Persuasive Discourse in Adolescents With Learning Disabilities: Written Versus Spoken Sentence Complexity

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The purpose of this study was to determine whether there were differences in levels of sentence complexity and grammatical correctness between the spoken and written persuasive language of adolescents with Learning Disabilities (LDs). After viewing short videos providing background information on controversial animal welfare topics, spoken and written persuasive samples were collected from 27 adolescents with LDs. The samples were analyzed for measures of sentence complexity descriptively and quantitatively using multivariate analysis of variance. Sentences were further evaluated for percent of complex vs. simple and grammatically correct vs. incorrect productions. Complex sentences were produced with similar frequency in written (84%) and spoken (75%) persuasion. Thirty-three percent of written and twenty-six percent of spoken complex sentences contained grammatical errors. Given the social and academic value of persuasive communication and the shared grammatical weaknesses in sentences, our findings lend support to combined speaking and writing practice and use of effective collaborations between educators and speech-language pathologists when teaching the language of persuasion.

Keywords: **Writing, Persuasion, Sentence, Adolescent, Language, Grammar**

INTRODUCTION

Writing Skills and Students with Learning Disabilities

The ability to write and speak persuasively is a focus in the schools and workforce for *all* students, including those with learning disabilities (LDs; i.e., disorder in the processes involved in understanding or using spoken or written language [Individuals with Disabilities Education Act, 2004]). High school students are expected to both write and discuss arguments and provide support for their claims (Common Core State Standards Initiative: English Language Arts,

2010). Yet, more than 50% of students with LDs are failing state writing tests which include persuasive writing tasks (Nation's Report Card, 2011). In fact, 62% of high school students who received writing scores of below basic in 2011 were students with disabilities. The writing of high school students with LDs is characterized by fewer words, less complexity and poorer quality than typically developing (TD) peers (Nippold, Ward-Lonergan, & Fanning, 2005).

Language is Complex and Multidisciplinary

There is growing evidence that academic writing and academic speaking are interconnected and can be used to support each other (Pennington & Bishop, 2009; Reznitskaya et al., 2001; Uccelli, Dobbs, & Scott, 2013). Educators and Speech-Language Pathologists (SLPs) in the schools work collaboratively in teams. Together with other clinicians and specialists, they share responsibility for academic outcomes for students who receive services in special education. Thus, it is important for all team members to develop shared terminology and approaches. These may include shared awareness of the underlying language skills that students need for success in the curriculum.

One language ability that has been less studied in high school students (and is generally less understood by laypeople) is the use of complex sentences. In English, clauses form sentences. Clauses are often classified as being either independent (i.e., a complete thought that contains a subject and a verb and can stand alone as a sentence; e.g., I need dancing shoes) or dependent. Dependent clauses include utterances that contain (1) a subject and a verb but cannot stand alone as a sentence (e.g., when I learn to dance…), (2) an infinitive verb (i.e., a verb in its unmarked form; e.g., *to prepare* for prom…), or verbs that often end in –*ing* and act like dependent clauses (i.e., participles or gerunds; e.g., *offering* to swing dance…; Berry & Brizee, 2010; Maurer, 2012; Yilmaz, 2018).

Complex sentences are sentences that contain at least one independent clause and at least one dependent clause (e.g., I need dancing shoes when I learn to dance or offering to swing dance, I need dancing shoes; Scott, 2011). Without the ability to appropriately use complex sentences during speaking and writing activities, students will be unable to express efficiently the embedded and connected ideas that make up complex thinking (Nippold, 2014). Although good writers combine both simple and complex sentences when writing, students who appropriately use more complex sentences receive higher scores on writing quality (Beers & Nagy, 2009; Crowhurst, 1983).

Language sampling

Well documented and growing language interconnections exist between spoken and written language (Carlisle, 2010; Scarborough, 2005; Snowling, 2005; Whitehurst & Lonigan, 1998). For example, we know that the ability to manipulate individual spoken sounds in words is necessary for individuals to become strong readers and writers. Much of this critical knowledge comes from

research in which these discrete abilities are measured using specifically designed individual tasks.

In contrast to discrete measures, language sampling takes a more naturalistic approach to examining spoken and written language. Researchers have obtained and analyzed monologic (or one speaker) samples of language when students are given a prompt or task to write or speak about. Successfully communicating a cohesive and academic text requires students to juggle multiple and competing demands. It is thought that generating a language sample on higher level topics will stress the language system and indicate where deficiencies exist. Thus, it provides educational teams with critical information about students' ability to use academic, higher level language, including vocabulary, knowledge of required organizational structure, and the ability to produce grammatically correct and complex sentences (Scott, 2009, 2011).

Development and Growth of Complex Sentences

A detailed explanation of the "complexities" of complex sentence development and growth is beyond the scope of this paper. However, an understanding of the general course of development of complex sentences may help to explain the importance of complex sentences to communication. Very young children first produce single words which they gradually combine into simple sentences (i.e., one subject and one verb that contains a complete thought; e.g., Mommy walked the dog.). Complex sentences first emerge in spoken language in children who are typically-developing (TD) between the ages of three and four years (Paul & Norbury, 2012); complex sentences emerge as children need to express increasingly complex ideas. For example, children learn to combine different forms of verbs such as adding the infinitive to a main verb (e.g., *I like ice cream* might become *I like to eat ice cream*) and to modal auxiliary verbs (e.g., *I would like to eat ice cream*). These more sophisticated utterances represent more efficient ways to communicate thoughts. They learn to use more specific connector words and verbs that allow embedding of clauses within sentences (e.g., that, if, when, before, because), thus adding depth and specificity to their communication efforts. Spoken simple sentences gradually develop into complex sentences from early childhood through adulthood (e.g., Mommy walked the dog when I was at school).

School-age children are exposed to increasing complexity in sentences as they read higher level textbooks and are required to express more complex ideas in depth during academic writing and speaking. Students with LDs who experience written language difficulties are less likely to have access to the language of academic texts. With fewer models and experiences than TD peers interacting with complex sentences on higher-level topics, students with LDs may be less likely to appropriately use complex sentences (Nippold, 2014).

Finally, increasing evidence suggests that the level of complexity of sentences used depends upon the organizational structure or type of essay being produced (i.e. genre). Fewer complex sentences are typically produced when writing stories; complex sentences appear with more frequency in various types of expository essays (e.g., sequential, descriptive, compare-contrast, persuasive; Nippold et al., 2008; Scott & Windsor, 2000; Verhoeven et al., 2002). Persuasive essays require the most frequent use of complex sentences (Beers & Nagy, 2011; Brimo & Hall-Mills, 2019).

Persuasive Discourse

Persuasive discourse is considered to be the most challenging discourse type for all students. It develops gradually through engagement in social interactions in which the perspectives of others must be recognized and addressed. Further, the persuader must give multiple reasons to support the position in a logical way. Through the process of persuading others, students demonstrate critical academic and social thinking about controversial and relevant topics (Nippold et al., 2008).

More information is known about the *written* persuasive abilities of school-age children (Dobbs, 2014; Ferretti, MacArthur, & Dowdy, 2000; Graham, Harris, & Mason, 2005; Nippold, Ward-Lonergan, & Fanning, 2005; Uccelli, Dobbs, & Scott, 2013). Better persuasive writers generate longer essays that contain more complex words, more complex sentences, provide more and varied reasons for their viewpoints, more specific use of words that connect ideas and that indicate uncertainty (e.g., it might be…) and include the opposing viewpoint. Further, as students move through the grades, their sentences increase in complexity, type and length; they include more adverbial connector words (e.g., finally), more abstract nouns, and verbs that reflect thinking and talking (e.g., argue, thought; Nippold, Ward-Lonergan, & Fanning, 2005). Some information is known about the spoken persuasive language characteristics of children who are typically-developing in grades 5 through 9 (Gilabert, Garcia-Mila, & Felton, 2013; Koonce, 2015; Moran, Kirk, & Powell, 2012; Westerveld & Moran, 2011). For example, as children who are TD move through the elementary grades, their spoken persuasion becomes longer and more complex.

Interconnections between spoken and written persuasive language

Although several studies have examined spoken persuasive language separately from written persuasive language, few studies have compared spoken and written persuasive discourse in school-age children using language sample analyses discussed above (Brimo & Hall-Mills, 2019; Hidi & Hildyard, 1983). Hidi and Hildyard found that elementary children in grades 3 and 5 who were typically developing wrote and spoke persuasively with similar flow and connections between ideas. The research design was a between-subjects design; one group of children provided the written samples and a different group of children

provided the spoken samples. Groups may not have been equivalent in other areas, thus challenging the validity of the findings.

More recently, Brimo and Hall-Mills (2019) gathered two spoken and two written persuasive language samples in the same group of 64 9th grade students, 9 of whom were diagnosed with LDs. The language samples were transcribed from handwritten or videotaped samples and analyzed for the complexity of sentences. To analyze sentence complexity, language samples were broken into sentences and independent and dependent clauses were identified and counted. A variety of types of grammatical constructions were counted as complex including sentences that contained an independent clause only, a dependent clause only and combined independent and dependent clauses. Dependent clauses were counted as dependent when they included a variety of higher level grammatical components. Consistent with Hidi and Hildyard's (1983) findings for elementary-aged children's use of persuasive language, Brimo and Hall-Mills found that high school students used a similar amount of complex sentences in both spoken and written persuasion.

The above sample of 9th grade students contained a range of abilities. However, students with LDs made up only 14% of the sample. Adolescents with LDs show different patterns of strengths and weaknesses from TD students (Green, 2009; Scott & Windsor, 2000). Given the academic and language challenges facing students with LDs, teaching strategies should be driven by knowledge of existing patterns of characteristics. Teachers, other educators, parents, and SLPs may not have access to computerized language sample analysis programs. However, we can recognize (or learn to quickly recognize) complex vs. simple sentences within language samples. We also are trained to recognize grammatical correctness (i.e., adherence to the accepted rules of formal English grammar).

Perhaps, classifying students' written and spoken sentences as either simple or complex and noting the grammatical correctness of those sentences would be more functional for educators. A coding system that measures both the complexity and the correctness of each sentence could be used by teachers, other educators and SLPs jointly. Nelson, Barr and Van Meter's (2004) sentence complexity coding system provides a descriptive method of examining sentence complexity and the grammatical correctness of the sentences produced. Sentences can be coded as complex correct, simple correct, complex incorrect (grammatically) and simple incorrect (grammatically). With this knowledge, teams of educators in the schools can begin to have common ground for making decisions about which sentence level goals to address and in what modality (speaking or writing or both).

Purpose

Thus, the purpose of this study was to compare sentence complexity and grammatical correctness in the persuasive spoken and written discourse of high school students with LDs. Knowledge of similarities and differences will provide a springboard to the collaborative development of more efficient instructional approaches that use persuasive language strengths to remediate persuasive language weaknesses. This study focuses on the following research questions:

1) Are there differences in the complexity of sentence types in spoken and written persuasive language in high school students with LDs?
2) Are there differences in the grammatical correctness of simple and complex sentences produced in spoken vs. written persuasive language samples?

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METHOD

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Participants

Participants were 27 students enrolled in 9th (12 students), 10th (10 students), and 11th (5 students) grades at a Title 1 school in the United States. All participants were receiving special education services for learning disabilities in reading or writing and were enrolled in an English class designed for students with learning disabilities. Eighteen were male students and nine were female students.

Procedure

Institutional Review Board approval was received. After receipt of signed consents, participants watched short videos to provide background information on the topics, and provided one written and one spoken sample. Samples were transcribed from handwriting and videotape before being analyzed.

Writing and speaking prompts. Participants viewed two short videos on animal welfare and were instructed to persuade their congresswoman to believe what they believed about animal welfare based on the information from the videos. Both videos were obtained from news clips. The informational video (8:29 minutes long) that preceded the writing activity examined the pros and cons of keeping orca whales in captivity. The video (7:11 minutes long) that preceded the speaking activity examined the pros and cons of hunting and killing wolves who were attacking livestock. After viewing each video, participants were asked to persuade their congresswoman to believe what they believed. Should orca whales be kept in captivity or should they be set free? Should wolves be hunted and killed or should they be allowed to roam free?

Obtaining samples. After watching each video, students immediately provided language samples. Written samples were obtained in the classroom in groups prior to obtaining the spoken sample. After watching the orca video, participants were given 30 minutes to write a persuasive letter. After watching

the wolf video, spoken samples were videotaped individually by trained graduate students using GoPro2 cameras. Spoken samples were taken after the written samples in quiet rooms across the school and students were told to take the time they needed to formulate their ideas before talking.

  Transcribing and Coding. Spoken and written samples were transcribed in Word by trained graduate students. Transcribed samples were manually coded by one of the authors. Salutations, mazes, and closing remarks (i.e. Dear Congresswoman, um, thank you, etc.) were excluded in the transcription of the samples. Sentences were coded as simple or complex and grammatically correct or incorrect (i.e., simple incorrect, simple correct, complex incorrect, complex correct); please see Table 1 for an explanation of our sentence complexity coding system adapted from Nelson, Bahr, & Van Meter, p. 397).

  We defined grammatical correctness as adherence to the established rules of formal English grammar. Run-on sentences with no clear pauses in spoken language or punctuation in written language were separated using rules for calculating T-units (i.e., one independent clause and one dependent or embedded clause formed one complex utterance). Spelling mechanics were ignored in accordance with previous research. We also calculated the total number of words (TNW), total number of sentences produced, total number of T-units (i.e., one independent clause plus the dependent clauses attached to or embedded within it; Hunt, 1970), and mean length of T-unit in words (MLTU; e.g., total number of T-units/TNW). Finally, a graduate student was trained and conducted coding reliability. Twenty-two percent of samples were judged and coded for reliability: interrater reliability = .88; intrarater reliability = .92.

Table 1. *Explanation of Sentence Coding System (adapted from Nelson, Bahr & Van Meter, 2004).*

Sentence Type	Definition	Example
Simple Incorrect (SI)	Grammatically incorrect simple sentence	"They won't eat other**s** animal." "***There*** just makes me sick."
Simple Correct (SC)	Grammatically correct sentence with one independent clause	"The environment needs wolves." "It's not fair."
Complex Incorrect (CI)	Grammatically incorrect complex sentence.	"I think you should let the killer whale go free so ***they*** can't kill ***none*** anymore."
Complex Correct (CC)	Grammatically correct sentence that includes any of the following:	
	(1) Two independent clauses joined with *and, but or so*	(1) "You wouldn't like it and the whales hate it."
	(2) An independent clause and a dependent clause joined with *because, since or while*	(2) "I think killer whales should be set free because just imagine what it would be like if someone kept you locked up."
	(3) An independent clause that contains an embedded phrase with a secondary nonfinite verb that is unmarked for person, tense and number (*gerunds, infinitives and participles)*	(3) "I mean I don't hear about the other whales killing people."
	(4) An independent clause that contains a compound verb phrase	(4) "They need to be free in the ocean with their families."

Note. Incorrect grammatical constructions are in boldface.

Analyzing the data. We analyzed the data descriptively and quantitatively. Descriptively, we calculated the means, standard deviations and ranges of the above variables. We further calculated the percentage of complex correct,

complex incorrect, simple correct and simple incorrect sentences produced in speaking vs. writing. We used a multivariate analysis of variance (MANOVA) to test the null hypothesis that the mean of the variables (i.e., the centroid of the multivariate matrix of all the measurements) is the same between the spoken and written persuasive samples in the population. We used Wilk's lambda as a test statistic.

Results

Twenty-seven high school students with LDs provided one written and one spoken persuasive language sample. Sentence complexity (simple vs complex), total number of T-units, mean length of T-units, and total number of words and sentences produced were measured. Descriptive statistics for each of these measures are shown in Table 2.

Table 2. *Means, Standard Deviations and Ranges of Spoken vs Written Variables (n=27)*

	Spoken			Written		
Variable	M	SD	Range	M	SD	Range
TNW	54.11	4.58	7-166	58.11	31.51	12-137
# T-Units	4.74	3.93	1-15	4.96	2.51	1-12
MLTU	11.39	5.65	3-28	11.68	2.49	6-17
# Sentences	3.96	3.36	1-14	4.19	2.41	1-11

Note. M = Mean; *SD* =Standard Deviation; TNW = Total Number of Words; # T-Units = Number of T-Units; MLTU = Mean Length of T-Units; # Sentences = Number of Sentences.

Question 1: Are there differences in the complexity of sentence types in spoken and written persuasive language in high school students with LDs?

Because the variables were highly correlated, we conducted a principal component analysis to extract the main principal components that explained 99.117% of the variation in the original variables. We then created a biplot that showed the relative position of each set of both spoken and written measurements of persuasive skills, respectively (See Figure 2). The figure clearly shows a large overlap between spoken and written measurements, with the red and green ellipses, which represent the boundaries of the normal distribution within 1 standard deviation in both dimensions. The arrows also indicate the loadings of the original variables on the principal components. Principal component 1 is positively correlated with the number of words, sentences, T-units and complex

sentences used. Principal component 2 is positively correlated with the mean length of T-units and negatively correlated with the number of simple sentences.
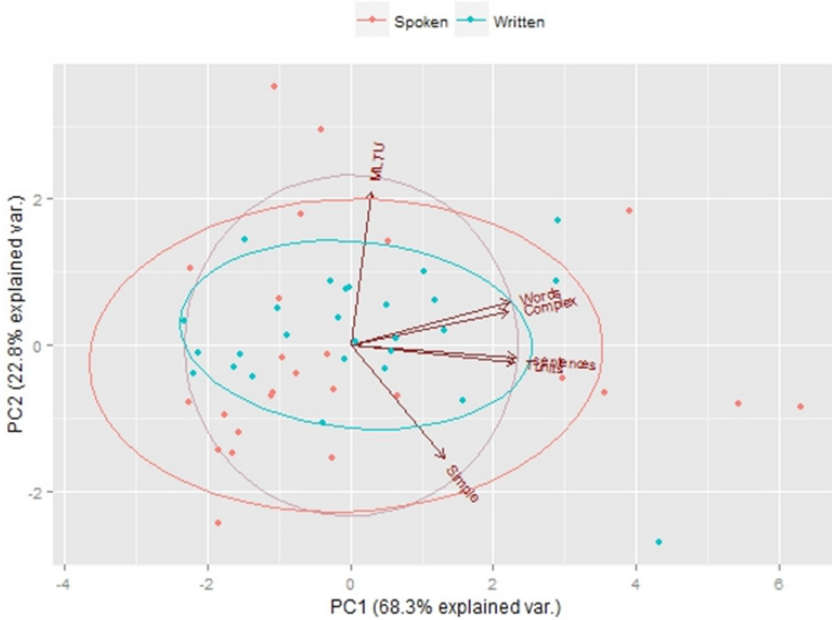

Figure 1. **Results of the principal component analysis showing an overlap of the range of principal component scores based on the measurements on both spoken and written persuasive skills. Var. = Variance; PC1 = Principal Component 1; PC2 = Principal Component 2. Arrows indicate the loadings of the original variables on the principal component axes.**

We then conducted a MANOVA on the principal components we extracted for each set of spoken or written measurements. Using the MANOVA, we tested the null hypothesis that the centroid of the set of principal components would be the same between spoken and written measurements. We found no statistically significant differences [$F(6, 47)$ = .80, p = 0.57, Wilks' Λ = .91]. When combined with a visual inspection of Figure 1, our findings suggest that there was not a significant difference between the spoken and written measures of sentence complexity.

Question 2: Are there differences in the grammatical correctness of simple and complex sentences produced in spoken vs. written persuasive language samples?

To answer Question 2, we calculated the total number of sentences produced in spoken persuasion (107) and the total number of sentences produced in written persuasion (113). Next, we classified the number of complex and simple sentences produced into those which were judged to be either grammatically correct or grammatically incorrect. The numbers produced in each spoken and written category are displayed graphically in Figure 2 to indicate the proportions of grammatically correct and incorrect simple and complex sentences within each modality.
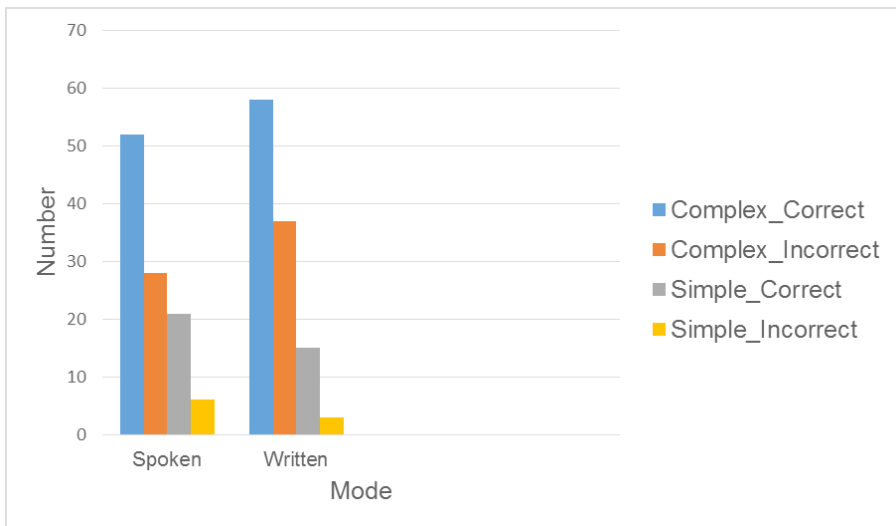

Figure 2. **Proportion of complex vs. simple sentences and correct vs. incorrect grammar**

DISCUSSION

Main Findings in Light of Current Research

We examined persuasive language samples to determine whether complex sentences were produced with similar frequency in the writing and speaking of high school students with LDs. We found no differences in complex sentence production between spoken and written persuasion in high school students with LDs. Our findings are consistent with findings in the persuasive genre for high school students who were mostly TD (Brimo & Hall-Mills, 2019; Hall-Mills & Apel, 2013). The similarities in persuasive sentence complexity across a range of high school students (with and without LDs) support the interconnections

between academic speaking and academic writing. Both persuasive speaking and persuasive writing require the use of complex sentences to express complex thinking and ideas. High school students produce persuasive discourse using complex sentences across both language modalities.

In contrast to the findings of Brimo and Hall-Mills (2019), our participants with LDs generated *fewer* sentences in both writing and speaking than did their students who were mostly TD. The mostly TD sample produced an average of 11 spoken sentences and 13 written sentences. In contrast, our students with LDs produced an average of 4 sentences in both modalities. It is possible that these differences can be attributed to the use of different prompts or topics between the studies or different methods of elicitation of the samples.

However, the reduced number of sentences produced overall is in keeping with multiple studies of the writing abilities of students with LDs; they write across a variety of genres and ages with fewer words, fewer ideas and less complexity than students who are TD. It is also likely that the reduced sentence production is due, in part, to the unique requirements of the language of academic, higher level texts. Known written language deficits of students with LDs may inhibit adequate access to the language of textbooks. Without independent access to higher level texts, the number and quality of opportunities to independently engage with and practice using academic and less familiar language is limited.

In addition to examining the frequency of production of complex vs. simple sentences, we examined the proportions produced of each, as well as the proportions that were judged to be grammatically correct vs. incorrect. Overall, 75% of the spoken samples and 84% of the written samples contained complex sentences. Again, our findings are consistent with the findings of Brimo and Hall-Mills (2019) in which the majority of sentences in both modalities were complex.

Turning to our findings regarding grammatical correctness, our participants produced similar proportions of spoken and written simple sentences that were incorrect (3% of all written sentences and 5% of all spoken sentences). However, they produced more complex sentences that were judged to be grammatically incorrect; 26% of the spoken samples and 33% of the written samples contained complex sentences with incorrect grammar. Thus, students with LDs are using complex sentences in persuasive discourse. The use of complex sentences indicates that students with LDs generate complex ideas but may not yet be able to use the range of syntactic conventions of formal English when formulating complex sentences. This is a good sign (Nunan, 2005); complex sentences are already being produced.

A review of which grammatical rules were violated is beyond the scope of our study. Perhaps the persuasive task stressed the language systems and revealed sentence level deficiencies. Regardless of the reason, it's important to find

out how well students communicate in real world situations that are more demanding than conversational tasks. With this knowledge, we can continue to address weaknesses that occur in more natural situations. Growing evidence suggests that working on grammatical deficits using workbook-like exercises does not transfer or generalize to student's writing (Yilmaz, 2018). Yet, students continue to need multiple practice opportunities and multiple exposures to higher level, academic language.

The similarities between spoken and written persuasion may give us a starting point to build both spoken and written persuasive language simultaneously. For example, presenting a controversial topic and having the students formulate their opinions in peer groups through discussions, completing a graphic organizer to guide the arguments, and sharing them verbally with other peer groups incorporates both speaking and writing. Additionally, these combined activities highlight that writing is a process and involves explicit and implicit social interactions between the writer/speaker and the reader/listener (Graham & Harris, 2013). Although it has yet to be proven, students with LDs may benefit from explicit use of the typical recursive cycle of engagement between speaking and writing that is thought to occur implicitly in children who are typically developing. Gains in speaking might scaffold and support writing and vice versa. With multiple exposures to language in both speaking and writing, the ability to retrieve information from long term memory and manipulate it to express more complex ideas using appropriate grammar may develop with increased automaticity. With increased automaticity and exposure to more complex language, grammatical correctness may also increase.

Limitations and Future Directions

The sample size was small and the students came from the same school limiting the generalizability of the results. Further, we were unable to obtain participant medical or educational backgrounds, including dates of diagnoses, history of services received, etc. Background information and additional data pertaining to the participants would provide a better overall picture of our participants and, perhaps, increase generalizability of findings. Persuasive samples on a variety of topics should be obtained in the future to ensure valid findings.

Conclusions

Positive outcomes for students with LDs are dependent upon effective collaborations between educators and specialists, including SLPs. All those who work with our students need an understanding of the characteristics of the disability and each other's roles on the team. Special education roles and service delivery models in the schools are changing (IDEA, 2004). Traditionally, educators have commonly addressed written language difficulties while SLPs separately have addressed spoken conversational language difficulties.

Yet the Common Core Standards (2010), professional ethics statements and roles and responsibilities documents require an integrated approach to remediation (ASHA, 2001). Collectively, growing evidence supports viewing language holistically across writing and speaking (Cirrin et al., 2010; Murphy et al., 2016). If special education teams work together both collaboratively and complementarily, then we might more efficiently increase both speaking and writing persuasively.

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