of instructional approaches. In addition, there needs to be more work on the role of syntax in writing for students from different backgrounds to inform future interventions. Berninger and Wolf (2009) suggest that language cueing and sorting games may prove useful in syntax-related intervention research.

In this study, controlling for grade level, transcription skills, language status, and syntactical skill (i.e., Formulated Sentences), there was no relationship between morphological skill as measured by Extract the Base and Contextual Conventions. Note, however, that the strong correlation between Formulated Sentences and Extract the Base ($r = .72$) may be masking the relationship between morphological skill and Contextual Conventions. Furthermore, as syntactical skill includes some knowledge of morphological properties of words it could be construed that the relationship between syntactical skill and Contextual Conventions actually implicates morphological skill as well. More research needs to be done to understand the complex relationships between syntactical skill, morphological skill, and proficiency in written conventions in order to inform instruction.

Intervention research suggests that promoting students' morphological skill can have positive effects on spelling ability, which is closely related to and part of Contextual Conventions. For example, Devonshire and Fluck (2010), working with students between the ages 5 and 11, found that students who received an intervention focusing on morphology outperformed students in a control group on a spelling measure. Similarly, Nunes, Bryant, and Olson (2003) found positive effects of morphologically-focused intervention on spelling outcomes for children ages 7 and 8. In fact, a recent literature review by Bowers, Kirby, and Deacon (2010) revealed that across studies of morphology-based interventions with experimental and control groups, the effect size (Cohen's d) on spelling outcomes was .49. However, across studies comparing an experimental group with a group that received an alternative treatment, the effect size was only .05. The review did not analyze effects for general writing outcomes beyond spelling, and the studies reviewed did not explore how instruction on multiple aspects of language (e.g., syntactical and morphological skill) might support writing. Instruction on

morphological skills could play a direct role on writing through its influence on Contextual

Conventions, broadly speaking. Or, morphological skills could play an indirect role on

Contextual Conventions through its role in spelling, which was found to have a significant and

positive relationship to Contextual Conventions in this study. Much more research on the impact

that instruction to promote morphological awareness may have on writing outcomes is needed.

Story Composition

Vocabulary breadth measured by Picture Vocabulary was a significant predictor of Story

Composition, controlling for grade level, transcription skills, language status and knowledge of

word relations as measured by Word Classes. The Story Composition subtest includes eight

items related to content, two items related to word choice, and one item related to style. Given

that word choice is central to the Story Composition subtest, it is not surprising that vocabulary

breadth would be related to this outcome. What is important to note is that, as with syntactical

skills, oral vocabulary is related to written vocabulary, suggesting that instruction on oral

vocabulary might influence written vocabulary. There is some indication in the research base

that the above hypothesis might be accurate. For example, in an intervention study with fourth

and fifth graders, Duin and Graves (1986) found that vocabulary instruction relevant to the

writing topic contributed to higher quality written narratives. However, much more empirical

work is needed to thoroughly evaluate the effect of vocabulary instruction on writing outcomes.

In the present study, word relations as measured through Word Classes, was not

significantly related to Story Composition, controlling for other variables in the model. As with

syntactical and morphological skill, the relationship between Picture Vocabulary and Word

Classes ($r = .57$) may conceal a relationship between word relations and Story Composition.

Note, though, that Word Classes was a receptive task and Picture Vocabulary was an expressive

task. It could be that expressive vocabulary, regardless of whether it is vocabulary breadth or knowledge of word relations, is more influential in written expression than receptive vocabulary, given that writing is an expressive task as well. More research is needed on the role of multiple aspects of oral vocabulary and writing outcomes using measures that tap various aspects of language skills through tasks assessing each domain. Furthermore, little research has been conducted exploring the effect of instruction that includes attention to multiple aspects of vocabulary and writing, but the present study suggests that such research is warranted.

Language Status

Across language and writing measures, ELs scored lower than their non-EL peers, which is to be expected considering they are still developing language proficiency in English, the language of schooling for these children. Of note is that the difference on the TOWL Story Composition subtest was slight and non-significant. It may be that this measure is not sensitive enough to individual differences or that differences between ELs and non-ELs are not as pronounced on this measure, which focuses in large part on story content. Knowledge of story structure and content on the provided stimulus may not distinguish ELs and non-ELs. Interestingly, controlling for vocabulary breadth and knowledge of word relations, ELs performed better than their non-EL peers on this outcome, suggesting that while ELs may be hampered in writing by their emerging English language skills, they have funds of knowledge to draw on when writing narratives that may be comparable to that of their non-EL peers. Notably, the relationship between vocabulary breadth and story composition was consistent across ELs and non-ELs, suggesting that, controlling for spelling and handwriting, at least, ELs and non-ELs at the same level of oral vocabulary may be able to use that oral vocabulary to an equal extent in writing.

Even after controlling for syntactical and morphological skill, however, ELs scored below non-ELs on Contextual Conventions. And, when we explored interactions between Formulated Sentences and language status on Contextual Conventions, we found that there was no difference between ELs and non-ELs at lower levels of syntactical skill such that lower levels of syntactical skill were related to lower scores on Contextual Conventions for ELs and non-ELs alike. However, there was a difference between ELs and non-ELs at higher levels of syntactical skill such that high levels of syntactical skill were related to higher scores on Contextual Conventions for non-ELs but not for ELs. This finding suggests that non-ELs at higher levels of syntactical skill may have an easier time translating that skill into writing than ELs.

Few studies have been conducted that show the effects of instruction in language skills with ELs or investigate whether effects are similar or different for ELs and non-ELs. For example, Mancilla-Martinez (2010), in implementing a vocabulary intervention with fifth grade ELs, found that students in the treatment group grew significantly in the quality of their writing over the course of the intervention, even though writing was not specifically taught in the intervention. However, the study did not include non-ELs or compare ELs and non-ELs. Additionally, while Proctor, Uccelli, Dalton, and Snow (2009) included writing captions in their online vocabulary instruction approach, they did not evaluate the effects of vocabulary instruction on writing captions for the fifth grade ELs and non-ELs in their sample. Theoretically, increasing vocabulary may support ELs and non-ELs to a similar extent. However, supporting syntactical skill may benefit ELs more than non-ELs, who may have less difficulty translating syntactical skills into writing. These hypotheses need to be evaluated in future intervention research focused on language skills and writing outcomes.

Limitations

The generalizability of the results of this study is constrained by three main factors. First, the sample is small and not optimally representative of non-ELs and ELs in the population. Research with larger and more diverse populations of non-ELs and ELs is needed. Second, the data was taken at one point in time and does not capture the developmental nature of language skills or writing proficiency. Longitudinal research on language skills and writing outcomes is needed. Third, to avoid over-testing students, we assessed students using only one of many possible types of assessments for each language and writing skill, and, as such, were not able to measure multiple aspects of the skills under study or use various task types previously employed to tap language and writing skills. We discuss this limitation in more detail below.

Language is multidimensional, but using only one measure for each skill meant that we captured one aspect of each domain. For example, we assessed vocabulary breadth through an expressive task and knowledge of word relations through a receptive task, which meant we ignored students' receptive vocabulary breadth and expressive knowledge of word relations. Similarly, for both syntactical and morphological skill, we assessed students using expressive rather than receptive tasks. For the morphological skill task, we evaluated derivational morphology to the exclusion of compound and inflectional morphology. Future research investigating multiple aspects of the language domains is needed.

Additionally, different task types may be more or less effective at revealing students' language skills. For vocabulary breadth, we used a picture task rather than a definition task; for knowledge of word relations, we chose a multiple choice task rather than an expressive word associations task; for syntactical knowledge, we employed a picture prompt task rather than, say, a grammaticality judgment task; and for morphological skill, we used a task that required morphological decomposition as opposed to a task that assesses identifying affixes in written

words or choosing words that fit the syntactic context. Therefore, we cannot generalize to other aspects of vocabulary, syntactical skill, or morphological skill, and further research is needed exploring the relationship between different aspects of these language skills and writing.

Furthermore, language skills are interrelated. So, while we aimed to assess one language skill per measure, students drew on multiple language skills in responding on each assessment. For example, while we used Formulated Sentences to measure syntactical skill, scoring reflected whether student responses were syntactically *and* semantically correct. Similarly, morphological skill was assessed using the Extract the Base test, which requires writing as well as some syntactic, semantic, and orthographic knowledge. Given the relationship between aspects of language, reflected in the use of such terms by linguists as *semantax* and *morphosyntax* (e.g., Komeili & Marshall, 2013; Menyuk & Brisk, 2005), language measures typically tap multiple aspects of language at once. Still, this is a limitation in the present study.

Finally, there were limitations in the measure we used for writing, the TOWL, which evaluates narrative proficiency, to the exclusion of other genres, using a picture prompt. The content of the picture may have been unfamiliar to students, which might result in a written narrative that does not represent students' true narrative proficiency. Furthermore, the scoring range of Story Composition subtest is somewhat limited, and it may not be optimal for capturing variance in narrative performance. Overall, more development and validation of writing measures is needed to ensure that researchers and practitioners are adequately and accurately assessing the skills needed for writing achievement in schools. Finally, more research is needed on the influence of language skills on writing outcomes on not only narrative but also expository texts. Differences across genre should be explored.

Conclusions

This study offers insight on an important but neglected topic. Some researchers have explored the relationship between writing and language skills (Berninger & Abbott, 2010; Kim et al., 2011; Hooper et al., 2010; Olinghouse & Leaird, 2009; Nagy, Berninger, & Abbott, 2006), but there has been little work comparing EL and non-EL writers. Given the importance of writing to the current academic climate and the growing population of EL students in U.S. schools, this is clearly an area that needs further exploration. The results of this study suggest the language skills of both EL and non-EL students may contribute to their writing proficiency. These results also provide support for a conception of language and writing proficiency that is a partially integrated, multicomponent system (Berninger & Abbott, 2010). At this point, the empirical evidence for the relationship between language skills and writing outcomes is thin. More research that includes diverse measures of language skill and writing proficiency should be used. In addition, longitudinal research is needed to extend our understanding of how language skills for both EL and non-EL students develop over time and how that developmental progression affects writing performance. Such a line of research could provide an indication of skills educators might target for language instruction to improve writing outcomes for EL and non-EL students alike.

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Table 1

Demographic Information

	Total Sample	Non-ELs	ELs
	$N = 197$	$n = 118$	$n = 79$
Grade 3	37%	30%	47%
Grade 4	36%	38%	32%
Grade 5	28%	32%	22%
Female	53%	53%	57%
Free or Reduced Lunch	80%	73%	90%
Latino	52%	21%	100%
Black	40%	66%	0%
White	7%	12%	0%
Other	1%	1%	0%

Table 2

Means and Standard Deviations

	Total Sample	Non-ELs	ELs
	$N = 197$	$n = 118$	$n = 79$
Spelling	6.35 (2.95)	7.06 (2.79)	5.29 (2.88)
Handwriting	63.85 (25.73)	67.22 (26.22)	58.82 (24.29)
Picture Vocabulary	31.96 (5.20)	34.53 (2.83)	28.11 (5.56)
Word Classes	9.57 (3.60)	10.46 (3.58)	8.25 (3.21)
Formulated Sentences	36.31 (10.00)	39.83 (7.75)	31.06 (10.70)
Extract the Base	22.05 (4.60)	23.41 (3.83)	20.03 (4.91)
Contextual Conventions	10.88 (4.58)	12.26 (4.47)	8.82 (3.94)
Story Composition	9.85 (1.82)	10.02 (1.40)	9.59 (2.30)

Table 3

Correlations (N = 197)

Variable	1	2	3	4	5	6	7	8
1. Spelling	1.00							
2. Handwriting	0.23*	1.00						
3. Picture Vocabulary	0.43*	0.22*	1.00					
4. Formulated Sentences	0.45*	0.35*	0.68*	1.00				
5. Word Classes 2	0.48*	0.40*	0.57*	0.64*	1.00			
6. Extract the Base	0.67*	0.32*	0.64*	0.72*	0.65*	1.00		
7. Contextual Conventions	0.56*	0.38*	0.49*	0.58*	0.56*	0.60*	1.00	
8. Story Composition	0.20*	0.19*	0.42*	0.37*	0.34*	0.39*	0.32*	1.00

$* \, p < .05$

Table 4

Analytic Models for Contextual Conventions (N=197)

Model	1	2	3
Intercept	6.62*	1.82	3.48~
Grade 4	2.18*	1.60*	1.72*
Grade 5	2.43*	1.29~	1.25~
EL	-1.44*	-.82*	3.27*
Spelling	.79*	.54*	.54*
Handwriting	.02*	.02~	.02~
Formulated Sentences		.11*	.07*
Extract the Base		.08	.08
Formulated Sentences*EL			-.10*
Extract the Base*EL			-.03
Residual	11.24	10.22	10.01
AIC	1049.7	1035.0	1012.8
ΔAIC		14.7	36.9

~ p < .10, * p < .05

Table 5

Analytic Models for Story Composition (N=197)

Model	1	2	3
Intercept	10.38*	5.67*	4.46*
Grade 4	.93*	.51	.50
Grade 5	1.33*	.69~	.71~
EL	.07	.81*	-4.44
Spelling	.16*	.04	.04
Handwriting	<.01	<.01	<.01
Picture Vocabulary		.15*	.19*
Word Classes		.03	.03
Picture Vocabulary*EL			.17~
Word Classes*EL			.02
Residual	2.84	2.50	2.42
AIC	778.8	757.9	755.2
ΔAIC		20.9	23.6

~ p < .10, * p < .05