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Efficacy of aphasia group conversation treatment via telepractice on language and social measures

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EFFICACY OF APHASIA GROUP CONVERSATION TREATMENT VIA TELEPRACTICE ON LANGUAGE AND SOCIAL MEASURES

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MADELINE DUNNE

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Approved by

First Reader

Elizabeth Hoover, Ph.D., CCC-SLP, BC-ANCDS
Clinical Professor of Speech, Language & Hearing Sciences

Second Reader

Gayle DeDe, Ph.D., CCC-SLP
Research Associate Professor of Communication Sciences and Disorders
Temple University

Third Reader

Michelle Mentis, Ph.D., CCC-SLP
Clinical Professor and Chair of Speech, Language & Hearing Sciences

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ABSTRACT

Conversation treatment for persons with aphasia (PwA) can lead to significant changes on measures of language impairment and quality of life. The COVID-19 pandemic resulted in greater use of telepractice treatment delivery; however little evidence exists regarding efficacy of a telepractice conversation group. The present study investigated the effects of telepractice group conversation treatment on standardized measures of language function and social oriented/patient-reported outcomes, as compared to in-person, and no-treatment control data. Eight PwA were recruited for inclusion in a telepractice conversation group treatment using a delayed, within-subjects design. Participants were compared to data taken from a larger RCT conducted previously (seven in-person participants and eight no-treatment control group participants). Results of evaluations conducted at baseline, pre-treatment, and post-treatment intervals revealed significant improvement from pre to post treatment on repetition and picture description tasks for the telepractice group. Compared to in-person group and no-treatment group data, results suggest superior benefits for in-person delivery of conversation group treatment compared to telepractice delivery. However, both in-person and telepractice treatment are superior to a no-treatment paradigm. Overall, results prompt further research regarding telepractice group conversation treatment for PwA.

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INTRODUCTION

Aphasia, a language impairment, commonly occurs after a traumatic brain injury or stroke and is defined as a loss of ability to understand or express language. Language impairments often impede an individual's ability to effectively communicate and their psychosocial well-being. In the United States, it is estimated that over 2.5 million Americans are living with aphasia (Simmons-Mackie, 2018). Communication difficulties are often chronic for people with aphasia (PwA). PwA often report social isolation, loss of autonomy, restricted activities, stigmatization, and loneliness (LeDorze & Brassard, 1995). Social isolation has been correlated with negative health outcomes including infection, depression, cognitive decline, and morbidity and mortality (Simmons-Mackie et al., 2020). Thus, it is important to establish treatment that maximizes communication outcomes.

Two general categories of treatment include individualized, impairment-based therapies aimed at improving language functions with aid from a clinician and communication-based therapies involving more natural interactions involving real life communication challenges (Elman & Bernstein-Ellis, 1999). Communication-based therapy aims to address isolation and negative outcomes by providing social environments for functional communication use. Also known as conversation therapy, communication-based therapy includes a variety of different approaches such as communication partner training, group aphasia therapy, approaches to communication support, and interaction-focused therapies (Simmons-Mackie et al., 2014). This study focuses on group aphasia therapy and its transference to telepractice.

Group conversation therapy approaches for PwA involve conversational interactions facilitated by a skilled clinician. Unlike individual therapy, group therapy offers opportunities for peer conversation, sharing of experiences, and practicing communicative strategies to build conversational skill and confidence. Following an "embedded" approach style, group conversation therapy involves changing conversational behaviors online within the context of actual conversational interaction (Simmons-Mackie et al., 2014). Conversation groups offer a sense of community and collaboration for PwA, thus providing a social context to participate in authentic conversation and develop social relationships (Simmons-Mackie et al., 2014). Furthermore, group conversation therapy is rooted largely in a social model and the Life Participation Approach to Aphasia (LPAA), which focuses on a broad approach to functional communication treatment through life participation goals and social relationships (Chapey et al., 2000). Group conversation therapy draws from counselling literature and adheres to social model philosophy, emphasizing the importance and interdependence of relationships and communicative interactions (Elman & Bernstein-Ellis, 1999). Therapy goals can target increasing multimodality or total communication, improving introduction of new topics/management of topics, improving self-repair, and increasing initiation/taking turns/participation in conversation.

Research suggests group conversation therapy can improve performance on standardized aphasia tests, psychosocial well-being, social participation, and quality of life. A randomized controlled trial (RCT) study by Elman and Bernstein-Ellis (1999) provided evidence of the effectiveness of group therapy based on language and functional

test scores and described methods consistent with conversation therapy. 24 PwA were assigned into two treatment groups (immediate and deferred) to determine the effect of speech-language group treatment compared to socialization group treatment over a four-month period. Participants received five hours weekly of group communication treatment over a four-month period. Group treatment focused on improving the ability to convey a message using multimodal strategies, fostering initiation for conversational turns, and expanding self-awareness of personal goals and confidence for communication situations. Elman and Bernstein-Ellis found improved scores on language-dependent measures including the Shortened Porch Index of Communicative Ability (SPICA; Disimoni et al., 1980) and Western Aphasia Battery (WAB-R; Kertesz, 2007) only after treatment; no significant change was noted on the linguistic measures during the baselines when no treatment was provided. Thus, results indicated that group conversation treatment was efficacious.

DeDe, Hoover, and Maas (2019) enrolled 48 participants with chronic aphasia into three treatment groups (dyad, large group, delayed control group) to determine how treatment dosage and group dynamics affect treatment outcomes. Conversation group treatment targeted individual goals for participant within thematically oriented conversation treatment, and treatment was provided for an hour, twice per week, for 10 weeks. Researchers found greater changes on standardized measures for both treatment groups than the control group. Furthermore, dyads showed the most changes on measures of language impairment, while the large group showed significant changes on the Aphasia Communication Outcome Measure (ACOM; Hula et al., 2015) and connected

speech task. Thus, conversation treatment is associated with changes in measures of language impairment and quality of life, and group size may be associated different outcomes.

Additionally, there is evidence that participation in aphasia conversation groups improves discourse production, functional communication, connected speech, informativeness, and word retrieval. Using data from their previous RCT, Hoover and colleagues (2021) analyzed the impact of conversation treatment on measures of monologic discourse. Although there were no significant changes observed on percent correct information units (CIU; Nicholas & Brookshire, 1993), which was the primary outcome measure, the treated groups demonstrated improvement on aspects of the complete utterance (CUs; Edmonds et al., 2009) method following treatment, whereas the control group did not. Changes were more common in absolute rather than relative values, suggesting that conversation treatment impacts the overall amount of language produced rather than efficiency of production.

Similarly, Boyle and colleagues (2022) analyzed structured and conversational discourse samples previously collected by Elman and Bernstein-Ellis (1999) that were never previously transcribed or analyzed to examine the effects of group conversation treatment on the informativeness and efficiency of structured and conversational discourse tasks in adults with chronic aphasia. Researchers evaluated changes in discourse informativeness and efficiency at treatment exit and follow-up with Bayesian generalized linear mixed-effects models. The structured discourses were combined and analyzed for number of words and number of correct information units (CIUs) according

to the rules published by Nicholas & Brookshire (1993), whereas the conversational discourse followed adaptations made by Leaman and Edmonds (2019) for analyzing CIUs in conversation. To assess informativeness across samples of different lengths, the proportion of CIUs was calculated (total CIUs/total words). To assess how efficiently information was conveyed, the number of CIUs produced per minute was calculated by dividing the number of CIUs by the participant's speaking duration. Results from structured discourse revealed that on average, the mean and median CIUs and median number of words produced increased across all time points; the mean number of words produced fell from entry to exit but increased overall by follow-up, and the mean and median number of minutes (i.e., total talking time) remained relatively stable across all time points. For conversational discourse, the overall CIU changes followed a generally similar pattern across all time points, and the mean and median number of words produced fell from entry to exit but increased at follow-up. The mean and median number of minutes remained relatively stable across time points for conversational discourse. Overall, results at the group level showed that structured discourses became more informative and efficient after treatment, and that this improvement was at least maintained at follow-up. Although informativeness of conversational discourse did not change from treatment entry to exit, there was some evidence of improvement at follow up. Thus, participation in group conversation treatment was associated with more informative and efficient structured discourse production and modestly improved informativeness in conversational discourse for group participants. These studies taken together add to the limited evidence of improved informativeness following conversation-

based group treatment and support the notion that treating in the context of a complex language activity (a group conversational exchange) can result in cascading generalization to simpler aspects of language (discourse informativeness and efficiency) (Boyle et al., 2022).

While most traditional conversation groups occur in-person, the COVID-19 pandemic has dramatically shifted the nature of communication groups around the globe. With reference to federal health advice and social distancing measures in light of the COVID-19 pandemic, PwA around the world have generally followed the guidelines of staying inside, restricting when and where to gather with family and peers, reducing social activities, and maintaining appropriate social distance with other people. Thus, these adaptations now directly contradict the traditional principles of conversational treatment and LPAA. To accommodate social distancing, communication groups have shifted to telepractice platforms.

Telepractice offers an appropriate mode of service delivery that can facilitate a high-quality, best practice, and continuous service to PwA while maintaining physical distancing. According to ASHA (2021), telepractice is the application of telecommunications technology to the delivery of speech language pathology and audiology professional services at a distance by linking clinician to client or clinician to clinician for assessment, intervention, and/or consultation. ASHA adopted the term telepractice rather than the frequently used terms telemedicine or telehealth to avoid the misperception that these services are used only in health care settings. Additionally, the use of telepractice must be equivalent to the quality of services provided in person and

consistent with adherence to the Code of Ethics, Scope of Practice in Speech-Language Pathology, state and federal laws, and ASHA policy. With telepractice constantly evolving, web technology allows clinicians to engage clients through virtual environments and other personally salient activities.

In the last decade, telepractice has increasingly been considered in the management of adult neurogenic communication disorders as a potential means to overcome the barriers of access to treatment caused by distance, lack of specialist availability, and impaired mobility in patients. Transportation and geographic factors represent significant barriers to outpatient care (Syed et al., 2013). With reliance on public transportation and other factors, the availability of quality care can be limited across the country, especially to those in rural areas. Additionally, studies have shown that outcomes after traumatic brain injury (TBI) tend to be poorer in rural areas due to limited availability of rehabilitation (Brown et al., 2019). This likely holds true for aphasia (regardless of etiology) as well. Moreover, in areas where there are no community aphasia programs, people living with aphasia are denied this valuable option for ongoing support.

Telepractice can overcome these physical limitations and barriers, thus offering potential benefits with regard to resources, travel, time, and cost. Due to significant physical disabilities and/or comorbidities, PwA may have difficulty with independent transportation to medical appointments. Ashton et al. (2008) identified a variety of communication barriers to using public transport by PwA, including complex ticketing systems, unreliable and unpredictable schedules and bus service, and the need for quick

verbal responses (e.g., hailing a bus). Furthermore, vulnerable patient groups are at a significantly greater risk for communication failure and consequent health issues. In a review of a series of research studies on accessibility of the community for PwA, Worrall et al. (2007) concluded that "people with aphasia are marginalized by a communicatively inaccessible society" (p. 12) and that improving accessibility will have a positive impact on other communicatively disabled groups as well.

In addition, time may pose constrictions, with commuting times and transportation to services requiring significant time. This affects not only PwA, but also caregivers, family, and health professionals. In a qualitative study of family member goals, Howe et al. (2012) found that family members were interested in being included in rehabilitation, in being given support, and being able to cope with new responsibilities. However, barriers, such as time have limited attention to the needs of family members in rehabilitation. Thus, telepractice has the potential to increase service delivery with better management of chronic diseases, shared health professional staffing, reduced travel times, and fewer or shorter hospital stays (Snoswell et al., 2020).

With regard to cost, chronic aphasia can lead to negative impacts on finances. For example, less positive outcomes for aphasia are associated with lower income and less ability to afford supports or rehabilitation (Simmons-Mackie & Cherney, 2018). Aphasia and its etiologies may require extensive costs, including potential high health care costs; cost of lost wages; costs to family and society with more hospital readmissions, and overall lost productivity. Furthermore, health care costs are higher for those with aphasia than for stroke survivors without aphasia. In a study of Medicare payments for stroke in

South Carolina, Ellis et al. (2012) found that patients with aphasia from stroke had higher one-year attributable health care costs than those patients post stroke without aphasia. Likewise, a Canadian study comparing outcomes of people with aphasia to a general stroke cohort found that the aphasia cohort had more than twice the health care costs per person per year, as compared to the control group (Kagan et al. 2017). In addition to the costs of health care, financial impacts of lost wages, productivity, pain and suffering are an additional burden. Research on return to work following aphasia diagnosis finds that 14% to 28% of working age people with aphasia return to employment, with almost all of these PwA returned to lower status jobs or part time status (Simmons-Mackie & Cherney, 2018). Thus, the resources required to achieve therapy in the long term may be unattainable in the current financial climate for PwA, and lower cost options for the support of treatment are needed.

To mitigate these extraneous costs, telepractice may reduce the cost of treatment. Clark and colleagues (2002) found that travel savings during TeleRehab treatment program was $8,217.00, and productivity savings for the caregiver was $11,256. Travel savings were based on mileage rate of .365 per mile, and productivity was based on a daily average earnings reported by the US Department of Commerce and Bureau of Labor Statistics at $84.00 per day. Additionally, a study by Burns et al. (2017) found that a synchronous SLP telepractice service for patients with head and neck cancer reported average cost savings of 12% for the health service and $40.05 saving per patient per referral. These savings may transfer to the aphasia population and other communication disorders as well. Furthermore, aphasia centers and community group programs are

typically offered at a reasonable cost; many of the programming options are not funded by US insurance or Medicare (Simmons-Mackie & Cherney, 2018). Thus, telepractice groups would not restrict participants to a particular stage post onset and offer a variety of accessible, programming options.

While there are many benefits to telepractice, it is important to recognize its potential impacts and consequences for individuals. Depending on a client's physical and sensory capabilities, telepractice may not be suitable, as it requires appropriate hearing and visual ability, manual dexterity, and physical endurance to endure telepractice sessions. Additionally, a client must possess a level of cognitive functioning to maintain attention and sit in front of a camera and navigate the specific software. Furthermore, communication characteristics, including auditory processing/comprehension, literacy, and intelligibility may interfere with telepractice. Lastly, a client must have access to technology, resources (e.g., computer, internet), and an appropriate environment for telepractice. If technological errors occur for the client, he/she must be able to follow directions to operate and troubleshoot the software program (American Speech-Language-Hearing Association, 2022).

Although telepractice offers many advantages in flexible delivery and cost effectiveness, there is limited evidence regarding its effectiveness. Few comparative studies have reported successful transference of assessments and intervention approaches to telepractice platforms. Hill et al. (2009) conducted a study with 32 adults with acquired aphasia and reported that severity of aphasia did not affect the accuracy of telepractice assessment of the Boston Diagnostic Aphasia Examination – Third Edition (Short Form;

Goodglass et al., 2001) except in assessing naming and paraphasias. Statistically significant differences in rating scale scores in these domains were found for telepractice assessment versus face-to-face assessment for severely impaired individuals only.

A recent paper (Dekhtyar et al., 2020) reported a high degree of reliability between in-person and videoconference administrations of the WAB-R for all three quotient measures. Twenty adults with chronic aphasia completed the Western Aphasia Battery-Revised (WAB-R; Kertesz, 1982) both in person and via videoconference with the order counterbalanced across administrations; specific modifications to select WAB-R subtests were made to accommodate interaction by computer and Internet. A high degree of reliability was found between in-person and videoconference administration for measures of AQ, LQ, and CQ. Specific results revealed that 85% of participants did not show a preference for one form of administration over the other suggesting that the administration of the WAB-R in person and via videoconference may be used interchangeably in aphasia population (Dekhtyar et al., 2020). These results may foreshadow the relationship between in-person and telepractice aphasia conversation groups.

Additionally, Bilda (2011) developed a video-based script training program to analyze the positive effects and usefulness of a telepractice program. Script training draws on instance theories of automaticity and follows a cue-based drill of a script to boost automatization of script use (Bilda, 2011). The study found that all participants displayed significant improvements in producing target phrases over the whole set of scripts and in the AAT subtests “Naming” and “Repetition” after training. Moreover,

participants reported increased confidence and greater participation in social interactions and everyday conversations (Bilda, 2011). However, it is important to note that the assessment measures used in this study lack validity and reliability. Thus, it is critical to develop and utilize valid and reliable tests to measure the effectiveness of intervention on language and social life. Overall, the study further demonstrates the feasibility of computer training programs.

Hall and colleagues (2013) conducted a systematic review of 10 studies in which telepractice procedures were used in the assessment or treatment of individuals with aphasia. Four of the studies used telepractice for assessment purposes, one used the telephone to administer stroke outcome questionnaires, four studies employed telepractice for a range of intervention services (auditory comprehension, script training, syntax targets, specific verbal targets), and one used video teleconferencing to conduct weekly consultation meetings with an individual participating in a community reintegration program. The evidence gathered from the studies included suggests that assessment, intervention, and consultative services conducted via telepractice are feasible, effective, and equivalent to in-person services for PW (Hall et al., 2013).

The studies reviewed above focus on specific communicative acts. To date, little-to-no comparative studies have investigated the effects of socially oriented group treatment for aphasia delivered via telepractice. Pitt et al. (2019a) developed an online aphasia group therapy program, Telerehabilitation Group Aphasia Intervention and Networking (TeleGAIN), in accordance with the guidelines of the Medical Research Council framework for complex interventions. The overarching aim of TeleGAIN was to

improve communication related quality of life through three specific goals of the intervention: (1) create opportunities for communicative success, (2) share personal life history, and (3) provide support for living successfully with aphasia through networking with others (Pitt et al., 2019b). TeleGAIN consisted of 12, 1.5-hour weekly therapy sessions totaling 18 hours of group therapy. Across the 12 sessions, participants were provided opportunities to participate in conversation and complete functional communication activities via web based videoconferencing (Adobe Connect). Each session used a range of communication supports, including personal photographs, choice boards, key words, graphic choices and rating scales. TeleGAIN was designed to cater for a maximum of four people with aphasia, primarily to ensure sufficient computer screen space to display therapy materials and video streaming from four participants and the clinician; thus, four participants with nonfluent aphasia who were at least 12 months post onset were included in the pilot study. Prior to the group intervention commencing, an initial face-to-face session with the participant and researcher speech–language pathologist was arranged to install all the equipment and software needed, update plugins and drivers if required and provide training in how to access the group videoconference, interact with Adobe Connect and use the hardware. The data collected during the study were primarily concerned with technical feasibility and usability, acceptability of the intervention, therapeutic effect and participant satisfaction. Three of the four participants demonstrated a significant improvement on CAT Naming, Spoken Picture Description, Spoken Comprehension, and Written Comprehension subtests. Additionally, two of those three participants also demonstrated improvements in the total score of the ALA. With

statistically significant improvements in communication related quality of life, increased engagement in communicative activities, and decreased aphasia severity, TeleGAIN appeared to be a feasible and acceptable delivery form for aphasia group intervention (Pitt et al., 2019b).

More research on the effects of group treatment for aphasia delivered via telepractice on language and social outcomes is necessary, especially when compared to in-person treatment. By replicating DeDe et al.'s 2019 study design with a telepractice focus, interventions can be compared to determine the effect of telepractice on measures of language impairment and quality of life for PwA. Furthermore, the transference of effects from in-person treatment to a web conferencing platform can be better assessed using the Aphasia Communication Outcome Measure (ACOM) as the primary outcome measure, as opposed to correct information units, as used in the original study. The reason for the change on this measure is twofold. Firstly, Conversation treatment focuses on functional communication using multiple modalities, and the ACOM incorporates multimodal communication. Test items such as "how effectively do you explain how to do something" or "how effectively do you make your wants and needs known" are not constrained to verbal communication and thus may better capture changes in use of communication more broadly. Secondly, the ACOM was shown to be sensitive to the effects of treatment for the large group only in DeDe et al.'s prior study. Thus, if equivalent to the in-person group, the telepractice group should show significant improvement on the ACOM as well. Research on aphasia conversation treatment delivered via telepractice is essential, as there is a need for more cost-effective

intervention, and very few comparisons and validations on intervention programs and assessments over telepractice exist. Thus, the present study will investigate the following questions:

1. Is telepractice group conversation treatment effective in changing performance on speech samples and standardized measures of language function, and socially oriented/ patient-reported outcomes for PwA?
2. How do outcomes from telepractice group conversation treatment compare to historic, in-person group treatment and no-treatment control group outcomes?

METHODS

Participants

Eight PwA were recruited for inclusion in the telepractice conversation group treatment using a delayed treatment, within-subjects design. Table 1 presents basic descriptive data about the participants. One participant was unable to complete all testing sessions due to medical issues; although she participated in group discussion, her results were not included in the study. As telepractice participation was remote, participants were recruited from locations around the country. Inclusion criteria included (a) age of 18 years or older, (b) at least 5 months post onset from a stroke, (c) English as a first language, and (d) presence of aphasia (based on clinical judgment and standard assessment scores). Inclusion treatment remained consistent DeDe et al (2019). Recruitment occurred during spring 2021. Participants' abilities to navigate Zoom were

screened during the baseline testing session. The protocol was approved by the Institutional Review Board at BU. Informed written consent was obtained from all participants. Participants were compared to data taken from the larger RCT conducted previously (seven in-person participants and six no-treatment control group participants; n = 20); see Table 1. The study was unblinded, as blinding of participants and clinicians was not possible given the behavioral nature of the intervention, and blinded outcome assessment was not possible due to limited resources.

Table 1: Demographic Data

	Telepractice	**In-Person**	**Control**
Age (years)	55.8 (14.3)	61.4 (20.9)	74.4 (9.0)
Gender (M/F)	2/6	5/3	8/0
CAT naming total score[a]	59.4 6.7)	50.6 (21.8)	45.5 (23.6)
Aphasia syndrome			
Anomic	6	2	1
Broca's	1	3	2
Conduction	1	2	3
Sv MNF			2
TCM			
TCS			
Wernicke's		1	

Note. Aphasia syndromes were based on CAT scores and clinician judgment. M/F = male/female; CAT = Comprehensive Aphasia Test; Sv MNF = severe mixed nonfluent; TCM = transcortical motor; TCS = transcortical sensory

[a]Values are mean (standard deviation)

Treatment

Treatment intervention included 60-minute sessions, twice weekly, for 10 weeks. The group was facilitated by the primary researcher and a graduate student clinician, under the supervision of a licensed speech-language pathologist (first reader) with previous experience administering conversation treatment. Conversation treatment followed a socially oriented approach, where participants were encouraged to engage in meaningful, authentic conversations surrounding functional topics. Topics included: personal history, dining, news/events, entertainment, and travel. Subthemes within the topics allowed each broad topic to be discussed 4 times. These topics were chosen given their potential applicability to personal interests and daily activities and thus for their potential to promote generalization of any treatment gains to other environments with other conversational partners (Hoover et al., 2021). Picture and other supports were available, and clinicians modeled use of gestures, writing, and other multi-modality communication to help scaffold participation and conversation.

All stimuli, supports, and procedures were consistent with the historical study. Telepractice sessions followed the same format and schedule of shared topics. Furthermore, PowerPoint slide shows, follow-up questions, and relevant supports from the R21 study were used. Each participant had two individual goals identified based on testing performance and the PwA's goals.

Treatment Fidelity

To establish consistency of treatment, graduate student clinicians received training and materials from the historic study. Clinicians completed a training orientation via Zoom prior to intervention to review procedures, goals, conversation treatment, cueing hierarchies, and weekly topics.

In addition, an undergraduate student was trained to use a checklist to record variables related to fidelity in each session. This included tracking number of conversation turns, type of conversation turns, and sufficient multi-modal models within the conversation group sessions, in efforts to adhere to treatment protocols. Mean, standard deviation, and range for number of sessions attended by PwAs in the group were recorded.

Assessment Protocol

Telepractice participants were administered a testing battery at baseline (Time 1 - late April/early May 2021) pre-treatment (Time 2 - late May 2021), and post-treatment (Time 3 - conclusion of 10-week intervention); this allowed for data from the original study to serve as an historical control and comparison for the telepractice group. Test administration was completed by graduate student clinician(s) under supervision of a licensed speech-language pathologist.

Standardized Tests of Language in Aphasia

The Comprehensive Aphasia Test (CAT; Swinburn, Porter, & Howard, 2004) documented the presence of aphasia and served as a measure of general treatment effects. The CAT is a psycholinguistic test battery that targets expressive and receptive language in oral and written modalities. Five sections were administered: auditory comprehension, reading comprehension, verbal expression, repetition, and picture description. Subsection scores were analyzed to examine changes as a function of treatment.

The Northwestern Assessment of Verbs and Sentences: Verb Naming Test (NAVS-VNT; Cho-Reyes & Thompson, 2012)) is a single-word confrontation naming test of verbs used to evaluate changes in naming ability.

Patient-Reported Outcomes

The Aphasia Communication Outcome Measure (ACOM; Hula et al., 2015) is a psychometrically validated measure of the impact of aphasia on communication in daily life. The ACOM asks questions such as how effectively the PwA talks to family members and strangers or how effectively the PwA writes a short to-do list. The adaptive short form of the ACOM, which uses the PwA's response to each item to select subsequent items, was administered.

The Communication Confidence Rating Scale for Aphasia (CCRSA; Babbitt et al., 2011) was administered. The CCRSA is a relatively simple questionnaire that has been used to quantify communication confidence in individuals with aphasia. The survey was based on eight items from the American Speech-Language-Hearing Association

Quality of Communication Life Scale (ASHA QCL; Paul et al., 2005) which were well-suited to being adapted to rating confidence. The CCRSA asks participants to rate confidence in a variety of communication situations on a scale from 0–100. Although the CCRSA was not administered in the historic study, the author included this measure in the present study to further assess communication confidence. Communication confidence is defined as "a feeling about one's power to participate in a communication situation, one's sense about one's own skills and/or ability to express oneself and to understand the communications of others" (Babbitt et al., 2011). Communication confidence is an important factor that contributes to intervention satisfaction and efficacy. As opposed to the ACOM, the CCRSA exams how confident the PwA feels doing a task rather than how well. Evidence shows that the CCRSA is sensitive and useful in measuring self-reported communication confidence in PwA, as compared to other self-report measures (Cherney et al., 2011)

Speech Samples

Three narrative tasks were selected to measure changes on monologist discourses: 1) CAT (Swinburn et al., 2004) picture description, (2) Cat Rescue Picture (Nicholas & Brookshire, 1993), and (3) Cinderella Retell. Standardized prompts were given from the Aphasia Bank protocol for the Cinderella retell and Cat Rescue Picture and from the CAT for its picture description task (MacWhinney et al., 2010). For the Cat Rescue Picture description task, the client is presented with the "Cat Rescue" image, and he/she must develop a story with a beginning, middle, and end based upon the image. Studies suggest

that some people with language impairments have conceptualization deficits manifested by information selection and sequencing difficulties (Hameister & Nickels, 2018). Thus, main concepts and language were assessed throughout the picture description tasks. The Cinderella story has frequently been used in aphasia research, and general systems for scoring narrative productions that have been developed and applied to the Cinderella transcripts of individuals with aphasia.

Narratives were coded using the CAT standardized narrative analysis method (CAT-NA; Swinburn et al., 2004) and complete utterance (CU; Edmonds et al., 2009) coding. DeDe et al. (2019) found that CAT-NA coding showed sensitivity to change in one of the experimental treatment groups (large groups). The CU coding method was included due to its clinical applicability and sensitivity to treatment change and inclusion of both a measure of informativeness and syntax. For CU coding, the end of each utterance is marked with a + or − to indicate whether an utterance contained an appropriate agent and verb and its obligatory arguments (+/−SV[O]) and relevant meaning (+/− RELEVANT). Following Boyle's (2014) recommendations, number of utterances, and CU data from each narrative were averaged together prior to analysis to improve reliability. Thus, these discourse measures were selected and designed to measure informativeness and syntactic completeness.

RESULTS

Effects of Telepractice Delivery

Given the small sample size, the data were analyzed using nonparametric test statistics.

To examine telepractice group treatment effects, data for each measure were analyzed separately using Wilcoxon signed ranks tests to compare between time points (baseline 1 to pre-treatment, and pre- to post-treatment). No significant change was noted on any measure from baseline to pre-treatment time points (all *p*s > .05), thus demonstrating stability between time points and a valid control period. Results presented in Table 2 are means and standard deviations per group over time and *p* values.

Table 2: Telepractice baseline to pre-treatment results for each measure.

	Telepractice		
	Baseline	**Pre-Tx**	***P* value**
CAT Spoken Comprehension	46.4 (8.2)	48.86 (11.3)	0.173
CAT Written Comprehension	51.3 (8.7)	53.0 (9.1)	0.292
CAT Repetition	53.0 (4.9)	53.6 (6.4)	0.450
CAT Naming	59.43 (6.7)	59.43 (6.8)	0.962
CAT Picture Description	20.4 (8.4)	20.6 (9.6)	0.865
CAT Reading Aloud	54.9 (6.8)	55.4 (8.0)	0.598
VNT	16.4 (3.4)	16.7 (4.5)	0.786
ACOM	51.6 (7.5)	52.9 (9.4)	0.398
CCRSA	67 (13.7)	71.8 (13.5)	0.063

Total Utterances	18.3 (7.6)	18.0 (10.9)	1.000
Total REL	16.0 (7.6)	16.3 (10.5)	0.553
Total SV	16.8 (8.0)	16.2 (11.1)	1.000
Total CU	14.6 (7.9)	15.1 (10.7)	0.671
% REL	86.5 (16.4)	83.8 (29.4)	0.917
% SV	89.4 (11.2)	86.3 (17.4)	0.499
% CU	76.8 (16.2)	74.3 (29.6)	0.735

Telepractice group means and standard deviations at pre-treatment and post-treatment time points for each measure and *p* values are presented in Table 3. Effects that are significant ($p < .05$) are bolded. The CAT Repetition and CAT Picture Description tasks yielded statistically significant results; all other subtests revealed no significant effects (all *p*s > .05). On the CAT repetition subtest, there was a significant improvement from pre- to post treatment testing total score, $Z = 26.5$, $p = .033$. Moreover, the CAT picture description total score showed a significant improvement from pre- to post treatment, $Z = 21$, $p = .028$. Furthermore, the telepractice group showed no significant changes from pre- to post-treatment on either patient-reported outcome measure scores (all *p*s > .05) and discourse measures (all *p*s > .05) between pre- and post-treatment.

Comparison of telepractice to other experimental conditions

Pre-treatment scores for each measure by group were analyzed using Kruskal-Wallis tests to determine whether the groups differed before treatment. There were no significant effects of group (all *p*s > .05) suggesting statistically equivalent groups on

severity of aphasia at pre-treatment.

To examine differences between the three groups (telepractice, historic in-person, and no-treatment control groups), Wilcoxon signed ranks tests were calculated for each group pre- to post-treatment on each measure to allow for comparisons between groups. Results are presented in Table 3. Results presented are means and standard deviations per group over time and p values. Effects that are significant ($p < .05$) are bolded.

Table 3: Pre- to post-treatment results on each measure for all conditions.

	Telepractice			**In-Person**			**Control**		
	Pre-Tx	Post-Tx	*P* value	Pre-Tx	Post-Tx	*P* value	Pre-Tx	Post-Tx	*P* value
CAT Spoken Comprehension	48.86 (11.3)	49.0 (8.0)	0.865	53.7 (7.0)	55.0 (10.0)	0.343	50.7 (6.6)	52.6 (6.2)	0.172
CAT Written Comprehension	53.0 (9.1)	53.4 (7.4)	0.865	55.2 (7.9)	57.7 (10.4)	0.340	53.0 (6.5)	53.3 (13.4)	0.611
CAT Repetition	**53.6 (6.4)**	**55.6 (5.9)**	**0.033**	51.3 (5.1)	53.8 (6.7)	0.343	52.0 (7.2)	53.7 (8.8)	0.203
CAT Naming	59.43 (6.8)	60.7 (5.0)	0.233	55.3 (7.8)	59.2 (10.0)	0.058	48.0 (18.0)	53.6 (8.5)	0.916
CAT Picture Description	**20.6 (9.6)**	**24.6 (11.3)**	**0.028**	15.2 (9.1)	18.3 (11.9)	0.072	13.4 (8.0)	18.6 (11.4)	0.105
CAT Reading Aloud	55.4 (8.0)	56.4 (8.8)	0.131	54.5 (9.7)	55.1 (9.6)	0.357	53.1 (6.7)	54.0 (7.8)	0.336
VNT	16.7 (4.5)	16.6 (3.0)	0.865	15.5 (8.1)	15.8 (6.9)	0.686	13.0 (5.7)	13.3 (7.0)	0.684
ACOM	52.9 (9.4)	56.1 (11.0)	0.499	**51.5 (7.6)**	**56.9 (9.7)**	**0.028**	46.2 (8.5)	45.5 (7.7)	0.917
CCRSA	71.8 (13.5)	77.9 (13.7)	0.128						
Total Utterances	18.0 (10.9)	18.8 (9.2)	0.865	9.6 (3.7)	10.8 (4.5)	0.244	9.7 (3.2)	11.5 (5.3)	0.345
Total REL	16.3 (10.5)	17.1 (9.7)	0.599	**5.7 (3.9)**	**7.6 (5.5)**	**0.043**	5.8 (3.9)	8.2 (6.1)	0.115
Total SV	16.2 (11.1)	17.5 (9.2)	0.398	8.5 (3.8)	9.4 (4.6)	0.344	8.5 (3.3)	9.9 (5.3)	0.345
Total CU	15.1 (10.7)	16.0 (9.7)	0.397	5.0 (3.8)	6.9 (5.5)	0.104	5.3 (3.9)	7.3 (6.0)	0.141
% REL	83.8 (29.4)	86.5 (23.9)	0.345	54.0 (23.3)	66.4 (33.7)	0.116	57.1 (24.8)	62.9 (32.2)	0.173
% SV	86.3 (17.4)	91.0 (13.3)	0.249	8.5 (3.8)	9.4 (4.6)	0.344	86.6 (9.2)	83.1 (15.2)	0.753
% CU	74.3 (29.6)	78.4 (23.5)	0.398	**46.2 (25.1)**	**60.2 (35.5)**	**0.028**	51.8 (27.0)	55.3 (33.5)	0.249

Note. Slashed cells indicate that CCRSA was not administered for in-person and control groups.

In-Person Group

Results from the historic study showed significant improvement from pre- to post treatment on the ACOM ($Z = 21$, $p = .028$). From the CU discourse analysis, significant improvement was found for total +REL ($Z = 15$, $p = .043$), and %CU ($Z = 21$, $p = .028$). Of note, CAT Naming ($Z = 19.5$, $p = .058$) and CAT Picture Description ($Z = 19$, $p = .072$) improvements were shown to be approaching significance. No other subtests on the CAT or discourse analysis showed significant changes.

Control Group

No significant changes were observed for the control group from pre- to post treatment. Thus, the control group served as a reliable, stable control compared to the in-person and telepractice groups.

Treatment Fidelity

Mean, standard deviation, and range for attendance, number of conversation turns, and number of clinician models for telepractice group and in-person group are presented in Table 4. Attendance for both telepractice and in-person groups was comparable. The range of conversational turns between telepractice and in-person greatly varied. Number of clinician models appeared to be similar between telepractice and in-person groups, despite differences in delivery model affecting available clinician models (e.g., telepractice group relying more on written and AAC than gesture).

Table 4: Treatment Fidelity

	Telepractice	In-Person
Attendance	μ = 18 SD = 1.1 Range = 17–19	μ = 18 SD = 1.5 Range = 15 – 19
Number of conversational turns	μ = 22.9 SD = 18.4 Range = 4 – 110	μ = 31.2 SD = 13.1 Range = 14.7 – 49.2
Number of clinician models	μ = 12.8 SD = 8.7 Range = 2 – 32	μ = 12.2 SD = 2.7 Range = 3 – 21

DISCUSSION

This study examined the effects of telepractice group conversation treatment on standardized measures of language function and socially oriented/patient-reported outcomes for PwAs, as compared to in-person, and no-treatment control data. Results from this study suggest that conversation group treatment delivered via telepractice platforms can lead to gains on standardized measures of language, whereas the no-treatment control group did not. This finding suggests that conversation treatment may offer linguistic benefits via telepractice delivery; however, there are differences in the types of change observed between the treatment conditions.

Effects of Telepractice Conversation Treatment

The first research question investigated whether telepractice group treatment was effective in changing performance on monologic narratives, standardized measures of language function, and socially oriented/ patient-reported outcomes. Following a delayed

treatment, within-subject design, the telepractice group served as their own controls. No significant change was noted on any measure from baseline to pre-treatment time points, suggesting stable performance on all measures. From pre- to post-treatment, statistically significant change was observed for two measures: repetition and picture description subtests of the CAT. Thus, the data presented is consistent with previous studies showing that conversation treatment is associated with improved performance on standardized measures of language performance. Similar to Pitt and colleagues (2019a), telepractice participants demonstrated improvement on CAT Spoken Picture Description task. Thus, these shared results may be potentially attributed to telepractice delivery model.

It is interesting to note that the telepractice group showed no significant changes on the measures from the combined discourse samples. Discourse measures used were monologic in nature and elicited by clinicians in response to specific stimuli. Thus, these measures should have been less complex than conversational discourse since they did not involve multiple speakers, turn-taking, interactional use of language, or understanding and reacting to utterances made by conversational partners (Boyle et al., 2022). Therefore, if treatment focuses on the complex level of conversation in communication groups, one would expect cascading generalization to aspects of structured discourse. However, this was not the result for telepractice participants, as no significant changes were present. This may be due to individual language profiles, as some participants had little room for growth with regard to relevance and SV. Furthermore, the limited sample size may have impacted discourse significance. With a larger in-person group sample (n = 15), Hoover et al. (2021) found that number of utterances and number of relevant

utterances significant increased from pre- to post-treatment for the large group condition. Nevertheless, this emphasizes the need for further research on measures of dialogic communication and conversation assessments.

The ACOM did not show significant changes as a function of treatment for the telepractice group. This result indicates that the participants did not perceive any significant changes in the effectiveness of their communication in the community, e.g. reading signs in the grocery store or beginning conversations with strangers. It may be the case that the COVID-19 pandemic may have negatively impacted opportunity for practice in these scenarios given the overall limited social interactions and opportunities for engagement in the community. For example, questions related to strangers or social events may have inherently been lower in response more so due to the pandemic and other external factors as opposed to communication confidence.

Participants in this study showed limited improvement on typical outcomes measures, such as standardized tests or CUs. The measures chosen were those prescribed in the previous in-person study and as such, it may be that the measures used in this study were not sensitive to the treatment changes of telepractice conversational group therapy. Some participants were close to or at the ceiling for various subtests across all three testing points, thus limiting room for improvement. Additionally, when examining objective observations of change via treatment fidelity tracking (number of conversations turns, number of clinician models), PwA showed increased engagement, adoption of multimodal communication methods, and increased sharing of new information during conversation treatment sessions. Additionally, weekly conversation group logs revealed

behavioral improvements in communicative effectiveness, communication attempts, and personal goals. Because assessment measures are monologic and individual-based, they do not capture conversational skills or the ability to hold multiple partner conversations; however, fidelity tracking and weekly logs are able to assess these skills more appropriately and accurately within a group context. Thus, standardized measures may not capture the benefits of telepractice conversation group treatment, yet increases in the number of conversational turns, communication attempts, and communication effectiveness are indicative of language and social growth and merit further study.

Comparison of telepractice to other experimental conditions

The second research question investigated how telepractice group treatment effect patterns compared to historic, in-person group treatment and no-treatment control group effects. Both the telepractice and in-person groups showed superior benefits to the control group. However, the two delivery models were associated with improvement on different types of communication outcome measures. While the telepractice group showed improvement on task-specific standardized tests (CAT Repetition subtest) and functional language tasks (CAT Picture Description), the in-person group showed more overall improvements across discrete, functional, and discourse tasks.

Similar to the telepractice group, the in-person group showed improvement on the CAT Picture Description Task Description ($Z = 19$, $p = .072$). However, the in-person group was not significant at the $p < .05$ level, as compared to the telepractice group. This may be due to individual participant characteristics, as many telepractice group

participants were monologic in their conversational turns, in that turns would stay on a specific person for extended periods of time. This may have transferred to picture description, as participants were able to share as many details and information regarding the presented picture as they so wished without interruption. Furthermore, the telepractice delivery model may have influenced performance, as Zoom arguably constrains attention more due to screen presentation options.

Of note, the in-person group showed significant changes on the ACOM and discourse measures while the telepractice group did not. As mentioned earlier, there is limited research on the effects of the COVID-19 pandemic on patient-reported outcomes for PwA. However, it is important to consider the different levels of engagement between in-person and telepractice delivery. With in-person groups, PwA have more opportunities to socialize and connect with peers before and after sessions, thus elaborating on group dynamics established within sessions. Whereas telepractice participants only engage with other group members and socialize, as meetings are opened leaving no additional time outside of sessions to interact and develop friendships.

Furthermore, in-person sessions allow for different levels of engagement, such as side conversation, glance exchanges, etc. Over Zoom and other telepractice platforms, group participants are not afforded these opportunities, as focus is solely on the speaker. Depending on the size of the device being used, the preferred screen parameters (speaker vs gallery view) may inhibit the opportunity to observe other participants' expressions and communication attempts. Additionally, many participants follow "Zoom Etiquette" rules of remaining on mute to avoid interrupting the speaker with environmental

distractors and noise. As a result of microphone muting, subtle cues and nuances of conversation initiation, such as inhalation before speaking and other verbal acknowledgments and signals are omitted from telepractice groups that are frequently presented in-person. Moreover, engagement via Zoom is inherently limited by connection/internet difficulties, with the flow of conversation and group dynamics prone to breaks and challenges. Aside from these challenges, turn-taking over telepractice may not be as natural as in-person, due to fear of talking over one another. Therefore, in-person group treatment provides opportunities for a different and perhaps deeper level of engagement, compared to telepractice. Further research should examine frequency and length of turn, in addition to opportunities for different types of engagement in-person and over telepractice.

Although in-person group treatment presented with a greater number of significant findings than the telepractice group, it is important to acknowledge that both groups offer benefits compared to no-treatment. The telepractice group, therefore, adds to existing literature on the benefits of group conversation treatment for PwA. Telehealth may be a preferred method of delivery for PwA that are limited by costs, support, accessibility, and location. Thus, the results of this study are relevant to a larger discussion regarding the delivery methods for conversation treatment and merit continued study.

Treatment Fidelity

It is important to note that one participant (BU28)'s CCRSA pre-treatment score was omitted from statistical analysis due to psychosocial fragility on the original testing day. The participant experienced a medical event the day prior to pre-treatment testing that resulted in particularly low self-esteem and confidence. Therefore, the CCRSA was deemed inappropriate and not reflective of the patient's typical status. Furthermore, the CCRSA assesses perception of self, as opposed to objective performance. Thus, other measures were included in the statistical analysis because they were not compromised by poor self-perception.

Of note, the range of turns between telepractice and in-person groups greatly varied, with 4 – 110 for telepractice and 14.7 – 49.2 for in-person respectively. Moreover, this range signifies that some telepractice group participants were more dominant in the conversation while others experienced difficulties initiating and entertaining turns throughout the group. These differences may be due to the nature of telepractice delivery and/or individual participant characteristics. Depending upon Zoom presentation view (gallery vs speaker), some participants may not have been aware of other's attempts to take a turn and may have been constrained to viewing the speaker only, as opposed to watching the group as a whole. Additionally, while there was no significant difference in terms of severity of the participants, there was a range in terms of personality and presumed confidence in terms of taking initiative with turns.

Limitations and Future Directions

This study had a number of limitations. First, this pilot study included a small sample size (n = 7) and therefore all findings must be interpreted with caution. However, the significant effect sizes noted warrant further investigation in future research. For example, the larger sample in the RCT (n = 15) in which the in-person data (n = 6) was taken revealed different results than the small in-person data analyzed in the present study; the larger group showed significant improvements ($p < .05$) on CAT naming, CAT picture description, ACOM, number of utterances, and number of relevant utterances scores pre- to post-treatment, whereas the small in-person group in the present study on showed significant improvements on ACOM, number of relevant utterances, and percentage CU. Thus, a larger sample size is merited to further assess significant differences.

Second, blinding of participants and clinicians was not possible due to the nature of the pilot study and limited resources. Additionally, the participants who were involved in the study were self-selected and therefore could be considered to have approached the treatment with a positive attitude and selection-bias.

Given the nature of a telepractice platform (Zoom), technical difficulties, Wi-Fi connectivity errors, etc. were observed which may have negatively influenced the level of engagement. In the majority of treatment sessions, at least one participant or clinician experienced a technology-related issue. Although this did not interrupt the flow of the group session in most instances, these occurrences occasionally created distractions and breakdowns in conversation as attempts were made to resolve issues.

Most outcome measures reported here were all standardized measures, rather than subjective outcome ratings. All testing measures were considered to be an accurate and reliable measure of performance, yet, importantly, these measures have not been standardized or validated over telepractice. Therefore, their applicability to different profiles or a larger sample size merits further study.

Future work, with a larger number of participants, could examine whether there is a relationship between session variables such as number of sessions attended or number of speaking turns and treatment outcomes. Additionally, future research should include varying aphasia severities and types to better understand benefits of telepractice for different aphasia presentations. Since majority of telepractice participants were within mild-moderate range, telepractice should be trialed with more severe profiles. Because telepractice participants' contributions during conversation groups were very monologic in nature, turn length and duration should be analyzed and compared to in-person and control groups. Lastly, qualitative research on telepractice is warranted to better examine participant perceptions of telepractice as compared to in-person treatment.

CONCLUSION

In summary, this pilot study investigated the benefits of conversation treatment delivered via telepractice. Participants showed significant improvement pre-post treatment for repetition and picture description. Compared to in-person group and no-treatment group data, results suggest superior benefits for in-person delivery of conversation group treatment compared to telepractice delivery, and both are superior to

a no-treatment paradigm. Thus, these results are relevant to a larger discussion regarding the delivery methods for conversation treatment and merit continued study with a larger sample.

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