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Abstract

Writing is an essential element of literacy development, and language plays a central role in the composing process, including developing, organizing, and refining ideas. Language and writing are interconnected, making it paramount for educators to attend to the development of deaf students' language skills. In this quasi-experimental study, we examined the impact of strategic and interactive pedagogical approaches, namely Strategic and Interactive Writing Instruction (SIWI), implemented with deaf students in grades 3-6 to develop genre-specific traits in their expressive language (spoken or signed) and writing. In this study, a total of 16 teachers and their 69 students participated in the treatment and comparison groups. Expressive language and writing samples were collected at the beginning and end of the year for three different genres. Students in the treatment group showed statistically significant gains in their expressive and written language for recount and information genres when compared to students in the comparison group. There was not a significant treatment effect on persuasive expressive language or writing. Additionally, there was a significant positive correlation between expressive language and writing at both time points across all three genres. This study provides evidence on the importance of attending to language skills during literacy instruction.

Introduction

Language sets the foundation for writing. Children initially construct their thoughts, ideas, and feelings through expressive language in everyday communication. Upon receiving formal education and exposure to authentic writing activity in their environments, they learn to convert their thoughts into a written form (Bazerman et al., 2017). Having both language proficiency and metalinguistic awareness is crucial to expressing and formalizing concepts in writing (Berninger et al., 2006; Dockrell & Connelly, 2016; Hooper et al., 2011; Kent et al., 2013). Due to systemic failures, many deaf children pass through their critical developmental years without sufficient access to language that supports fluent expression of ideas. The development of expressive language occurs through frequent acts of meaning-making with more proficient users of the language, resulting in the continual honing of pragmatic discourse skills and the expansion of vocabulary and syntax (Bates et al., 2017; Clark, 2018). It is common for language development to falter for deaf children when spoken language is not accessible for meaning making exchanges, and when adequate exposure to signed language has also not been provided (Hall, 2017). Entering school without a strong foundation in language causes children to be ill-equipped to engage with the curricula (Moores & Martin, 2006). Consequently, deaf education teachers are relied upon to cultivate deaf children's expressive language in order for language to be an avenue for sharing and accessing new concepts. Teachers often center the use of signed language in the classroom (Dostal & Wolbers, 2014) due to its visual accessibility to deaf people, and because of its grammatical richness that allows the expression of complex ideas and thoughts on the hands and body. When provided with sufficient input in signed language, deaf children not only develop the linguistic competency needed to express complex ideas, they have a comprehensive language through which to learn about a vast array of topics, including writing.

In this study, deaf education teachers implemented Strategic and Interactive Writing Instruction (SIWI), an approach to teaching writing that emphasizes the active participation of students in meaning-making processes. We examined the impact SIWI has on students' development of genre-specific traits in both expressive language (i.e., American Sign Language and spoken English) and written language. We begin with a review of the literature regarding language and writing before presenting our research questions. Next, we discuss our methodology for data collection and analysis. Finally, we share our results and interpretations.

The Importance of Language

Research highlights the importance of language and pragmatic discourse skills in children broadly (Language and Reading Research Consortium, 2015) and deaf children specifically (Paul et al., 2020). Deaf children in signing environments follow a trajectory for signed language development similar to hearing children's development of spoken language, from babbling and the use of single words to the combination of words (Simms et al., 2013). As they grow in cognitive and linguistic competence, deaf children begin to adapt their expressions to be responsive to varied contexts and communicative partners (Cohen-Koka et al., 2022). In school, they become aware of variations in language structures that align with different communication

purposes such as narrative, informational, or persuasive genres (Stone, 2011; Zimmer, 1989). For instance, when sharing a personal experience, individuals typically mention who was involved, where it happened, and when the event occurred, using first-person pronouns and past tense verbs (Hyland, 2013). When expressing such information through signed language, one enacts unique features of visual-spatial grammar. For example, role shifting to visually depict various people and places through body shifting and eye gaze is used. (Cohen-Koka et al., 2022; Stone, 2011). Both hearing and deaf children benefit from language instruction that expands their repertoires and enables them to metacognitively consider the grammatical structures that are intertwined with their communicative goals and socio-cultural functions. Indeed, most school-aged deaf children need plentiful exposure to and instruction with signed language due to their limited exposure to signed language outside the classroom (Lillo-Martin & Henner, 2021).

Intervention studies giving central focus to natural sign language development with the goal of impacting literacy development are scarce (Scott & Dostal, 2019). These studies often involve showing a story to children or adults, and then asking them to retell the story. Story stimuli come in various forms, including cartoon videos (Smith & Cormier, 2014), comic strips (Tang et al., 2007), and picture books (Beal-Alvarez & Trussel, 2015). Within these studies, researchers analyze key components present in narratives, such as story structure and language features (Petersen & Spencer, 2012). A successful retelling of an ASL text demonstrates receptive comprehension and confirms deaf students' ability to replicate linguistic structures and textual features, which is an important step toward the more complex process of composing their own expressive texts. The composing process extends these skills by leveraging students' existing language and cognitive resources for brainstorming, organizing, and revising one's ideas for a determined audience and purpose. Thus far, the literature has sparingly documented deaf students' ability to produce personal narratives through spoken or signed language, but not information reports or persuasions.

The field of writing and writing pedagogy has long been based on the premise that writing is closely connected to speaking. However, the exact nature of this connection has been debated by researchers (Sperling, 1996). Writing research that views writing as similar to speaking often emphasizes the dialogic relationship between writers and readers (Freedman, 1994). This research advocates for instructional approaches that prioritize students' familiarity with their readers. In these approaches, students engage in purposeful conversations, either spoken or written, with the goal of informing and extending their subsequent writing. Research indicates that the nature of these interactions and their impact on students' writing depend heavily on the broader instructional environment of the classroom (c.f., Gutierrez, 1992). Related, Hayes and Flower (1980) found that the length of t-units increases with age and skill level, both in writing and speaking, suggesting a connection between these two modalities of language. As children develop their syntactic skills, they are able to produce longer and more complex t-units in both writing and speaking (Hunt, 1970).

Prior research examining oral narrative development has proposed developmental stages by age (Boudreau, 2008; Westby & Culatta, 2016), but how these stages apply and relate to

signed narratives in deaf children needs to be better understood. For example, hearing children as young as two years old around the world begin narrating past events (Miller & Sperry, 1988; Miller et al., 1990). They gradually expand their narrative telling by including chronological ordering of events and by increasingly adding detailed descriptions of actions and emotions (Veneziano et al., 2020). Children receiving narrative instruction and support beyond six years of age, having already obtained fluency in spoken language, demonstrate extensive, detailed, and organized stories (Kemper, 1984). The ongoing development of cognition intertwined with language, such as perspective taking and the consideration of a communication partner's needs, leads to increased complexity in children's narratives throughout their school years (Paris & Paris, 2003). There are strong correlations between oral narratives and literacy outcomes in hearing children (Babayiğit et al., 2021; Gardner-Neblett & Iruka, 2015; Suggate et al., 2018).

Research by Rathmann et al. (2007) and Morgan (2006) observed developmental patterns in signed narratives among deaf children raised in signing environments similar to development among hearing children. However, most deaf children are not raised in signing environments, leading to highly diverse trajectories in language development (Hernandez et al., 2023). Becker (2009) found that deaf children in Germany who are not exposed to proficient signers in their environments were not producing signed narratives commensurable with skills expected for their ages. In Smith and Cormier's (2014) examination of video narratives of deaf children aged eight to ten, they found that children with proficiency in British Sign Language used constructed actions (i.e., gestural representation of actions by someone else) adeptly compared to children with lower proficiency, indicating a divergence in cognitive linguistic resources, such as unique spatial features, needed for perspective taking. According to Kuntze et al. (2014), early exposure to signed language, especially before the age of 5, in which critical thinking is mediated through signing adults, is crucial for key language and cognitive skills required for literacy. However, it is worth noting that even early exposure to signed language may not be sufficient if the quantity of exposure is inadequate. In the absence of ample exposure to signed language, deaf children are at risk for experiencing language deprivation and its impact on cognitive, language, and literacy development (Scott, 2022).

Language proficiency is the most significant predictor of literacy skills, with signed language serving a key role for many deaf children (Caldwell-Harris & Hoffmeister, 2022; Lederberg et al., 2019; Scott & Hoffmeister, 2016). Deaf children who develop signing skills early, regardless of whether they have deaf parents, have better print literacy skills and accelerated growth rates in English literacy (Allen & Morere, 2020). Various studies highlight the important connection between sign language proficiency and literacy skills. A study by Hoffmeister et al. (2022) demonstrated how heightened knowledge of ASL vocabulary and grammatical structures is facilitative to the learning of English syntax. Van Beijsterveldt and Van Hell (2009) have documented how deaf children proficient in signed language often produce clearer and more detailed written narratives compared to those with low proficiency in signed language. For example, proficient signers have a stronger grasp of temporal reference (van Beijsterveldt & Van Hell, 2010) – writing narrative texts in past tense and informative texts in

present tense – which suggests that a strong foundation in signed language promotes metalinguistic understandings needed for written communication. Overall, these studies stress the importance of adequate exposure to accessible early language and the need for instruction that simultaneously develops deaf children's cognitive linguistic resources and literacy skills.

Translanguaging

Taking into account the varied levels of exposure and access that deaf children have to spoken and signed languages, an inclusive pedagogical approach that can leverage students' whole linguistic repertoires during classroom interactions, especially among those with lower language proficiencies or those knowing multiple languages, is particularly important. One such orientation to instruction is translanguaging, a dynamic process that understands language not as separate linguistic systems but as a single, integrated cognitive system that children draw upon during meaning-making processes (Otheguy et al., 2015). Therefore, language should not be seen in isolation but as part of broader sociocultural experiences that deaf children navigate. Given that English is predominantly used in the United States along with signed languages and other family or community languages, deaf children's communicative repertoires are likely to be comprised of multiple languages and modalities, including but not limited to mouthing, speaking, drawing, writing, signing, and gesturing (Cannon et al., 2016; Pizzo, 2016).

Rather than limiting deaf children's expressions to the grammatical rules of just one language or mode, a translanguaging perspective welcomes the fluid and interactive use of all language resources. Ultimately, the employment of one's linguistic resources is context-based with the goal of negotiating meaning during authentic communicative acts (Seltzer & Garcia, 2020). Considering the critical role language proficiency plays in literacy development (Williamson & Clemons, 2023), a translanguaging pedagogy should not only aim to leverage all the deaf students' linguistic resources but also provide ample opportunities through meaningful interactions to expand and deepen their linguistic competence and linguistic flexibility. Wolbers et al. (2023) propose a Translanguaging Framework in Deaf Education that minimizes asymmetries in language access by centralizing visual communication. Translanguaging Framework for Deaf Education promotes language expansions, clarifications, and comparisons/contrasts between signed and written languages and their variations. While this approach can result in both expressive and written language development, it requires a shift in instructional perspectives and strategies from traditional approaches.

Strategic and Interactive Writing Instruction is a research initiative focused on professional development for teachers, particularly in terms of how to leverage students' various linguistic resources during writing instruction as suggested in the TFDE (Dostal et al., 2019; Wolbers et al., 2023). It aims to promote changes in instructional behaviors with the goal of enhancing students' writing and language outcomes.

Strategic and Interactive Writing Instruction

Strategic and Interactive Writing Instruction (SIWI), driven by cognitive, sociocultural, and language theories, is an instructional framework with the specific aim of developing deaf students' writing proficiency. Students are taught the strategies of expert writers and apply these

to the composing process (e.g., brainstorming, organizing, revising) with support from the classroom writing community in the form collaborative problem solving, scaffolding, and meaning-making dialogues (Dostal & Wolbers, 2014; Wolbers, 2008). Instruction is tailored to teaching and learning contexts within deaf education and to students' individualized and authentic communicative goals. When writing for authentic purposes, one considers the needs of the reader and the goals of communication. As such, genre-specific traits, text structures, and language features are explicitly taught and practiced during SIWI (Dostal & Wolbers, 2016; Dostal et al., 2021). The purpose and audience are collaboratively generated and posted on a visual scaffold in the group writing space, , encouraging students to continuously contemplate the "why" of their message and "who" the intended recipients of the message are, thus reinforcing sociocultural functions of the communicative task (Wolbers et al., 2022). Targeted text and language structures of the genre may be modeled and discussed, and then integrated into the collaboratively developed written composition, thereby enhancing metalinguistic awareness (Wolbers et al., 2020, 2015).

Throughout the composing process, students are actively engaged in the co-construction of text (Wolbers et al., 2018), during which teachers enact the translanguaging pedagogy of the Translanguaging Framework in Deaf Education. While students generate ideas for their writing, for example, they are encouraged to express themselves in any way they know how, using all of their available communicative resources. Students' contributed expressions are taken up into a space, referred to as the "Language Zone" (Dostal et al., 2019), where Translanguaging Framework in Deaf Education pedagogy is employed, allowing for students' initial expressions to be validated, clarified, expanded, and compared and contrasted across language variations and modalities (Wolbers et al., 2023). Teachers utilize strategies in the Language Zone that enhance meaning-making processes (e.g., drawing, role playing) and ensure a unified understanding and shared language of the topic. Following this, teachers and students jointly undertake the task of translating their ideas from expressive language to the written form, deciding together the best way to represent their expressions in print. Teachers may bring in ASL and English mentor texts to introduce students to certain genre traits and language structures that would assist in their written composition (Kilpatrick & Wolbers, 2020). At the end of the recursive composing process, the class shares their final written product with the intended audience, fulfilling their desired purpose for writing, whether it is to entertain, inform, or persuade. Ideally, their audience responds back, creating an authentic communicative experience and stimulating student motivation for continuing to write (Troia et al., 2012). See siwi.utk.edu for more information about the enactment of SIWI. Indeed, implementing SIWI has a positive effect on students' motivation to write (Wolbers et al., 2022). Student initiative to engage in writing increases while disengaging and off task writing behaviors decrease (Dostal et al., 2015).

Furthermore, SIWI has resulted in significantly better outcomes in genre-specific writing traits, written language, and the Woodcock Johnson IV Broad Written Language compared to those who continue with their usual writing instruction (Wolbers et al., 2022). Data also show that students make gains in length and clarity of their ASL expressions during periods of

receiving SIWI in comparison to periods when not receiving SIWI (Dostal & Wolbers, 2014). To date, there has not been a group comparison study examining the impact of SIWI on expressive language development, nor has there been a study examining genre-specific traits in deaf children's expressive language.

The Current Study

SIWI has over 15 years of success in improving written compositions among deaf students (see Wolbers et al., 2022). However, previous studies did not include a measure for capturing development of genre-specific traits in expressive language, which we recognize as an important gap to fill. SIWI principles, including interactive collaborative writing, specialized language instruction, and authentic communication with audiences, are factors that have the potential to impact the expressive language development in deaf children. During composing, ideas are generated and refined through expressive language first before being connected to written text. This allows deaf children to benefit from the input of their peers and teachers, who can provide feedback on their ideas and engage with them to refine their expressions. In the act of communicating with authentic audiences, students practice using language for functional and genre-specific purposes. As such, engagement in SIWI has the potential to impact the bilingual development of expressed and written communication of deaf students. In the current study, we examine whether there is a relationship between the expressed and written samples of genre-specific communication, and whether the application of SIWI in the treatment group resulted in statistically significant growth in students' expressed and written compositions in comparison to students in a business-as-usual (BAU) condition, receiving their typical writing and language instruction.

Research Questions

1) To what extent does SIWI improve students' use of genre-specific traits (across 3 genres) in expressive language and written language?
2) Is there a relationship between students' use of genre-specific traits in expressive language and written language?

We hypothesize that SIWI will positively impact the English or ASL-English bilingual development of deaf students, resulting in statistically significant gains in students' use of genre-specific traits in both expressive (spoken or signed) and written language when compared to students in a BAU condition. We further hypothesize that there is a significant relationship between students' abilities to communicate genre-specific traits through expressive and written language.

Method

In this study, we adopted a quasi-experimental design to investigate the impact of SIWI on the expressive language and written language skills of deaf students in grades 3-6. Deaf education teachers from the treatment group applied SIWI by engaging students in the composing process through interactive, collaborative writing and specialized language instruction. Deaf education teachers in the comparison group continued with their typical writing and language instruction, referred to as business as usual (BAU). Teachers in the treatment group

had participated in a SIWI study the previous year focused on writing and reading outcomes (Wolbers et al., 2022). All teachers who participated in that study were invited to participate in the current study focused on expressive language outcomes, and their relationship to students' writing outcomes. An open invitation for BAU teachers was sent to all school programs who had participated in previous SIWI research. To enroll as a BAU teacher, one must not have received prior exposure to SIWI at the school program or through professional development opportunities. This study was largely based on a convenience sample; however, there was an attempt to include teachers across similar settings and language philosophies in both groups, and compare teachers by educational background and preparation to teach writing.

Teacher Participants

Six teachers participated in the treatment group and 10 teachers in the BAU group. Through a distributed survey, teachers self-reported demographic data about themselves, their instruction, and their schools. In the treatment group, all teachers reported as female. There were two teachers of color (one Asian/Pacific Islander and one multiracial) and four white teachers. Three teachers identified as deaf and three as hearing. Of the deaf teachers, one used hearing aids. In the BAU group, seven teachers reported as female and three as male. There were three teachers of color (two African American, one Latino/a) and seven white teachers. Two teachers identified as deaf (with one wearing hearing aids), two identified as hard of hearing and wore hearing aids, and six were hearing. In terms of ASL use, three teachers identified as native ASL users in the treatment group. Of the non-native users, they reported 0, 24, and 35 years of experience using ASL. In the BAU group, one teacher was a native user and 9 were non-native users. The non-native users ranged in experience from seven years to 31 years, with one participant identifying as a CODA.

Teachers reported their highest level of education, preparedness to teach writing, and years of experience in the classroom. One teacher in the BAU group had an Ed.S. degree or master's degree plus 30 credits. Thirteen teachers had a master's degree (five treatment, seven BAU), and three teachers had a bachelor's degree (one treatment, two BAU). The years of teaching experience of SIWI teachers ranged from 6-26 years, while BAU teachers' experience ranged from 3-29 years. Independent *t*-tests were conducted to compare years of teaching experience of SIWI (M = 18, SD = 6.66) and BAU (M = 8.85, SD = 9.33) teachers, and there were no statistically significant differences found, $t(14) = -2.09$, $p = 0.06$. Teachers were asked to rate their preparation to teach writing, aside from SIWI training, on a three-point scale. In the treatment group, one rated their preparation as exceptional, and five teachers said their preparation was adequate. In the BAU group, one teacher rated their preparation as exceptional, eight as adequate, and two as minimal.

Finally, teachers reported characteristics of their schools. In the treatment group, four teachers taught at a school for the deaf while two taught in public school districts, either in self-contained or pull-out settings. The schools for the deaf followed a bilingual or multilingual education philosophy while the school district settings followed a total communication philosophy. In the BAU group, six teachers were at schools for the deaf, and five taught in public

school districts. Six teachers reported that their schools followed a bilingual or multilingual philosophy while five followed a total communication philosophy. Teachers also reported on their personal teaching philosophies related to language, which largely aligned with their schools'. Exceptions included one teacher in the treatment group, who stated a personal bilingual teaching philosophy that contrasted with their school's approach. Two teachers in the BAU group held personal teaching philosophies that aligned with total communication while their schools followed bilingual principles.

Student Participants

There were 31 students in the treatment group and 38 students in the comparison group (see Table 1). The treatment group had 6 third graders, 4 fourth graders, 18 fifth graders, and 3 sixth graders. The comparison group had 11 third graders, 8 fourth graders, 13 fifth graders, and 6 sixth graders. Out of 31 treatment students, 17 identified as female and 14 identified as male. Out of 38 control students, 20 identified as female and 18 identified as male. The treatment group had 14 white students, 2 African American/Black students, 7 Latino/a/x students, 4 Asian Pacific Islander students, 2 multiracial students, and 1 student identified as other. The comparison group had 4 white students, 9 African American/Black students, 20 Latino/a/x students, 2 Asian Pacific Islander students, and 3 who identified as other. Regarding hearing levels, 11 students in the treatment group were severely or profoundly deaf, 13 were moderately or moderately-severely deaf, and 7 were mildly deaf. A large group of students in the comparison group were severely or profoundly deaf (n=26), 10 were moderately or moderately-severely deaf, and 2 were mildly deaf. In the treatment group, 12 students had cochlear implants, 13 students had hearing aids, and 6 students did not have any listening assistives. Out of 31 students, 15 always used their listening assistives, 5 students used them frequently, 1 student used them sometimes, and 10 students never used them. In the comparison group, 14 students had cochlear implants, 21 students had hearing aids, and 3 students did not have any listening assistives. Out of 38 students, 25 students always used their listening assistives, 2 students used them frequently, 3 students used them sometimes, 5 used them infrequently and 3 students never used them. Approximately a third of the treatment group had additional disabilities such as ADHD, autism, cognitive, physical, and visual (10 out of 31 students). Less than a fifth of the comparison group students had additional disabilities such as ADHD and autism (7 out of 38).

Students could elect to use ASL or spoken English for their expressive language samples. In the SIWI group, 23 signed their expressive language samples and 8 spoke them, compared to 29 in the BAU who signed, 8 who spoke, and 1 who used an equal combination of both languages. Teachers were asked to rate how proficient their students' language expressions were at the beginning of the year in both ASL and spoken English on a 5-point likert scale (from 1 "can express most anything in the language" to 5 "does not express anything in the language"). Treatment group students' proficiency in ASL (M = 2.35, SD = 1.49) and English (M = 2.81, SD = 1.42) were found to be comparable to BAU students' proficiencies in ASL (M = 2.63, SD = 1.30) and English (M = 3.08, SD = 1.44), $t(67) = -0.82$, $p = 0.42$ and $t(67) = -0.79$, $p = 0.44$ respectively.

In the treatment group, the language that was primarily used at home for communication between family members and the deaf student varied with 13 families using English, 5 families using Spanish, 4 families using ASL, 6 families using English and ASL, 1 family using Mandarin, 1 family using Urdu, and 1 family having limited or no communication. Four of these families had a deaf parent. In the comparison group, 10 families used English, 7 families used Spanish, 1 family used ASL, 6 families used English and ASL, 4 families used English and Spanish, 3 families used Bengali, 2 families used Portuguese, 1 family used Tagalog, and 4 families had limited or no communication. Two of these families had a deaf parent.

Out of 31 students in the treatment group, 18 of them were transferred to their current educational program from a different program (e.g., a public school program where they were mainstreamed orally or with interpreters, or in self-contained classrooms, or in a school for the deaf using sim-com). Similarly, 14 out of 38 students in the comparison group were transferred to their current program.

Absenteeism was higher in the treatment group with 81% of students missing 10 or more school days, compared to 55% of comparison group students who missed the same amount of school days. Pre and post data were successfully collected for students with high absenteeism, with the exception of one student in the BAU and two students in the treatment group for whom data collection was not complete across all variables.

In total, we consider the student groups to be largely comparable on most variables. However, notable differences that may have potential to impact the outcomes of the study include the BAU group having a higher percentage of students of color, and the treatment group having a higher percentage of students with disabilities and students with high absenteeism.

Data Collection

The independent variable was the type of instruction students received (SIWI or BAU), while the dependent variables were students' expressive and written language as quantified by genre-based trait scores. The data were students' spoken or signed samples and writing samples that were collected in the fall (pre-test) and in the spring (post-test) during one academic year. Instructions for teacher administration of sample prompts were identical across treatment and BAU groups. Students were given a prompt for three genres of focus: recount (personal narrative), information report, and persuasive. These three were chosen due to the emphasis placed on the genres in the grade 3-6 standards. There was a prompt A and B for each genre. If teachers gave prompt A to students for the purpose of collecting writing samples, we asked them to give prompt B to collect the expressive language samples. If teachers gave prompt B to collect writing samples, we asked them to give prompt A to collect expressive language samples. Unique prompts were administered for the collection of signed and written samples at the same time point so that students would engage in the composition process for each rather than translating. Prompts were rotated at post-test collection.

Recount prompt A asked students to share an experience that happened to them in the past such as visiting a special place or trying something new. Recount prompt B asked students to share something they did at school such as performing in a school play or participating in a

science project. Information Report prompt A asked students to pick a place or an animal that they know a lot about to share. Information Report prompt B asked students to pick a hobby or a person they know a lot about to share. Persuasive prompt A asked students to share their opinions with their caregivers regarding screen time. Persuasive prompt B asked students to share their opinions with their caregivers about sugary drink limitations.

After a prompt was presented to students in spoken/written English and/or ASL as many times as needed, they were given 15 to 20 minutes to complete the sample, with the option to take more time as needed for planning and organizing their ideas using any tools of their own choosing. While BAU and SIWI teachers could answer questions about a prompt to ensure their students understood the task, they did not assist students in composing or revising their work. Teachers video-recorded their students' expressive language responses to the three prompts in signed language or spoken language, depending on their preference and/or classroom norms. A total of 390 expressive language samples were collected, with 66 recount samples, 65 information report, and 64 persuasive samples collected at pre-test and post-test time points. Writing samples were collected from students at the same two time points of the academic year as the expressive samples. A total of 404 writing samples were collected, including 66 recount samples, 68 information report samples, and 68 persuasive samples collected at pre-test and post-test time points.

Scoring

The expressive language video samples and the transcribed writing samples were uploaded to a password-protected Google Drive folder that is accessed only by the research team. Each file was de-identified of personal and group information, and was given a numerical identification. Expressive language and writing samples were evaluated using a genre-specific rubric containing three traits which were derived from the writing rubrics of the National Assessment of Education Progress (NAEP) (National Assessment Governing Board, US Department of Education, 2010). The scored traits were orientation, events, and organization for recount samples; topic, facts, and organization for information report samples; and opinion, reasons and examples, and organization for persuasive samples. Following the NAEP's rubric scale, each trait was assigned a score ranging from 0, signifying no inclusion of that trait, to 6, indicating full inclusion of the features. This rubric has been used in previous studies of SIWI (e.g., Dostal et al., 2021; Wolbers et al, 2022) with similar pre-test scores across studies. Recount pre-test scores in previous studies ranged from 3.93 to 5.92; information report scores ranged from 3.91 to 4.36; and persuasive scores ranged from 4.93 to 5.49.

Two raters viewed 20% of the expressive language video samples and assigned scores. The intraclass correlation coefficients for the recount, information report, and persuasive samples were .97, .92, and .92, respectively. The remaining 80% of video samples were divided between the two raters for separate viewing and scoring. Four raters scored 20% of the writing samples per genre, resulting in an intraclass correlation coefficient (ICC) of 0.99 for recount, 0.98 for information report, and 0.99 for persuasive. The remaining samples were divided among the four

raters and scored. After individual scoring was complete, the raters rescored four of the same samples to once again compare scores and ensure calibration was maintained.

SIWI Professional Development

In accordance with the recommendations set forth by Darling-Hammond (2009), we provided teacher participants with a comprehensive professional development experience. The process began with a five-day in-person training session held during the summer, entailing 40 hours of presentations, modeling, and hands-on practice. Subsequently, each teacher was scheduled for 8, 30-minute meetings with a SIWI coach spread throughout the academic year. During these meetings, teachers were asked to share their current or upcoming writing topics along with their applications of and goals for strategic, interactive, and language approaches. SIWI coaches provided guidance and feedback as needed. In late fall, teachers reconvened for an additional two-day in-person training that focused on deepening their understanding and application of SIWI, and assessing students' writing. The fall training and the bi-weekly meetings with SIWI coaches were designed largely in response to teachers' needs, and provided a support system for transforming their instructional practices (Graham et al., 2021. Wolbers et al., 2016).

Treatment

Immediately after the five-day training session in the summer, teachers in the treatment group started implementing SIWI with their students at the beginning of the academic year while continuing to receive coaching throughout the year. Teachers guided students through the entire writing process, incorporating strategic, interactive, and language approaches throughout each instructional unit. Teachers in the SIWI group dedicated two hours per week over a 27-week period, apportioning 9 weeks to each of the following genres - recount, information report, and persuasive. SIWI can be implemented as a standalone framework; it is also possible to incorporate the content and resources of an adopted ELA curriculum. Out of 6 SIWI teachers, 1 used the CAFE and Writer's Workshop, 2 used Lucy Calkins' curriculum, 2 used McGraw Hill Wonders, Framing Your Thoughts, and Bilingual Grammar Curriculum, and 1 used Sunshine State Curriculum.

Instructional Fidelity

At the core of SIWI are three guiding principles emphasizing strategic, interactive, and language approaches. These principles are represented by 53 indicators of teacher behaviors. Teachers participating in the treatment group in this study had been trained to apply each of the indicators throughout their instructional units. An instructional unit involves the entire writing process, from the initial stage of selecting a topic and identifying the intended reader to the concluding stage of sharing the completed publication with their reader. To evaluate instructional fidelity, the SIWI observation and fidelity instrument containing the 53 indicators was used to score a total of three instructional units per teacher, with one observation per genre. Each indicator was scored on a scale of 0 (not implemented), 0.5 (partially implemented), and 1 (fully implemented). The total score across all 53 indicators was calculated, divided by 53, and

multiplied by 100 to get a percentage score. The total fidelity score (averaged across the three instructional units) ranged from 61% to 91% with an average of 78.5%.

BAU Instruction

To differentiate the instruction occurring in treatment and BAU groups, at the beginning and end of the academic year, BAU and SIWIteachers were asked to respond to a 22 item survey about the frequency in which they engaged in specific instructional practices. There were 7 items related to evidence-based practices for teaching writing (e.g., teach students strategies for planning; teach students to use genre-specific language and domain-specific vocabulary in their writing). Eight survey items related to evidence-based practices for supporting writing (e.g., have students study and then imitate models of good writing; collaboratively problem solve and make decisions about writing with students). The final 7 items were writing instructional practices documented in deaf education literature (e.g., teach the differences between ASL and English grammars) (Strassman and Schirmer, 2013; Mayer & Trezek, 2015). These 22 practices are in alignment with SIWI principles of instruction.

The teachers rated each item based on how often they implemented the practice on an 8-point likert scale (1=never, 2=several times a year, 3=monthly, 4=several times a month, 5=weekly, 6=several times a week, 7=daily, 8=several times a day). At the beginning of the year, (prior to implementing SIWI) teachers in the treatment group responded similarly to the survey items (M=4.83, SD=0.96) compared to BAU teachers (M=4.60, SD=1.17), $t(14) = -0.39$, $p = 0.70$. At the end of the year, there was a significant difference between groups, with SIWI teachers indicating they implemented evidence-based instructional practices more frequently (M=5.73, SD=1.24) than BAU teachers (M=4.49, SD=1.24), $t(14) = 1.93$, $p = 0.04$.

The BAU group teachers reported teaching writing for two to two and a half hours per week, with the exception of one teacher who reported teaching writing one hour per every four days in a six day instructional cycle. BAU teachers used a variety of curricula to teach writing: Bedrock Literacy Program (2 teachers); Benchmark Advance (1); Fairview (1), Fountas and Pinnell (1), Houghton Mifflin Harcourt (2), Bedrock Literacy paired with Houghton Mifflin Harcourt (1); Bilingual Grammar Curriculum with Houghton Mifflin Harcourt (1).

Data Analysis

To answer research question number one, data were entered into SPSS and analyzed using 2 x 2 repeated-measures ANOVA. The between-subjects factor was group (SIWI and BAU), and the within-subjects factor was time (pre- and post-test). Post-test means for expressive and written language by genre were assessed for differences that may exist between SIWI and BAU groups, while taking into consideration the pre-test means. To address research question number two, Pearson correlation coefficients were calculated to measure the strength of the linear relationship between expressive language and written language outcomes by genre.

Results

Research Question 1

To what extent does SIWI improve students' use of genre-specific traits (across 3 genres) in expressive language and written language? A repeated-measures ANOVA was performed to

evaluate the effect of SIWI on expressive language and writing outcomes across three genres--recount, information report, and persuasive. The pre- and post-test means and standard deviations are presented in Table 1 for expressive language and in Table 2 for writing.

Table 1

Descriptive Statistics for Pre and Post Expressive Language Samples Across Groups

	SIWI			BAU		
	N	*M*	*SD*	*N*	*M*	*SD*
Recount Pre	29	6.38	2.19	37	6.32	2.89
Recount Post	29	7.74	2.10	37	6.36	2.75
Information Pre	28	5.21	1.63	37	5.84	2.49
Information Post	28	7.93	2.38	37	6.30	3.26
Persuasive Pre	28	5.55	1.71	36	5.04	2.11
Persuasive Post	28	7.23	1.92	36	6.38	2.61

Table 2

Descriptive Statistics for Pre and Post Writing Samples Across Groups

	SIWI			BAU		
	N	*M*	*SD*	*N*	*M*	*SD*
Recount Pre	28	4.02	3.19	38	4.28	2.72
Recount Post	28	6.27	2.85	38	5.41	3.40
Information Pre	31	3.48	2.72	37	4.00	2.69
Information Post	31	6.31	3.33	37	5.55	3.19
Persuasive Pre	31	4.18	2.45	37	2.97	1.85
Persuasive Post	31	5.60	2.63	37	4.77	3.19

The treatment resulted in a statistically significant effect on expressive language for recount, $F(1, 64) = 6.99$, $p = 0.01$, partial $\eta^2 = 0.10$, and for information information report, $F(1, 63) = 12.91$, $p < .001$, partial $\eta^2 = 0.17$. Parallel to these findings, SIWI had a statistically significant effect on recount writing, $F(1, 64) = 5.25$, $p = 0.03$, partial $\eta^2 = 0.08$, and information report writing, $F(1, 66) = 4.24$, $p = 0.04$, partial $\eta^2 = 0.06$. Pairwise comparisons at time point 1 for these variables indicate no significant differences between groups at pretest. Effect sizes ranged from medium to large, 0.06 to 0.17. The Appendix presents pre- and post-information report expressive language and writing samples from a fourth-grade treatment group student to highlight the changes in the student's language and writing over the course of one academic year. The samples are presented side-by-side to facilitate comparison.

There was not a statistically significant treatment effect on persuasive expressive language, $F(1, 62) = 0.65$, $p = 0.42$, partial $\eta^2 = 0.01$, nor persuasive writing, $F(1, 66) = 0.64$, $p = 0.43$, partial $\eta^2 = 0.01$. Pairwise comparisons of persuasive variables at time point 1 show no differences for expressive language but do show statistically significant differences for writing, indicating the treatment group started the year with higher persuasive writing scores than BAU. Students with disabilities showed similar patterns of growth as their group affiliation (i.e., SIWI or BAU), albeit with less overall progress.

Research Question 2

Is there a relationship between students' use of genre-specific traits in expressive language and written language?

Pearson correlation coefficients were calculated to measure the linear correlation between expressive language and writing outcomes. With respect to the recount genre, results showed there was a significant, moderate, and positive correlation between expressive language and writing at both pre-test, $r(67) = 0.47$, $p < .001$, and post-test, $r(65) = 0.48$, $p < .001$. Expressive language was also positively and significantly correlated with writing for the information report genre at pre-test, $r(67) = 0.53$, $p < .001$, and post-test, $r(66) = 0.32$, $p = .009$. Lastly, persuasive expressive language and writing variables were also found to be significantly, positively, and moderately correlated at pre-test, $r(66) = 0.51$, $p < .001$ and post-test, $r(66) = 0.56$, $p < .001$. The correlations between expressive language and writing are demonstrated in the Appendix through the positive changes that can be seen across one student's pre- and post-test expressive language and writing samples in the information report genre. In addition to an increase in length from pre- to post-test samples, subtopics are categorized and introduced in both expressive and written post-test samples, and there is an increase in overall organization through details that align with the main topic.

Additional Findings

In addition to the findings to the research questions, we endeavor to share observations from this study about the students' use of sign or speech, and observations regarding when the

teacher and student's communication were misaligned. Approximately three-quarters of students included in this study expressed themselves through signed language, and a quarter used spoken language. The majority of students using signed language were in classrooms where teachers reported an ASL/English bilingual philosophy. The majority of students using spoken language were in classrooms where their teachers' communication philosophy was reported as Total Communication. For the most part, students, regardless of using signed language or spoken language, demonstrated similar patterns of gains in both the SIWI and BAU groups.

However, we observed a different pattern of achievement in one treatment classroom. The teacher reported a Total Communication philosophy which was implemented through auditorily-oriented communication (i.e., sign-supported speech or simultaneous communication). In this classroom, four students used signed language and two students used spoken language. Thus, for the four signing students, the language use of the students and teacher were misaligned. We became aware of this situation when the teacher's instructional fidelity percentage was much lower compared to the other treatment group teachers. The teacher was rated 61% total instructional fidelity and 42% on the metalinguistic/linguistic set of items, which indicates a poor use of language approaches that are responsive to students' needs. Signing students' expressive language and writing outcomes in this classroom showed 50% less gain than the SIWI group average. This could be attributed to the communication misalignment.

In the BAU group, there were six students who used signed language and were receiving instruction in Total Communication classrooms. However, it is unclear the extent to which the teachers' and students' use of language were misaligned. Because video recorded observations did not occur in the BAU classes, we are unable to report how effectively or ineffectively teachers used visually-oriented communication with these students.

Discussion

This research explored the impact of Strategic and Interactive Writing Instruction (SIWI) on the expressive language and writing outcomes of deaf students in 3rd to 6th grade classrooms. The signed language or spoken language and writing growth of students in the treatment and comparison groups were tracked for one academic year through the collection of pre- and post-samples across three different genres: recount, information report, and persuasive. A repeated-measures ANOVA was performed to identify any impact the treatment had on expressive language and writing variables. Statistically significant outcomes were found for expressive language and writing on genre-specific traits associated with recount and information report, suggesting that SIWI had a positive impact on students' language and literacy development. However, no significant differences were found in persuasive compositions for both expressive language and writing. Additionally, across all bivariate comparisons of expressive language and writing for all three genres, there were significant correlations, with moderate, positive linear relationships. These findings offer intriguing insights that warrant further discussion on the implications and future directions of research on language and literacy skills in deaf students.

Expressive Language

Overall, deaf students scored higher in expressive language than in writing, both at the pre- and post-test stages, suggesting that expressive language skills tend to develop and improve in advance of writing skills. This finding aligns with existing literature providing evidence that language skills often precede and drive writing development (Gardner-Neblett & Iruka, 2015; Hooper et al., 2011). Additionally, significant correlations between expressive language and writing outcomes demonstrate that there is a significant and positive linear relationship between these two. It can be deduced that as students grow in their abilities to communicate ideas through expressive language to audiences for authentic and varied purposes, there is potential for these same skills to begin to take hold in their writing. In the dialogic spaces of SIWI, students engage in translanguaging practices with the goal of understanding one another and proceeding with collaborative decisions and actions. Students are accessing their entire linguistic repertoires to effectively communicate their ideas to others, while also attentively receiving others' expressed contributions. During the interactive, meaning-making process, students are constantly exposed to the diverse idiolects of other students and teachers, thereby creating opportunities for expanding each others' linguistic resources. Then, the ability for students to leverage their existing linguistic competence through writing can be enhanced when they receive effective instruction designed to help them make connections between their expressed and written languages (Bazerman et al., 2017; Graham et al., 2019).

Expressive and Written Language Growth

In SIWI professional development, teachers were introduced to the concept of engaging students in the composing process. It was explained that the development of students' genre knowledge could be promoted through expressive language first before making connections to writing. Publishing ideas through signed or spoken language was presented as an instructional option. However, classroom observations revealed that teachers implementing SIWI rarely guided students through the composing process with the aim of producing a final product in signed or spoken language. Therefore, it was not surprising that although expressive language gains were documented and the scores were higher than writing, students exhibited greater progress in their written compositions from pre- to post-test than in signed or spoken language. The emphasis on writing in SIWI professional development may have prompted teachers to dedicate most of their time to written compositions without exploring the benefits of signed or spoken language compositions. Teachers' decisions not to focus on signed compositions in particular may be influenced by their own ASL composing skills, or their knowledge of video editing processes that support ASL composing (Holcomb et al., 2023). We hypothesize that greater time and attention on composing in and publishing of expressive language on videos would have led to greater development in expressive language skills. These observations, combined with the finding that expressive language development precedes and drives writing development, suggest teachers to dedicate increased instructional time to both expressive language and writing target areas (Graham & Perin, 2007; National Commission on Writing, 2003). As for the ASL-English bilingual development documented in this study, bilingual

outcomes may have been further strengthened through specific attention to sign composing processes.

Persuasive Genre

An interesting, but not surprising, finding surfaced in the results regarding the persuasive genre. While deaf students exhibited growth in both expressive and written language within the recount and information report genres, the same progress was not seen in the persuasive genre. The difficulties in this genre mirror the findings in both deaf-related (Wolbers et al., 2022) and mainstream studies (Ferretti & Lewis, 2019). Crafting a persuasive piece requires formulating an opinion, through critical analysis, and then defending it with convincing reasons and examples, while considering potential counterarguments. Nippold's (2014) research identified an age factor to growing skills in persuasion. As students mature, they exhibit greater abilities to acknowledge and engage with differing views, leading to improved applications of persuasive traits in their written compositions. Additionally, a correlation exists between the ability to use persuasive elements in spoken language and persuasive writing skills (Brimo & Halls-Mills, 2019).

In addition to broad challenges experienced by students in this genre, prior language deprivation experiences impacting cognition could present more hurdles for deaf students.Communicating persuasively requires abstract thinking linked to more complex language use (Dostal et al., 2021). Studies show that deaf students who experienced language deprivation often grapple with tasks requiring analogical reasoning (Henner et al., 2016) and encounter difficulties with tasks requiring theory-of-mind (Schick et al., 2007). The larger sociolinguistic context also may shape deaf students' engagement with the art of persuasion. If deaf students do not have good access to diverse perspectives and debates that naturally occur on social media, within families, and in schools, they do not have equity in opportunities to abstract these skills. SIWI attempts to combat these inequities through instructional approaches such as engaging students in persuasive dialogue practice in the classroom buttressed by ASL and visual support. Yet, seeing positive outcomes may require more than one academic year of SIWI, which reinforces Graham et al. (2019)'s suggestion to embrace the long view on writing development. It is plausible that, as deaf students continue to grow in their cognition and language skills from being in an accessible environment over the years, their persuasive skills will also grow (Henner et al., 2019).

Limitations and Future Directions

The study was conducted using a convenience sample of teachers who had previously participated in a SIWI study and had implemented SIWI with deaf students for one year. Random assignment of teachers to groups was therefore not feasible. However, there was an attempt to locate BAU teachers who were comparable on critical demographic variables. While it was not identified as a statistically significant difference between groups, teachers in the treatment group began the study with more years of teaching, on average, than teachers in the BAU group. Coincidentally, no statistically significant differences were detected in the reported use of evidence-based practices for writing instruction across teacher groups at the start of the

study either. This may indicate that years of experience do not necessarily translate to greater effectiveness in one's writing instruction. During the review process, it was suggested that we rerun the analyses in this study to account for the influence of the teacher as a covariate. We entered one teacher factor into the analyses; this factor was extracted using the principal components method from years of teaching and use of evidence-based writing instruction approaches. There were no differences in the reported findings. It is acknowledged, however, that there are other potentially intangible influences that experienced teachers have on their students, and future studies can attempt to explore these variables.

Secondly, the case of one treatment group teacher's auditorily-oriented communication being misaligned with the visually-oriented communication of their students indicates a need for future studies to capture the teachers' expressive language in relation to their students' communication needs during group instruction and small group/individual support. In group comparison studies, it is recommended that researchers observe teachers' and students' language use in both treatment and comparison group classrooms. Examining occurrences of communication misalignment with greater depth could reveal the extent to which asymmetries in communication access are provoked, and the extent to which literacy instruction is or is not equitable to all students. We suggest this as an implementation factor to be considered in addition to teacher instructional fidelity.

Third, there were notable differences in the student groups that could not be controlled. The students in the treatment group had significantly higher persuasive scores at the start of the year, and it is possible that the rate of growth in persuasive genre traits slows as students are scoring higher and asked to demonstrate increasingly more difficult skills. Additionally, the BAU group had a higher percentage of students of color, while the treatment group had a higher percentage of students with disabilities and students with a higher percentage of absenteeism. Any or all of these variables may have contributed to the outcomes in this study. While students with disabilities showed some progress in both the SIWI and BAU groups, more research is needed to explore the ways and extent to which SIWI supports the language and writing development of each disability group given the variation in the learning needs across students.

Fourth, in the SIWI framework, dialogic pedagogy indicators included asking metacognitive questions about the structures of the genre, the purpose and goals of writing in this genre, and the writing subprocesses. However, to what extent these specific practices were applied in each teacher's instruction and their influence on persuasive writing remain an underexplored area. The literature suggests that attending to the impact of dialogic pedagogy may reveal key insights that are currently absent in the field of deaf education, especially in the area of persuasion. Given that previous studies on the efficacy of SIWI also found that deaf students did not exhibit as much growth in their persuasive writing compared to other genres (Wolbers et al., 2022; Dostal et al., 2021), we recognize the need to attend to these factors more closely in future studies.

Lastly, based on the interrelatedness of expressive language and writing skills found in this study, we propose the need for interventions targeting genre-based sign or spoken language

development of deaf students. Specifically related to the future implementation of SIWI, professional development programming can do more to emphasize the importance of sign composing, from establishing one's audience to publication. Teachers of deaf students likely need guidance with how to approach composing with their students in sign language--holding and organizing ideas in sign language and revising sign language expressions for grammar, structure, and meaning. They need tools for assessing sign language development, setting appropriate sign objectives, and embedding supported practice of these skills in strategic and interactive composing approaches. Along with these is the need for teachers to be adept at using video editing software--a tool analogous to a pencil or Word document used in written compositions--for revising and publishing signed compositions.

Conclusion

This research examines the impact of Strategic and Interactive Writing Instruction (SIWI) on the development of expressive language and writing outcomes in deaf students with a particular focus on three genres of communication--recounting, informing, and persuading. SIWI is a framework of strategic, interactive, and responsive language approaches specifically designed to guide teachers in implementing evidence-based writing instruction with deaf students. Yet, little is known about SIWI's impact on the development of genre-based expressive language skills. In this quasi-experimental study, 16 teachers and 69 students were distributed between treatment and comparison groups. At the beginning and end of an academic year, expressive language (either spoken or signed) and writing samples were collected from students. Repeated-measures ANOVA indicated SIWI had a statistically significant impact on the expressive language and writing of students in the recount and information report genres. However, the same impact was not observed within the persuasive genre. Additionally, the reporting of six bivariate correlations show significant, positive, and moderate correlations between expressive language and writing variables. The findings of this study further demonstrate the importance of developing expressive language to support literacy achievement. SIWI has the potential to enhance the development of English for those who only use spoken language and the development of ASL and English for those who also use signed language. Lower than expected growth in some areas suggests that future interventions and research are needed to achieve desired outcomes. We observe an imminent need for an intervention targeting signed compositions through strategic and interactive approaches, which can be imparted to teachers through effective professional development programming. We also suggest that the alignment or misalignment of teacher-student communication is a crucial variable to consider in future interventional studies involving deaf students.

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Appendix

Transcribed Information Report Expressive Language Sample

Pre Prompt B: Share about a hobby or a person.	**Post** Prompt A: Share about a place or an animal.
Hairstylist If you don't know how to be a hairstylist, you can watch YouTube or ask your family, friends, or anyone to help you learn over time. Then, maybe you can do people's hair: braid, flatiron, curl, or any hairstyle.	*El Salvador* Interestingly, El Salvador has different types of houses that are like the ones in the United States. The houses in El Salvador are made of wood using tree branches, and the toilets and showers are not inside. Though the bathrooms are outside, you can use a blanket for privacy. The doors are different than the ones we often see; they have gates with locks. Kids can independently explore anywhere they want, but it's important that the child shares with their family or an adult where they are going before they leave to visit another place. El Salvador has many beaches and pools. It also has a huge water park! In the park, there is a playground with water. It's cool! El Salvador has a white and blue flag with a white stripe in the middle and a blue stripe on the top and bottom of the flag. In the middle of the flag is a boat. El Salvador is near Mexico and Guatemala.

Information Report Written Sample

Pre Prompt A: Share about a place or an animal.	**Post** Prompt B: Share about a hobby or a person.
I Know about school. Many children going school for learning something.	*Skill!* I can do hairsyles, sewing, and make up. I have a cool hairsyles like braids, curly, and

maybe children learning math class, LA class, Heath class can be anything thier learning something, many children must going school for learning something before they maybe going to collage to learning thier job maybe. or maybe learning something before they became a aduit can Thier Job teachers maybe?	straight. How did I learn? Well, my aunt teaching me to make a cool hairsyles. I can make clothes and face mask schky. I can do make up with sparking. love to do design nails, and cooking. I alway help someon to make foods cooking. I love to make foods by self. I love nails design. I like to create nails design. Interesting: I can do a trick things, can make a spainsh music, editing the videos and pics. I can make my own spainsh music. I love to listening my spansh music. I like to editing the pics and pics so people can interesting my editing pics and videos.