Connective Use in Academic Writing by Students With Language Learning Disabilities From Diverse Linguistic Backgrounds

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Abstract

The aims of the current project included to (a) describe the use of connectives in written language samples by fifth grade students, (b) examine differences in connective use between groups who differed in English proficiency and exceptionalities, and (c) examine the predictive relationship between connective measures and writing quality ratings. Investigators utilized written expository responses of 1,128 students in fifth grade who differed in English proficiency and language ability. The sample included 214 English learners and 144 students with language learning disabilities (LLD). Group differences were examined in the use of advanced connective words in academic writing. Regression analysis was used to examine connective measures as predictors of overall writing quality rating. Students with LLD used advanced connectives less frequently than their peers and demonstrated less variety in their connective word use. Two connective measures (total number of advanced connectives and the ratio of connectives) were significant predictors of writing quality. Findings support the need for additional efforts to improve the use of cohesive devices in academic writing for students with LLD to minimize achievement gaps.

Keywords

academic language, connectives, school age, written language, writing quality

Connectives have been widely recognized as a prevalent feature of academic or literate language (Crosson & Lesaux, 2013; Nippold et al., 2005) and abundant in students' texts and formal written contexts (Nair, 2007). The term *connective* refers to a word or phrases that help to link ideas across sentences (Nippold et al., 1992). As a broad category, connectives are purported to be developmental markers of language maturity (Nippold et al., 2005).

Previous studies have reported more frequent use of connectives in academic texts as opposed to nonacademic writing (Ghanbari et al., 2016). Such connectives that occur in the school texts and academic writing are considered part of *academic language*, or the language used in school (Schleppegrell, 2001), which is recognized as an essential requirement for success with advanced literacy tasks in school (Pilgreen, 2006; Schleppegrell & Colombi, 2002; Snow & Uccelli, 2009). The language of schools, sometimes referred to as *Academic English*, reflects a more formal register than the language register that commonly occurs in home contexts used for casual social communication (Scarcella, 2003). In contrast to casual social communication, academic language is characterized by complex grammatical structures, discourse connectives, and abstract concepts (e.g., Bailey, 2007; Chamot & O'Malley, 1994).

There is burgeoning interest in the role of connectives in writing achievement and reading comprehension (e.g., Crosson & Lesaux, 2013; Kim et al., 2013; Nippold et al., 2005; Uccelli et al., 2015), but fewer studies have focused explicitly on advanced connectives in academic writing. Authors of previous studies have reported that greater use of connective devices is associated with more advanced writers (Connor, 1991; Jin, 2001). Other findings have suggested knowledge of connectives may predict reading comprehension (Cain et al., 2005; Uccelli et al., 2015; van Silfhout et al., 2015) and academic writing (Crosson & Lesaux, 2013).

A few studies have reported a relationship between connective use and age/maturation or language sophistication. Seminal research in this area, such as that of Crowhurst (1987), suggests that students use specific types of early developing connectives during early elementary grades

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(e.g., *and, so, also, then)* and more sophisticated or advanced connectives are used in middle and high school (e.g., *consequently, finally, in conclusion*). In one cross-sectional study, Nippold et al. (2005) examined clausal development in a persuasive writing task across three age groups: children who were 11 years old, adolescents who were 17 years old, and 24-year-old adult college students. Results indicated that the frequency of relative clauses was statistically different between groups with a mean of 11.70 in the children's written samples, 16.64 in the adolescents' samples, and 20.79 in the adults' writing. The authors' concluded the rate of use of relative clauses demonstrated an age-related increase into adulthood.

Students From Diverse Linguistic and Ability Backgrounds

Some students may be more likely to experience difficulty in acquiring connectives and leveraging them in academic writing, including students with language learning disabilities (LLD) and students from diverse linguistic backgrounds who are English learners (ELs). Previous studies have shown students with language impairments are at greater risk of having difficulty acquiring complex syntax (Bishop & Donlan, 2005; Marinellie, 2004; Wetherall et al., 2007); however, the majority of studies have focused on spoken language. In one such study, investigators examined syntactic development in 10-year-old students (*n* = 30) as measured during conversation with an adult and reported that students with specific language impairment demonstrated fewer complex sentences, adverbial clauses, and relative clauses compared with typically developing peers. In another study, Zwitserlood et al. (2015) reported that students with specific language impairment, at 8.5 years old, used fewer relative clauses than their typically developing peer group on a spoken narrative task.

Given that students with LLD often struggle with grammatically complex sentences in spoken language tasks (e.g., Marinellie, 2004), learning connective words and leveraging them in academic writing may be exponentially more challenging than for their typically developing peers. Although it is hypothesized that students with LLD would have difficulty leveraging connective word use during academic writing tasks, there are few empirical studies that examine and describe disparities in connective use in academic writing.

Similarly, students who are ELs may also be expected to experience difficulty in connective use on academic language tasks (Ogle et al., 2016; Townsend et al., 2012). Findings of a study by Townsend et al. (2012) demonstrated significant differences in academic language knowledge between English-speaking monolinguals (*n* = 212) and students from linguistic minority backgrounds (125) in

seventh grade. As Ogle and colleagues point out in their text on teaching academic language, ELs may not have mastery of tier one words, making it even more difficult to derive the meaning of advanced connectives common in the academic language in school and academic texts.

In a study by Faruk and Barua (2016), students' connective use was analyzed by category for ELs. Results indicated that most common connectors were used among and between language groups. The results were inconclusive with some language groups demonstrating under- or overuse of connectives depending on type of connective. In another study by Mohammed (2015), ELs demonstrated frequent use of connectives; however, elaborative connectives (e.g., *in other words, for example, rather, in any case, actually*) were used infrequently by students from EL backgrounds. In contrast, Ghanbari et al. (2016) who studied the written responses of ELs (*n* = 60), ages 20 to 38, reported that elaborative connectives were the more frequent types of connectives used in addition to inferential connectives (*so, therefore*).

Measurement of Connectives. There is not widespread agreement on a system of measuring and/or categorizing connectives. Although there are a multitude of different connectives, researchers have attempted to group or distinguish types of connectives to assist in examining and describing children's acquisition and use of connectives. In a few studies, connectives have been organized by their function or nature of the relation between phrases (e.g., additive, clarifying, contrastive, resultive, transitional, and corroborative; Bax et al., 2019). Examples of *Alternatively*, in another classification system, Nair (2007) identified advanced connectives that occurred in middle school texts according to their frequency of use, with designations of *common* and *academic* connectives. Among frequently occurring connectives in academic texts, 12 advanced connectives were considered to be common connectives (e.g., *however, meanwhile, therefore, though, unless*). In addition, 17 connectives were considered to be *academic* based on the contexts in which they more narrowly occur. Specifically, academic connectives refer to connectives that are associated more exclusively with the formal register of academic contexts such as *alternatively, nevertheless, conversely*, and *despite.*

Gaps in the Literature. Findings of burgeoning studies corroborate the important role of connectives in academic language; however, only a handful of studies have examined connectives in academic writing and included students with LLD. Furthermore, additional studies are needed that considered potential challenges in the acquisition and use of connectives by students from diverse linguistic backgrounds. In response, the current study aimed to examine the following research questions:

Table 1. Descriptive Characteristics of Fifth Grade Student Participants.

Characteristic	Total sample (N = 1,128)		English learners (n = 214)		English proficient (n = 914)	
	n	%	n	%	n	%
Free/Reduced-price lunch						
Eligible for FRL	864	78.3	182	85	682	74.6
Not eligible	11	1	1	0.5	10	1.1
Did not apply	229	20.3	31	14.5	198	21.7
Missing data	24	2.1			24	2.6
Race/Ethnicity						
Hispanic	586	52	201	93.9	385	42.1
Black	290	25.7	6	2.8	284	31.1
White	162	14.4	2	0.9	160	17.5
Multiracial	50	4.4	3	1.4	47	5.1
Asian	20	1.8	2	0.9	18	2
Missing data	20	1.8	0	0	20	2.2
Exceptionality						
No identified exceptionalities	984	87.2	164	76.6	820	89.7
Specific learning disorder	104	9.2	34	10	70	7.7
Language impairment	48	4.3	25	7	23	2.5
Articulation disorder	28	2.4	10	3	18	2

Note. Some students with language learning disabilities had one or more of the exceptionalities. Specifically, a number of students with specific learning disorders or language impairment also had articulation disorders. FRL = free and reduced-price lunch.

1. **Research Question 1:** What was the average use of advanced connectives in writing for fifth grade students from diverse linguistic and ability backgrounds?
2. **Research Question 2:** Where there group differences in use of advanced connectives in writing between fifth grade students who differ in English proficiency and language ability, including students with and without LLD?
3. **Research Question 3:** What factors predict overall ratings of writing quality (e.g., connective use, language ability, EL status)?

Method

Data for this study were gathered as part of a larger study of the impact of word knowledge instruction on the writing skills of students in fifth grade. The project was approved by the university human subjects committee (HCS # 2018.25857). The larger study included 2,555 consented students of which 1,128 (44%) were randomly selected for the current study examining students' connective word use in their responses on the district writing assessment at the beginning of the school year.

Participants

Participants in this study included 588 girls and 540 boys enrolled in fifth grade in 41 elementary schools in a large school district. Descriptive information on race and

eligibility for free and reduced-price lunch status is provided in Table 1. Using district data, students were further categorized into groups according to the language spoken at home and their identification as having a language-related exceptionality with eligibility for special education services.

Students with LLD. The current study included students with LLD who were receiving special education support services in inclusive classrooms. District data were used to determine whether the student was identified as having an LLD. This criterion resulted in inclusion of 144 students with LLD. All students received instruction in the participating inclusive classrooms and received speech-language services and/or other related services for exceptionalities, including specific learning disability or language impairment, with or without a speech/articulation disorder. Of the 144 students with a language-related exceptionality, 94 spoke were monolingual English speakers and 50 were categorized by the district administrative data as ELs for which a language other than English was the primary language spoken at home.

To characterize general language skills of students with LLD, investigators obtained and examined administrative data from the district regarding students' performance on classroom-administered standardized assessments that occurred at the beginning of the school year. Based on the Florida Assessments for Instruction in Reading Aligned to the Language Arts Florida Standards (FAIR-FS; Foorman et al., 2015), the students with LLD in the current study demonstrated a mean score equivalent to the 28th percentile

on the vocabulary knowledge task ($M = 28.70$, $SD = 22.70$). On the reading comprehension subtest of the FAIR, the students with LLD in the current sample demonstrated a mean score equivalent to the 18th percentile rank ($M = 18.14$ percentile, $SD = 22.90$). As expected, the students with LLD performed substantially lower than the expected average performance (i.e., 50th percentile rank) and lower than typically developing peers in their classrooms whose average score on the vocabulary knowledge task was equivalent to the 45th percentile ($M = 45.43$ percentile, $SD = 27.13$). Similarly, peers without exceptionalities in the participant pool performed within normal range on the reading comprehension task ($M = 40.71$ percentile, $SD = 29.26$).

Students who were ELs. The participating classrooms included students from varied linguistic backgrounds. Based on the district's administrative data, the study included 469 participants who spoke a language other than English at home and 659 who were monolingual English speakers. Students in the current study were from homes in which 35 different languages were spoken, with the largest being Spanish speaking households ($n = 416$). Among students from linguistically diverse backgrounds, 214 were considered ELs at the time of the study. ELs were identified by the school district as having limited English proficiency (LEP) and were currently enrolled support services in ESOL (English for Speakers of Other Languages). To additionally characterize their English language skills, investigators examined administrative data obtained from the district regarding students' performance on classroom-administered standardized assessments that occurred at the beginning of the school year. Based on the FAIR-FS, students who were ELs in the current study performed at the 25th percentile on the vocabulary knowledge task ($M = 25.09$ percentile, $SD = 20.31$). On the reading comprehension subtest of the FAIR, ELs as a group performed at the 18th percentile ($M = 18.19$ percentile, $SD = 19.69$) compared with the expected average performance for monolingual typically developing peers at the 50th percentile rank.

Written Language Samples

Researchers collected students' written language responses on the district's interim writing assessment which was an expository writing task. The prompt challenged writers to a dual purpose, to inform about the benefits of fitness and persuade the reader to consider fitness routines. Expository writing is recognized by the Institute of Education Sciences Practice Guide among main purposes of writing for elementary school students (Graham et al., 2012; The Writing Site, 2008).

For the fall interim writing task, teachers distributed a packet containing two written passages about the benefits of exercise, directions for the writing task, and lined paper

to use for a written response. The directions instructed students to read two passages, plan a response explaining how fitness can contribute to unexpected outcomes, write the response, and revise and edit the response. The first passage pertained to the unexpected outcomes of fitness. The passage was seven paragraphs long (one and a half pages double-spaced). The second passage (two pages in length) was about the benefits of fitness for an individual who was blind. Students were given 120 min to read the two passages and compose a written response that explains the benefits of fitness.

Measures

Connectives. As previously noted, a *connective* is a term used to refer to cohesive devices such as conjunctions including early developing (e.g., and, but, or, so) and later developing forms (e.g., nevertheless). Because the current study focused on fifth grade academic writing, we narrowed our attention to later developing connectives. A list of common and academic connectives that appear in middle school text books (Nair, 2007) was selected for use in describing later developing connectives that may be specifically relevant to academic language. We used the word list of the 29 identified connectives identified in academic texts (12 designated as common and 17 designed as academic connectives; Nair, 2007) to create a word list for a custom word search using Systematic Analysis of Language Transcripts (SALT). Collectively, the 29 connectives encompassed a varied array of connective relationships including additive (e.g., moreover, likewise), clarifying (e.g., specifically, albeit), contrastive (e.g., in contrast, alternatively, nonetheless, despite, however, although), resultive (e.g., consequently), and transitional (e.g., finally, meantime, meanwhile).

For the current study, investigators computed three connective measures using the SALT data output. These measures included connective use, number of unique connectives, and connective ratio to length. For connective use, investigators summed the total number of times any of the 29 advanced connectives occurred in each written response. The number of unique connectives reflected the number of different connectives that occurred in the written response out of the 29 advanced connectives. Finally, the connective ratio was computed by calculating the number of connectives divided by the total number of sentences in the written response.

Writing quality. The school district's interim writing assessment was used in the current study, which included a rubric for rating writing quality consistent with the rubric used in the state writing assessment (Florida Department of Education, n.d.). Writing quality ratings are considered an authentic classroom-based assessment and holistic rubric ratings are one of the most common components of writing

assessment in schools (e.g., Mabry, 1999). The rubric-based writing quality measure in the current study was previously shown to be significantly related to student performance on standardized measures of language and literacy achievement (Wood & Schatschneider, 2020). Quality rating scores were based on a rubric which was used to score the written samples on three categories of quality: (a) quality category one (QC1): purpose, focus, and organization; (b) quality category two (QC2) evidence and elaboration; and (c) quality category three (QC3) conventions of Standard English. These elements are consistent with components found in established scoring systems such as Weschler Objective Language Dimensions (Rust, 1996) and previous studies (Williams et al., 2013).

Each quality component contributed to the total composite rating. For the first category of writing quality (QC1), students' writing samples were scored on purpose, focus, and organization. To score the maximum 4 points in this category, the student's written response demonstrated a strong idea with little or no loosely related material, skillful use of transitions, and a logical progression of ideas including an introduction and conclusion. For the second category of writing quality (QC2), investigators scored the writing samples on the inclusion of evidence and elaboration. To achieve the maximum number of 4 points, students integrated evidence thoroughly and smoothly using appropriate vocabulary and sentence structure. Finally, for the third-quality category rating (QC3), investigators rated students' writing on use of conventions of Standard English. To obtain a full 2-point rating in this category, students' responses may have only occasional minor errors in use of Standard English without patterns of errors and generally demonstrate appropriate use of punctuation, capitalization, sentence formation, and spelling.

Finally, a composite score was calculated as the sum of the three components. This overall quality of writing rating was aligned with state assessment procedures. The total writing quality rubric score (on a 10-point scale) is purported to reflect original thought, use of text evidence, inferences, implicit understanding, and synthesizing across texts.

Procedures

The investigators ensured all of the writing samples were transcribed into the electronic database for analysis using the SALT program. Research assistants typed the written samples into a Word document to prepare it electronically for graduate research assistants who reviewed the paper copies against the electronic file to check accuracy and formatted the transcript using SALT conventions. Because the SALT program has specific formatting conventions, a check for formatting errors was conducted by another research assistant prior to running SALT analyses.

To calculate the frequency of connective word use, the investigators created a custom word list in SALT that included the 29 words on the list of common and academic connectives that appear in middle school text books (Nair, 2007). After integrating transcripts for the 1,128 participants in a rectangular data file, we explored the occurrences of the custom word list for all the transcripts at one time. The software program was used to generate an automated data report on the number of occurrences of each academic word within each transcript with each item in the word list as a separate variable.

For the ratings of writing quality, two raters (blind to the students' characteristics) scored the written samples on each of the three categories of writing quality. The raters were certified teachers with graduate degrees who worked as writing resource teachers and writing academic coaches for the partnering school district. Raters had completed extensive training on the writing rubric, passed an assessment of writing training, and attended monthly training meetings including regular online scoring courses to recalibrate. A randomly selected subsample were double rated. When considering any point difference a disagreement, inter-rater agreement was 70%, 77.5%, and 67.5% for quality subcomponents, respectively. This was above the 60% criteria for ratings of writing quality in published reviews (Graham & Perin, 2007). When considering agreement as a point difference of greater than 1, similar to previous studies (e.g., Koutsoftas, 2016; Koutsoftas & Gray, 2012), an inter-rater agreement of 100%, 100%, and 97.5% was attained.

To answer the first research question, the investigators sought to examine average rate of use of connective words. To explore this question, research assistants computed frequency counts of each advanced connective using the word list feature in SALT. To compute the rate of use relative to length of the response, the number of occurrences was divided by the total number of sentences in the response. To answer Research Question 2, we conducted analyses of variance to examine mean comparisons between groups who differed in their English proficiency and students with and without LLD using Welch corrections for unequal sample sizes. To answer the third research question, regression analysis was conducted to examine whether measures of connective use were significant predictors of writing quality ratings.

Results

Average Use of Connectives

To answer the first research question, we first describe the use of connectives in writing samples by students in fifth grade. Table 2 displays descriptive statistics on connective word use by groups of students who differed in English proficiency and

Table 2. Average Use of Advanced Connectives Within Groups by Proficiency and Ability.

Group	n	Rate of use M (SD)	Connective ratio to length M (SD)	Number of different connective words M (SD)
ELs Without LLD	164	0.21 (0.55)	0.02 (0.09)	0.19 (0.46)
ELs With LLD	50	0.28 (0.64)	0.009 (0.03)	0.12 (0.33)
English Proficient With LLD	94	0.07 (0.26)	0.01 (0.05)	0.07 (0.26)
English Proficient Without LLD	820	0.29 (0.64)	0.24 (0.51)	0.24 (0.51)

Note. LLD refers to students who have language learning disabilities. ELs refers to students who are English learners receiving ESOL support and categorized by the district as having limited English proficiency. Connective ratio to length refers to the number of connectives divided by the number of sentences. ESOL = English for Speakers of Other Languages.

Table 3. Group Comparisons in Total Connective Use in Written Responses.

Group comparison	Mean difference	t (df)	p
English Proficient (excluding LLD) vs. English Learner (excluding LLD)	0.07	1.48 (258.3)	.139
English Proficient with LLD vs. English Proficient without LLD	0.19	4.37 (168.9)	<.0001
EL without LLD vs. EL with LLD	0.09	1.48 (138.7)	.142
English Proficient without LLD vs. English Learner with LLD	0.17	3.21 (73.9)	.002

Note. LLD refers to language learning disabilities. EL refers to students who are English learners. These contrasts were performed with Welch corrections.

identification of LLD. The means and standard deviations are provided in Table 2 to describe connective vocabulary use by subgroups of students from diverse language backgrounds including ELs and students with and without LLD.

Group Differences

To answer the second research question, we conducted an analysis of variance between groups to compare the occurrence of connective words between groups of students who differed by the presence of a LLD (students with LLD and without LLD). Students' use of connective words differed between the two groups, $F(1, 1,126) = 5.928$, $p = .015$, with a Cohen's D effect size of .34. On average, students with LLD produced fewer connective words in written responses than their peers without language learning disorders. In addition, to differences in rate of occurrence, the groups differed in variety of different connective words used, $F(1, 1,126) = 11.51$, $p = .01$. Students with LLD used fewer different advanced connective word types than their peers without LLD. As a group, students without exceptionalities demonstrated a total of 15 different advanced connective words, whereas students with LLD demonstrated seven different advanced connective words.

To further examine the second research question, we compared the occurrence of connective words in the written responses of students who differed in English proficiency (ELs vs. non-ELs). There were no significant differences between groups in the use of connective words in writing, $F(1, 1,126) = 0.17$, $p = .682$. On average, students who were ELs used connective words with similar frequency

than their peers who were proficient speakers ($p = .141$). To examine potential within-group differences, we also compared connective word use for each subgroup of students using Welch corrections due to unequal variances (refer to Table 3). There was a statistically significant difference between subgroups as determined by one-way analysis of variance, $F(3, 1,124) = 4.048$, $p = .007$. As displayed in Table 3, significant differences in connective use were demonstrated between English proficient students and ELs with LLD, but not ELs without LLD.

To answer Research Question 3, potential predictors of ratings of writing quality (total connective use, connective ratio to length, and number of unique connectives) were entered in a regression analysis. The total number of connectives used and the ratio of connectives to length were significant predictors of writing quality ratings (refer to Table 4). For every unit increase in the number of connective used, the writing quality rating is predicted to be higher by .741 points. With three factors entered (number of connectives, connective ratio to length, unique connectives), the model accounted for a significant but small amount (6%) of the variance in writing quality, $F(3, 1,042) = 22.32$, $p < .0001$.

Discussion

Key Findings

Students with LLD used connective words in written responses less often than their peers and demonstrated a limited variety of different advanced connective words. ELs

Table 4. Summary of Regression Results for Predictor Variables of Writing Quality.

Dependent variable	R	R²	t value	p value	β
Number of connectives	.21	.05	$t(3, 1,043) = 2.95$	$<.0001$	0.33
Ratio of connectives to length	.24	.06	$t(3, 1,043) = 4.04$	$<.0001$	0.17
Unique connectives	.25	.06	$t(3, 1,043) = 1.27$	.204	0.10

Note. Ratio of connectives to length refers to the number of connectives divided by the number of sentences. Unique connectives refers to the number of unique advanced connectives.

with LLD also demonstrated significantly fewer connectives in their written responses. Students who were ELs without exceptionalities, however, demonstrated similar frequency and variety of connective use compared with their peers who were proficient in English. More frequent use of connectives in academic writing was associated with higher overall ratings of writing quality. Total number of advanced connectives used and the ratio of use in relation to the number of sentences were significant predictors of ratings of writing quality.

Comparison With the Existing Literature

The current findings corroborate previous findings that indicate persistent gaps in academic language achievement, including connective use, for students with LLD. The current findings bring to light that students with LLD are at increased risk for experiencing challenges in academic writing that may warrant greater attention to academic connectives as intervention targets. Although contributing factors cannot be deduced by the current results, the superior performance by proficient peers and students without LLD may be partially due to more advanced syntactic language skills, better word retrieval, and/or because of greater experience with similar written language tasks. As expected from previous results in the literature, students with LLD tend to be at greater risk for difficulties in acquiring complex syntax (e.g., Marinellie, 2004). As such, the lack of mastery of connectives found in academic language may be expected to compound difficulties in text comprehension in later grades when informational texts are densely packaged with content and advanced academic connectives.

The overall rate of use of connectives reported in the current study was lower than that reported in previous studies. Findings of Nippold et al. (2005), for example, indicated that the use of relative clauses was statistically different between groups with a mean of 11.70 in the children's written samples, 16.64 in the adolescents' samples, and 20.79 in the adults' writing. The differences in rate of use may be partially explained by the fact that the current study focused on a narrow list of 29 advanced connectives found to occur in academic texts rather than other types of early developing connectives such as *because* and *so that* specifically which often conjoin relative clauses in conversational language as

well. Because the current study was particularly concerned with the academic language that occurs in school settings, focusing on advanced connectives allowed for a more nuanced examination of potential gaps in students' use of advanced connectives that is more distinctive to academic writing.

The finding that there was a positive relation between students' use of connectives in written language and ratings of overall writing quality substantiates the importance of students' mastery of advanced connectives in academic writing. Given that rubric-based writing quality ratings are the most common writing assessment used in classroom contexts, and connective use was found to be a significant predictor of writing quality ratings, the current findings lend support for further consideration of the important function and role of connectives in academic writing. The ability to compose a cohesive written response would seem to be critical to school success, especially considering that ratings of writing quality using holistic rubrics are one of the most common writing assessment procedures in elementary schools (e.g., Six Trait Writing Rubric [STWR], Education Northwest, 2006; Wagner et al., 2011). The relationship between connective use and ratings of writing quality may suggest that by improving connective use in writing, overall quality may also be expected to improve; however, empirical examination of this relationship is needed to verify. The current exploratory findings support the need for additional research on the effect of instruction on advanced connectives on students' writing performance outcomes.

Unique Contributions

Previous research has pointed out disparities in knowledge of academic language and subsequent academic achievement. This study is one of few, if any, that describes students' expressive use of advanced connective words in writing and highlights a distinct gap in academic writing between groups who differ in language ability. The examination of students' use of connectives in an authentic curriculum-based writing assessment task offers a unique contribution to broaden our understanding of disparities in writing achievement. There are few if any empirical studies that describe school age students' connective use in writing,

particularly in inclusive classrooms rich in cultural, linguistic, and ability diversity.

A potential unique advantage of the current inquiry was the use of open-ended written responses to examine connectives which may have prevented potential constraints of ceiling effects allowing us to observe group differences without suppressing potential differences by closed sets of choices or a limited range of occurrences. The fact that there was an open-ended number of potential connective words that could be generated within the written response allowed for observed variability across groups that differed in proficiency and ability.

Implications

Considering that academic writing tasks are used in state assessments and college entrance exams, the relationship between connective use and ratings of overall writing quality raises concern and awareness of the importance of students' proficiency with cohesive devices including common and academic connectives. The group differences noted in the current results indicate that we cannot assume that all students have sufficient supports to acquire connective words and leverage them as cohesive devices in academic writing. The overall low frequency of connective use calls for consideration of innovative approaches to intensify instructional experiences with cohesive devices.

Based on the current findings, speech-language pathologists may want to consider partnering with classroom teachers to facilitate students' acquisition of cohesive devices including advanced connectives in academic writing. Recognizing that connectives are characteristic of academic language used frequently in classroom textbooks (Schleppegrell, 2004), additional research is needed to inform educational practices on effective ways to provide linguistic scaffolding or other instructional supports to facilitate students' access to the academic language of texts, including knowledge and use of cohesive devices.

Limitations

It should be noted that the 29 connectives from the common and academic connective list (Nair, 2007) do not serve as a proxy for all the types and forms of possible connectives and cohesive devices. Although this limits conclusions that can be drawn, these advanced connectives were of particular relevance given the age of the students and type of task. It would be informative for future studies to expand the types of cohesive devices examined across groups and to include a wide age range to better understand the broader development of connectives.

In addition, the results should be interpreted cautiously given that the procedures used in the current study yielded frequency counts (i.e., rate of connective use) which cannot

be assumed to reflect quality of use but rather an attempt at use. It is possible that some participants used connectives in their written responses but used them incorrectly. Although this is acknowledged as a weakness of the current study's use of automated count data, it is partially mitigated by the inclusion of correlational analyses which substantiated a relationship between connective use and overall rating of writing quality. Given the positive relationship between use of connectives and quality ratings, it is unlikely that a high percentage of the use data reflects a high proportion of inaccurate use; however, instances of errors cannot be ruled out as the rate of errors cannot be determined from the automated count data.

In addition, results should be interpreted cautiously given that the prompt in the current study did not explicitly instruct students to try to use connectives. This was important to avoid overinflating students' natural use of connectives; however, as such, the results may not reflect students' full knowledge or optimal use of connectives. Students' use of connectives may also have been negatively impacted by potential difficulties in reading the passages. Although students were allowed to respond to the writing prompt without using the passages at all, it is possible that reading difficulties may have conflated students' difficulties in formulating lengthy and complex written responses. Comprehension of the passages was not assessed; however, it seems likely that students with better comprehension of the passages would be more likely to have richer written responses. Furthermore, recognizing that the current study assessed use of connectives in a written language task, it should not be assumed that spontaneous generative use of connectives reflects students' understanding of connectives. It is possible that students use connectives that they do not fully understand and vice versa that students understand considerably more connectives than they generate in a writing sample.

Suggestions for Future Research

Further studies are needed to expand on this research and consider the full range of types of connectives. In addition, it would be interesting to examine various connective relationships across different types of writing tasks. Argumentative writing, for example, may provide implicit demands for specific types of cohesive device. In addition, future studies are needed that describe connective use across different grades and consider accuracy of use as well as frequency and type.

Declaration of Conflicting Interests

Funding

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