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Speech-Language Pathologist Training, Knowledge, and Confidence in Telepractice Service
Delivery

by
Shantel Resare

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To the Graduate Faculty:

The members of the committee appointed to examine the thesis of Shantel Resare find it satisfactory and recommend that it be accepted.

Heather Ramsdell Ph.D., CCC-SLP

Major Advisor

Kris Brock Ph.D., CCC-SLP

Committee Member

Ruiling Guo DHA, MPH, MLIS

Graduate Faculty Representative

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Speech-Language Pathologist Training, Knowledge, and Confidence in Telepractice Service Delivery

Thesis Abstract--Idaho State University (2021)

The purpose of this study was to garner understanding of what factors influence speech-language pathologist confidence in using telepractice as a service delivery model. A national survey was distributed to 6431 speech-language pathologists and 548 responses fit the inclusion criterion. Speech-language pathologist respondents who had more training with telepractice in graduate school reported feeling more confident with delivering telepractice services. Respondents reported that they wished their graduate courses would have contained more information regarding a combination of telepractice topics. Most respondents were interested in continuing education related to best practices in telepractice service delivery. While answers were subject to participation bias, results indicate institutions should consider curriculum containing subtopics into graduate education. This, in turn, could benefit clinicians' sense of competency providing telepractice. Future studies on telepractice could focus on reducing barriers to telepractice.

Keywords: Confidence; In-person; Service delivery model; Telepractice, Training

Chapter I: Introduction

Telepractice provides speech-language pathologists (SLPs) with the opportunity to serve populations that would not have access to, or not be appropriate for in-person service delivery (Tucker, 2012). Telepractice is a model of professional rehabilitation services provided by a clinician via technology in the client's natural environment over a prolonged period of time to children, adolescents, and adults with developmental delays, developmental and acquired disorders, or chronic debilitating disorders (Brienza & McCue, 2013). Telerehabilitation is thought to have gained roots when the telephone was invented and calls were used to conduct therapy (Scalvini et al., 2004). Now telepractice involves the same basic format with a client and clinician interacting at a distance in skilled therapy activities appropriately adapted to delivery via technology. For example, an SLP may meet with a client to administer articulation treatment via an online platform (such as Zoom, Blackboard, Google Meet). Clinicians may present asynchronous material (prerecorded/preprinted/predistributed) that the client can access when they are unavailable to meet synchronously with the clinician. As the body of evidence related to telepractice has evolved, asynchronous sessions have been generally less preferred than concurrent sessions due to the advantage of more immediate skilled therapy. Telepractice has continued to evolve in the recent years.

A major consideration in the evolving landscape of telepractice is client and disorder variables which may preclude some clients from receiving telepractice services. Consider a preschool age child with speech and occupational therapy needs. Telepractice may involve the child sitting on a chair for an extended time and learning how to use a personal computer (with a physical mouse) or a laptop (with a trackpad), which makes the interaction much more complicated for the child. An engaged caregiver would need to be present to guide the client in

using the computer software programs, as well as troubleshooting any technological issues that may occur, but that may not be possible in some family situations. Further, consider clients with severe mobility challenges such as those with cerebral palsy. These clients may have physical and motoric impairments that complicate engagement in telepractice. Speech-language pathologists need to consider client and disorder variables when evaluating telepractice candidacy and when setting up a successful practice (Grillo, 2019). Despite the fact that telepractice may not be appropriate for all clients, its efficacy for client's who can tolerate it makes it a valid method of service delivery throughout the world (Shprintzen, & Golding-Kushner, 2012).

Telepractice is equivalent to in-person service delivery in providing effective therapy for clients (Rietdijk et al., 2020), and is now used extensively due to the coronavirus disease (COVID-19) pandemic. Knowledge and training surrounding technology and procedures has been a point of concern for therapists venturing into telepractice for some time (Tucker, 2012). Clinicians have remained hesitant to provide telepractice because of lack of knowledge and training (American Speech, Language, and Hearing Association [ASHA] 2002, 2016). In fact, telepractice education at the graduate level has been addressed less in school as the need for services continues to grow (Grillo, 2017). Grillo (2020) remarked that due to the disruption of in-person service delivery because of the coronavirus disease (COVID-19) pandemic, telepractice has become a dominating service delivery model. She maintained that telepractice positively impacts client progress because it fully utilizes the naturalistic home setting. She predicts a rise in the use of a hybrid model in the coming years consisting of one session online and one session telepractice per week (E. Grillo, personal communication, September 9, 2020). Therefore, it is

important that telepractice service delivery and its subtopics are covered in graduate level courses and other training.

No standard training for service delivery via telepractice exists (Rao & Yashaswini, 2018), but graduate student confidence in delivering telepractice has been shown to increase when students have received training during graduate school (Rao & Yashaswini, 2018). A preliminary study with audiology students indicated that 8 out of 8 respondents reported higher likelihood to use telepractice after being trained with hands-on experience in graduate school (Watts & Willis, 2017; ASHA, 2012). Not all graduate SLP programs provide hands-on telepractice education and when training is provided, the type of telepractice instruction is not extensive (Cohn & Cason, 2019; Mohan et. al., 2017). Graduate level telepractice education has evolved since telepractice began; however, it still has a long way to go in terms of clinician training, knowledge, and confidence to meet current demands.

Telepractice and Graduate Work

Telepractice is a natural result of the rise of the internet and client demand for continuity of care and coverage. Telepractice allows access to people who are homebound, or who would benefit from therapy provided in a more naturalistic setting, such as the home. Telepractice began to take hold in the United States in 1998 when the National Institute for Disability and Rehabilitation Research (NIDRR) allotted funding to research telepractice as a subset of telehealth. That research was aimed at understanding use of telepractice as an intervention for those who required additional therapy after inpatient rehabilitation ended. Since then, educational institutions have been researching the use of speech and language telepractice to serve individuals in rural areas, with advanced age, or in dangerous inner-city locations where SLPs were less likely to be retained.

Practicum hours are a major component of the graduate school experience. It has not been reported what percent of graduate program used telepractice prior to COVID-19. Through the annual *Communications Sciences & Disorders* (CSD) educational survey, important information is gathered annually regarding CSD education at the undergraduate through doctoral level. The data collected in the survey informs interested individuals of the current educational trends at the graduate level with regards to telepractice. The 2018-2019 report surveyed 281 institutions that offered a master's degree in speech-language pathology. The average number of graduate practicum hours obtained by students in these programs on campus was 117.6, and off campus was 334.7. While these numbers indicated that the students did find clinical placement hours in multiple sites, the researchers did not specify what service delivery models were used.

Further, the survey results revealed that graduate programs could not offer sufficient clinical placements, therefore having to enroll fewer students. Insufficient placements were the highest rated negative impact on graduate school enrollment at 58.4%. (ASHA, 2019). While telepractice could be the bridge to provide more clinical placement opportunities, allowing for graduate schools to accept more students, there are many variables that would need to be carefully considered first. One of these variables would be availability of supervisors. Current requirements indicate that 100% supervision needs to be maintained during telepractice sessions with graduate students. Speech-language pathology supervisor availability may limit the amount of telepractice clinical provision accessible to graduate students. However, current ASHA (2020) policy allows multiple graduate students to acquire clinical hours in the same session while providing joint telepractice with 100% supervision by a qualified SLP. Educational programs in CSD may find this to be a useful avenue to expand student enrollment while meeting the demand for more SLPs who have adequate training in telepractice.

Comprehensive and adequate training will be impacted in part by adequate mentorship by those who have experience in telepractice. It will be beneficial for clinical supervisors to mentor their student clinicians in the telepractice skills they have acquired before and during COVID-19. Graduate students who have academic, clinical, and research mentors are more likely to attend and remain in graduate school, produce better written professional reports and theses, and have more access to placements following academic clinical experiences (Wright-Harp & Cole, 2008). Mentorship combined with telepractice training will successfully foster a smooth transition into telepractice for student clinicians. Telepractice has continued to evolve since first being integrated into clinical graduate programs and will continue to move forward as time changes.

Universities first began involving graduate students in telepractice as part of a research initiative examining its effectiveness as a service delivery model. The universities offered students the option of being part of a telepractice clinical experience that would expand research in the field of speech-language pathology as well as give students hands-on experience (Grogan-Johnson, 2014). The following are examples of graduate student involvement in evaluating, creating therapy plans, executing sessions, recording data, and recording session therapy notes and progress notes all via telepractice.

In 2006, Kent State University in Ohio started a program to determine whether telepractice would be equivalent to in-person therapy for clients in rural areas experiencing a shortage and low retention of SLPs. They followed the lead of other educational telepractice research programs and designed a program where 120 eligible students from two rural school districts in grades 1 through 5 received speech and language telepractice for half of the school year. They used live, interactive videoconferencing via desktop computers, Web cameras, and a videoconferencing application. The project was expanded over several years as the results of the

program indicated that telepractice was as effective as in-person service delivery. This program gave graduate student clinicians training experiences to better prepare them for future telepractice work (Grogan-Johnson, 2014).

Similarly, the *Telepractice and eLearning Lab* run by SLPs and audiologists at the University of Akron included graduate students in telepractice service delivery. They offered those students an enhanced learning experience and a space where they could develop skills and knowledge to use with families and children in early intervention. The unique characteristics of this program were the telepractice coaching component and working with populations who had hearing loss. The coaching component combined the knowledge of skilled SLPs and allowed them to oversee coaching in early intervention. This benefitted the graduate students because they received competent mentorship in how to provide telepractice coaching and advocacy. The SLP and graduate student were tasked with emailing a copy of treatment materials to caregivers; caregivers would print materials before treatment. The clinician would conduct treatment activities initially with the client, and then coach parents through leading activities with clients. These tasks helped students be better prepared to deliver telepractice on their own once they graduated. The students reported that participation in these enhanced experiences prepared them for working in a field that is continually becoming more dependent on non-traditional service delivery options (i.e., telepractice; Houston et al., 2014).

Yet another example of the first use of telepractice details the advantages and effectiveness of telepractice. In Belfast, Maine the Waldo County General Hospital (WCGH) explored telepractice as a response to a client who traveled 4 hours to receive therapy each week (Towey, 2013). Over time, the hospital assumed a larger caseload of clients receiving telepractice. The therapists found telepractice to be more advanced than traditional service

delivery in some respects. Therapists and graduate students reported feeling more creative and flexible with therapy because they had access to more resources on the internet at the click of the mouse, rather than being limited to therapy materials in an office filing cabinet. Speech-language pathologists treated 63 children with speech and language disorders. Of the 63, they sampled a small cohort of children ($n = 10$) presenting with moderate to severe articulation and language disorders. Child progress was compared to 58 children receiving onsite therapy and to the National Outcomes Measurement Survey Functional Communication Measures (FCMs). Researchers stated that the children who received telepractice demonstrated similar or above average outcomes when compared to other clients who received face-to-face services. Namely, scores from children receiving telepractice indicated the domains of comprehension (C; 55%) and spoken language (SL; 59%) were statistically equivalent to traditional therapy (C; 42% and SL; 42%), and statistically higher than national benchmarks (C; 28% and SL; 27%). Due to similar FCMs in children receiving telepractice when compared to national benchmarks, WCGH therapists suggested telepractice is a more convenient, accessible, emerging treatment model, with greater advantages than an in-person treatment model (Towey, 2013). Therapist at WCGH suggested that clinical competency and skill are the most important clinician features for successful telepractice (Miller & Rollnick, 2002). While clinician features are important to successful telepractice, student and new SLPs must have a foundation in national standards as well.

Telepractice and National Standards

National guidelines require clinicians to be well versed on how telepractice differs from in-service delivery, and to adjust their work accordingly. Guidelines for required skills are outlined in ASHA (2017): “Clinicians who deliver telepractice services must possess specialized

knowledge and skills in selecting assessments and interventions that are appropriate to the technology and that take into consideration client and disorder variables” (para. 20). The knowledge and skills required are confidence, an attitude of success (Tucker, 2012), and familiarity with technology. The technology skills needed include a thorough understanding of the hardware, software, internet connectivity, and accessories like cameras and microphones that make telepractice work. Furthermore, SLPs need a working understanding of applications, recording capabilities, annotations, presentation modes, and more. Technology understanding extends to managing online interaction via screen share, games, widgets, and text chat (Telepractice, 2017). In addition, client and disorder variables factor into whether a client is appropriate for telepractice. Furthermore, therapists engaging in telepractice need to understand the level of privacy needs to be maintained as it would in face-to-face interactions.

Telepractice and Clinician Confidence

Speech-language pathologists have been less confident to use telepractice in the past due to the technological requirements of learning how to use technology and videoconferencing applications (Tucker, 2012). Such requirements include initiating internet set-up and connection, managing accounts for videoconferencing and therapy apps, and understanding how to play therapy games and resources via audiovisual presentations while on videoconferencing apps. Thorough hands-on clinical training in specific telepractice skills, technology, and national considerations (procedures and interstate-laws) are an essential component of SLP confidence in telepractice. This preparation will be essential to SLPs of the future and should be included in current SLP curriculum. Researchers have been encouraging this direction in clinical instruction for years, stating, “Education and training of SLPs in the use of technology-enabled practice by educational institutions and professional bodies will also facilitate clinician confidence in

telerehabilitation and prepare future SLPs to engage in this method of service delivery” (Theodoros, 2013, p. 319). This preparation can help reduce barriers that are associated with telepractice.

Common barriers reported by those who use telepractice are many. SLPs reported that troubleshooting, set-up and training client competency was time consuming during the sessions (Tucker, 2012). They indicated that learning how to adapt lessons and materials to an online format was time consuming and did not always meet the client’s needs. These barriers and more may impact the SLPs confidence in delivering quality teletherapy and will be considered in this survey study.

Previous studies have documented SLP knowledge and confidence in areas of practice via collecting identifying information and self-report of competency. Ray (2010) conducted a study determining if greater SLP knowledge in autism management and behavior contributed to SLP confidence. A survey was completed by 336 SLPs regarding confidence working with children who have autism. Those who had more knowledge and training in managing behaviors reported higher confidence in working with children with autism. Increased knowledge and training were shown to increase an SLPs confidence in their chosen service delivery and therapy approach. A survey designed like the study Ray (2010) conducted will help us determine to what extent SLP telepractice training impacts current SLP confidence and what subtopics were most impactful to their education. The subtopics relevant to telepractice are discussed in more detail below.

Telepractice Subtopics

The academic community has explored concepts vital to delivering comprehensive telepractice. Successful telepractice requires the clinician to manage a number of related

concepts as well as clinical professionalism and service delivery. The array of subtopics under the umbrella of telepractice ranges from technology to interpersonal skills. Towrey (2013) outlined the important subtopics of successful telepractice. In order to conduct successful telepractice, the SLP will need the essential technological requirements including a secure and stable internet connection, a desktop, laptop, Ipad, or Iphone, and a private environment. The SLP will need to know acceptable videoconferencing and documentation programs to keep privacy (Google Meet©, Zoom®, Box©,) and programs that enhance therapy (e.g., Theraplatform©, Boom cards®, etc.). The SLP will also need to understand regulatory knowledge (i.e., reimbursement, state licensing restrictions). A challenge facing SLPs is internet and digital management, which includes modem troubleshooting, internet speed testing, privacy settings, and security codes on sessions. An emerging topic in telepractice is supervising eHelpers (“A person who assists the patient during the speech therapy telepractice session...a caregiver, family member, nurse, or teacher”; Towey, 2013, p. 115). The required technical skill competencies are the ability to run computer programs such as PowerPoint, Word, PDF, and file explorer. Additional technical skills the SLP will need are sharing computer screens between clinician and client and using operating systems such as Windows or Mac. Finally, the SLP will need to effectively implement interpersonal skills (i.e., rapport between the clinician, client, and eHelper; understanding session expectations) in order to have a productive session. The caveats associated with providing telepractice services are that rural and frontier areas may not readily have access to reliable internet, making this delivery method less effective in these areas.

Purpose

Taking all of these concepts and ideas into consideration, the long-term goal of this research is to improve outcomes for clients who receive telepractice by better understanding the

key factors associated with SLPs comfort and knowledge for telepractice. Specifically, in this study, the **overall objective** was to explore via survey methodology the relationship between preferred service delivery model with telepractice training, knowledge, and confidence. Our **central hypothesis** was that reported preference for telepractice will be greater in those SLPs with more education in, knowledge of, and confidence with telepractice. Our hypothesis was based on preliminary findings that audiology students noted increased perceived confidence in using telepractice after hands on education (Watts & Willis, 2017). The **rationale** for the proposed research is to inform the field on various educational and training experiences that may, or may not enhance telepractice as a service delivery model. Such evidence may inform SLP university educators and SLPs regarding the provision of effective telepractice.

We tested our central hypothesis by pursuing the following **specific aims** within the framework of a nationally distributed online survey. We explored the association between various characteristics (work experiences, attitudes related to providing telepractice, and geographical location) and an SLPs: **Aim #1.** Level of education surrounding telepractice as a service delivery model, and where education was obtained (e.g., graduate school, continuing education, etc.,). **Aim #2.** Knowledge concerning subtopics of telepractice (as measured by responses to level of familiarity with telepractice-related concepts) including technology requirements and programs, regulatory knowledge, internet and digital management, eHelpers, technical skill competencies for SLP, and interpersonal skills. **Aim #3.** Sense of confidence when providing telepractice (as measured by responses to the survey question similar to, “how confident are you when providing telepractice in your clinical practice?”).

Chapter II: Methods

A survey (see Appendix), approved by the Human Subjects Committee at Idaho State University, was distributed to SLPs across the nation via email. The focus was to explore service delivery models in clinical practice, to better understand education and experiences with telepractice. Survey questions queried everything from clinician demographic information to perceived confidence, telepractice education received, perceived efficacy of telepractice services provided, and overall ease of service delivery. For responses to be included in data analyses, respondents had to report holding a current license to practice in their state, had to report having at least 6 months experience using a traditional in-person service delivery model, had to report having at least 3 months experience using Telepractice as a service delivery model, and had to complete all questions on the survey. Responses were recorded via Likert scale, multiple selection and multiple choice.

Participants

At the time of this study's proposal, there were approximately 182,413 SLPs nationally, according to the 2019 year-end member and affiliate counts published by ASHA. In order to generalize survey results to the clinical population as a whole, a sample size of 600 would guarantee a margin of error no greater than 4% for 95% confidence intervals for proportions (Daniel & Cross, 2018). Based on the predication that only 20% of participants would return surveys, we aimed to email a random sample distribution of approximately 3000 SLPs who either worked in an affiliated college/university department (e.g., SLP, Communication Sciences and Disorders, etc.), or had a publicly listed practice email address. In addition to an initial email requesting participation and providing the survey link, one follow-up reminder email was sent

out, again requesting participation and providing the survey link. Anonymous responses were obtained.

Data Analysis

Descriptive statistics (frequencies, percentages, mean, and range) were calculated to describe demographics and response rates. Survey responses between different preferences for service delivery model (traditional in-person, no preference, telepractice, and no response) are represented in tables for the following categories: demographics and clinical setting (Table 1), training (Table 3), knowledge (Table 5), and confidence (Table 7). Inferential statistics were calculated using IBM SPSS Statistics for Windows, Version 27. Pearson's Chi-Square and Fisher's Exact Test were used to explore the relationship (or level of independence) between criterion and predictor variables. Criterion variables included SLPs' demographic and clinical experience, training, knowledge, and confidence related to service delivery models. The predictor variable was preferred service delivery type. Phi ϕ or Cramer's V were employed to describe the strength of association between criterion and predictor variables. These are useful for depicting the effect size.

Chapter III: Results

Of the 6,431 surveys emailed, 604 (9.4% response rate) were returned, and 549 (90.9% of the total response rate) were useable. Surveys were excluded for a variety of reasons: participants responded “no” to informed consent, did not respond to over 75% of relevant survey questions, were not ASHA members, or were not SLPs.

Statistical Analyses

Chi-square tests of independence were completed using IBM SPSS Statistics for Windows, Version 27 to explore the relationship between SLPs preferred service delivery type and demographic/clinical experience, training, knowledge, and confidence in service delivery models. A standard alpha of .05 was used to determine statistical significance between the criterion and predictor variables. Chi-square analyses have the unique prerequisite that each cell must contain an expected count of at least 5 in 20% of the cells. Fisher’s exact test was designed for small samples and is thus more accurate than Chi-square in instances where more than 20% of the cells contain an expected count below 5. Conversely, chi-square is more accurate than Fisher’s with large samples. Accordingly, Fisher’s exact test results are reported in instances where the prerequisite cell count was not met. In addition to exploring the significance of the relationships between variables, effect size was calculated. Phi ϕ was used for effect size calculations in 2x2 crosstabulation analyses, and values of 0.1 for Phi ϕ were considered a small effect, 0.3 a medium effect, and 0.5 a large effect. Cramer’s V was used for effect size calculations in crosstabulations greater than 2 x 2. Using Cramer’s V, the number of degrees of freedom determines the phi coefficient (ϕ_c) necessary for each range of effect sizes. The higher the number of degrees of freedom, the smaller the phi coefficient needs to be in order to

determine a large effect size. When Cramer's V was used, the ranges, according to the degrees of freedom, are described in the notes sections of the tables.

Some of the response categories were collapsed in order to validate the use of chi-squares by meeting the prerequisite that there would be an expected count of at least 5 in 20% of the cells. All tables in this paper contain a fully, or more complete representation of the pre-collapsed raw data. Data were collapsed as follows. Preferred service delivery model was collapsed from six categories to two (such that strongly and somewhat prefer a traditional in-person service delivery model became *traditional in-person service delivery model*; and no preference, somewhat and strongly prefer a telepractice service delivery model, and no response became *non-traditional service delivery model*). Geographical regions were collapsed from 51 categories to six (such that *Northeast* was made up of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, New Jersey, New York, and Pennsylvania; *Midwest* was made up of Illinois, Indiana, Michigan, Ohio, Wisconsin, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota; *South* was made up of Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, District of Columbia, West Virginia, Alabama, Kentucky, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, and Texas; and *West* was made up of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming, Alaska, California, Hawaii, Oregon, and Washington; *mixed regions*; and *no response* per classifications from the United States Bureau of the Census, 2010). Clinical work setting was collapsed from nine to five categories (such that *college/university*, *hospital*, *private practice*, and *school* remained; and home health, nonresidential healthcare, residential healthcare, other, and no response became *other*). All questions requiring participants to state their level of agreement were collapsed from six to four categories for ease of interpretation (such that

strongly and somewhat disagree became *disagree*; *neither* disagree nor agree remained a neutral response; somewhat and strongly agree became *agree*; and *no response* remained). Questions related to training in telepractice were collapsed from eight categories to five (such that *no training* remained; one telepractice elective course, one telepractice required course, a section of telepractice taught in another course, and a seminar became *undergraduate, graduate, or PhD level course*; *speaking with professors/clinical instructors* remained; *other* remained; and *no response* remained). Amount of technology-enabled training with telepractice was collapsed from six to four categories (such that *none* remained, less than or equal to 25% and 26 to 50% of service provision became *less than or equal to 50%*; 51 to 75% of my service provision and greater than or equal to 76% became *greater than or equal to 51%*; and *no response* remained). Questions related to topics in telepractice course(s) were collapsed from eight to five categories (such that technology requirements and programs, internet and digital management, and technical skills competencies became the single category of *tech requirements, digital management, or tech skills*; *regulatory knowledge* remained; eHelpers management and interpersonal skills became the single category of *eHelpers or interpersonal skills*; a combination of responses remained, and *no response* remained). Factors that keep respondents from using telepractice were collapsed from 12 to 10 categories (such that technological operation concerns, slow internet speed, and financial reasons became the single category of *tech concerns, financial reasons, or slow internet speed*; and all other categories remained).

Variables of Interest

For the sake of results/discussion of descriptive statistics (percentages) in the following sections, we will compare respondents who prefer a traditional in-person service delivery model versus those who prefer telepractice as a service delivery model. When discussing statistical

comparisons, respondents were grouped according to collapsed data such that those who prefer a traditional in-person service delivery model were compared to the group of those who had no preference, preferred telepractice, or did not respond.

Demographics/Clinical Setting

For information related to demographics and clinical setting, see Table 1. Speech-language pathologists who prefer a traditional in-person versus telepractice service delivery model were similarly distributed across levels of education. With respect to geographical region, more SLPs who prefer in-person services work in the Midwest (specifically the West North Central: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota; difference of 10.66%) and the South (specifically the South Atlantic: Delaware, District of Colombia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia; difference of 9.28%); whereas there was a higher percentage of SLPs who prefer telepractice services across a mix of geographical regions (difference of 20.15%). Then, for population size surrounding work settings, there was a higher percentage of SLPs who prefer in-person services working in urban areas (difference of 7.5%) and a higher percentage of SLPs who prefer telepractice services working in suburban areas (difference of 10.10%). With respect to primary work setting, more SLPs who prefer in-person services reported to work in a college/university setting (difference of 7.61%), while more SLPs who prefer telepractice services reported to work in a private practice setting (difference of 7.29%). Finally, more SLPs who work with children between 5;1 years and 12;0 years reported a preference for telepractice as a service delivery model. As observed in Table 1, other responses across groups based on preferred service delivery model were similar.

Table 1
Demographics and Clinical Setting (N=552)

	Preferred Service Delivery Model							
	Traditional In-Person (n = 388)		No Preference (n = 58)		Telepractice (n = 22)		No Response (n=82)	
	%	n	%	n	%	n	%	n
Level of education								
Masters	84.79	329	62.07	36	86.36	19	68.29	56
PhD	12.89	50	34.48	20	13.64	3	29.27	24
Other doctoral	2.32	9	3.45	2	0.00	0	1.22	1
Other	0.52	2	0.00	0	0.00	0	1.22	1
Geographical regions								
Northeast								
New England	4.90	19	1.72	1	4.55	1	7.32	6
Mid-Atlantic	11.86	46	6.90	4	13.64	3	14.63	12
Midwest								
East North Central	15.72	61	17.24	10	13.64	3	15.85	13
West North Central	15.21	59	5.17	3	4.55	1	8.54	7
South								
South Atlantic	9.28	36	10.34	6	0.00	0	9.76	8
East South Central	5.93	23	8.62	5	9.09	2	4.88	4
West South Central	10.31	40	12.07	7	4.55	1	10.98	9
West								
Mountain	10.31	40	18.97	11	9.09	2	10.98	9
Pacific	13.92	54	13.79	8	13.64	3	9.76	8
Mixed	2.58	10	5.17	3	22.73	5	6.10	5
No Response	0.26	1	0.00	0	0.00	0	1.22	1
Population Size of Work Setting								
Rural	16.24	63	22.41	13	13.64	3	25.61	21
Suburban	62.63	243	62.07	36	72.73	16	50.00	41
Urban	21.13	82	15.52	9	13.64	3	23.17	19
No response	0.52	2	0.00	0	0.00	0	1.22	1
Primary Work Setting								
College/university	39.43	153	62.07	36	31.82	7	64.63	53
Hospital	2.06	8	1.72	1	4.55	1	1.22	1
Non-residential health care	0.00	0	0.00	0	0.00	0	0.00	0
Private practice	1.80	7	10.34	6	9.09	2	0.00	0
Residential health care	0.00	0	0.00	0	0.00	0	0.00	0
School	53.87	209	24.14	14	50.00	11	30.49	25
Home health	0.52	2	0.00	0	0.00	0	1.22	1
Other	1.55	6	0.00	0	0.00	0	2.44	2
No response	1.29	5	1.72	1	4.55	1	0.00	0
Primary Client Age Group								
0 to 3;0 years	1.55	6	5.17	3	0.00	0	7.32	6
3;1 to 5;0 years	18.56	72	8.62	5	13.64	3	14.63	12
5;1 to 12;0 years	52.32	203	37.93	22	68.18	15	45.12	37
12;1 to 18;0 years	8.76	34	8.62	5	4.55	1	3.66	3
18;1 to 65;0 years	13.14	51	32.76	19	9.09	2	24.39	20
65;1 years and up	5.15	20	6.90	4	4.55	1	4.88	4
No response	1.03	4	0.00	0	0.00	0	0.00	0

Note. The geographical regions were delineated according to the United States Bureau of the Census (2010).

The statistical relationships between preferred service delivery model and demographics/clinical setting are listed in Table 2. As can be seen, all comparisons were statistically significant at the $p < 0.05$ level or smaller, with the exception of that for preferred service delivery model by population size (rural, urban, suburban, or no response). Statistically, for level of education, more SLPs who prefer in-person services had a master's degree, while more who do not prefer in-person services had a PhD; for geographical region, results are similar to those described above; for work setting, more SLPs who prefer in-person services work in a school, while the others primarily work in a college/university; and for clinical age group, more SLPs who prefer in-person services work with children between 5;1 years and 12;0 years, while others primarily work with adults between 18;1 years and 65;0 years. Effect sizes ranged from small to large.

Table 2
Preferred Service Delivery Model by Demographics/Clinical Setting: Chi Square (X^2)/Fisher's Exact Test and Phi ϕ /Cramer's V (ϕ_c)

Variables of Interest	Fisher's Exact Test p Value	df	φ_c	Effect size	
Population Size Rural, Suburban, Urban	0.268	3*	0.080	Small	
Client Age Group	0.001	6***	0.208	Large	
	X^2	df	p	φ	Effect size
Level of Education	17.964	1	0.000	0.181	Small
	X^2	df	p	φ_c	Effect size
Geographical Region	11.480	4**	0.021	0.145	Small
Work Setting	25.946	4**	0.000	0.217	Medium

*Three degrees of freedom (df) determines the range of effect sizes for Cramer's V to be small = 0.06, medium = 0.17, and large = 0.29.

**Four degrees of freedom (df) determines the range of effect sizes for Cramer's V to be small = 0.05, medium = 0.15, and large = 0.25.

***Six degrees of freedom (df) determines the range of effect sizes for Cramer's V to be small = 0.04, medium = 0.13, and large = 0.20.

Aim #1. Training

For information related to SLP training, see Table 3. With respect to telepractice training, more SLPs who prefer in-person services received training from a mix of sources (difference of 9.72%), whereas there was a higher percentage of SLPs who prefer telepractice services who received training from ASHA continuing education (difference of 10.19%). Speech-language pathologists who prefer a traditional in-person versus telepractice service delivery model were

similarly distributed across experience in telepractice courses in graduate school and technology-enabled telepractice provision in graduate school. With respect to best preparation, more SLPs who prefer in-person services took “other” training (difference of 2.58%), and more SLPs who prefer telepractice services reported none of their courses provided best preparation (difference of 6.02%). Then, with respect to subtopics, more SLPs who prefer in-person services received training in courses covering a combination of subtopics (difference of 7.26%); whereas more SLPs who prefer telepractice received training in courses covering technical skill competencies (difference of 3%). Last, with respect to SLP wish for subtopics covered in courses, SLPs who prefer in-person services wished their courses covered regulatory knowledge (difference of 2.32%), and SLPs who prefer telepractice wished their courses covered a combination of subtopics (difference of 13.28%).

Table 3
Training

	Preferred Service Delivery Model							
	Traditional In-Person (n = 388)		No Preference (n = 58)		Telepractice (n = 22)		No Response (n=82)	
	%	n	%	n	%	n	%	n
Where did you receive training in telepractice?								
Undergraduate	0.00	0	0.00	0	0.00	0	0.00	0
Graduate	0.77	3	3.45	2	0.00	0	0.00	0
PhD	0.77	3	0.00	0	0.00	0	0.00	0
ASHA continuing education	7.99	31	12.07	7	18.18	4	0.00	0
Other continuing education	0.00	0	0.00	0	0.00	0	0.00	0
Other	20.10	78	18.97	11	22.73	5	1.22	1
No Response	2.06	8	1.72	1	0.00	0	98.78	81
Multiple Response	68.81	267	65.52	38	59.09	13	0.00	0
Describe your experience in telepractice courses in graduate school?								
None	91.75	356	89.66	52	90.91	20	1.22	1
One telepractice elective course	0.26	1	0.00	0	0.00	0	0.00	0
One telepractice required course	0.00	0	0.00	0	0.00	0	0.00	0
A section of telepractice taught in another course	3.09	12	3.45	2	4.55	1	0.00	0
Seminar	0.77	3	3.45	2	0.00	0	0.00	0
Speaking with professors/clinical instructors about telepractice	2.32	9	0.00	0	4.55	1	0.00	0
Other	1.80	7	3.45	2	0.00	0	0.00	0
No response	0.52	2	0.00	0	0.00	0	98.78	81
What amount of your graduate level telepractice clinical service provision was technology-enabled (training with telepractice service delivery)?								

None	94.85	368	96.55	56	95.45	21	1.22	1
Less than or equal to 25% of my service provision was via telepractice	3.61	14	0.00	0	4.55	1	0.00	0
26% to 50% of my service provision was via telepractice	0.26	1	1.72	1	0.00	0	0.00	0
51% to 75% of my service provision was via telepractice	0.00	0	1.72	1	0.00	0	0.00	0
Greater than or equal to 76%% of my service provision was via telepractice	0.52	2	0.00	0	0.00	0	0.00	0
No response	1.29	5	0.00	0	0.00	0	98.78	81
Which of your graduate level courses provided the best preparation for telepractice?								
None	89.43	347	93.10	54	95.45	21	1.22	1
One telepractice elective course	0.52	2	0.00	0	0.00	0	0.00	0
One telepractice required course	0.00	0	0.00	0	0.00	0	0.00	0
A section of telepractice taught in another course	1.55	6	1.72	1	0.00	0	0.00	0
Seminar	0.77	3	0.00	0	0.00	0	0.00	0
Speaking with professors/clinical instructors about telepractice	4.64	18	3.45	2	4.55	1	0.00	0
Other	2.58	10	1.72	1	0.00	0	0.00	0
No response	1.03	4	0.00	0	0.00	0	98.78	81
Which subtopics did your telepractice course(s) cover? Select all that apply.								
Technology requirements and programs	1.80	7	0.00	0	0.00	0	0.00	0
Regulatory knowledge (i.e., reimbursement, state licensing restrictions)	1.29	5	1.72	1	0.00	0	0.00	0
Internet and digital management eHelpers management -“A person who assists the patient during the speech therapy telepractice session...a caregiver, family member nurse, or teacher”(Towey, 2013, p 115).	0.26	1	0.00	0	0.00	0	0.00	0
Technical skill competencies for SLP (i.e., running tech programs, sharing screens, using operating systems)	0.00	0	0.00	0	0.00	0	0.00	0
Interpersonal skills (i.e., rapport w/ client and eHelper, session expectations)	1.55	6	1.72	1	4.55	1	0.00	0
Combination of responses	0.77	3	0.00	0	0.00	0	0.00	0
No response	29.38	114	20.69	12	22.73	5	0.00	0
	65.46	254	75.86	44	72.73	16	100.00	82
What do you wish your training in telepractice would have included? Select all that apply.								
Technology requirements and programs	1.03	4	1.72	1	0.00	0	0.00	0
Regulatory knowledge (i.e., reimbursement, state licensing restrictions)	2.32	9	5.17	3	0.00	0	0.00	0
Internet and digital management eHelpers management -“A person who assists the patient during the	0.52	2	0.00	0	0.00	0	0.00	0
	2.06	8	5.17	3	9.09	2	0.00	0

speech therapy telepractice session...a caregiver, family member nurse, or teacher”(Towey, 2013, p 115).

Technical skill competencies for SLP (i.e., running tech programs, sharing screens, using operating systems)	2.06	8	5.17	3	9.09	2	0.00	0
Interpersonal skills (i.e., rapport w/ client and eHelper, session expectations)	1.80	7	1.72	1	4.55	1	0.00	0
Combination of responses	54.90	213	41.38	24	68.18	15	0.00	0
No response	35.82	139	39.66	23	9.09	2	100.00	82

The statistical relationships between preferred service delivery model and training are listed in Table 4. As can be seen, all comparisons were statistically significant at the $p < 0.05$ level or smaller. Statistically, for telepractice training received, results are similar to those described above. For course experience in graduate school, more SLPs who prefer in-person services received no training, while the others did not respond or received courses primarily through a seminar. For technology-enabled telepractice provision in graduate school, more SLPs who prefer in-person services were not technology-enabled, while others did not respond or reported 51-75% of graduate level service provision as via telepractice. For best preparation in graduate courses, more SLPs who prefer in-person services reported none of their courses prepared them for telepractice service delivery, while more of others did not respond. For subtopics covered, more SLPs who prefer in-person services reported a combination of subtopics, while others did not respond or reported technical skill competencies. For subtopics that SLPs wished their courses covered, more SLPs who prefer in-person services reported a combination of subtopics, while more others did not respond or reported eHelpers or technical skills competencies. Effect sizes ranged from medium to large.

Table 4***Preferred Service Delivery Model by Training: Chi Square (X^2)/Fisher's Exact Test and Cramer's V (ϕ_c)***

Variables of Interest	Fisher's Exact Test p Value	df	φ_c	Effect size	
What amount of your graduate level telepractice clinical service provision was technology-enabled (training with telepractice service delivery)?	0.000	3*	0.610	Large	
Which subtopics did your telepractice course(s) cover?	0.000	4**	0.227	Medium	
	X^2	df	p	φ_c	Effect size
Where did you receive training in telepractice?	196.861	4**	0.000	0.599	Large
Describe your experience in telepractice courses in graduate school?	217.356	4**	0.000	0.629	Large
Which of your graduate level courses provided the best preparation for telepractice?	208.908	4**	0.000	0.617	Large
What do you wish your training in telepractice would have included?	46.213	4**	0.000	0.290	Large

*Three degrees of freedom (df) determines the range of effect sizes for Cramer's V to be small = 0.06, medium = 0.17, and large = 0.29.**Four degrees of freedom (df) determines the range of effect sizes for Cramer's V to be small = 0.05, medium = 0.15, and large = 0.25.**Aim #2. Knowledge Concerning Subtopics of Telepractice**

Descriptive statistics related to knowledge concerning subtopics of telepractice are presented in Table 5. With respect to knowing where to find telepractice resources, more SLPs who prefer in-person services neither agreed nor disagreed (difference of 9.28%) that they know where to find resources; whereas more SLPs who prefer telepractice services agreed (difference of 21.74%) that they know where to find resources. With respect to whether or not formal training is needed to provide quality telepractice services, more SLPs who prefer in-person services agreed (difference of 13.96%) that training is needed and more SLPs who prefer telepractice services disagreed (difference of 19.59%). Speech-language pathologists who prefer in-person versus telepractice service delivery model were similarly distributed with respect to opinions on whether or not current telepractice training is adequate for graduate students, and whether or not a training certification should be required to provide telepractice. With respect to opinions on whether or not telepractice-specific training should be required in graduate school, more SLPs who prefer in-person services disagreed (difference of 12.23%) that training should

be required, while more SLPs who prefer telepractice services neither agreed nor disagreed (difference of 12.65%). In regard to technology breakdown deterring SLP interest in using telepractice, more SLPs who prefer in-person services agreed (difference of 28.37%) with this statement, while more SLPs who prefer telepractice services disagreed (difference of 20.52%). Finally, with regard to interest in receiving continuing education in telepractice best practices, more SLPs who prefer in-person services neither agreed nor disagreed (difference of 9.63%) that they were interested, while more SLPs who prefer telepractice services agreed (difference of 23.03%).

Table 5
Knowledge Concerning Subtopics of Telepractice

	Preferred Service Delivery Model							
	Traditional In-Person (n = 388)		No Preference (n = 58)		Telepractice (n = 22)		No Response (n=82)	
	%	n	%	n	%	n	%	n
I know where to find telepractice resources sufficient to my needs.								
Disagree	12.11	47	3.45	2	4.55	1	0.00	0
Neither agree nor disagree	9.28	36	5.17	3	0.00	0	0.00	0
Agree	73.71	286	81.03	47	95.45	21	0.00	0
No response	4.90	19	10.34	6	0.00	0	100.00	82
I need to obtain formal training (e.g., take a course, CEU) to provide quality telepractice.								
Disagree	30.41	118	34.48	20	50.00	11	0.00	0
Neither agree nor disagree	24.23	94	25.86	15	22.73	5	0.00	0
Agree	41.24	160	27.59	16	27.27	6	0.00	0
No response	4.64	18	12.07	7	0.00	0	100.00	82
The current field-specific telepractice training is adequate for SLP coming out of graduate school.								
Disagree	34.02	132	48.28	28	36.36	8	0.00	0
Neither agree nor disagree	44.07	171	32.76	19	45.45	10	0.00	0
Agree	15.21	59	6.90	4	13.64	3	0.00	0
No response	7.22	28	12.07	7	4.55	1	100.00	82
A training certification should be required in order to provide telepractice.								
Disagree	48.45	188	55.17	32	50.00	11	0.00	0
Neither agree nor disagree	25.00	97	18.97	11	27.27	6	0.00	0
Agree	22.16	86	12.07	7	22.73	5	0.00	0
No response	4.90	19	13.79	8	0.00	0	100.00	82
Telepractice-specific training in graduate school should be required in order to provide telepractice.								
Disagree	30.41	118	41.38	24	18.18	4	0.00	0
Neither agree nor	23.71	92	20.69	12	36.36	8	0.00	0

disagree								
Agree	40.98	159	25.86	15	45.45	10	0.00	0
No response	5.41	21	12.07	7	0.00	0	100.00	82
Technology breakdown deters my interest in using telepractice.								
Disagree	34.02	132	60.34	35	54.55	12	0.00	0
Neither agree nor disagree	19.07	74	22.41	13	31.82	7	0.00	0
Agree	42.01	163	5.17	3	13.64	3	0.00	0
No response	5.41	21	12.07	7	0.00	0	100.00	82
I am interested in receiving continuing education related to best practices in telepractice service delivery.								
Disagree	7.99	31	3.45	2	0.00	0	0.00	0
Neither agree nor disagree	14.18	55	13.79	8	4.55	1	0.00	0
Agree	72.42	281	68.97	40	95.45	21	0.00	0
No response	5.93	23	13.79	8	0.00	0	100.00	82

The statistical relationships between preferred service delivery model and knowledge of teletherapy are listed in Table 6. As can be seen, all comparisons were statistically significant at the $p < 0.05$ level or smaller. Statistically, for knowledge of finding resources, more SLPs who prefer in-person services agreed that they know where to find resources, while more who do not prefer in-person services did not respond. For opinion on formal training, more SLPs who prefer in-person services disagreed with the need for formal training, while others did not respond. For current telepractice training adequate for graduate school, more SLPs who prefer in-person service delivery neither agreed nor disagreed with the adequacy of current training, while others mostly did not respond. For opinion whether a training certification should be required, more SLPs who prefer in-person services disagreed with the need for a training certificate, while others primarily did not respond. For opinion whether telepractice-specific training in graduate school should be required, more SLPs who prefer in-person services agreed that additional training is needed, while others primarily did not respond. For whether technology breakdowns deter interest, results were similar to those described above. For interest in receiving continuing education for best practices, more SLPs who prefer in-person services agreed with interest, while

others primarily did not respond. Effect sizes were large. Due to the amount of people who did not respond to this section of the survey the reported results were potentially skewed.

Table 6
Preferred Service Delivery Model by Knowledge Concerning Subtopics of Telepractice: Chi Square (X^2) and Cramer's V (ϕ_c)

Variables of Interest	X^2	df	p	ϕ_c	Effect size
I know where to find telepractice resources sufficient to my needs.	181.723	3	0.000	0.575	Large
I need to obtain formal training (e.g., take a course, CEU) to provide quality telepractice.	185.705	3	0.000	0.582	Large
The current field-specific telepractice training is adequate for SLP coming out of graduate school.	160.138	3	0.000	0.540	Large
A training certification should be required in order to provide telepractice.	184.185	3	0.000	0.579	Large
Telepractice-specific training in graduate school should be required in order to provide telepractice.	174.756	3	0.000	0.564	Large
Technology breakdown deters my interest in using telepractice.	196.096	3	0.000	0.598	Large
I am interested in receiving continuing education related to best practices in telepractice service delivery.	172.862	3	0.00	0.561	Large

Three degrees of freedom (df) determines the range of effect sizes for Cramer's V to be small = 0.06, medium = 0.17, and large = 0.29.

Aim #3. Confidence Related to Telepractice

Descriptive statistics for confidence in telepractice are presented in Table 7. With respect to confidence to deliver quality telepractice directly after graduation, more SLPs who prefer in-person services disagreed (difference of 20.62%) that they felt confident, while more SLPs who prefer telepractice services neither agreed nor disagreed (difference of 10.61%). Then, with respect to currently feeling confident providing quality telepractice, more SLPs who prefer in-person services disagreed (difference of 8.34%) with current confidence, while more SLPs who prefer telepractice services agreed (difference of 20.45%). Finally, with regards to knowledge and use of technology influencing confidence implementing telepractice, more SLPs who prefer in-person services neither agreed nor disagreed (difference of 9.11%) with this statement, while more SLPs who prefer telepractice services agreed (difference of 14.62%).

Table 7
Confidence Related to Telepractice (N = 552)

	Preferred Service Delivery Model							
	Traditional In-Person (n = 388)		No Preference (n = 58)		Telepractice (n = 22)		No Response (n=82)	
	%	n	%	n	%	n	%	n
I felt confident to deliver quality telepractice directly after graduation.								
Disagree	70.62	274	55.17	32	50.00	11	0.00	0
Neutral	12.11	47	13.79	8	22.73	5	0.00	0
Agree	9.54	37	12.07	7	18.18	4	0.00	0
No Response	8.25	32	18.97	11	9.09	2	100.00	82
I currently feel confident providing quality telepractice.								
Disagree	12.89	50	3.45	2	4.55	1	0.00	0
Neutral	7.99	31	5.17	3	0.00	0	0.00	0
Agree	75.00	291	81.03	47	95.45	21	0.00	0
No Response	4.64	18	10.34	6	0.00	0	100.00	82
My knowledge and use of technology influence my confidence in implementing telepractice as a service delivery model.								
Disagree	4.64	18	8.62	5	4.55	1	0.00	0
Neutral	13.66	53	3.45	2	4.55	1	0.00	0
Agree	76.29	296	74.14	43	90.91	20	0.00	0
No Response	5.93	23	13.79	8	0.00	0	100.00	82

The statistical relationships between preferred service delivery model and confidence are listed in Table 8. As can be seen, all comparisons were statistically significant at the $p < 0.05$ level or smaller. Statistically, confidence to deliver quality telepractice directly after graduation, more SLPs who prefer in-person services disagreed, while more others did not respond. For currently feeling confident providing quality telepractice, more SLPs who prefer in-person services agreed, while more others did not respond. Finally, for knowledge and use of technology influencing confidence implementing telepractice, more SLPs who prefer in-person services agreed, while more others did not respond. Effect sizes were large.

Table 8
Preferred Service Delivery Model by Confidence Related to Telepractice: Chi Square (X^2) and Cramer's V (ϕ_c)

Variables of Interest	X^2	df	p	ϕ_c	Effect size
I felt confident to deliver quality telepractice directly after graduation.	164.622	3	0.000	0.548	Large
I currently feel confident providing quality telepractice.	184.430	3	0.000	0.580	Large
My knowledge and use of technology influence my confidence in implementing telepractice as a service delivery model.	175.079	3	0.000	0.565	Large

Three degrees of freedom (df) determines the range of effect sizes for Cramer's V to be small = 0.06, medium = 0.17, and large = 0.29.

In terms of barriers, 41% of respondents reported nothing was the primary thing keeping them from using telepractice (226); 20% reported that the client not appropriate for therapy (108). Less reported factors considering barriers were slow internet speed, limited access to technology, opinion that it is not an effective/efficient, fear, and disinterest. This is consistent with prior research that technology is a barrier to telepractice. Although telepractice is not a new practice, accessing adequate internet is difficult especially in rural areas. Because telepractice is useful in rural areas, this internet and access barrier in rural areas is an additional difficulty.

Chapter IV: Discussion

Due to the COVID-19 pandemic state, county and school districts dictated the move to telepractice for many schools and practices. These changes and the subsequent training for telepractice impacted Speech-language pathologist opinion on preference for in-person or telepractice service delivery. The purpose of this study was to explore via survey methodology the relationship between SLP preferred service delivery model with telepractice training, knowledge, and confidence. We expected a preference for telepractice would be greater in those SLPs with more education in, knowledge of, and confidence with telepractice. We explored the association between various characteristics (work experiences, attitudes related to providing telepractice, and geographical location) and an SLPs: Aim #1. Level of education surrounding telepractice as a service delivery model, and where education was obtained; Aim #2. Knowledge concerning subtopics of telepractice including technology requirements and programs, regulatory knowledge, internet and digital management, eHelpers, technical skill competencies for SLP, and interpersonal skills; and Aim #3. Sense of confidence when providing telepractice. Ultimately, our purpose is to improve outcomes for clients who receive telepractice by better understanding the key factors associated with SLPs comfort with and knowledge of telepractice.

Demographics/Clinical Setting

While telepractice has become important for delivery of speech and language services during the pandemic, almost all SLP respondents reported that they prefer in-person service delivery, especially the typical, master's level clinician, working in Midwest (per United States Bureau of the Census geographical delineations, 2010) suburbia across a range of client ages. Those with a PhD, working in private practice, in West North Central and South Atlantic geographical and/or rural regions with elementary school age children expressed preference for

telepractice, had no preference, or did not respond. Perhaps those with PhD have more comfort using technology, have more time to learn and implement technology programs, and have access to technology.

Aim #1. Training

While most respondents reported receiving no training for delivery of telepractice services in graduate school, those who did report confidence providing telepractice indicated that they received training through continuing education (in clear opposition to those who were not confident with implementing telepractice). Very few SLPs reported that their education included hands-on technology-enabled telepractice training, and of those who did receive training, it was reported to be through a section of a course or through independently speaking with professors/clinical mentors outside of courses. Topics covered in training that was obtained most often consisted of a combination of technology requirements, regulatory knowledge, internet and digital management, eHelpers management, Technical skills and competencies, Interpersonal skills. Also, there was general consensus across respondents that they would have benefited from additional coursework on technological competency.

Aim #2. Knowledge Concerning Subtopics of Telepractice

Many respondents indicated that they do not know where to find materials to inform their service delivery through telepractice, and that their graduate courses did not adequately prepare them for implementing telepractice. Despite this lack of preparation, respondents were divided on whether a telepractice training certification is needed to sufficiently implement telepractice, whether telepractice-specific training in graduate school should be required. Respondents were not divided on the topic of continuing education, however, with the majority interested in learning about best practices in telepractice service delivery.

Aim #3. Confidence Related to Telepractice

According to our results, most respondents did not feel confident delivering quality telepractice directly after graduation; and while all reported feeling confident currently, those who indicated a preference for telepractice reported confidence at a higher percent than those who reported a preference for traditional in-person service delivery. The majority of respondents agreed that their knowledge of technology influences their confidence implementing telepractice. This is consistent with prior research done with audiology students who reported more confidence when exposed to hands-on telepractice (Watts & Willis, 2017). This expands the research in demonstrating that the level of confidence before training is lower than after training. Confidence continues to be a contributing factor to use of telepractice.

Limitations and Future Directions

Consideration of threats to internal and external validity reveal several potential flaws that may have impacted the results of this survey study. A common challenge with survey designs (especially ones that involve controversial topics) is response bias. Those who feel compelled to respond to surveys, often hold polarized views that lean strongly either positively or negatively for a particular topic. Accordingly, response bias is a potential limitation because the participants volunteered to participate in the survey, perhaps because they feel particularly strongly about the topic of service delivery models. In the future, perhaps offering a prize could mitigate response bias, by eliciting responses from a larger demographic of SLPs.

Another limitation is the fact that this survey covered sensitive topics related to SLPs' ability to serve clients via a new and nontraditional service delivery model. This may have impacted the way in which respondents answered questions. They may have felt compelled to respond favorably, to present themselves as competent practitioners in the field (Van de Mortel,

2008). Therefore, a social desirability bias may have affected the results. In the future, this could be mitigated by employing a control of social desirability bias within the survey.

Question formulation is another consideration, and may have impacted respondents' answers. There may have been questions that were posed in such a way that swayed respondents to provide certain responses. In order to mitigate this issue in future research, the same questions could be posed in different ways throughout the survey to look for consistency in answers. Also, the survey could be better vetted by consulting a number of SLPs for feedback to the survey design, prior to finalizing and distributing it.

Then, of the 549 participants, 81 did not respond to a majority of the questions at the end of the survey, which possibly skewed some results. We attempted to overcome this concern through exploration and reporting of trends observed. Future directions could look into knowledge of telepractice in more detail with more respondents. Future directions may focus on enhancing SLP provision of telepractice through decreasing clinician fear of technology through training. Future directions can look at why SLPs prefer certain client age groups for telepractice versus in-person services. Additionally, further research may investigate how to support SLPs who prefer telepractice in rural locations, and the impact of multicultural considerations on telepractice across cultures/languages.

Clinical Implications and Conclusions

These results inform the field on the current opinion of SLPs. There is a need for graduate programs to provide education regarding subtopics important for telepractice, and where related materials can be found. Even more so, there is an interest in and need for continuing education on the topic. These results may also inform the field such that those in rural areas prefer telepractice more than suburban areas, and therefore, it is important to identify ways

to support telepractice as a service delivery model in rural areas and grow it in suburban areas. Any such change would enhance telepractice as a service delivery model.

Through this research, we aimed to inform the field on SLP confidence in, training in, and knowledge of telepractice. Based on a national survey study, it can be concluded that SLPs who have more training with telepractice in graduate school, feel more confident to deliver telepractice services. Further, those who prefer telepractice, have more knowledge on subtopics of telepractice (e.g., technology requirements and programs, regulatory knowledge, internet and digital management, eHelper management, technical skill competencies, interpersonal skills, etc.). This research illustrates that barriers continue to deter some SLPs from using telepractice, but provides insight into types of barriers most commonly encountered (client not appropriate for therapy, slow internet speed, limited access to technology, opinion that it is not an effective/efficient, fear, and disinterest). Based on these results, continuing education (or graduate programs) could consider integrating comprehensive coverage of telepractice subtopics into courses designed for SLP education. To better understand implications of these results, future studies on telepractice could focus on enhancing SLP telepractice through reducing fear of technology use. Examining factors contributing to SLP knowledge, confidence, and training in telepractice will help inform the field on how to enhance provision of information on telepractice, specifically that covered in continuing education and/or graduate coursework. This, in turn, could benefit SLP's sense of confidence for providing speech and language services via telepractice.

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Appendix

Speech-Language Pathologist Training, Knowledge, and Confidence in Telepractice Service Delivery

As part of a graduate research project, my thesis adviser, Heather L. Ramsdell, PhD CCC-SLP, and I, Shantel Resare, are conducting a survey to explore speech-language pathologist's training, knowledge, and confidence in telepractice delivery. Ultimately, we hope to elevate graduate level education and current practicing speech-language pathologist knowledge on what leads to the best training, knowledge, and confidence in service delivery. Approval for the study has been obtained by the Human Subjects Committee at Idaho State University.

This survey is being distributed to speech-language pathologists across the United States. It is brief and will take you no more than 10 minutes to complete. Your response is voluntary and any information you provide will remain anonymous. Your completion of this survey would be greatly appreciated and would help to advance the field by enabling our team to find out more about graduate education in speech-language pathology. We thank you for your time and consideration!

Please respond to all questions by selecting the appropriate option based on your current work setting. We will send two reminder emails to those who have not yet completed the survey, and responses are needed by xxx.

- (1) Are you a member of the American Speech-Language Hearing Association (ASHA)?
 - a. Yes
 - b. No

- (2) What is your current certification status?
 - a. None
 - b. Clinical fellow (CF)
 - c. Certified Speech-Language Pathologist (CCC-SLP)
 - d. Certified Audiologist (CCC-A)
 - e. Dual certified (CCC-SLP and CCC-A)
 - f. Only state licensed
 - g. Other

- (3) What is the highest level of education that you have completed?
 - a. Associate's degree
 - b. Bachelor's degree
 - c. Master's degree
 - d. Doctor of philosophy
 - e. Other doctoral degree (e.g., of Medicine, Audiology, Speech-Language Pathology, Education, etc.)
 - f. Other

(4) In what geographical region do you practice?

Alabama	Idaho	Minnesota	North Dakota	Vermont
Alaska	Illinois	Mississippi	Ohio	Virginia
Arizona	Indiana	Missouri	Oklahoma	Washington
Arkansas	Iowa	Montana	Oregon	West Virginia
California	Kansas	Nebraska	Pennsylvania	Wisconsin
Colorado	Kentucky	Nevada	Rhode Island	Wyoming
Connecticut	Louisiana	New Hampshire	South Carolina	Washington DC
Delaware	Maine	New Jersey	South Dakota	Other
Florida	Maryland	New Mexico	Tennessee	
Georgia	Massachusetts	New York	Texas	
Hawaii	Michigan	North Carolina	Utah	

(5) How would you classify the primary area where you practice speech-language pathology?

- a. Rural
- b. Suburban (largely populated by single-family homes)
- c. Urban (a dense city-like environment)
- d. Other

(6) How would you classify the primary area where you practice speech-language pathology?

- a. College/university
- b. Hospital
- c. Non-residential health care facility
- d. Private practice
- e. Residential health care facility
- a. School

- b. Other
- (7) What is the primary age group that you work with?
- a. 0 to 3;0 years
 - b. 3;1 to 5;0 years
 - c. 5;1 to 12;0 years
 - d. 12;1 to 18;0 years
 - e. 18;0 to 65;0 years
 - f. 65;1 years +
- (8) What is your preferred speech-language pathology service delivery method for treatment and diagnosis?
- a. Strongly prefer the traditional face-to-face service delivery model
 - b. Somewhat prefer the traditional face-to-face service delivery model
 - c. No preference between traditional and telepractice service delivery models
 - d. Somewhat prefer telepractice as a service delivery model
 - e. Strongly prefer telepractice as a service delivery model
- (9) Traditionally, most clinical speech-language pathology services (treatment and diagnosis) are provided using face-to-face methods (which includes the client and a clinician participating in evaluation and/or treatment activities while physically sharing the same space). How often do provide clinical speech-language pathology services via the traditional face-to-face service delivery model?
- a. I do not use a traditional face-to-face service delivery model
 - b. $\leq 25\%$ of the time
 - c. 26 to 50 % of the time
 - d. 51 to 75 % of the time
 - e. $\geq 76\%$ of the time
- (10) The spread of COVID-19 has initiated a spike in service providers utilizing telepractice delivery models (including the use of videoconferencing technologies to provide speech-language pathology treatment and diagnosis at a distance). How often do you provide clinical speech-language pathology services via a telepractice service delivery model?
- a. I do not use telepractice as a service delivery model
 - b. $\leq 25\%$ of the time
 - c. 26 to 50 % of the time
 - d. 51 to 75 % of the time
 - e. $\geq 76\%$ of the time
- (11) Where did you receive training in telepractice?
- a. Undergraduate
 - b. Graduate
 - c. PhD
 - d. ASHA continuing education
 - e. other continuing education
 - f. Other: _____

- (12) Describe your experience in telepractice courses in graduate school? _____
- a. none
 - b. 1 telepractice elective course
 - c. 1 telepractice required course
 - d. 1 unit taught as part of a course
 - e. more than 1 unit taught as part of a course
 - f. a seminar
 - g. speaking with professors/clinical instructors about telepractice
 - h. unsure
- (13) What amount of your graduate level telepractice clinical service provision was technology-enabled (training with telepractice service delivery)?
- a. I did not receive any technology-enabled practice or training
 - b. $\leq 25\%$ of my service provision was via telepractice
 - c. 26 to 50 % of my service provision was via telepractice
 - d. 51 to 75 % of my service provision was via telepractice
 - e. $\geq 76\%$ of my service provision was via telepractice
- (14) Which of your graduate level courses provided the best preparation for telepractice?
- a. none
 - b. 1 telepractice elective course
 - c. 1 telepractice required course
 - d. 1 unit taught as part of a course
 - e. more than 1 unit taught as part of a course
 - f. a seminar
 - g. speaking with professors/clinical instructors about telepractice
 - h. other
- (15) What subtopics did your telepractice course(s) cover? Select all that apply:
- a. Technology requirements and programs
 - b. Regulatory knowledge (i.e., reimbursement, state licensing restrictions)
 - c. Internet and digital management
 - d. eHelpers management - "A person who assists the patient during the speech therapy telepractice session...a caregiver, family member nurse, or teacher" (Towey, 2013, p 115).
 - e. Technical skill competencies for SLP (i.e., running tech programs, sharing screens, using operating systems)
 - f. interpersonal skills (i.e., rapport w/ client and eHelper, session expectations)
- (16) What do you wish your training in telepractice would have included?
- a. Technology requirements and programs
 - b. Regulatory knowledge (i.e., reimbursement, state licensing restrictions)
 - c. Internet and digital management

- d. eHelpers management -“A person who assists the patient during the speech therapy telepractice session...a caregiver, family member nurse, or teacher”(Towey, 2013, p 115).
 - e. Technical skill competencies for SLP (i.e., running tech programs, sharing screens, using operating systems)
 - f. interpersonal skills (i.e., rapport w/ client and eHelper, session expectations)
- (17) What keeps you from using telepractice?
- a. Nothing keeps me from using telepractice as a service delivery model
 - b. Technological operation concerns
 - c. Limited access to technology
 - d. Clients on caseload are not appropriate for telepractice
 - e. Delivery method not supported in work environment
 - f. Not an efficient/effective service delivery method
 - g. Slow internet speed
 - h. Financial reasons (e.g., cannot afford software)
 - i. Fear (related to inexperience with use of technology)
 - j. I am just not interested
 - k. Other

To what extent do you agree with the following statements?					
	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree
(18) I felt confident to deliver quality telepractice directly after graduation.					
(19) I currently feel confident providing quality telepractice.					
(20) I know where to find telepractice resources sufficient to my needs.					
(21) I need to obtain formal training (i.e., take a course, CEU) to provide quality telepractice					
(22) The current telepractice training is adequate for upcoming speech-language pathologists.					
(23) A telepractice training certification should be required in order to provide teletherapy.					
(24) Telepractice training in graduate school should be required in order to provide teletherapy.					
(25) Technology breakdown deters my interest in using telepractice.					

(26) I am interested in receiving continuing education related to best practices in telepractice service delivery.					
(27) Telepractice allows me to work beyond (more creatively) my professional training and knowledge to a greater extent than a non-digital, face-to-face interaction.					