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EFFECTS OF A TELEREHABILITATION GROUP ON CONTINUING LANGUAGE  
TREATMENT AFTER PARTICIPATION IN AN INTENSIVE  
COMPREHENSIVE APHASIA PROGRAM (ICAP)

by

Alexis M. Missel

A thesis submitted in partial fulfillment  
of the requirements for the degree

of

MASTER OF SCIENCE

in

Speech-Language Pathology

Thesis Approved:

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UTAH STATE UNIVERSITY  
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**Abstract**

EFFECTS OF A TELEREHABILITATION GROUP ON CONTINUING LANGUAGE  
TREATMENT AFTER PARTICIPATION IN AN INTENSIVE  
COMPREHENSIVE APHASIA PROGRAM (ICAP)

by

Alexis M. Missel

Utah State University, 2020

Major Professor: Dr. Lisa Milman

Department: Communicative Disorders and Deaf Education

*Purpose:* The primary aim of the current study was to investigate an option for targeted intervention as a follow-up to an Intensive Comprehensive Aphasia Program (ICAP). Common features of an ICAP include: a focus on life participation; individualized and functional communication goals; an average cohort size of six participants that begin and complete the program together; comprehensive aims, including targets for language skills/impairment, group socialization/activity and participation, involvement of significant others (SOs) and family education/environmental factors; and a variety of service delivery approaches, comprised of individual, group, and technology-based sessions (Rose et al., 2013). Despite being demonstrated as efficacious aphasia therapy, there is little research assessing maintenance and generalization of gains following conclusion of the ICAPs, with one exception showing mixed results (Winans-Mitrik et al., 2014). Furthermore, there are few options that exist as tailored ICAP follow-up programs or continued intervention guided by the ICAP principle features. To address this, a Tele-connect Aphasia Group (TAG) project was initiated to provide continuing intervention after ICAP via telerehabilitation group therapy.

*Method:* This exploratory pilot project adapted standardized assessment measures and generated novel aphasia-friendly structured interview materials for use in a telerehabilitation format.

Following a formal language assessment via videoconference, six participants completed up to four one-hour aphasia group sessions via telerehabilitation, along with up to 60 minutes per week of individual sessions/coaching over telephone or videoconference, over the course of four weeks.

*Results:* Analysis of standardized language assessment differences between post-ICAP and pre-TAG indicate that although most participants demonstrated a decline in communication profile gains after three months, participants endorsed the benefit of participation in an ICAP and the importance of continued language therapy. Standardized language assessment pre-TAG and post-TAG scores indicate that improvements in communication profile are feasible following one month of additional ‘booster’ telerehabilitation aphasia services. Additionally, results of an informal patient reported outcome measure indicated that participation in telerehabilitation group therapy was deemed beneficial by all six participants and their significant others.

*Conclusions:* Overall, progress towards personalized communication goals were observed in all six participants. Moreover, participants endorsed the benefit of continuing language therapy at home through participation in group telerehabilitation, especially when supplemented with individual meetings/sessions. Future studies investigating aphasia group therapy via telerehabilitation may benefit from evaluating more aphasia-friendly service delivery, adjustments to clinician and SO training in use of telehealth, and further evaluation of modified assessments. Improvements to aphasia group therapy via telerehabilitation may include assessments of quality of life, provision of services to support SOs, and generation of supplemental materials to be used in conjunction with videoconference services.

**Public Abstract**

Effects of a Telerehabilitation Group on Continuing Language Treatment after Participation in an  
Intensive Comprehensive Aphasia Program (ICAP)

Alexis Missel

Aphasia is an acquired neurogenic language disorder encompassing oral and/or written language expression and comprehension affecting an estimated two- to two to four million people in the United States, (Simmons-Mackie, 2018; National Aphasia Association, 2016). The primary aim of the current study was to investigate an option for targeted intervention as a follow-up to an Intensive Comprehensive Aphasia Program (ICAP). There is little research assessing maintenance of communication profile gains following conclusion of the ICAPs, and there are few options that exist as tailored ICAP follow-up programs or continued intervention guided by the ICAP principle features. To address this, a Tele-connect Aphasia Group (TAG) project was initiated to provide continuing intervention after ICAP via telerehabilitation group therapy. Following a formal language assessment via videoconference, six participants completed up to four one-hour aphasia group sessions via telerehabilitation, along with up to sixty minutes per week of individual sessions/coaching over telephone or videoconference, over the course of four weeks.

Results demonstrate progress towards personalized communication goals by all six participants. Moreover, participants endorsed the benefit of continuing language therapy at home through participation in group telerehabilitation, especially when supplemented with individual meetings/sessions.

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## Introduction

Individuals with aphasia make demonstrable communication improvements through participation in Intensive Comprehensive Aphasia Programs (e.g., Babbitt et al., 2016; Babbitt et al., 2015; Griffin-Musick et al., 2020; Off et al., 2018; Persad et al., 2013; Rodriguez et al., 2013; Winans-Mitrik et al., 2014), but their road to recovery does not end when their cohort's session concludes – continued home practice addressing meaningful, personalized, functional communication is essential to empowering a person with aphasia (PWA) to live their fullest life possible. Aphasia, an acquired neurogenic language disorder encompassing oral and/or written language expression and comprehension, affects an estimated two to four million people in the United States, with approximately 225,000 new cases diagnosed in the US each year (Simmons-Mackie, 2018; National Aphasia Association, 2016). Language deficiencies experienced by a PWA may subsequently impact the individual's activity and participation in daily life, yielding a severely diminished psychosocial well-being (Wallace et al., 2017b). Dissatisfaction with social networks, isolation, and loss of friends have been reported as contributors to negative perception of quality of life (Hilari et al., 2012; Northcott et al., 2016). Furthermore, both the person with aphasia and the significant other (SO) may experience difficulties with daily communication, social and leisure activities, employment and finances, dealing with health professionals, role changes, and a myriad of other logistical and psychosocial challenges contributing to communication burden (McGurk & Kneebone, 2013).

Psychosocial well-being and communication skills of both PWA and SO may be addressed through speech-language therapy. A variety of intervention approaches, ranging from one-on-one individual sessions to group therapy (e.g., Brady et al., 2016; Elman & Bernstein-Ellis, 1999), face-to-face structure to telerehabilitation (TR) (e.g., Pitt et al., 2017; Woolf et al.,

2016), and discrete skill acquisition to integrated approaches (e.g., Marshall & Mohapatra, 2017; Milman, 2016) have been supported as efficacious and are utilized to address goals within the World Health Organization International Classification of Functioning, Disability and Health (WHO-ICF) framework (e.g., Hula et al., 2013; Wallace et al., 2017a). In a recent analysis, Wallace and colleagues identified outcomes important to PWA and SOs across a WHO-ICF framework, including: improving language across modalities and settings (body function and structure/impairment), returning to work (activities), maintaining social networks (participation), increasing confidence (personal factors), and accessing health services and equipment (environmental factors) (2017b, p. 1370). In addition, it was recommended that aphasia intervention be guided by individualized, person-centered goals (Wallace et al., 2017b).

### **Intensive Comprehensive Aphasia Programs (ICAP)**

Intensive Comprehensive Aphasia Programs (ICAPs) address all facets of the WHO-ICF model and are supported by a growing body of literature (e.g., Babbitt et al., 2016; Babbitt et al., 2015; Persad et al., 2013; Rodriguez et al., 2013; Winans-Mitrik et al., 2014). As a comprehensive program, there is evidence to support diverse ICAP benefits within aspects of body function and structures/impairment (e.g., language production) as well as across activities/limitations and participation/restrictions (e.g., phone conversations with family members) (Persad et al., 2013). In addition to communicative and linguistic measures, environmental factors are addressed and personal factors such as quality of life have been shown to improve after treatment in an ICAP (Griffin-Musick et al., 2020; Hoover et al., 2017; Off et al., 2018).

ICAPs are immersive intervention experiences that utilize evidence-based practice (EBP) and infuse principles of neuroplasticity (Kiran & Thompson, 2019; Kleim & Jones, 2008), but

differ from traditional outpatient aphasia therapy on some aspects. Dissimilarities include setting, staffing, incorporation of diverse materials, increased time dedicated to treatment planning, and implementation of a wide variety of treatments with a focus on intensity and comprehensiveness (Babbitt et al., 2015). Although there is variability within the ICAP service delivery model, ICAPs have in common a number of elements which have been evidenced to provide cognitive, linguistic, and psychosocial benefits to participants (Griffin-Musick et al., 2020; Hula et al., 2013; Rose et al., 2013; Winans-Mitrik et al., 2014). These common components include: a focus on life participation; individualized and functional communication goals; an average cohort size of six participants that begin and complete the program together; comprehensive aims, including targets for language skills/impairment, group socialization/activity and participation, involvement of SOs and family education/environmental factors; and a variety of service delivery approaches, comprised of individual, group, and technology-based sessions (Rose et al., 2013). ICAPs not only implement intervention with significant intensity, but also a greater overall number of therapy hours than typical outpatient treatment, featuring an average duration of 100 program hours, administered in three to seven hours of treatment per day over approximately one month (ranging from 30 hours/2 weeks to 150 hours/4 weeks) (Babbitt et al., 2016; Rose et al., 2013).

Due to the demands of an ICAP and a proposed relationship between time post-onset and high-intensity treatment tolerance, inclusion criteria are implemented in many programs to ensure personal factors and expectations align with the demands of the intervention (Hula et al., 2013; Øra et al., 2018). While it has been hypothesized that a longer time post-onset may facilitate participation in an ICAP, participation by individuals with varying degrees and types of severity has yielded advantageous results (Babbitt et al., 2016). Ultimately, success has been

attributed to the EBP of ICAPs enacted through creation of multidimensional, functional individualized goals, incorporation of both individual and group treatments with a pragmatic focus, inclusion of family and provision of SO education, and an intensive, cohort model (Babbitt et al., 2016; Rose et al., 2013).

### **Continuing Intervention after ICAP**

Many individuals who complete an ICAP may encounter barriers after reintegrating into their home environments and experiencing the demands of their daily life (Wray & Clarke, 2017). Furthermore, SOs may experience stress and communicative burdens after returning home (McGurk & Kneebone, 2013). For this reason, many ICAPs provide home programs, advise participation in community therapy groups, and/or accept participants back to partake in the ICAP for another session. However, based on a review of recent publications, there appears to be limited information available about generalization of language therapy to everyday life, follow-up treatment, or continuing intervention after ICAP completion (e.g., Babbitt et al., 2016; Babbitt et al., 2015; Persad et al., 2013; Rodriguez et al., 2013), with the exception demonstrating mixed maintenance outcomes at two-months post-treatment (Winans-Mitrik et al., 2014). For instance, little is known about an individual's adherence to a home program, maintenance of treatment gains, and continued speech-language treatment. Such information has the potential to extend the ICAP model by expanding our understanding of therapeutic opportunities for continued psychosocial support, language improvement, and generalization as PWA transition from an intensive intervention program to the challenges of daily life.

### **Current Research**

This study seeks to address this knowledge gap by investigating the efficacy of aphasia telerehabilitation (TR) group therapy as a structured follow-up intervention to an ICAP.

### ***Aphasia Group Therapy***

Studies have revealed that group therapy can be as effective as one-on-one therapy (Hoover et al., 2015; Pitt et al., 2017). For instance, discrete linguistic processes such as word finding and naming have been shown to improve through group therapy for PWA (Attard et al., 2018; Lima et al., 2018). Community aphasia groups can also aid PWA in reintegrating into their community by utilizing a multidimensional approach that is consistent with the WHO-ICF framework, targeting communication therapy, conversation activity, social and/or psychological support, stroke/aphasia education, and participation in accessible activities (Attard et al., 2015). In addition, quality of life may be impacted through multifaceted improvement of sense of social inclusion through peer support, purposeful living through engaging in helping roles, and autonomy through group decision making and goal setting (Attard et al., 2015; Attard et al., 2018).

### ***Aphasia Group Therapy & Telerehabilitation***

Provision of intervention depends on resource availability. Telerehabilitation (TR), is one way to facilitate successful intervention opportunities in a cost-efficient and time-effective manner for individuals who are isolated and do not have the means or opportunity to access local services due to either geographic, physical, or time constraints (Ross et al., 2006; Taylor et al., 2009).

TR groups combine the advantages of group and TR interventions and can be as impactful as face-to-face treatment (Hall et al., 2013). In addition to being able to engage with a qualified service provider, participants in a TR group may be able to broaden their social networks to include individuals experiencing similar challenges. They have been implemented using both widely available teleconference tools and custom-tailored tools. One telepractice



group intervention using a specially designed protocol, TeleGAIN, was perceived to provide overarching support for living with aphasia by increasing confidence, attenuating social isolation, improving skills in technology, and expanding use of communication strategies (Pitt et al., 2017). In addition to social well-being and pragmatic communication benefits, performance of language intervention on discrete skills such as word finding therapy has been shown to be comparable for both face to face and remote therapy (Woolf et al., 2016). Moreover, SLPs perceive TR groups as a feasible and effective option for providing services to PWA, citing benefits to the participants that include participation in a supportive and meaningful activity and development of a social network; as well as benefits to clinicians that include flexibility of delivery and saving time and money (Pitt et al., 2018; Swales et al., 2016).

### **Research Questions**

This study endeavors to answer the following questions:

1. *Do participants maintain communication profile gains three months after ICAP completion?*
2. *Do participants show a change in communication profile after completion of an aphasia TR group?*
3. *What is the participant's perception of the value of continued aphasia intervention three months after completing an ICAP but prior to participation in the aphasia TR group, as well as after participation in the aphasia TR group?*

We hypothesized that the PWA would demonstrate a decline or maintenance of gains three months post-ICAP, but would show limited continued improvement. We further hypothesized that the PWA would demonstrate improved language performance as a result of participation in the aphasia TR group. Additionally, we predicted that participation in the group would elicit psychosocial benefits for the both the PWA and the SO.

### **Method**

**Institutional Review of Human Subjects Research and Recruitment**

This research was approved by the Utah State University (USU) Institutional Review Board (IRB) prior to initiating recruitment and/or any contact with research participants. Recruitment occurred in collaboration with the Big Sky Aphasia Program (BSAP), an Intensive Comprehensive Aphasia Program (ICAP) at the University of Montana, following consent by participants to be contacted following their completion of the four-week ICAP.

**Participants**

Recruitment was initiated with eight individuals (and optionally one significant other/support person) who had completed an Intensive Comprehensive Aphasia Program (ICAP) and expressed interest in participation in the Telerehabilitation Aphasia Group (TAG). Individuals were contacted via phone call and email to determine their continued interest in TAG, and a follow-up email with the recruitment poster and additional information if they expressed interest in the study and verbally consented to receive the email (see Appendix A). Ultimately, six individuals completed the initial interviews and consent process. All participants were independent, community-dwelling adults who were at least six months post-onset of diagnosis of aphasia and three months post-participation in the ICAP (see Table 1). Participants included four male and two female adults ranging in age from 43-73 years ( $M = 60.3$  years) who expressed an interest in participating in continued aphasia group intervention via telerehabilitation. Participants agreed to not initiate any new language and/or cognitive intervention during the course of the study ( $M = 10$  weeks from TAG formal recruitment to TAG post-assessment). In addition, all participants had access to technology (computer, adequate internet connection, software) needed to participate in eight videoconference formal sessions over the course of the study (one videoconference system check session, two 60-minute pre-

assessment sessions, one 60-minute session/week for four weeks, one 60-minute post-assessment sessions). In order to accurately represent this population, no additional restrictions were placed on years of education, or on type and/or severity of aphasia.

**Table 1.** Demographic Information

	Treatment Group 1			Treatment Group 2		
Participant	<i>TAG1901CH</i>	<i>TAG1902IG</i>	<i>TAG1904TH</i>	<i>TAG1903SH</i>	<i>TAG1905LAR</i>	<i>TAG1906CS</i>
Gender	M	M	M	M	F	F
Age	73	64	63	53	43	66
Handedness	R	R	R	R	R	R
Lesion Date	7/24/2014	5/14/2018	2/16/2017	3/16/2017	11/26/2018	5/20/2016
Lesion Location	L MCA CVA	L MCA CVA	L MCA CVA	L CVA; L ICA dissection	L MCA CVA; L ICA CVA; L ACA CVA	L CVA
Education	Some College	.	Associate degree	Bachelor's Degree	Bachelor's Degree	Doctorate Degree
Aphasia Classification	Broca's	Global	Global	Transcortical Mixed/Isolation	Broca's	Broca's
Aphasia Severity	Severe	Very Severe	Very Severe	Severe	Moderate	Severe

## Experimental Design

This exploratory research project employed a small-n, pre-post treatment design with replication (within treatment phase only) across six participants (two aphasia groups, each with three participants). Participants were asked to attend, via telehealth, nine formal sessions: one study introduction session, one computer set-up/testing session, two pre-treatment evaluation sessions, four treatment sessions (with the option of four one-on-one coaching sessions to prepare for the group), and one post-treatment evaluation session.

After consenting to participate in the study, sociodemographic and medical information was collected for each participant. Following examination of medical records and collection of pre-treatment evaluation data (Sessions 1 & 2), participants were assigned to one of two possible TR groups (Treatment Group 1 or Treatment Group 2) taking into consideration each individual's communication abilities, availability, and scheduling preferences.

Experimental control was exercised through replication within participants (multiple measures taken during each study phase) and across participants (within the full group). As described in greater detail below, additional means to ensure the internal validity of the study included: 1) use of both standardized and experimental measures; 2) treatment adherence check (i.e., data is reported for all recruited participants regardless of whether they completed the study).

## **Measures**

### ***Review of Medical Records***

An intake interview was conducted via phone call with the person with aphasia and their significant other to ensure that participants met all study inclusion/exclusion criteria (see description of sample above and standardized interview protocol in Appendix A). Individuals who qualified and wished to participate were then asked to sign the informed consent and Health Insurance Portability and Accountability Act (HIPAA) forms (see Appendix A). Medical records and language/communication assessment results from the Intensive Comprehensive Aphasia Program (ICAP) and other relevant clinical facilities were then requested and reviewed. This review included assessment results (i.e., Western Aphasia Battery – Revised (WAB-R) (Dekhtyar et al., 2020; Kertesz & Raven, 2007; see also Appendix F), the ICAP Pre-Post Treatment Questionnaire, and treatment goals from their former participation in the ICAP.

### ***Pre- and Post- TAG Testing***

Prior to initiation of and after completing all TR group therapy sessions, participants completed a language assessment battery over two sessions (see Table 2) to establish baseline performance, guide treatment planning, and measure potential changes. Part one of the Western Aphasia Battery - Revised (WAB-R), as adapted for tele-assessment, (Dekhtyar et al., 2020;

Kertesz & Raven, 2007; see also Appendix F) was administered during the first assessment session. Outcome measures completed during the second pre-TAG evaluation session included: Perception of Language Treatment Questionnaire (PoLTQ) (experimental measure; see also Appendix E) and Goal Attainment Scaling (GAS) (Schlosser, 2004; see also Appendix G). Outcome measures administered in the post-TAG evaluation session included: the Western Aphasia Battery - Revised (WAB-R) as adapted for tele-assessment (Dekhtyar et al., 2020; Kertesz and Raven, 2007; see also Appendix F), Perception of Language Treatment Questionnaire (PoLTQ) (experimental measure, see also Appendix E), and Goal Attainment Scaling (GAS) (Schlosser, 2004; see also Appendix G).

**Table 2. Outcome Measures**

<b>Outcome Measures</b>	<b>Assessment Description</b>	<b>Administration Time &amp; Duration</b>	<b>Recipient</b>	<b>Research Question(s)</b>
Perception of Language Treatment Questionnaire (experimental measure, see appendix E)	A questionnaire developed specifically for this study that includes 7 items to assess the motivation, confidence level, habits, barriers, and successes related to implementing home practice focused on continuing language therapy after an ICAP.	Pre-TAG S2 Post-TAG  (15 minutes)	Participant / Person with Aphasia (PWA)	RQ3
Western Aphasia Battery - Revised (WAB-R) (Dekhtyar et al., 2020; Kertesz & Raven, 2007, see Appendix F)	Individually administered assessment for adults with acquired neurological disorders to assess linguistic skills most frequently affected by aphasia, including content, fluency, auditory comprehension, repetition and naming, reading, and writing.  The WAB-R has been shown to have strong intrarater reliability of 0.99 and interrater reliability of 0.99. Test-Retest reliability is reported as 0.99. The concurrent validity for this test with the Neurosensory Center Comprehensive Examination for Aphasia (NCCEA) is reported as a Pearson's correlation coefficient of 0.96, $p < .0001$ (Kertesz and Raven, 2007).	Pre-TAG S1 Post-TAG  (45 – 60 minutes)	Participant / Person with Aphasia (PWA)	RQ1  RQ2
Goal Attainment Scaling (GAS) (Schlosser, 2004, see Appendix G)	Individualized goal scaling generated through a collaboration between clinician and participant that is used to measure the extent to which an individual's goals are met.	Pre-TAG S2 Post Tx Session 1 Post Tx Session 2 Posts Tx Session 3 Post Tx Session 4	Participant / Person with Aphasia (PWA)	RQ2

		Post-TAG (30 minutes)		
Aphasia Telerehabilitation (TR) Group Satisfaction Survey (experimental measure, see Appendix H)	A clinician generated 5-item survey to measure perception of the value of Aphasia Telerehabilitation Group participation.	Post-TAG (15 minutes)	Participant / Person with Aphasia (PWA)  Significant other (SO)	RQ3

Goal Attainment Scaling (GAS) was used to generate individualized person-centered goals and an individualized person-centered measurement scale to assess goal attainment throughout study phases (see Table 3 and Appendix G). GAS is a motivational interviewing and goal setting technique that has been indicated as an effective means to develop functional, participation-oriented SMART (Specific, Measurable, Attainable, Relevant, and Timely) goals for individuals with communication disorders (Schlosser, 2004). In addition to identifying individualized, systematically measurable treatment goals, GAS may be utilized to catalyze communication between families, participants, and clinicians, to identify barriers to generalizing participants' treatment to everyday life, and to develop self-anchored references of success. Specifically, GAS has been demonstrated as a sensitive measure to identify therapeutic gains related to personal factors (Brands, Bouwens, Wolters, Gregorio, Stapert, & Heugten, 2013; Duke, Bains, Ferdinandi, & Tittley, 2013; Mumby & Whitworth, 2012; Schlosser, 2004).

Goal writing through GAS considers the desired outcomes expressed by a client, assessment results and clinician observations, and realistic, achievable targets within a pre-specified timeframe. The five point scale (see Table 3) ranges from deterioration in performance to exceeding expectations: 'worst expected outcome' is classified as "-2", 'less than expected outcome'/'baseline' is assigned a status of "-1", 'expected outcome' is established as "0", 'more than expected outcome' is "+1", and the 'best expected outcome' is identified as "+2"

(Schlosser, 2004). Additionally, the participants identify the importance of each goal. Utilizing GAS allows individuals with aphasia to be meaningfully engaged throughout the therapeutic process, while enabling therapists to employ clinical judgement to scale goals and determine next steps in intervention.

**Table 3: Example of potential GAS goal: Self-Advocacy**

<b><u>Level of Attainment</u></b>	<b><u>Goal</u></b>
<b>+2 Best Expected Outcome</b>	Without written support, I will independently express a personal preference (i.e., “I want to stay home.” or “I want to go out.”) to my significant other in 80% of opportunities.
<b>+1 More Than Expected Outcome</b>	I will independently express a personal preference (i.e., “I want to stay home.” or “I want to go out.”) by reading a written prompt aloud to my significant other in 100% of opportunities.
<b>0 Expected Outcome</b>	<b>I will independently express a personal preference (i.e. “I want to stay home.” or “I want to go out.”) by reading a written prompt aloud to my significant other in 80% of opportunities.</b>
<b>-1 Less Than Expected Outcome / Baseline</b>	I will independently express a personal preference (i.e., “I want to stay home.” or “I want to go out.”) by reading a written prompt aloud to my significant other in 60% of opportunities.
<b>-2 Worst Expected Outcome</b>	I will independently express a personal preference (i.e., “I want to stay home.” or “I want to go out.”) by reading a written prompt to my significant other in 40% of opportunities.
<b><i>Comments</i></b>	<i>Timeline:</i> <i>Strategy:</i>

### ***Treatment Probes***

The initial intention of this project specified that after each weekly aphasia TR group therapy session, participants would complete the: 1) Perception of Language Treatment Questionnaire (seven items) (PoLTQ) and 2) Goal Attainment Scale (GAS) created for each client (3 items). Due to the severity of aphasia of the enrolled participants and as an effort to reduce the cognitive load for participants, the PoLTQ was completed only twice (pre-TAG and

post-TAG). However, GAS was completed, as planned, after each group therapy session. Student clinicians and the certified SLP calculated independent sets of GAS scores. The final entered GAS scores for a given session were based on a consensus decision by the clinician and supervising SLP.

### ***Post-Testing***

In addition to the outcome measures identified as both pre- and post- assessments, participants and significant others took a five-item satisfaction survey following completion of the aphasia TR groups (experimental measure; see also Table 3 and Appendix H).

### **Treatment**

#### ***Intervention***

The overarching therapeutic purpose was to promote generalization of ICAP treatment to an everyday context, so treatment goals and activities were person-centered based on assessment results; specifically, goals and barriers were identified through the Perception of Language Treatment Questionnaire and GAS. For instance, if a barrier was to explain communication needs to familiar and unfamiliar communication partners, the goal might have been to express a self-advocacy statement (Table 3). Similarly, if a barrier was communication with long-distance family members, a goal might have been to write coherent emails (see Appendix G for additional examples of GAS goals).

Each session included three segments (see Table 4): (1) audio-visual system check, rapport building, and social communication (10 minutes); (2) facilitated practice (10 minutes/participant x three participants = 30 minutes); and summary discussion (10 minutes).



During the audio-visual system check, significant others for five of the six participants often facilitated set-up of necessary equipment for the videoconference and communicated any challenges to the clinicians.

The group practice included three activities, each supported by visuals (e.g., clipart, personal photographs, aphasia friendly text) on a shared screen. The first activity, ‘Introductions’, provided a pragmatically appropriate, structured opportunity to address GAS1 and/or GAS2 by prompting use of an ID card and/or writing or speaking a personal introduction. The second activity, ‘Family’, created highly structured opportunities for participants to address GAS2 and/or GAS3 by identifying family members and verbally producing targeted social phrases in response to scripted functional prompts. Finally, the third activity, ‘Catching Up’, allowed semi-structure, conversational practice of language and non-verbal communication including, but not limited to, the participants’ personal targets (e.g., use of an ID card; verbal production of functional words, such as family member names, and functional phrases).

Clinicians followed-up with participants via email, phone call, and/or videoconference one to two times between each weekly session in order to check-in with barriers and progress, facilitate home practice, and provide necessary intervention materials.

**Table 4: Session Structure**

<b>Time</b>	<b>Activity</b>	<b>Therapeutic Purpose</b>
:00 - :10	Audiovisual system check, rapport building, and social communication	Social/pragmatic practice in a naturalistic setting
:10 - :50	Eight to twelve minutes per person: Discussion of carry-over from therapy goal to real world problem via structured and semi-structured activities divided into the following three segments. <ul style="list-style-type: none"> <li>• Introductions</li> <li>• Family</li> <li>• Catching Up</li> </ul>	Problem based approach to learning, with high personal relevance and saliency
:50 - :00	Summarize discussion: Assign homework and synthesize take-home thoughts	Transfer of skills outside telerehabilitation session

**Intervention Materials.** Clinicians not only worked collaboratively with the client to customize goals, but also to personalize intervention materials based on the barriers identified and targeted through GAS. For example, if an individual's goal was to verbally produce a self-advocacy statement to facilitate more fulfilling communicative interactions with familiar and unfamiliar communication partners, treatment materials might include information on characteristics of aphasia, communication partner training tools, self-advocacy writing supports, and self-advocacy rehearsal supports. Alternatively, if an individual's goal was to communicate with a family member via email, treatment materials might have included: email outlines, sentence composition supports, word banks, instruction on assistive technology, and other email practice supports.

**Telerehabilitation (TR) System.** Telerehabilitation sessions were broadcast by clinicians at USU, while participants and their significant others participated via personal computers or tablets from their respective homes. TR sessions were conducted through the secure HIPAA-compatible Utah Education Network (UEN)/Utah Health Network (UHN) broadcast system (5mb/s incoming signal; 1mb/s outgoing signal) in real time using commercially available Cisco Webex jabber videoconferencing system software. Clinicians at USU used a Cisco SX10 videoconferencing system integrated with a remote-controlled HD (768 x 448) video camera, a Cisco CTS-QS C20 microphone, and a widescreen (30") Samsung display.

A minimum of one graduate student-clinician and one speech-language pathologist was present for each session, with some sessions attended by additional graduate student-clinicians and/or undergraduate students to assist with data collection and materials management. The two clinicians shared a small table from which they could access laptop control of the videoconference via a USB-connected mouse. Blank room dividers were placed behind the

clinicians in order to simplify the visual scene of the room and minimize any potential distractions. Although the laptops were capable of video and were used to capture a close-up image of the facilitating clinician's face, an external webcam was also utilized in order to enable a wide-angle shot of both clinicians. The close-up camera was employed to share facial expressions, phonemic cueing, and to zoom-in on visual written or picture cues. The wide-angle camera was utilized to provide context of clinicians in the room, and to capture broader body gestures. An external microphone was utilized to ensure adequate volume for the participants. Participants were visible to the clinicians on a large television screen mounted to the front of the room. A checklist (see Appendix B) was utilized to ensure set-up consistency across intervention sessions.

While bandwidth requirements for Webex vary based on the make and model of the computer/camera/microphone in use, minimum requirements are 0.5 Mbps (download/receive) and 1.5 Mbps (upload/send). The participants accessed the system from home via broadband internet using a personal computer/laptop with a webcam and integrated microphone. One participant required a laptop loan from the university in order to access the videoconference software. This setup enabled clients and clinicians to see each other at all times via a grid layout. Sessions were recorded and are stored on an established, controlled-access, secure state education/healthcare server (Utah Education Network). Sessions and recordings were scheduled in advance so that participants were only required to start/turn-on the computer, open their email, click the link to join, and enter a password to connect. Participants and their significant others were provided with aphasia-friendly guides to set-up and participate in the videoconferences (see Appendix C). Live technical support was provided by technicians located at the university to ensure high quality connectivity and audio-visual signal.

### ***Treatment Fidelity***

While the student-clinician and clinical supervisor did not formally complete a checklist after each session to verify that all treatment components were completed as described, a collaborative discussion of strengths and challenges was conducted following each session (see Table 3 and Appendix I).

### **Results**

This study sought to (1) evaluate maintenance of language gains three months after ICAP completion, (2) analyze any potential language/communication changes following participation in the Tele-connect Aphasia Group (TAG) project, and (3) ascertain participants' (individuals with aphasia and their significant others) perception of the value of continuing language therapy at home after completing an ICAP, as well as after completing TAG. A cohort of six participants completed the program in two treatment groups established based on a variety of factors, including participant's baseline language level and scheduling availability. Data is presented by individual participant, by treatment group (i.e., two groups of three participants each), and as collapsed data for the entire cohort (i.e., both groups/all six participants). Descriptive data is provided for individuals, subgroups, and the full cohort, while statistical analyses were completed both on individuals and the whole cohort.

Descriptive and visual (graphic) data were used to report raw data from individual participants across all study phases: baseline, treatment, and post-treatment. In addition, paired sample t-tests were used to compare performance on all pre- and post-treatment measures for participants as a complete cohort. Insufficient data were available to analyze outcome measures from significant others, but their feedback and opinions are reported when available. While the original intent of this study sought to include systematic pre-post analysis of significant others'

perceptions, this aim was ultimately not realized due to the time constraints and exploratory nature of this project. The results are expounded upon, organized by research question, below.

Table 5 summarizes the participation record and treatment intensity for TAG with respect to weekly group and individual sessions. All participants completed at least one session, either a group or individual videoconference, every week. Five of the six participants completed all four group sessions. One participant missed session number two due to a scheduling conflict, but did attend the individual session for that week.

Individual sessions were offered for additional practice and coaching, with the option to complete one one-hour session or two half-hour sessions per week. Four participants completed a total of four hours of individual sessions, one participant completed a total of three hours of individual sessions, and one participant completed two hours of individual sessions.

**Table 5.** TAG Participation Record: Total hours (for group and individual sessions) and treatment intensity (mean hours/week).

	Treatment Group 1			Treatment Group 2			Hours	
Participant	<i>TAG1901CH</i>	<i>TAG1902IG</i>	<i>TAG1904TH</i>	<i>TAG1903SH</i>	<i>TAG1905LAR</i>	<i>TAG1906CS</i>	Mean	SD
<b>TAG Group Sessions</b> (total hours)	4	4	4	4	3	4	3.83	0.41
<b>TAG Individual Sessions</b> (total hours)	4	4	2	4	4	3	3.67	0.82
<b>TAG Treatment Intensity</b> (mean hours/week)	2	2	1.5	2	1.75	2	1.88	0.21

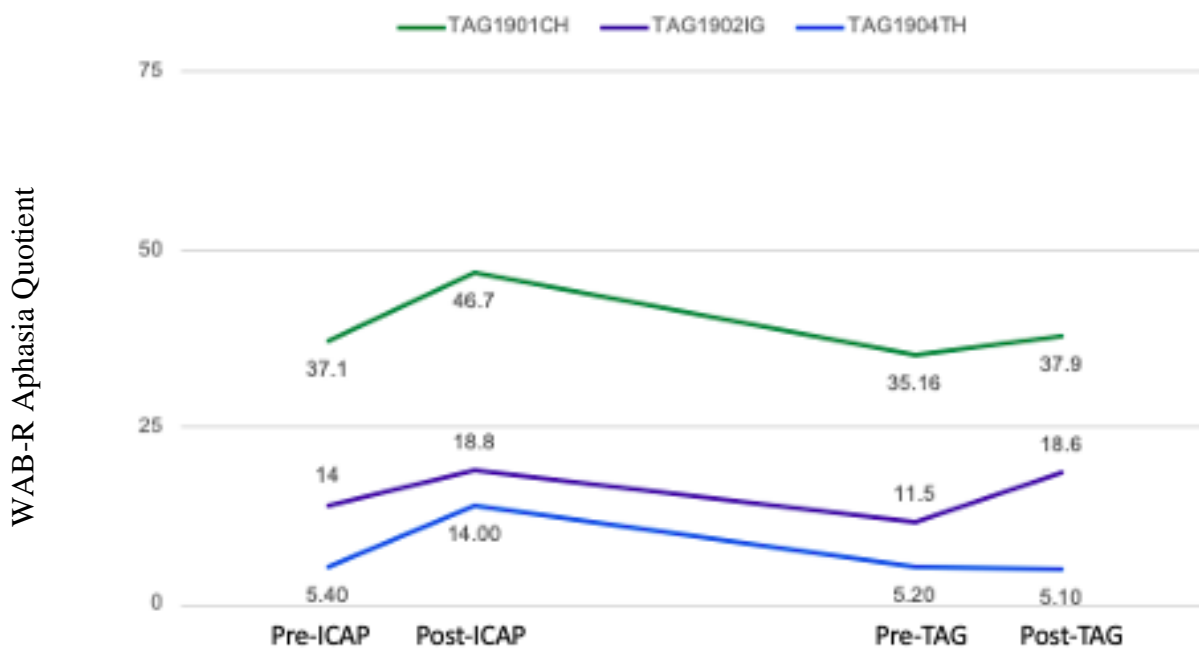
*Note.* Treatment intensity was calculated by dividing total hours of treatment by weeks of treatment.

### **Research Question 1: Do participants maintain language performance improvements three months after completing an ICAP?**

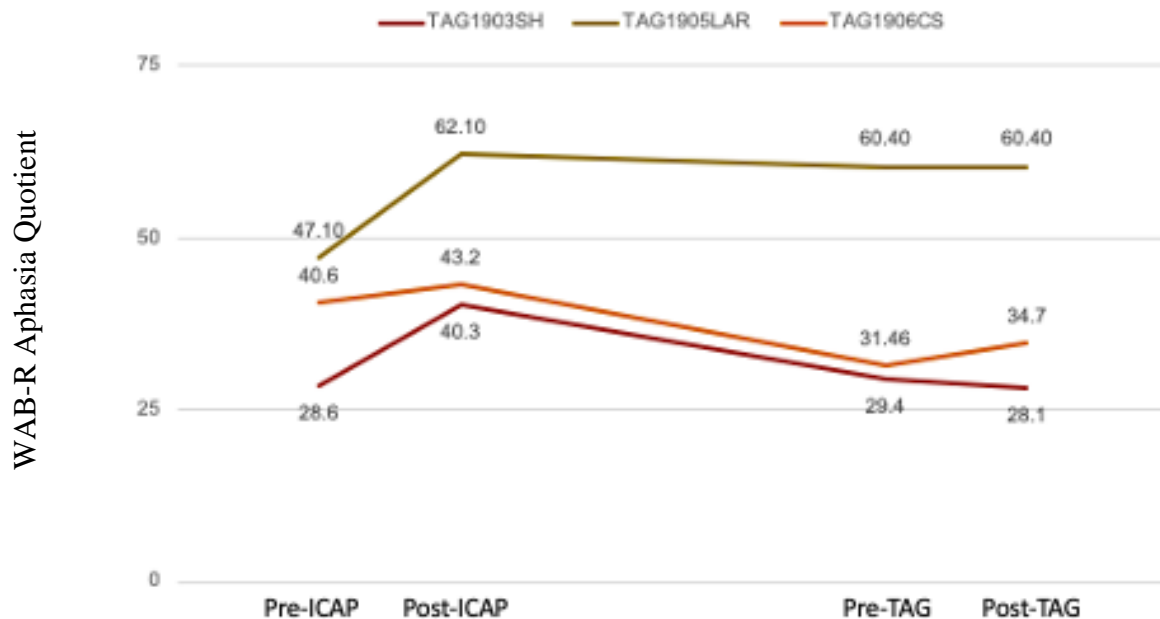
Figures 1 (Treatment Group 1) and 2 (Treatment Group 2) show Western Aphasia Battery – Revised (WAB-R) aphasia quotient (AQ) for pre- and post- ICAP (from ICAP reports of in person test administration), and for pre- and post- TAG (tele-assessment). Table 6 (Treatment Group 1) and Table 7 (Treatment Group 2) show post-ICAP (i.e., July 2019) and pre-

TAG (i.e., October 2019) WAB-R AQ scores, aphasia classification, and severity ranking. All three participants in Treatment Group 1 demonstrated statistically significant ( $\geq 2$  SEM) declines in WAB-R AQ scores when comparing post-ICAP to pre-TAG. However, neither changes in aphasia classification nor severity were noted for any of the Treatment Group 1 participants. Treatment Group 2 analysis indicated decreased WAB-R AQ scores for all three participants, with statistically significant ( $\geq 2$ SEM) WAB-R AQ score decline for two of the three participants when comparing post-ICAP to pre-TAG. As with Treatment Group 1, however, no participants presented with changes in aphasia classification or severity.

**Figure 1.** Treatment Group 1, WAB-R AQ Scores: Pre-ICAP, Post-ICAP, Pre-TAG, Post-TAG



*Note.* Western Aphasia Battery – Revised (WAB-R), Aphasia Quotient (AQ).

**Figure 2.** Treatment Group 2, WAB-R AQ Scores: Pre-ICAP, Post-ICAP, Pre-TAG, Post-TAG

Note. WAB-R = Western Aphasia Battery – Revised, Aphasia Quotient.

**Table 6.** Treatment Group 1: Post-ICAP and pre-TAG maintenance performance on standardized measure of language.

	TAG1901CH		TAG1902IG		TAG1904TH		Normative Data			
Administration	Post-ICAP	Pre-TAG	Post-ICAP	Pre-TAG	Post-ICAP	Pre-TAG	Max	M	SD	SEM
WAB-R AQ	46.70	35.16(**)	18.80	11.50(**)	14.00	5.20(**)	100	31.7	16.6	2.9
CLASSIFICATION	Broca's	Broca's	Global	Global	Global	Global				
SEVERITY	Severe	Severe	Very Severe	Very Severe	Very Severe	Very Severe				

Note. WAB-R = Western Aphasia Battery – Revised, normative data from the test manual (Kertesz, 2007); AQ = aphasia quotient. (\*) Pre- to post-treatment change  $\geq 1$  SEM unit (65% confidence interval). (\*\*) Pre- to posttreatment change  $\geq 2$  SEM units (95% confidence interval).

**Table 7.** Treatment Group 2: Post-ICAP and pre-TAG maintenance performance on standardized measure of language.

	TAG1903SH		TAG1905LAR		TAG1906CS		Normative Data			
Administration	Post-ICAP	Pre-TAG	Post-ICAP	Pre-TAG	Post-ICAP	Pre-TAG	Max	M	SD	SEM
WAB-R AQ	40.30	29.40(**)	62.10	60.40	43.20	31.36(**)	100	31.7	16.6	2.9
CLASSIFICATION	Transcortical Mixed / Isolation	Transcortical Mixed / Isolation	Broca's	Broca's	Broca's	Broca's				
SEVERITY	Severe	Severe	Moderate	Moderate	Severe	Severe				

Note. WAB-R = Western Aphasia Battery – Revised, normative data from the test manual (Kertesz, 2007); AQ = aphasia quotient. (\*) Pre- to post-treatment change  $\geq 1$  SEM unit (65% confidence interval). (\*\*) Pre- to post-treatment change  $\geq 2$  SEM units (95% confidence interval).

In summation, all six participants demonstrated declines in WAB-R AQ over the approximately three-month period from post-ICAP (in-person administration) to pre-TAG (tele-assessment), with five of the six participants demonstrating statistically significant changes. Additionally, for five of the six participants, pre-TAG WAB-R AQ scores were less than or within one-point of their pre-ICAP WAB-R AQ scores. When Treatment Group 1 and Treatment Group 2 are consolidated, statistically significant group changes in WAB-R AQ from post-ICAP to pre-TAG were observed ( $t(5) = -5.55, p < .00$ ). Overall, aphasia classification and severity ranking remained consistent across time from pre-ICAP to post-TAG.

**Research Question 2: Does a participant's language performance change after participating in TAG?**

Language performance was assessed during baseline, treatment, and post-treatment phases of TAG using the Western Aphasia Battery – Revised (see Appendix F) and individualized objectives developed through Goal Attainment Scaling (GAS) (see Appendix G for participants' individualized goal attainment scales).

***WAB-R Results.***

Performance on the WAB-R for each of the six participants is shown in Tables 8 – 10, demonstrating scores for the overall Aphasia Quotient (AQ), as well as for subtests of Part 1, including: information content (IC), fluency, auditory verbal comprehension (AVC), repetition, and naming. Of the six participants, three improved their WAB-R AQ scores from pre- to post-TAG, with one of those three individuals showing statistically significant changes in WAB-R AQ. With respect to information content (IC), four participants showed statistically significant improvement from pre- to post-TAG, and one participant showed statistically significant decline. One individual showed statistically significant improvement in fluency, and another one



participant showed improvement with statistical significance in auditory verbal comprehension (AVC). Three participants demonstrated improved scores in repetition, with one of those three people achieving repetition gains which were statistically significant. However, one participant showed statistically significant decreased scores in repetition. No statistically significant changes were noted for naming.

**Table 8.** Treatment Group 1: Pre-TAG and post-TAG treatment performance on standardized measure of language.

	<b>TAG1901CH</b>		<b>TAG1902IG</b>		<b>TAG1904TH</b>		<b>Normative Data</b>	
<i>Administration</i>	Pre	Post	Pre	Post	Pre	Post	Max Score	SEM
<b>WAB-R AQ</b>	35.16	37.19	11.50	18.60 (*)	5.20	5.10	100	2.9
<b>IC</b>	3.00	4.00 (*)	0.00	2.00 (*)	0.00	0.00	10	0.4
<b>Fluency</b>	1.00	1.00	0.00	1.00 (*)	0.00	0.00	10	0.4
<b>AVC</b>	7.68	7.65	3.35	3.20	2.60	2.55	10	0.5
<b>Repetition</b>	3.70	4.40	1.50	1.40	0.00	0.00	10	0.5
<b>Naming</b>	2.20	1.90	0.90	1.70	0.00	0.00	10	0.5
<b>CLASSIFICATION</b>	Broca's	Broca's	Global	Global	Global	Global		
<b>SEVERITY</b>	Severe	Severe	Very Severe	Very Severe	Very Severe	Very Severe		

*Note.* WAB-R = Western Aphasia Battery – Revised, normative data from the test manual (Kertesz, 2007); AQ = aphasia quotient; IC = information content; AVC = auditory verbal comprehension. (\*) Pre- to posttreatment change  $\geq 2$  SEM units (95% confidence interval).

**Table 9.** Treatment Group 2: Pre-TAG and post-TAG treatment performance on standardized measure of language.

	<b>TAG1903SH</b>		<b>TAG1905LAR</b>		<b>TAG1906CS</b>		<b>Normative Data</b>	
<i>Administration</i>	Pre	Post	Pre	Post	Pre	Post	Max Score	SEM
<b>WAB-R AQ</b>	29.40	28.10	60.40	60.40	31.46	34.70	100	2.9
<b>IC</b>	2.00	3.00 (*)	8.00	7.00(*)	2.00	3.00 (*)	10	0.4
<b>Fluency</b>	1.00	1.00	2.00	2.00	2.00	2.00	10	0.4
<b>AVC</b>	1.90	1.75	9.40	8.90	6.83	7.65	10	0.5
<b>Repetition</b>	8.30	7.30 (*)	4.70	6.20 (*)	2.40	2.80	10	0.5
<b>Naming</b>	1.50	1.10	6.10	6.10	2.50	1.90	10	0.5
<b>CLASSIFICATION</b>	Transcortical Mixed / Isolation	Transcortical Mixed / Isolation	Broca's	Broca's	Broca's	Broca's		
<b>SEVERITY</b>	Severe	Severe	Moderate	Moderate	Severe	Severe		

*Note.* WAB-R = Western Aphasia Battery – Revised, normative data from the test manual (Kertesz, 2007); AQ = aphasia quotient; IC = information content; AVC = auditory verbal comprehension. (\*) Pre- to posttreatment change  $\geq 2$  SEM units (95% confidence interval).

As shown in Table 10, when data was collapsed across both groups/all six participants, two-tailed paired t-tests did not indicate statistically significant differences between pre- and post-treatment scores on the WAB-R AQ or individual subtests (i.e., Information Content, Fluency, Auditory Verbal Comprehension, Repetition, or Naming).

**Table 10.** All Participants: Pre-TAG and post-TAG treatment performance on standardized measure of language.

<i>Administration</i>	<i>Pre</i>		<i>Post</i>		<i>Two-Tailed t-test</i>		
	Mean Pre	<i>SD Pre</i>	Mean Post	<i>SD Post</i>	t-value	DF	p-value
<i>WAB-R AQ</i>	28.85	<i>19.51</i>	30.80	<i>18.75</i>	1.55	5	0.18
<i>IC</i>	2.5	<i>2.95</i>	3.17	<i>2.37</i>	1.58	5	0.18
<i>Fluency</i>	1.00	<i>0.89</i>	1.17	<i>0.75</i>	1	5	0.36
<i>AVC</i>	5.29	<i>3.08</i>	5.28	<i>3.12</i>	-0.05	5	0.96
<i>Repetition</i>	3.43	<i>2.90</i>	3.68	<i>2.81</i>	0.73	5	0.50
<i>Naming</i>	2.2	<i>2.11</i>	2.12	<i>2.08</i>	-0.42	5	0.70

*Note.* WAB-R = Western Aphasia Battery – Revised; AQ = aphasia quotient; IC = information content; AVC = auditory verbal comprehension.

### ***GAS Results.***

Standardized GAS procedures and analysis, as described by Schlosser (2004) were employed. Performance on individualized GAS for each of the six participants is shown in Tables 11 and 12, and Figures 3 – 5. GAS specifics for each of the six participants are included in Appendix G. According to GAS standards (Schlosser, 2004), “-1” represents the individual’s baseline score and “0” indicates the short-term goal deemed achievable given a variety of factors (e.g., the timeline of therapy to be provided, level of severity, and level of home-support). Scores of “+1” and “+2” indicate exceeds expectations, while “-2” represents a decline in function. Two-tailed sign tests, a non-parametric statistical analysis comparable to a t-test, were utilized to generate p-values for each GAS collapsed across both groups/all six participants (Schlosser, 2004). Additionally, following GAS analysis procedure used by Schlosser (2004, p. 218-220) standardized T-scores were used as a weighted percentage improvement score, with a mean of “50” and standard deviation (SD) of “10”. For example, 50 is equivalent to expected goal outcome, “60” demonstrates one SD above expected outcome, and “40” represents one SD less than the expected outcome. In this study, all goals were equally weighted. T-scores were calculated for every goal for each individual, and mean T-scores were calculated for each GAS collapsed across both groups/all six participants.

**Table 11.** All participants: GAS#1-3, Pre-TAG and Post-TAG GAS scores and Sign Test p-value

	Treatment Group 1						Treatment Group 2						Non-parametric Analysis
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Sign Test
Participant	TAG1901CH		TAG1902IG		TAG1904TH		TAG1903SH		TAG1905LAR		TAG1906CS		Two-tail p-value
GAS#1	-1	1	-1	0	-1	0	-1	1	-1	2	-1	2	.03*
GAS#2	-1	1	-1	2	-1	1	-1	1	-1	2	-1	2	.03*
GAS#3	-1	2	-1	1	-1	1	-1	1	-1	2	-1	1	.03*

Note. (\*) p-value less than or equal to .05 is statistically significant. GAS #1 = use of an ID card. GAS #2 = verbally communicating functional information. GAS #3 = verbally communicating an extended set of functional items.

**Table 12.** All participants: GAS#1-3, T-scores

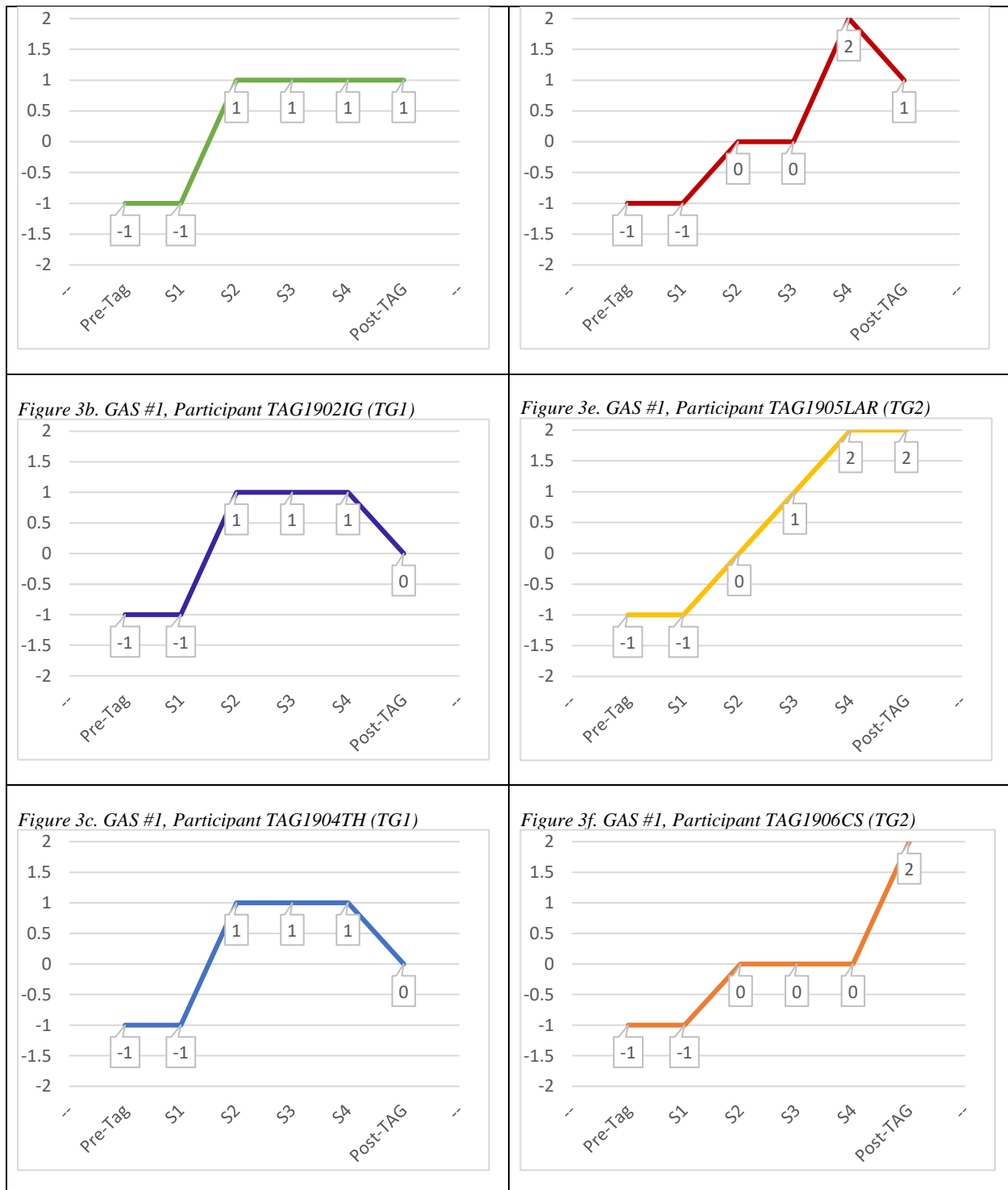
	Treatment Group 1						Treatment Group 2						Non-parametric Analysis	
	Individual T-scores												Group T-scores	
Participant	TAG1901CH	TAG1902IG	TAG1904TH	TAG1903SH	TAG1905LAR	TAG1906CS							Mean	SD
GAS#1	60*	50	50	60*	70**	70**							60*	8.94
GAS#2	60*	70**	60*	60*	70**	70**							65*	5.48
GAS#3	70**	60*	60*	60*	70**	60*							63.33*	5.16

Note. (\*) T-score greater than or equal to 60 is equivalent to one standard deviation above expected outcome. (\*\*) T-score greater than or equal to 70 is equivalent to two standard deviations above expected outcome. GAS #1 = use of an ID card. GAS #2 = verbally communicating functional information. GAS #3 = verbally communicating an extended set of functional items.

**GAS #1.** The first self-selected outcome measure, GAS #1, focused on using an ID card to support personal introductions and provision of relevant contact information. The individualized GAS scales developed for each participant varied in terms of cueing expectations, as well as amount of personal details to be shared. When pre-and post-treatment GAS #1 data was collapsed across both groups/all six participants and analyzed via a two-tailed sign test, statistically significant improvement was realized, with  $Z = 2.45$ ,  $p = .03$ . Two members of Treatment Group 1 met their GAS #1 goal (T-scores = 50 for TAG1902IG and TAG1904TH), and one member of Treatment Group 1 exceeded their GAS #1 goal (T-score = 60 for TAG1901CH). All three members of Treatment Group 2 exceeded their GAS #1 goal (T-score = 60 for TAG1903SH; T-score = 70 for TAG1905LAR and TAG1906CS). Individual performance on GAS #1 is illustrated in Figures 3a – 3f.

**Figure 3a-3f.** GAS #1 Baseline (pre-TAG), treatment (S1-S4), and post-TAG performance for each of the six participants.

Figure 3a. GAS #1, Participant TAG1901CH (TG1)	Figure 3d. GAS #1, Participant TAG1903SH (TG2)
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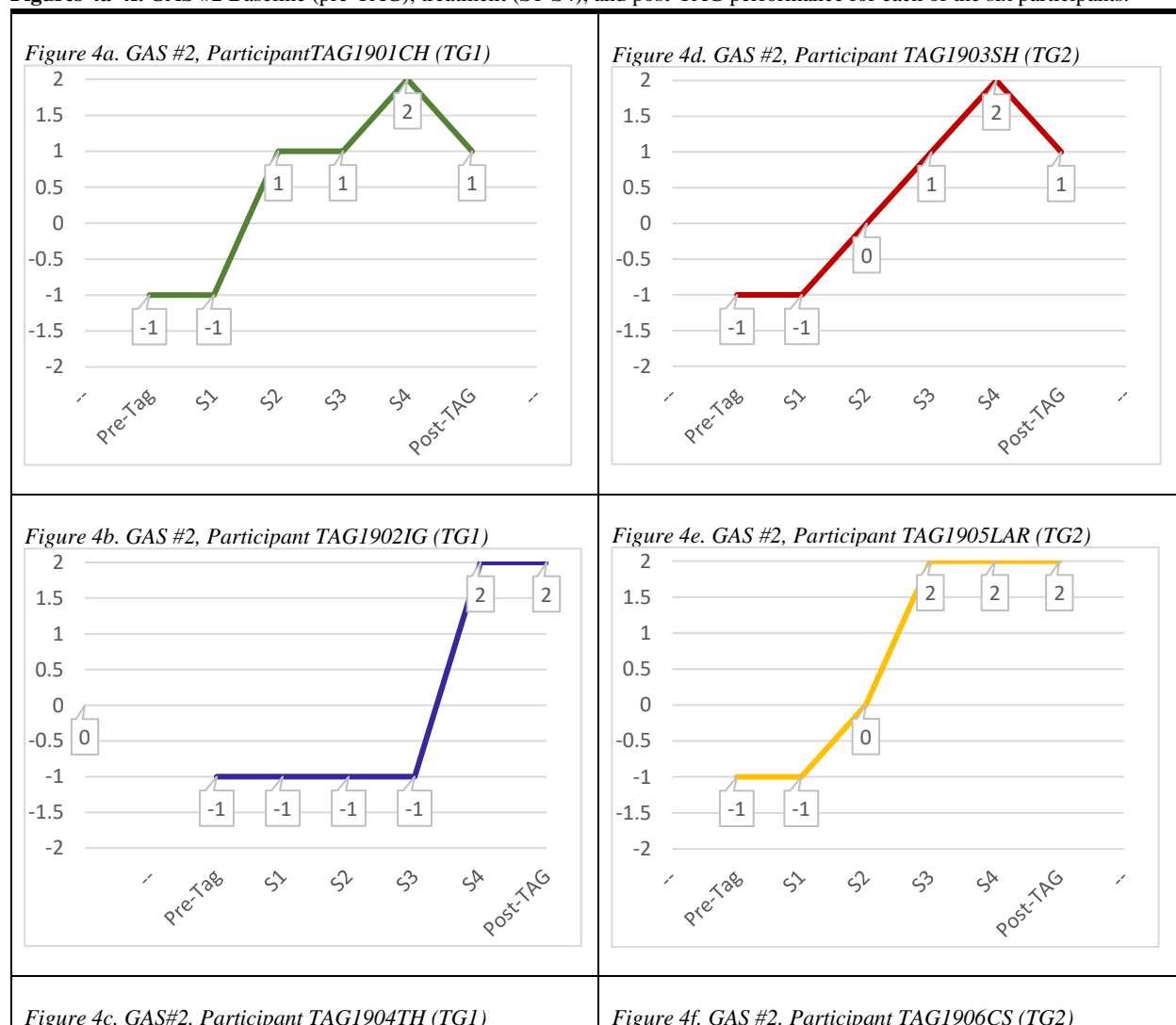


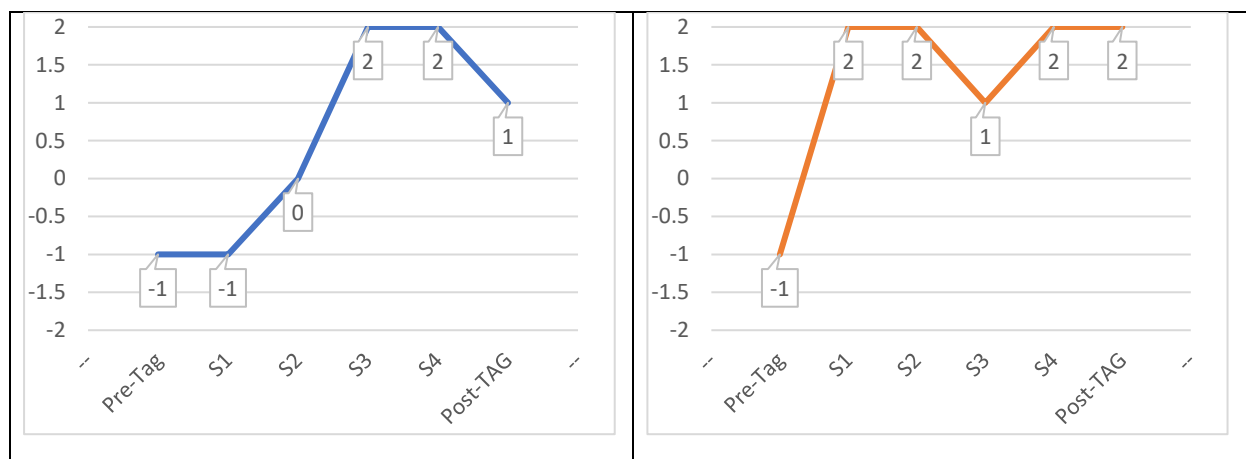
Note. TG1 = Treatment Group 1; TG2 = Treatment Group 2; **Figure 3a:** GAS#1 for participant TAG1901CH: use of an ID card. **Figure 3b:** GAS#1 for participant TAG1902IG: use of an ID card. **Figure 3c:** GAS#1 for participant TAG1904TH: use of an ID card. **Figure 3d:** GAS#1 for participant TAG1903SH: use of an ID card. **Figure 3e:** GAS#1 for participant TAG1905LAR: verbally communicating functional, personal information. **Figure 3f:** GAS#1 for participant TAG1906CS: use of an ID card.

**GAS #2.** The second outcome measure, GAS #2, focused on verbally communicating functional personal information (e.g., name of self, names of immediate family members, such as

significant others and children). Two of the participants focused on oral productions (TAG1901CH, TAG1905LAR), and four of six participants focused on written communication (TAG1902IG, TAG1904TH, TAG1903SH, TAG1906CS). When pre-post GAS #2 data was collapsed across both groups/all six participants and analyzed via a two-tailed sign test, statistically significant improvement was again realized, with  $Z = 3.67$ ,  $p = .03$ . All members of Treatment Groups 1 and 2 exceeded their GAS #2 goal (T-score = 60 for TAG1901CH, TAG1904TH, and TAG1903SH; T-score = 70 for TAG1902IG, TAG1905LAR, TAG1906CS). Individual performance on GAS #2 is illustrated in Figures 4a – 4f.

**Figures 4a-4f.** GAS #2 Baseline (pre-TAG), treatment (S1-S4), and post-TAG performance for each of the six participants.

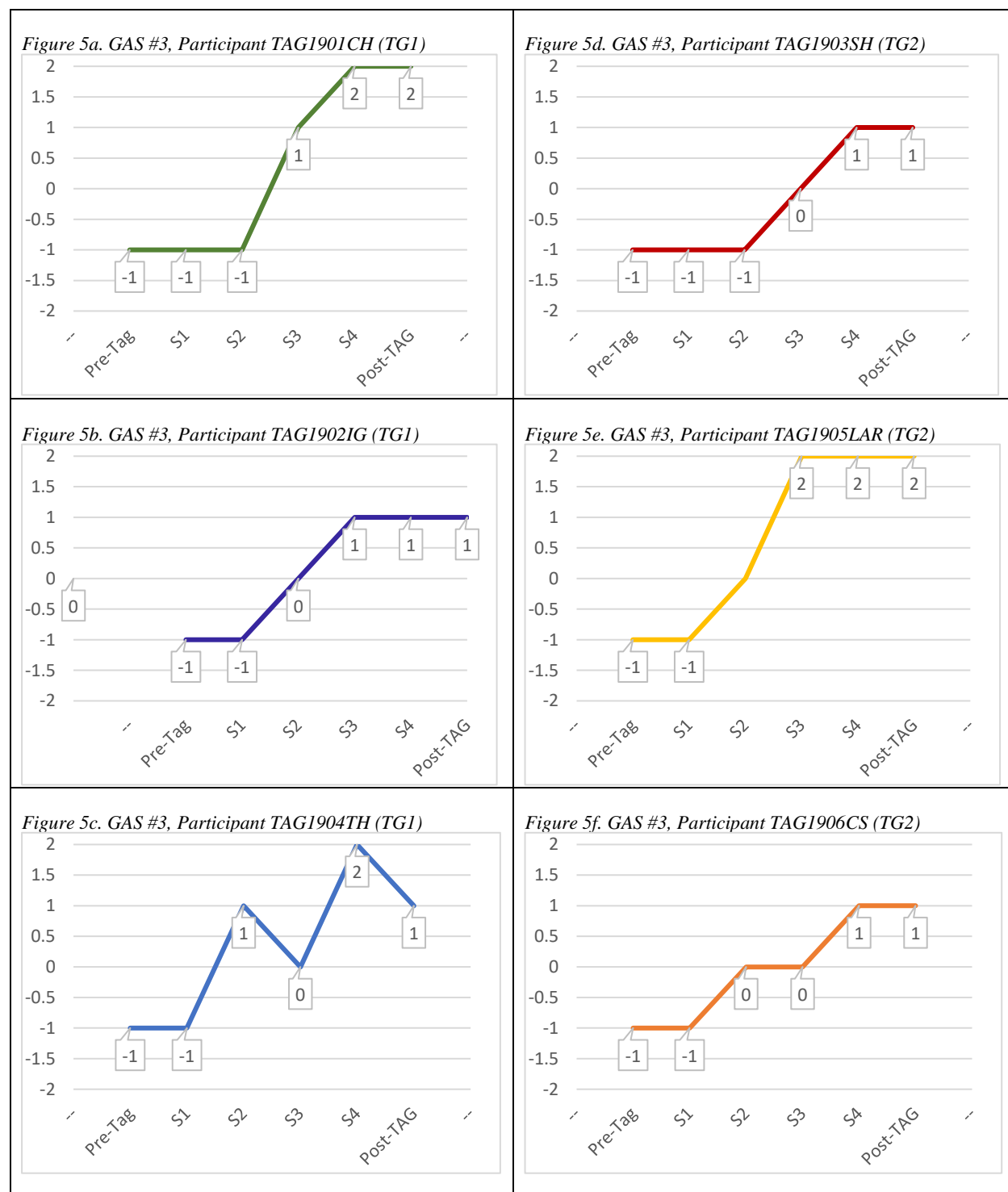




Note. TGI = Treatment Group 1; TG2 = Treatment Group 2; **Figure 4a:** GAS#2 for participant TAG1901CH: verbally communicating functional, personal information. **Figure 4b:** GAS#2 for participant TAG1902IG: writing their name. **Figure 4c:** GAS#2 for participant TAG1904TH: writing their name. **Figure 4d:** GAS#2 for participant TAG1903SH: writing their name. **Figure 4e:** GAS#2 for participant TAG1905LAR: use of an ID card. **Figure 4f:** GAS#2 for participant TAG1906CS: writing their name.

**GAS #3.** The third outcome measure, GAS #3, was designed to support communicating an extended set of functional items (e.g., names of grandchildren, functional phrases). For two of the six participants (TAG1901CH, TAG1905LAR) this goal targeted spoken production. For the remaining four participants (TAG1902IG, TAG1904TH, TAG1903SH, TAG1906CS), this goal accepted a broader array of responses by asking participants to identify family members via pointing, writing, or verbalization. As with the previous goals, statistically significant improvement was also realized with a two-tailed sign test when pre-post GAS #3 data was collapsed across both groups/all six participants and analyzed, yielding  $Z = 3.27$ ,  $p = 0.03$ . The GAS #3 goal was exceeded by all members of Treatment Groups 1 and 2 (T-score = 60 for TAG1902IG, TAG1904TH, and TAG1903SH; T-score = 70 for TAG1901CH, TAG1905LAR, TAG1906CS). Individual performance on GAS #3 is illustrated in Figures 5a – 5f.

**Figures 5a-5f.** GAS #3 Baseline (pre-TAG), treatment (S1-S4), and post-TAG performance for each of the six participants



Note. TG1 = Treatment Group 1; TG2 = Treatment Group 2; **Figure 5a:** GAS#3 for participant TAG1901CH: verbally communicating functional, personal information. **Figure 5b:** GAS#3 for participant TAG1902IG: gesturally or verbally communicating functional, personal information. **Figure 5c:** GAS#3 for participant TAG1904TH: gesturally or verbally communicating functional, personal information. **Figure 5d:** GAS#3 for participant TAG1903SH: gesturally or verbally communicating functional, personal information. **Figure 5e:** GAS#3 for participant TAG1905LAR: verbally communicating functional, personal phrases. **Figure 5f:** GAS#3 for participant TAG1906CS: verbally communicating functional, personal information.

**Research Question 3: What was participants’ perception of the value of continuing language therapy at home three months after completing an ICAP/immediately prior to initiating TAG and immediately after completing TAG?**

An aphasia-friendly interview, comprised of questions referring to all home therapy in general, was conducted with the Perception of Language Treatment Questionnaire (PoLTQ) pre- and post-TAG in order to gauge participants’ opinions of the value of continued aphasia intervention. This 11-item questionnaire was comprised of five quantitative questions (Q1, Q2, Q3, Q4a, Q7) eliciting ratings from zero to ten, and six qualitative questions (Q4b, Q4c, Q5a, Q5b, Q6a, Q6b) allowing for open-ended verbal/text responses. Three of the six participants completed the questionnaire prior to participation in TAG. The remaining three participants did not complete the questionnaire pre-TAG due to time constraints during onboarding. All six participants completed the PoLTQ post-TAG.

***PoLTQ Qualitative and Quantitative Question-by-Question Review.***

Both quantitative and qualitative responses to the questionnaire are shown in Tables 13 (Treatment Group1) and 14 (Treatment Group 2). Because of the comprehension and expression challenges of some participants, the PoLTQ was modified to accept collaborative responses from participants with aphasia (PWA) and their significant others (SO). Responses as applicable, therefore, are indicated as: “person with aphasia’s response” / (“significant other’s response”). While all participants completed the PoLTQ post-TAG, pre-post data is only available for three of the six participants.

**Table 13.** Treatment Group 1: Perception of Language Treatment Questionnaire (PoLTQ) of Persons with Aphasia (PWA) and Significant Others (SO)

	<i><b>TAG1901CH</b></i>		<i><b>TAG1902IG</b></i>		<i><b>TAG1904TH</b></i>	
<b>Administration</b>	<b>Pre-TAG PWA (SO)</b>	<b>Post-TAG PWA (SO)</b>	<b>Pre-TAG PWA (SO)</b>	<b>Post-TAG PWA (SO)</b>	<b>Pre-TAG PWA (SO)</b>	<b>Post-TAG PWA (SO)</b>
<b>Q1: Ease of technology (0-10)</b>	10 (NA)	10 (NA)	9.5 (NA)	5 (7)	NA (NA)	NA (6)



<b>Q2: Importance of cont. therapy (0-10)</b>	6 (10)	8 (10)	9 (NA)	5 (10)	NA (NA)	7 (10)
<b>Q3: Confidence re: cont. therapy (0-10)</b>	6 (10)	10 (10)	4 (NA)	2.5 (5)	NA (NA)	NA (10)
<b>Q4a: Hours per week</b>	5.5 (NA)	10+ (NA)	1.5 (NA)	4.5 (NA)	NA (NA)	5.5 (NA)
<b>Q4b: Types of home therapy</b>	Constant Therapy; CART; SLP outpatient therapy	CART; iPad language practice apps; AAC - Talking Photo Album	Constant Therapy; cloze sentences; repetition	iPad language practice apps; SLP home therapy	NA	Constant Therapy; writing to establish topic; gestures
<b>Q4c: Something else you want for home therapy</b>	No	“lots we're doing, I can't imagine any more “	sing more; participate in hobbies; tell jokes; engage with family	community involvement; generalizing use of ID card to community settings; introductions	NA	more 1 on 1
<b>Q5a: Barriers to home therapy</b>	No	Yes	Yes	Sometimes	NA	Yes
<b>Q5b: Contributing factors to barriers to home therapy</b>	No	<b>Other:</b> needs silence/ no distractions	<b>SN:</b> potential video conference w/ siblings; <b>LC:</b> moved away from family one year prior to the stroke	<b>Other:</b> sometimes just doesn't want to practice	NA	<b>PC:</b> pain; <b>Other:</b> a lot going on
<b>Q6a: Contributing factors to success with home therapy</b>	Yes	Yes	No	Yes	NA	Yes
<b>Q6b: Success with home therapy</b>	<b>SN; PF:</b> hard-working; <b>KHP</b>	<b>SN; PF:</b> motivation	NA	<b>SN; Other:</b> consistently getting to use iPad each day	NA	<b>SN:</b> cooperation with each other; <b>Other</b>
<b>Q7: Confidence re: aphasia information (0-10)</b>	7.5 (NA)	NA (“We have the tools; we just need to use them.”)	4 (NA)	7 (NA)	NA (NA)	NA (“I can look it all up.”)

Note. NA = Not Available/No data collected. **BARRIER FACTORS (as listed within PoLTQ):** (1) PC = Physical Challenges; (2) HC = Health Concerns; (3) SN = Support Network; (4) LC = Life Changes; (5) PF = Personal Factors; (6) W/PL = Work/Professional Life; (7) Need Addtl. Info. = Not enough information/Not sure how to do home program; (8) Other. **SUCCESS FACTORS (as listed within PoLTQ):** (1) PS = Physical Strengths.; (2) HW = Health Wellness; (3) SN = Support Network; (4) LC = Life Changes; (5) PF = Personal Factors; (6) W/PL = Work/Professional Life; (7) KHP = Knowledge of Home Program; (8) Other.

**Table 14.** Treatment Group 2: Perception of Language Treatment Questionnaire (PoLTQ) of Persons with Aphasia (PWA) and Significant Others (SO)

	<b>TAG1903SH</b>		<b>TAG1905LAR</b>		<b>TAG1906CS</b>	
<b>Administration</b>	<b>Pre-TAG PWA (SO)</b>	<b>Post-TAG PWA (SO)</b>	<b>Pre-TAG PWA (SO)</b>	<b>Post-TAG PWA (SO)</b>	<b>Pre-TAG PWA (SO)</b>	<b>Post-TAG PWA (SO)</b>
<b>Q1: Ease of technology (0-10)</b>	8 (NA)	NA (7)	NA (NA)	5 (NA)	NA (NA)	8 (NA)
<b>Q2: Importance of cont. therapy (0-10)</b>	10 (NA)	10 (10)	NA (NA)	8 (NA)	NA (NA)	10 (NA)
<b>Q3: Confidence re: cont. therapy (0-10)</b>	8.5 (NA)	NA (5.5)	NA (NA)	9 (NA)	NA (NA)	9 (NA)
<b>Q4a: Hours per week</b>	0 (NA)	6 (NA)	NA (NA)	7 (NA)	NA (NA)	10+ (NA)
<b>Q4b: Types of home therapy</b>	Partner strategies;	iPad choice-making app;	NA	Constant Therapy; writing; talking in daily life	NA	Constant Therapy; puzzles;

	SLP telerehab therapy	SLP telerehab therapy				iPad language practice apps
<b>Q4c: Something else you want for home therapy</b>	Spontaneous conversation; talking on the phone/facetime; Y/N questions; CART	More of the 1:1 apps that are user-friendly and quick to program	NA	Participant reports still volunteering at children's school as a way to extend functional phrase practice.	NA	More exercises (e.g., physical therapy or occupational therapy)
<b>Q5a: Barriers to home therapy</b>	Yes	Yes	NA	Yes	NA	I don't know
<b>Q5b: Contributing factors to barriers to home therapy</b>	<b>Need Addtl. Info.</b>	<b>HC: daughter has health problems; SN: limited to just SO; Need Addtl. Info.</b>	NA	<b>Other: busy schedule</b>	NA	<b>Other: boredom with monotonous tasks</b>
<b>Q6a: Success with home therapy</b>	Yes	Yes	NA	Yes	NA	Yes
<b>Q6b: Contributing factors to success with home therapy</b>	<b>PS: alertness; SN</b>	<b>PF: determination; SN</b>	NA	<b>PS: energy; HW: walking daily; SN: family/friends; PF; W/PL</b>	NA	<b>PF: determination; SN; KHP; Other: adequate time, e.g., retired with no children living at home</b>
<b>Q7: Confidence re: aphasia information (0-10)</b>	6 (NA)	NA (4)	NA (NA)	6 (NA)	NA (NA)	10 (NA)

Note. NA = Not Available/No data collected. **BARRIER FACTORS (as listed within PoLTQ):** (1) PC = Physical Challenges; (2) HC = Health Concerns; (3) SN = Support Network; (4) LC = Life Changes; (5) PF = Personal Factors; (6) W/PL = Work/Professional Life; (7) Need Addtl. Info. = Not enough information/Not sure how to do home program; (8) Other. **SUCCESS FACTORS (as listed within PoLTQ):** (1) PS = Physical Strengths; (2) HW = Health Wellness; (3) SN = Support Network; (4) LC = Life Changes; (5) PF = Personal Factors; (6) W/PL = Work/Professional Life; (7) KHP = Knowledge of Home Program; (8) Other.

**Question 1 (Ease of Technology).** PoLTQ question one evaluated perceptions of ease of technology use associated with telerehabilitation sessions. Participants indicated the technology was relatively easy to use ( $n = 3$ , mean = 9.17, SD = 1.04, range = 8-10) prior to TAG group sessions, but varied in post-TAG ratings, ranging from “somewhat easy” to “very easy” ( $n = 6$ , mean = 6.63, SD = 1.77, range: 5 to 10). Of the three participants for whom pre-post data is available, two individuals reported relatively stable opinions on the ease of use of technology.

**Question 2 (Importance of Continuing Therapy).** Participants' evaluation of the importance of continuing therapy was assessed with PoLTQ question two. Prior to TAG, participants rated continuing intervention as “somewhat important” to “very important” ( $n = 3$ , mean = 8.75, SD = 1.89, range = 6-10), with similar ratings post-TAG ( $n = 6$ , mean = 8.30, SD = 2.06, range = 5–10). However, when reviewed individually, one participant was observed to

increase their rating by two points, another was noted to drop their rating by five points, and yet another participant maintained their rating at ceiling. This variability could reflect a number of factors, including possible ineffectiveness of this particular measurement tool delivered via TR or variation in how personally effective each participant found the TAG program. Additionally, although participants agreed to abstain from initiating any new interventions during enrollment in TAG, each of the participants had continued home practice and/or participation in therapy following conclusion of the ICAP. Though the self-reported ratings were varied, their assertion of interest and ultimate participation in TAG further evidenced their positive valuation of ongoing treatment.

**Question 3 (Confidence Regarding Continuing Therapy).** PoLTQ question three assessed self-reported confidence in continuing language therapy at home, with participants reporting feeling “not sure” about their independent ability to participate in self-guided practice ( $n = 3$ , mean = 5.7, SD = 3.93, range = 4 - 8.5) prior to TAG. Confidence improved overall ( $n = 6$ , mean = 7.56, SD = 2.71, range = 2.5–10).

**Question 4a (Hours Per Week of Home Practice).** Participants reported varying home-practice amounts prior to TAG ( $n = 3$ , mean = 2.33, SD = 2.84, range = 0–5.5) compared to post-TAG ( $n = 6$ , mean = 4.90, SD = 1.64, range = 4.5 – 10). Participants did report, overall, an increase in hours of home practice following participation in TAG, and this change ranged from three additional hours per week to six additional hours per week. This indicates that all respondents reported increasing their weekly home practice beyond the structured TAG sessions and midweek clinician check-ins, which could potentially reflect participation in TAG contributing to greater access to resources, increased self-efficacy and/or motivation, or increased knowledge of home-practice exercises.

**Questions 4b (Types of Home Therapy).** Participants reported engaging in similar home-therapies and desiring functional activities pre- and post-TAG, including computer-based language practice (e.g., Constant Therapy), using some form of multi-modal communication, and participating in individual aphasia therapy via either outpatient, home health, or telerehabilitation.

**Question 4c (Additional Therapies of Interest).** Item four-“c” investigated additional therapies or supports participants were interested in incorporating into home-practice. In general, participants wanted therapies targeting functional activities, such as participation in hobbies, interaction with family, and improved spontaneous conversations.

**Questions 5a (Presence of Barriers to Home Therapy).** Based on item five-“a”, two of the three participants who responded pre-TAG reported perceiving barriers rendering it difficult to complete communication therapy at home prior to TAG. All participants reported at least some barriers (e.g., “yes, barriers”, “sometimes”, or “I don’t know”) post-TAG. Both pre-and post-TAG, participants felt that there were at least some challenges to completing home practice.

**Questions 5b (Description of Barriers to Home Therapy).** Primary barriers were identified in item five-“b” as needing additional information/support, and being socially isolated. Additional barriers noted included limited resources (e.g., time/other commitments, environmental supports) and boredom with repetitive tasks. Barriers to home therapy, identified in PoLTQ item five-“b”, were diverse across the two groups, and barriers were reported as prevalent both prior to and following participation in TAG.

**Questions 6a (Presence of Successes with Home Therapy).** Item six-“a” investigated perceptions regarding whether home therapy was working, and revealed that two of the three pre-TAG respondents felt they had achieved some level of home practice success. In contrast,

100% of respondents post-TAG indicated they felt they had achieved some level of success through continued aphasia therapy and home-practice.

**Question 6b (Contributing Factors to Successes with Home Therapy).** Item six-“b” followed up by inquiring about what factors have contributed to success. Prior to TAG, participants credited their success to physical strengths (e.g., alertness), support networks, and personal factors (e.g., hard-working). Personal factors (e.g., hard-working, motivated, determined) were also referenced post-TAG by four of the six participants as benefitting their home practice success. Health/wellness, work/professional life, and knowledge of home program were each only referenced once as contributing factors to success. In general, ‘social network’ was the most cited contributing factor to success.

**Question 7 (Confidence Regarding Ability to Independently Access Information About Aphasia from Home).** Item seven aimed to assess participants’ confidence levels in independently (i.e., without active clinician support) accessing information about aphasia and aphasia-friendly information from home. Prior to (n = 3, mean = 5.67, SD = 1.53, range = 4-10) and after (n = 6, mean = 5.75, SD = 2.48, range = 4–7.5) TAG, participants reported feeling “not sure” about accessing aphasia information. As a group, all six participants reported relatively stable or improved feelings of confidence in their ability to access helpful resources and information to help them with home practice for aphasia.

### **Discussion**

Persons with aphasia (PWA) may make continued communication profile gains for years following acute stage recovery (e.g., Allen et al., 2014; Holland et al., 2017; Moss & Nicholas, 2006). However, access to therapy may be limited by living in a rural area, co-occurring physical impairments, scheduling conflicts, access to qualified, aphasia-trained speech-language

pathologists, etc. (e.g., Chow, 2015; Lanyon et al., 2018). Even if individual therapy is feasible for a PWA, concurrent participation in a multi-modal, varied format approach as utilized in Intensive Comprehensive Aphasia Programs (ICAPs) may not be attainable. ICAPs have a growing body of evidence supporting their efficacy as aphasia intervention (e.g. Babbitt et al., 2016; Babbitt et al., 2015; Griffin-Musick et al., 2020; Off et al., 2018; Persad et al., 2013; Rodriguez et al., 2013); however, little research (with the exception of Winans-Mitrik et al., 2014) exists evaluating the maintenance of communication profile gains following completion of an ICAP. Furthermore, at the time of the initiation of this project to the best knowledge of the authors, ICAP participants typically receive home programs upon ICAP discharge, but few clinician-guided, tailored, post-ICAP intervention live programs exist to support continued aphasia intervention abiding by ICAP tenets (Pitt et al., 2019; Walker et al., 2018).

To address the need for follow-up treatment to ICAPs, this Tele-connect Aphasia Group program was initiated. Participants from a four-week ICAP program were recruited to enroll in aphasia group therapy delivered via telerehabilitation as one-hour sessions, once per week, over the course of four weeks. Additionally, individual sessions for the participants, in conjunction with communication training for their significant others, were provided intermittently throughout the week between group sessions. Three research questions were explored, and a discussion of each follows.

### **Research Questions**

***RQ1: Do participants maintain language performance improvements three months after completing an ICAP?***

**Pre-ICAP to Post-ICAP WAB-R.** Consistent with prior reports of ICAP participation (e.g., Babbitt et al., 2016; Babbitt et al., 2015; Persad et al., 2013; Rodriguez et al., 2013;

Winans-Mitrik et al., 2014), all participants demonstrated impressive gains in their communication profiles through the course of the four-week ICAP.

**Post-ICAP to Pre-TAG WAB-R.** During the three-month period from post-ICAP to pre-TAG, however, a statistically significant decline in performance was observed on a standardized language assessment (i.e., WAB-R AQ). While maintenance of treatment gains within the first couple of months post-ICAP has been demonstrated in some studies (e.g., Rodriguez et al., 2013), other studies have found mixed maintenance results (e.g., Winans-Mitrik et al., 2014). Ultimately, we may expect to see some declines in performance on a standardized language assessment following a three-month hiatus from intensive therapy. The decline observed in this study was likely due to multiple variables, including change in practice, change in clinicians, and change in delivery model from face-to-face to telerehabilitation.

***Change in Practice.*** Although, during the three months between the end of the ICAP and the initiation of TAG, each participant maintained some level of continued home practice as prescribed by ICAP clinicians and as generated by the participants and their significant others, the intensity and breadth of practice was not equivalent to the amount of skilled intervention and targeted practice they received during the ICAP. While all participants were completing some home practice as recommended by the ICAP, each participant noted that they desired additional practice and support. This change in practice may have been a contributing factor to the change in scores noted between post-ICAP and pre-TAG.

***Change in Clinicians.*** Additionally, all participants experienced a change in clinicians from ICAP to TAG. One clinician tested each participant for both the pre-ICAP and post-ICAP assessment sessions, while another clinician associated with a different program tested each participant for both the pre-TAG and post-TAG assessment sessions. Familiarity with the

clinician pre-ICAP to post-ICAP and pre-TAG to post-TAG should be considered as a possible factor influencing the participant's comfort level with the test. Likewise, being unfamiliar with the clinician from post-ICAP to pre-TAG may have negatively impacted performance on the assessment. Moreover, due to limited training time for use of telerehabilitation tools and the severity of aphasia in five of the six participants, significant others were involved as facilitators to enable tele-administration of the WAB-R during pre-TAG and post-TAG testing. Although strict parameters were established to minimize their participation in the assessment, their presence and limited participation may have affected the performance of the participants.

***Change in Delivery Model.*** Finally, the change in delivery model from face-to-face to telerehabilitation must be considered. The aphasia classification and severity ratings, as identified by the WAB-R, remained constant from post-ICAP to pre-TAG, but declines were noted in WAB-R AQ. Although a recent study (Dekhtyar et al., 2020) suggests videoconference administration and in-person administration yields highly correlated WAB-R scores, participation in the videoconference assessment session was a novel service delivery model for both the participants and the clinicians. This novelty may have impacted pre-TAG assessment results, with post-TAG assessment results improving as familiarity with telerehabilitation increased. Furthermore, the limited training time for use of the telerehabilitation system and the severity level (i.e., severe or very severe) of the aphasia in five of the six participants may have magnified the challenge of transitioning to the tele-assessment. Notably, the sole participant with a moderate severity level showed the least variability in post-ICAP (face-to-face) WAB-R AQ and pre-TAG (tele-assessment) WAB-R AQ, or the greatest maintenance from post-ICAP to pre-TAG. Participating in tele-assessment may require unique attention abilities and may increase overall cognitive load during the time of testing. Moreover, alternative modes of communication,



including nonverbal cues and prompts that are typically available during a face-to-face assessment, may be less accessible during tele-assessment. For example, use of a two-dimensional picture of a full room rather than employing three dimensional features within the assessment room (e.g., point to the window, point to your chair), appeared particularly challenging for some participants. Participants, and their significant others, broadly referenced the challenges of TR in their feedback on the PoLTQ (i.e., PoLTQ Q1: Ease of Technology).

**RQ1 Implications for Future Research.** Based on these posited factors, future iterations of the TAG project, and/or future research, could consider more closely tracking hours and type of practice not only during the ICAP, but following ICAP participation and during the structured follow-up intervention program. Additionally, it may be beneficial to maintain consistency between clinicians and between assessment administration modality from pre-ICAP to post-ICAP to pre-TAG to post-TAG.

***RQ2: Does a participant's language performance change after participating in TAG?***

It is notable that despite decreased scores on a standardized language assessment following a three-month interval after an ICAP, a brief period of intervention appeared to aid in stimulating gains made during the ICAP. Even with TAG treatment intensity ( $M = 1.88$ ,  $SD = .21$ ) much less than the ICAP ( $M = 17.86$ ,  $SD = .22$ ), this series of language therapy sessions seemed to serve as a way to promote maintenance of gains elicited through ICAP participation.

**Pre-TAG to Post-TAG WAB-R.** Although improvement on the WAB-R AQ was not statistically significant when collapsed for analysis across both groups/all six participants, increased WAB-R AQ score were noted for three of the six participants, and maintenance was noted in one of the six participants. Furthermore, four of the six participants showed statistically significant improved information content scores from pre-TAG to post-TAG. Any improvement

in WAB-R AQ given such a brief period of limited intensity intervention is noteworthy, as the WAB-R assesses a broad range of language skills, many of which were not directly targeted through the tailored TAG intervention. Changes in information content is particularly notable, as this subsection assesses generative language skills targeted through social interactions inherent within the TAG sessions. While it was surprising to see decreased WAB-R AQ for two of the six participants, some potential explanations for this could be differences in support/facilitation by the participant's significant other from pre-TAG to post-TAG, self-reported personal factors (e.g., fatigue) for the participant, and/or typical daily fluctuation in specific language skills.

***Differences in Assessment Facilitation.*** Although no specific intervention was provided to significant others of participants, five of the six significant others were heavily involved in facilitating the participation of their partner with aphasia during the assessment and during the TAG groups. While specific written and verbal instructions were provided, no formal training was administered to significant other to ensure consistent prompts, support, or non-interference. Anecdotally, it was noted that significant others demonstrated improved wait time and decreased prompting/interference in the post-TAG assessment compared to the pre-TAG assessment. Though data was not taken on these behaviors, it is possible that the differences in facilitation style by significant others from pre-TAG to post-TAG may have influenced participants' performance on the assessment.

***Personal Factors and Typical Fluctuation.*** Because post-testing was completed by participants in a single session, with timeslot options over only a few days, while pre-testing was conducted during several sessions, with timeslot options over a period of a few weeks, some participants may have completed the post-TAG assessment on a day of the week/time of day that differed from the day of the week/time of day of their pre-assessment and/or on a day when they

were experiencing increased fatigue, diminished attention, or changes in other health-related issues. Some participants/significant others did in fact offer unsolicited comments suggesting that there were extraneous personal factors negatively affecting their performance on post-TAG language assessment.

**GAS.** More consistent improvement across participants and domains was noted when assessed by GAS than by the WAB-R. This was not surprising given the personalized nature of GAS and the tight relation between GAS evaluation domains and treatment goals (which was not the case for the WAB-R). Progress towards personalized communication goals as assessed via goal attainment scaling were observed in all six participants, with statistical significance noted for each of the three goals when data was collapsed across both groups/all six participants. While each goal for each participant was individually tailored to suit the personal needs and abilities of the participants, the goals followed similar themes of generalizing achievements in the ICAP to the home and community environment through use of an ID card and functional language production. Because goal attainment scaling (GAS) intentionally sets scaled goals that are projected to be achievable given the particular intervention constraints, all goals were developed with the intent of being attainable (a score of “0”) by the end of the TAG project. There was a stronger relationship between the functional communication focus of this intervention and the GAS goals than between the impairment level skills assessed on the WAB-R.

***Artificially Easy/Challenging Goals.*** Goal Attainment Scales (GAS) were developed through careful consideration, including review of ICAP records, interviews with the participants and their significant others, analysis of assessment results, and consultation with the TAG clinical team lead by an aphasia expert and master clinician. Despite the efforts which went into development of each goal, it is plausible that the goals were not scaled accurately. The process of

developing GAS requires finesse, and high achievement on the GAS could indicate either that the intervention was effective or that the goals were established as too easy to achieve.

***GAS Weights.*** When using multiple goals through GAS it is not mandatory to weight each goal according to importance; however, doing so allows differentiated analysis of the outcomes based on how important the participant and clinician collaboratively determine each goal is worth relative to the other. Weighting goals prior to initiation of intervention may have allowed a more sophisticated analysis of individual achievement by taking into consideration not only the anticipated difficulty of the goal, but also the personal importance to each participant.

***Collaboration for GAS setting.*** As described above, establishing meaningful goals through GAS is an intentionally collaborative process between clinician and client. Due to the time constraints and language impairment severity of the participants in this study, the collaborative process in this project also relied on input from the participants' significant other. Furthermore, clinicians relied on email/phone confirmation of acceptance of the final renditions of each participant's, rather than being able to fully generate, edit, and accept each goal during an intervention session.

**RQ2 Implications for Future Research.** Nevertheless, all participants did, indisputably, complete the assessed language tasks with greater proficiency post-TAG than pre-TAG. While the precise scaling of GAS may have benefitted from greater refinement, the overall outcome of improved use of an ID card and targeted functional language is apparent. These outcomes indicate not only the efficacy of GAS but also the potential for Teleconnect Aphasia Groups targeting person-centered goals to yield improved language outcomes given a relatively low treatment intensity over a relatively brief period of time. Future projects may benefit from establishing GAS targeting transition to home at the time of discharge from the ICAP,

encouraging participants and their significant others to track progress using these goal scales, and then re-evaluating/adapting these scales for appropriate use within the context of continued home practice via teletherapy. Additional training on use of GAS may benefit the collaborative process between clinician and the person with aphasia, so that participants can be supported in more independently generating the basis for their GAS. Also, weighting the GAS prior to project initiation may yield more sensitive data outcomes.

***RQ3: What was participants' perception of the value of continuing language therapy at home three months after completing an ICAP/immediately prior to initiating TAG and immediately after completing TAG?***

**Participant's Perceptions.** Ultimately, participants' perceptions of continuing language therapy were strongly positive both prior to and following participation in TAG. To assess these perceptions, the clinician-generated, experiment-specific structured interview, Perception of Language Treatment Questionnaire (PoLTQ) was used. While this questionnaire was useful in facilitating comparable conversations both pre- and post-TAG, it was not tested for reliability nor validity prior to use. Furthermore, due to the significance with which participants' language abilities were impacted, the PoLTQ was adapted to accept responses from the participant and/or their significant other. Additionally, time constraints with participant onboarding resulted in pre-TAG PoLTQ data only being collected and documented for 50% of the participants, so statistical analysis could only be conducted for the three participants/significant other pairs who supplied responses both prior to and after TAG.

Despite this, the PoLTQ did render interesting data. Overall, hours of home practice per week increased following TAG. Qualitatively, some participants attributed this to the group and individual sessions, as well as practice materials provided, through TAG. Interestingly, more

barriers to home therapy in general were noted following TAG. This could be attributed to increased comfort with, so increased disclosure to, the interviewing clinician. Alternatively, it could be that as hours of home practice increased, more barriers became apparent; that is, higher frequency of home practice resulted in more opportunities to see the challenges with it or to self-identify communication needs. On the other hand, success with home therapy was more widely endorsed following TAG, with “support network” being endorsed by 100% of participants as a positive contributing factor. This finding is especially relevant when considering one intention of this project was to rekindle the social connections with former ICAP cohort members. TAG provided a support network in a variety of ways: (1) by connecting individuals with aphasia to friends experiencing similar challenges through aphasia groups, (2) by providing clinical support and resources to the individual with aphasia through one-on-one and group sessions, and (3) by providing clinical support and resources to the significant other instrumental in completing home practice with participants.

**Significant Others’ Perceptions.** Significant other’s perception of the value of the TAG project was assessed indirectly via the PoLTQ. However, significant others who participated in the study commented positively on their involvement with the project, as well as on the impact they observed the project having on their loved one with aphasia. Tables 16 and 17 summarize participants’ and significant others’ comments regarding the helpfulness of the TAG program, as well as suggestions for improvements. Five individuals stated that they felt they benefited in addressing impairment-level goals more through the individual sessions (e.g., “[It was] familiar and enjoyable to see ICAP folks, but may not have been super effective in supporting communication.”; “Concrete, specific tasks were most helpful, because abstract can be

frustrating [for my spouse with aphasia]”. Overall, however, all six participants commented on the positive social aspects of the group sessions.

**RQ3 Implications for Future Research.** All participant/significant other pairs endorsed an interest in participating in future iterations of the program and/or continuing to receive services in similar format from clinicians involved in TAG. This endorsement is indicative of overall satisfaction from both persons with aphasia and their significant others. Nevertheless, future research may consider the use of combined group intervention with individual sessions, as participants and their significant others repeatedly commented that the combination of these deliveries was especially beneficial. Furthermore, future studies may consider addressing additional activity/participation goals, and including psychosocial assessment and intervention components. Structured supports for significant others and family members could also be considered.

**Table 15.** Treatment Group 1: Comments regarding how TAG was helpful and suggestions for improvements

	<i><b>TAG1901CH</b></i>	<i><b>TAG1902IG</b></i>	<i><b>TAG1904TH</b></i>
<b>Helpful</b>	<ul style="list-style-type: none"> <li><b>IS:</b> 1:1 was most helpful</li> <li><b>SI:</b> Enjoyed seeing the people socially in group</li> <li><b>M:</b> Materials provided (e.g., Talking Photo Album) were useful</li> </ul>	<ul style="list-style-type: none"> <li><b>IS:</b> 1:1 really does help quite a bit</li> <li><b>SI:</b> Good to see other people</li> <li><b>M:</b> Materials provided (e.g., ID card, printed materials) were really important and helpful</li> </ul>	<ul style="list-style-type: none"> <li><b>SI:</b> Group worked really well – exciting</li> <li><b>SI:</b> Good to see people socially</li> <li><b>T:</b> Helpful practice for communicating via the internet</li> <li><b>O:</b> Writing improved</li> </ul>
<b>Suggestions</b>	<ul style="list-style-type: none"> <li><b>IS:</b> Mix it up with individual activities</li> <li><b>SI:</b> More fun when focus is on a social activity (e.g., cards, trivia, crafts, music)</li> <li><b>GD:</b> A less severe, more homogenous group may be better</li> </ul>	<ul style="list-style-type: none"> <li><b>T:</b> Pictures of group members involved were hard to see due to size</li> <li><b>T:</b> Certain fonts are more difficult to see and process</li> </ul>	<ul style="list-style-type: none"> <li><b>T:</b> Using the videoconference was sometimes confusing</li> <li><b>O:</b> Getting in set was difficult (e.g., gestures/pointing to body parts)</li> </ul>

Note. **IS** = Individual Sessions/Activities; **SI** = Social Interaction; **M** = Materials; **T** = Technology; **GD** = Group Dynamics; **O** = Other.

**Table 16.** Treatment Group 2: Comments regarding how TAG was helpful and suggestions for improvements

	<i><b>TAG1903SH</b></i>	<i><b>TAG1905LAR</b></i>	<i><b>TAG1906CS</b></i>
<b>Helpful</b>	<ul style="list-style-type: none"> <li><b>IS:</b> Working 1:1 was most beneficial</li> <li><b>SI:</b> Familiar and enjoyable to see ICAP cohort again</li> <li><b>O:</b> Concrete, specific tasks were most helpful</li> </ul>	<ul style="list-style-type: none"> <li><b>IS &amp; SI:</b> Liked both the group and 1:1 together; one was not better than the other</li> <li><b>SI:</b> Group was good for social experiences and real-world practice</li> </ul>	<ul style="list-style-type: none"> <li><b>IS:</b> 1:1 was her favorite</li> <li><b>SI:</b> Groups were good because participant is a 'people person'</li> <li><b>M:</b> Materials provided (e.g., practice materials)</li> </ul>

<b>Suggestion</b> s	<ul style="list-style-type: none"> <li>• <b>GD:</b> <i>Expectations and turn-taking via videoconference were confusing</i></li> <li>• <b>GD:</b> <i>More frequent engagement and focused intervention</i></li> </ul>	<ul style="list-style-type: none"> <li>• <b>T:</b> <i>More assistance with set-up on the computer</i></li> </ul>	<ul style="list-style-type: none"> <li>• <b>None:</b> <i>"Really like TAG"</i></li> </ul>
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*Note.* **IS** = Individual Sessions/Activities; **SI** = Social Interaction; **M** = Materials; **T** = Technology; **GD** = Group Dynamics; **O** = Other.

### Advantages of this Intervention Model

Use of telerehabilitation has been demonstrated as effective for language intervention. Telerehabilitation addresses barriers such as time and cost of traveling to therapy, impact of remote location, inclement weather, or physical disability on therapy attendance, and opportunity to include significant others or family members in therapy. Group therapy may be used to target not only impairment-based goals, but also activity and participation goals through functional, social interactions. The TAG project sought to capitalize on the benefits of both telerehabilitation and group therapy so support continued language intervention following an in-person, intensive comprehensive aphasia program. The less-intensive service delivery of TAG acted as a “booster” to support transition from the structure of the ICAP to the challenges of everyday life at home. Additionally, the TAG program provided weekly check-in sessions with the participant and their significant other via videoconference, phone, or email. Because of the flexibility in the delivery of these sessions, participation by both the person with aphasia and their family member was encouraged. Despite numerous benefits of this intervention model, there are also some inherent limitations.

### Limitations and Future Directions

Due to constraints surrounding the nature of this project as a feasibility study, a small ‘n’ within-subject pre-post-treatment design was employed, so the strength of statistical analysis was limited. Utilizing a small ‘n’ multiple baseline design across participants would enable more rigorous assessment of the effectiveness of this program. Ideally, measurement of maintenance



would take place at multiple points (e.g., one month post-ICAP, two months post-ICAP, three months post-ICAP), with multiple groups assigned by the study and staggered start times for each group. The generalizability of the results of this study is subsequently limited by the small sample size, and assumptions about efficacy are limited by single-point baselines. Moreover, the sample was comprised of participants with relatively significant language impairments.

The methodological choices were constrained by the time required to effectively manage the videoconference delivery platform, WebEx. For example, not all intended measures were able to be administered due to time constraints resulting from technology troubleshooting. Nevertheless, as a feasibility study, it evaluated a service delivery that may have improved accessibility to participants over more traditional models. Future iterations of TAG projects should investigate options to create a more aphasia-friendly technology interface for improved telerehabilitation service delivery.

As mentioned above, the reliability of this data is impacted by the novelty of standardized assessment administration via videoconference, the potential imprecision in development of individualized GAS, and the use of a clinician-generated, experiment-specific questionnaire. Additionally, further evaluation of modified assessments should be considered when comparing results of standardized assessments delivered in-person versus via videoconference.

Additionally, dosage standards have not been definitively established for aphasia groups, as previous studies have implemented group therapy at frequency of one to five hours per week, with a duration of two weeks to six months (e.g., Attart et al., 2018; Elman & Bernstein-Ellis, 1999; Lanyon et al., 2013). This study provided four 60-minute intervention sessions over the course of four weeks, so it is possible that this investigation may yield different results than a comparable intervention implemented with a higher frequency or longer duration.

Pitt et al. noted that PWA and SLPs grew more comfortable with more exposure to the TR format, so intervention becomes more efficient and effective after an adjustment period (2018). Due to the short nature of the proposed intervention, therapists provided multimodal support for participants so that they can utilize the technology to participate as fully as possible. Additional training time for both clinicians and participants may improve engagement, and therefore outcomes. Further research is needed to establish appropriate adjustments to clinician training in telerehabilitation administration and group facilitation. While participants still benefited from interactions with their peers, and though clinicians made a concerted effort to develop group exercises that were functional, meaningful, aphasia-friendly, and activity-based versus language-based, there are inherent constraints of a videoconference delivery that amplify the complexity of tasks and may require greater language skills. Some participants' significant others commented on the disparity between participant's language impairment levels or on the severity of language impairment overall, stating: "Group worked really well – exciting; but when something happened that was confusing [my spouse] would shut down."; "People are at different stages."; "A lot of time [we were] just sitting, but once they [participants] got talking [it was] a little better." Improved group facilitation practices, as well as increased comfort with telerehabilitation service provision and increased videoconference practice time for participants, may yield improved perceptions of groups.

When asked for suggestions on how to improve TAG, participants' and their significant other's comments largely centered around additional support with the technology and modifications to group dynamics. For example, one participant stated that when using the videoconference platform, it was "confusing regarding who questions were being directed to and what was expected" of each participant. Likewise, limitations within adjusting image size was a

concern for one participant/significant other pair, as indicated by their statement, “Pics of group members involved were hard to see due to being small; the pic of person talking was big, [but the] others are small)”. These limitations within the technology impact the multi-modal, full-body communication efforts which may support understanding in a person with aphasia. Another participant/significant other pair noted that the inherent breaks within the group intervention setting were a detriment, as the participant “likes to be focused”, so more consistent engagement and fewer rest periods or attending to the responses of others may be beneficial.

Future studies should take into account provision of services to support significant others and may consider the impact on other family members. Although significant others were included in this project, no particular therapy for caregivers was provided. Structured support for significant others was an original intent for this project, but ultimately unable to be included due to time limitations. Assessments of quality of life and communicative participation should also be considered when providing intervention to bridge services between an ICAP and independence at home. Finally, upcoming iterations of this project should aim to generate and distribute supplemental materials supporting home- and community- practice of functional language to be used in conjunction with videoconference services.

## **Conclusion**

Overall, progress towards personalized communication goals, as articulated by Goal Attainment Scaling, was observed in all six participants. Changes on standardized language assessments, however, were statistically nonsignificant when analyzed as a group. Nevertheless, participants endorsed the benefit of continuing language therapy at home through participation in group telerehabilitation, especially when supplemented with individual meetings/sessions. The results cannot confirm the efficacy of aphasia groups delivered via telerehabilitation as a follow-

up to an ICAP but do indicate that such forms of follow-up intervention may be feasible. Future studies investigating aphasia group therapy via telerehabilitation may benefit from evaluating more aphasia-friendly service delivery, adjustments to clinician and significant other training on use of telerehabilitation techniques, and further evaluation of modified assessments.

Improvements to aphasia group therapy via telerehabilitation may include assessments of quality of life, provision of services to support significant others, and generation of supplemental materials to be used in conjunction with videoconference services. Practical implications of this feasibility study include the potential to provide meaningful, impactful telerehabilitation services, via both individual and group delivery, to promote maintenance and generalization of communication profile gains following participation in an ICAP.

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**List of Appendices**

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- **Appendix H: Aphasia Telerehabilitation (TR) Group Satisfaction Survey**
  - Satisfaction Survey administered post only
  - Administered to: Participant and Significant Other
- **Appendix I: Treatment Fidelity Checklist**
  - Completed by two independent scorers for at least 80% of intervention sessions

## Appendix A1: Recruitment Flier



LANR LAB   UTAH STATE UNIVERSITY   LOGAN, UT

## TELE-CONNECT APHASIA GROUP (TAG) STUDY

PROPOSAL #9953

### WHO

*Participants must:*

- be an adult (19-90 years old)
- have aphasia
- have completed the Big Sky Aphasia Program (BSAP)

### WHAT

Week	Agenda	Time
1	Learn about the study	1 hour
2	Computer set-up	1 hour
3, 4	Language evaluation	2 hours
5, 6, 7, 8	Group treatment	4 hours
9, 10	Language evaluation	2 hours

### WHERE

You are at home.





We connect by computer.

Clinicians are at USU Clinic.



### WHY

Set new language goals | Reconnect with friends | Continue therapy from home

### CONTACT





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**Language & Aphasia NeuroRehabilitation Lab**  
 Utah State University, Logan UT  
 Phone: 435-797-1143 or -9202

**Appendix A2: Recruitment Phone Meeting Agenda****Phone Meeting AGENDA**

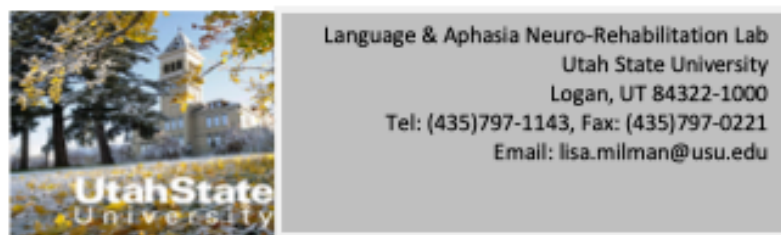
- Introduction
  - Confirm we are speaking to the right people: Who are we speaking with now?
  - Announce who is present and who is participating in the conversation
  - Is \_\_\_\_ there? Is it on speakerphone?
- Did they receive the paperwork?
- Do you have any questions immediately?
- Explain what we are going to do in the phone conversations:
  - We are going to be reviewing some personal information or medical history. Who is the best person to speak to about this?
  - How would you like to send the forms to us - you can send us the hard copy of the form, or we can go through it right now?
- Go through the demographic form
  - I want to start by going over some basic information to see who qualifies for this study.
  - You can send it back in

**PRIORITIES**

- Their well-being
- The integrity of the study
- Professional respect



## Appendix A3: Structured Interview/Demographic Form



## PARTICIPANT HISTORY FORM

Name of the person filling out this form:

Confidential Code

Relationship of the person filling out this form:

**Contact Information**

Last Name		First Name		Male <input type="checkbox"/>	Female <input type="checkbox"/>
Today's Date		Age		Date of Birth	

Primary Contact Person (and relation):	
Phone Number (Home)	Phone Number (Work or cell)
Do you use a computer at home?	Do you use email?
Email 1:	
Email 2:	
Email provider:	Bandwidth:
Postal Address Line 1	
Postal Address Line 2	
Postal Address Line 3	

Marital Status: Single Married Living with significant other Divorced Widowed Other
If other, please specify:
Emergency contact (relation):
Do you have any pets?
Do you have children?
Do you have children who live at home with you?

Name of Legal Representative (if applicable)	
Phone # of Legal Representative	
Address of Legal Representative	

**Basic Communication**

What is your native language?
Do you speak any other languages?
Do you have any problems with vision? Y N
If yes, are you able to see most things with eyeglasses? Y N
Do you have any problems with hearing? Y N
If yes, are you able to hear most things with a hearing aid? Y N

How would you describe your ability to.....

talk?



Bad



Ok



Good



Great

understand others talking?



Bad



Ok



Good



Great

read?



Bad



Ok



Good



Great

write?



Bad



Ok



Good



Great

What is your preferred way to communicate with others?

\_\_\_ talking

\_\_\_ listening

\_\_\_ reading

\_\_\_ writing

\_\_\_ computer

\_\_\_ other: \_\_\_\_\_



**Biomedical Information**

Have you had any of the following conditions? Please check all that apply:

Condition	History	Age of onset
Stroke	Y N	
Head Injury	Y N	
Brain Tumor	Y N	
Paralysis	Y N	
Swallowing difficulty	Y N	
Seizures	Y N	
High blood pressure	Y N	
Diabetes	Y N	
Heart surgery/other cerebrovascular disorder	Y N	
Depression	Y N	
Anxiety	Y N	
Other mental health or psychiatric condition	Y N	
Substance Abuse	Y N	
Alzheimer's Disease	Y N	
Other type of progressive neurological disorder	Y N	
Hearing loss	Y N	
Vision loss	Y N	
Memory loss	Y N	
Disorientation or confusion	Y N	
Language or learning impairment	Y N	
Other Developmental disorder	Y N	

Please describe any conditions identified above:

Do you have any other conditions that might affect your ability to participate in a:

- 1 hour language evaluation and/or a
- 1 hour communication group with others who have language/communication disorders

Do you have any other serious medical conditions that you think we should know about?

**Socio-Cultural Information****HANDEDNESS:**

BEFORE your stroke/neurological condition, which hand did you use to do most things?

LEFT RIGHT

AFTER your stroke/neurological condition, which hand did you use to do most things?

LEFT RIGHT

<b>Ethnicity</b>	
Hispanic or Latino <input type="checkbox"/>	American Indian/Alaska Native <input type="checkbox"/>
Asian <input type="checkbox"/>	Native Hawaiian/Other Pacific Islander <input type="checkbox"/>
Black or African American <input type="checkbox"/>	White not Hispanic <input type="checkbox"/>
More Than one Race <input type="checkbox"/>	Unknown or wish to not answer <input type="checkbox"/>

<b>Geographic Region</b>	
Where did you grow up (city/town)?	
Southern <input type="checkbox"/>	North central <input type="checkbox"/>
Western <input type="checkbox"/>	Northeast <input type="checkbox"/>
Rural (population <2,500) <input type="checkbox"/>	Urban (population>2,500) <input type="checkbox"/>

<b>Geographic Region</b>	
Where are you currently living (city/town)?	
Southern <input type="checkbox"/>	North central <input type="checkbox"/>
Western <input type="checkbox"/>	Northeast <input type="checkbox"/>
Rural (population <2,500) <input type="checkbox"/>	Urban (population>2,500) <input type="checkbox"/>

<b>Educational History</b>	
Less than High School <input type="checkbox"/>	High School <input type="checkbox"/>
Vocational/Some college <input type="checkbox"/>	College Graduate <input type="checkbox"/>
Total years of education:	Highest Degree Obtained:

<b>Vocational/Employment History</b>					
<b>Current Employment:</b>	Full time	Part Time	Not Working	Retired	Other
If other, please specify:					
If employed, describe your employment:					
If retired, how long have you been retired?					
What is your occupation/profession?					

**Language and Therapy History****Onset of current speech-language condition:**

Cause:
Date of Onset:
How has your communication changed over time:
What is your primary mode of communication?

**Hospitalization: Y N**

Duration of Hospitalization after Stroke/Brain Injury:

Name and Address of Hospital:

**Rehabilitation: Y N**

Duration of Rehabilitation after Stroke/Brain Injury:

Physical Therapy Y N	Duration:
Occupational Therapy: Y N	Duration:
Speech Therapy: Y N	Duration and description of therapy:
Any other therapy: Y N	Duration:

Name and Address of Most Recent Rehabilitation Program:

**Current speech-language therapy:**

What are your current medical symptoms/problems related to the stroke/brain injury?

Are you currently participating in any speech/language therapy? Y N

If so, please describe this therapy:

**Name and Address of Current Language Therapy Services**

- Do you plan to initiate any new speech-language therapy over the next 3 months? Y/N
  - If yes, please describe:
- Are you able to participate in a 1-hour communication group, once a week, for four weeks? Y/N
  - (We will try to schedule a time that works for you and other group members).

Please describe your communication abilities & difficulties:

Speaking:	
Understanding Speech:	
Reading:	
Writing:	
Using Gestures:	
Understanding Gestures:	
Using a computer to communicate:	
Continuing therapy at home:	
Other:	

**GERIATRIC DEPRESSION SCALE<sup>1</sup>**

**Directions:** Choose the best answer for how you have felt over the past week.

1. Are you basically satisfied with your life?	YES	NO
2. Have you dropped many of your activities and interests?	YES	NO
3. Do you feel that your life is empty?	YES	NO
4. Do you often get bored?	YES	NO
5. Are you in good spirits most of the time?	YES	NO
6. Are you afraid that something bad is going to happen to you?	YES	NO
7. Do you feel happy most of the time?	YES	NO
8. Do you often feel helpless?	YES	NO
9. Do you prefer to stay home, rather than going out and doing new things?	YES	NO
10. Do you feel like you have more problems with memory than most?	YES	NO
11. Do you think it is wonderful to be alive now?	YES	NO
12. Do you feel pretty worthless the way you are right now?	YES	NO
13. Do you feel full of energy?	YES	NO
14. Do you feel that your situation is hopeless?	YES	NO
15. Do you think that most people are better off than you are?	YES	NO

<sup>1</sup> Sheikh JI, Yesavage JA. Geriatric depression scale (GDS): recent evidence and development of a shorter version. In: Brink TL, ed. Clinical gerontology: a guide to assessment and intervention. New York: Haworth, 96:165-73.

Available at <http://www.aafp.org/afp/2002/0915/p1001.html#afp20020915p1001>

**Appendix A4: Aphasia-Friendly Informed Consent Form**

Page 1  
USU IRB: 9953

**Aphasia-Friendly Consent Form Summary****Tele-connect Aphasia Group (TAG)**

We are doing a study.

Main researcher

Lisa Milman | 435-797-1143  
lisa.milman@usu.edu



Graduate student researcher

Alexis Missel | 435-797-9202



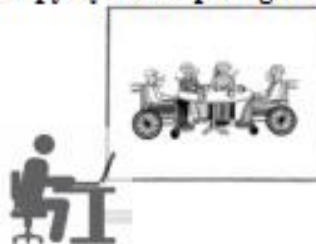
Graduate student researcher

Ellise Rees | 435-797-9202



Study Title:

**Continuing Aphasia Therapy by Participating in an Online Communication Group**





### Purpose

To learn more about:



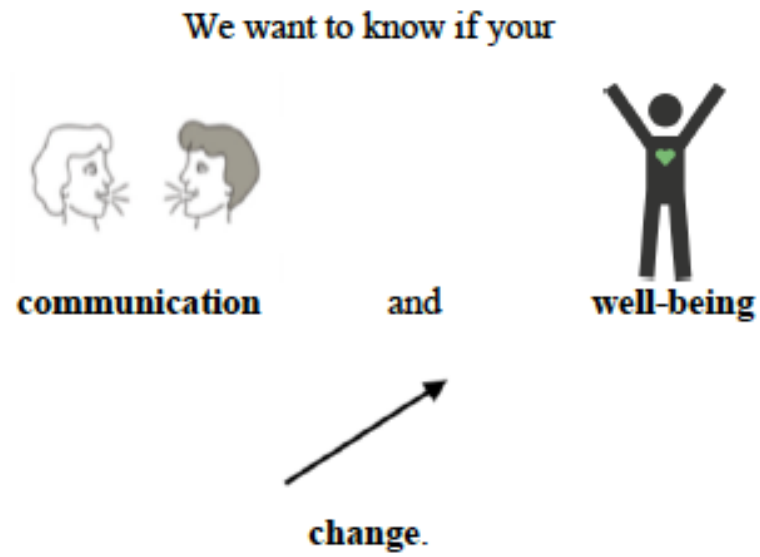
**Group**



**language therapy**



**by computer.**







**This form tells you about the study.**



**You can ask questions.**



**You can decide if you want to be in the study.**



**yes**



**or**



**no**



**What?**  
**You will be asked to:**

<i>Weeks = 10</i>	<i>Total Hours = 10</i>	<i>What?</i>
1	1 hour	<ul style="list-style-type: none"> <li>• Learn about the study</li> <li>• Decide to participate</li> <li>• Tell us about your medical and communication history</li> </ul>
2	1 hour	<ul style="list-style-type: none"> <li>• Set up computer</li> </ul>
3	1 hour	<ul style="list-style-type: none"> <li>• Language Evaluation</li> </ul>
4	1 hour	<ul style="list-style-type: none"> <li>• Language Evaluation</li> </ul>
5	1 hour	<ul style="list-style-type: none"> <li>• Treatment</li> </ul>
6	1 hour	<ul style="list-style-type: none"> <li>• Treatment</li> </ul>
7	1 hour	<ul style="list-style-type: none"> <li>• Treatment</li> </ul>
8	1 hour	<ul style="list-style-type: none"> <li>• Treatment</li> </ul>
9	1 hour	<ul style="list-style-type: none"> <li>• Language Evaluation</li> </ul>
10	1 hour	<ul style="list-style-type: none"> <li>• Language Evaluation</li> </ul>

**Recording**

You will be:

- Audio taped



- Videotaped



Your responses will be written out.



Your name and address will not be recorded.





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USU IRB: 9953

### Who?

You can participate if:

**You are an adult.**



**You have completed the Big Sky Aphasia Program.**



**You have aphasia.**



**You don't have other serious medical issues.**





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USU IRB: 9953

### Where?



You are at home.



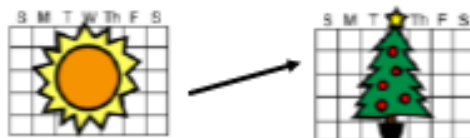
We connect by computer.



Clinicians are at USU.

### When?

The study will take place from:



**August 2019 to December 2019.**

### Other choices:

- You can choose another therapy somewhere else.





### Risks

1. You may feel tired or frustrated.



2. There may be a risk to your confidentiality.



### To minimize risks:



- Sessions will only be 1 hour.



- You can take a break or stop.



- We will use a secure internet server.



Utah Education and Telehealth Network

- Data will be in a safe location.





### Benefits

1. Your **communication** may improve.



2. You may **save money** on travel costs for therapy.



3. You may be able to **go to more therapy sessions** because you will be less affected by weather or transportation.



4. It may be easier to **involve family or friends** because therapy will be in your home.



5. The study may also **help others** with aphasia in the future.





### Privacy and Confidentiality

**To protect your information:**



- All sessions will be done using a secure conferencing system used by Utah hospitals and schools.



Utah Education and Telehealth Network

- Only researchers will have access to your data.



- Only we will be able to see the data.



- Identifying information, including recordings, will be stored separately.



- Identifying information will be destroyed after 10 years.





### Voluntary Participation

- Participation in this study is entirely voluntary.



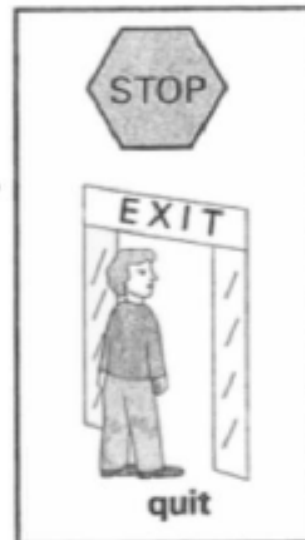
- It's your decision.



✓ You can stop at any time.

✓ It is your choice.

✓ It is ok to quit.







### Withdrawal

You could be asked to leave if:



1. We think it's in your best interest.



2. You tell us about plans to hurt yourself.



3. You don't meet study criteria.



4. The study is cancelled.





### Payment

- You will **not** be paid.



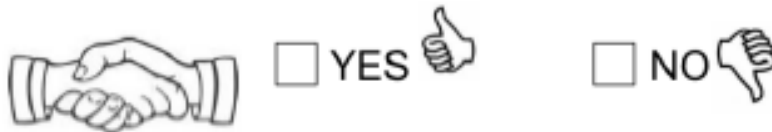
- There is **no** cost to participate.



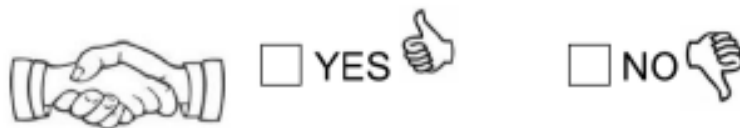


### Findings and Future Participation

- It's OK for my information to be used for future research.



- It's OK to use my audio/visual recordings to teach people about aphasia in educational or professional meetings.



- It's OK to be contacted for future research studies.



### Review

- The Institutional Review Board (IRB) at Utah State University approved this study.





### Questions?

- My questions have been answered?


☐

YES


☐

NO



- Questions about the study:



Main researcher

Lisa Milman | 435-797-1143  
lisa.milman@usu.edu



Graduate student researcher

Alexis Missel | 435-797-9202



- Questions about your rights:



USU IRB Director 435-797-0567



### Participation

- I am interested in learning more.


☐

YES


☐

NO



- I want to talk with a friend or family member about my decision to participate.


☐

YES


☐

NO



I would like \_\_\_\_\_ to be included.

I want to decide on my own.

**Appendix B: Researcher's Videoconference Checklist****Videoconference System Checklist**

<u>Date</u>	
-------------	--

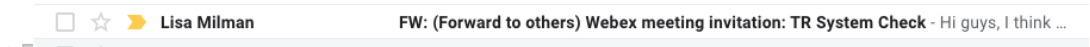
<u>Session Number</u>	
<u>Session Objective</u>	
<u>Participants Present</u>	
<u>Clinicians Present</u>	

<b><u>Complete</u></b>	<b><u>System Check</u></b>	<b><u>Notes</u></b>
	All appropriate attendees have been <b>invited</b>	
	Meeting host is <b>signed on</b>	
	<b>Room is set-up</b> appropriately	
	<b>Camera</b> is oriented appropriately (view of clinician)	
	<b>Microphone</b> is oriented appropriately	
	Only <b>one microphone</b> in the room is activated	
	Only <b>one set of speakers</b> in the room is activated	
	<b>Layout</b> is designated appropriately	
	<b>Sharing</b> documents/screen is possible	
	<b>Annotation</b> is possible	
	<b>Assigning privileges</b> is possible	
	<b>Recording</b> is possible	
	Participant's <b>point/response method</b> has been confirmed	

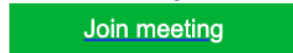
## Appendix C: Participants' Videoconference Instructions

### Tele-Connect Aphasia Group - Meeting Preparation

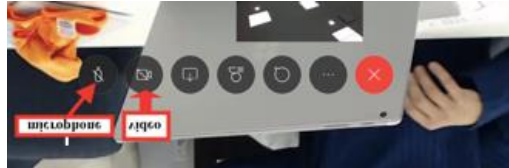
1. **Meeting Preparation:** Limit use of other electronics that might interfere with the computer signal
  - a. **Limit Internet Use.** If possible, make sure no one else is running any other internet/wifi programs in your home during the session
  - b. **Reduce background noise** (e.g., TV, radio, fans, pets) as much as possible
  - c. **Restart your computer** (or close any other open programs on your computer, such as word, browsers/google/safari).
  - d. **Have the following materials** ready to use during group
    - i. Scratch paper and writing utensil (pen/pencil)
    - ii. Picture card (see attachment)
2. **Joining the meeting:**
  - a. Open your email
  - b. Select the Webex meeting invitation



- c. Click on the green "Join the meeting" icon



- d. Check settings (images): Make sure mic & video icons are turned on

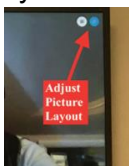


- e. Click on 'Join' meeting

3. **Adjusting your view:** You have some options, we recommend the view shown below



If you're not in this view, click on the icon in the upper right corner and select this option



## Tips for Success: Videoconferencing

- Make sure your **computer is charged**, or that you have your charging cord and are near a power outlet.



- Make sure your computer **microphone is pointed towards you** and/or near your mouth.



- Make sure your computer **camera is pointed towards you**, with your entire face in the center of the screen.



- You can adjust how loud the videoconference is by changing the **volume on your computer**. You could also wear **headphones**.



- You can **adjust the screens you see** by changing the “Layout Options” in the ‘WebX Videoconference’. *See the next/back page for additional instructions.*



## Layout Options - Webex Videoconference

**Step 1:** Hover your mouse in the top right corner of your screen to see the “Video Layout” button.

**Step 2:** Select the layout option that you prefer.

The section menu expands and then you can select a different view.

To use the Active Speaker/Thumbnail View, select



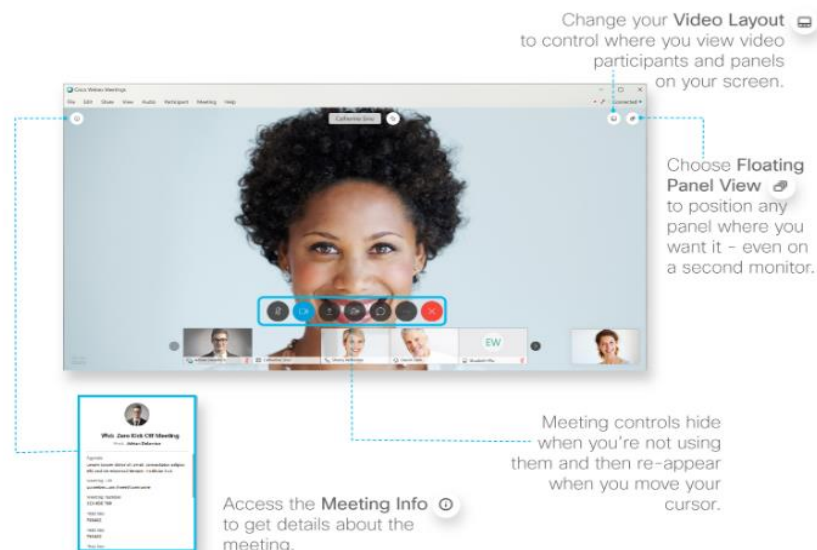
To use the Side-by-Side View, select



To use the Floating View, select






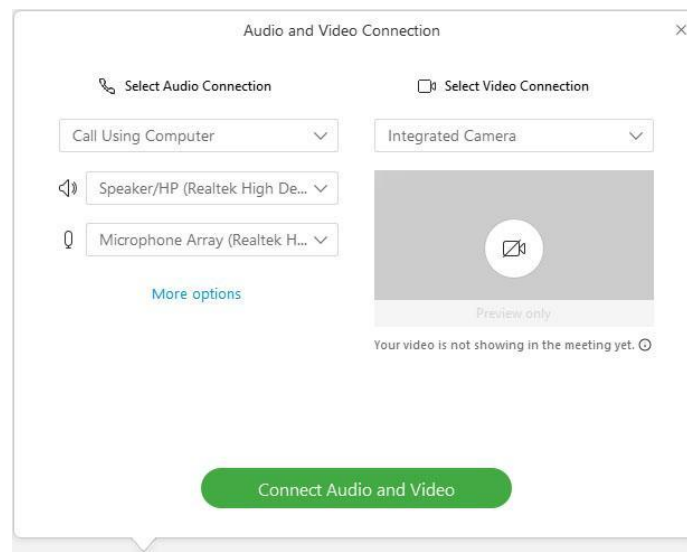
**Step 3:** The video screen of yourself will be visible in the bottom of your screen, and can be moved/adjusted independently of the other screens.




## **Additional Webex Videoconferencing Support**

### **Connect Audio**

- When you join a meeting, the Audio and Video Connection dialog box appears. If you don't choose an audio connection at the start of your meeting, you can select Connect audio and video  to go back to the Audio and Video Connection dialog box.
- To connect your audio during a Webex meeting, you can use your phone, computer, or a video device. During a meeting, you can stop or start your audio connection at any time.
- From the meeting control panel, you can select Mute  and Unmute  to turn your audio on or off.



### **Start Your Video**

- When you join a meeting, the Audio and Video Connection dialog box appears.
- If you don't choose a video connection at the start of your meeting, you can select Connect audio and video  to go back to the Audio and Video Connection dialog box.

- During a meeting, you can stop or start your video connection at any time. From the meeting control

panel, you can select Switch camera device or stop my video



and Start my video



to turn your video on or off.

### Share Content

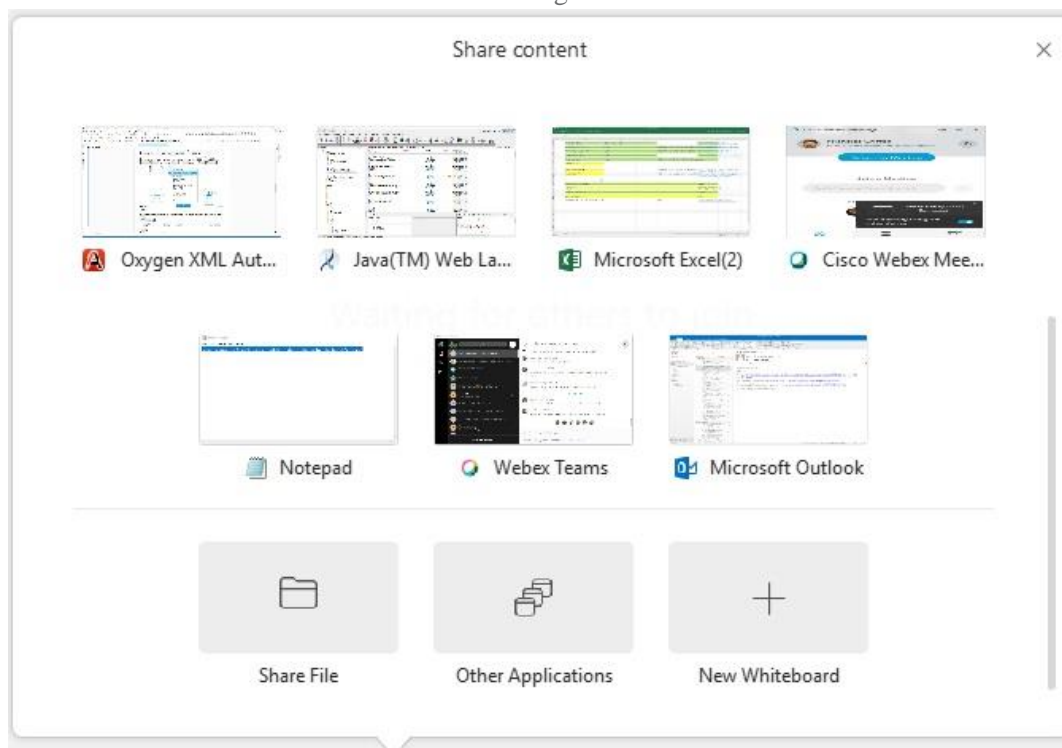
- You can share content during a Webex meeting.



- In the Participants panel, grab the ball and drop it next to your name. You become the presenter.



- Select Share content and start sharing.



- Go to the Share menu for more sharing options.

**Appendix D: Pre-Assessment Questionnaire****Pre-Assessment Questionnaire****Date:****Primary Participant - Participant ID:****Questionnaire administered by:**

Assessment Session 1 scheduled for:

---

**General Assessment Guidelines**

Thank you for taking the time to complete the videoconference pre-assessment with us. We will use the information gathered during the two pre-assessment sessions to tailor the Teleconnect Aphasia Group intervention to your specific strengths, interests, and needs.

Throughout the assessment we welcome, and are grateful for, technical and logistical support from significant others/caregivers/family/friends. While there will be some group discussion at the beginning of the assessment session, the majority of the assessment session will take place between the evaluating clinician and the primary participant.

- During the formal assessment, we ask that significant others/caregivers do not provide any support or assistance to the primary participant which may influence their responses or outcomes on the assessment. For example, repetition or rephrasing of the questions can only be provided by the evaluating clinician.
- Prior to the assessment, please print the PDF labelled “Print\_WAB Tele-assessment”.
- Additionally, please have a pen, comb, and book available. If a pen is unavailable, a pencil will suffice. If a comb is unavailable, a brush will suffice.
- So that we can ensure as smooth of an assessment session as possible, please take a few moments to answer the following questionnaire.

Each assessment session will take approximately 1 hour. A Webex videoconference link will be sent to you prior to the assessment. After some initial discussion as a group, we will let you know when we start recording the session.

Please email [alexis.missel@aggiemail.usu.edu](mailto:alexis.missel@aggiemail.usu.edu) or call us at 435-797-9202 with any questions or concerns.

---

1. Are you using a desktop, laptop, or tablet?

<b>Desktop</b>	
<b>Laptop</b>	
<b>Tablet</b>	

2. What kind of video camera is in use (integrated/external)? Are you able to adjust the angle of the video camera during the assessment?

<b>Yes</b>	
<b>No</b>	
_____	

3. Do you have a touchscreen device (ex. laptop, iPad)? Can the primary participant use the touchscreen independently?

<b>Desktop</b>	
<b>Laptop</b>	
<b>Tablet</b>	
_____	

4. Can the primary participant use a mouse independently?

<b>Yes</b>	
<b>No</b>	
_____	

5. What is the best way for the primary participant to communicate yes/no?

<b>Verbal</b>	
<b>Gesture</b> (ex. thumbs up)	
<b>Point</b>	
_____	

6. Can you open up and click through a PowerPoint on the device that will be used for the assessment?

<b>Yes</b>	
<b>No</b>	
_____	

7. Can you download and print PDF documents and Word documents to be used during the assessment?

<b>Yes</b>	
<b>No</b>	
_____	

8. Can you supply the following materials during the first assessment session?

<b>Pen</b>	
<b>Comb</b>	
<b>Book</b>	

9. Some portions of the assessment will require a verbal response, and some will require a “point” as a response. What method of pointing is easiest for the primary participant: pointing to a printed hard copy, using touchscreen to point to the computer/tablet screen, using a mouse independently?

<b>Point to printed hard copy</b>	
<b>Point using mouse</b>	
<b>Utilize touchscreen</b>	
<b>Other: _____</b>	

10. Do you have any questions for us?

<b>Yes</b>	
<b>No</b>	
_____	

## Appendix E: Perception of Language Treatment Questionnaire (Experimental Measure)

Perception of Language Treatment Questionnaire

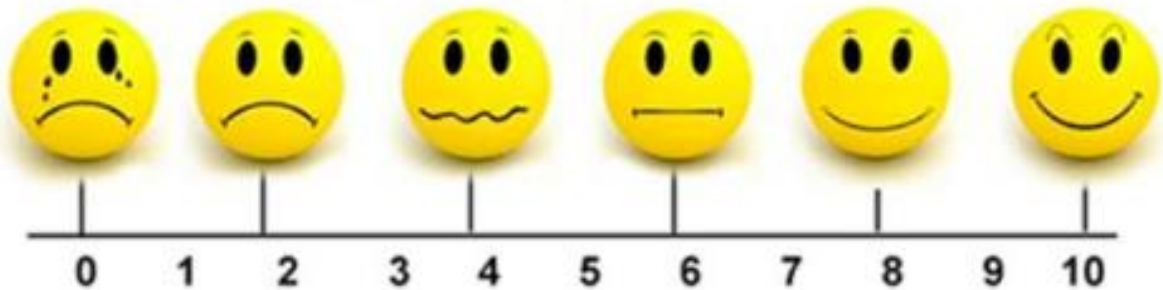
1. How well did the equipment work during therapy?



Not at all  
Easy

Somewhat  
Easy

Very Easy





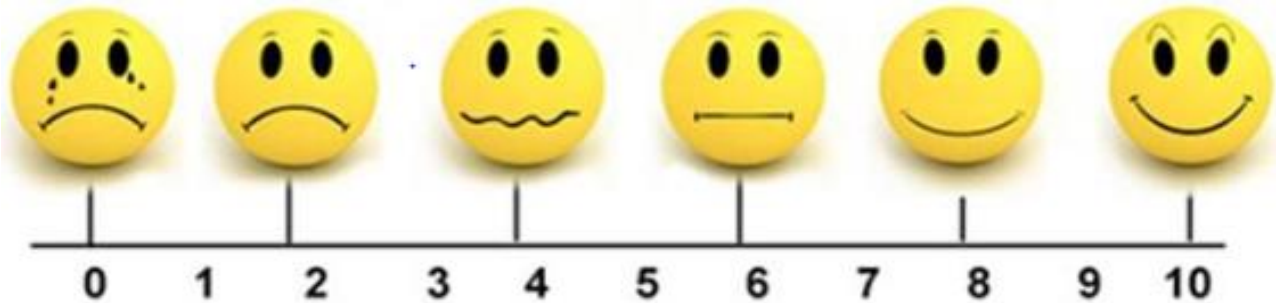
## 2. How important is it to continue ICAP/therapy at home?



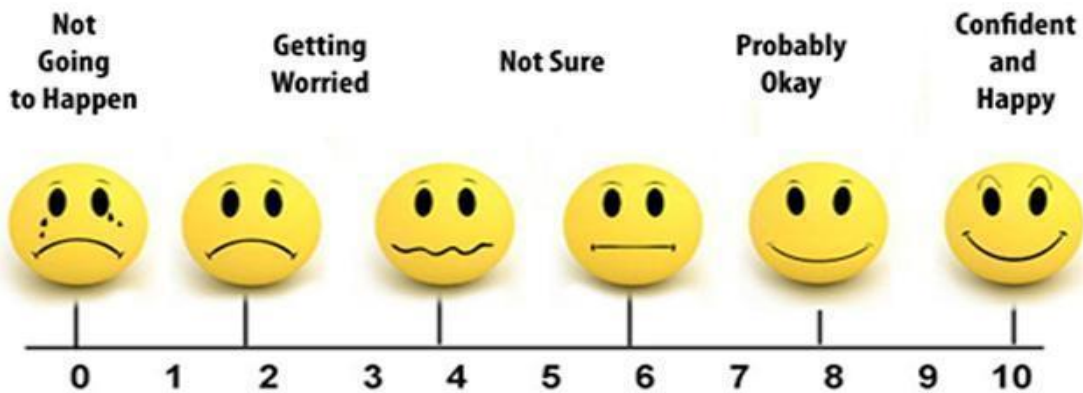
Not at all  
Important

Somewhat  
Important

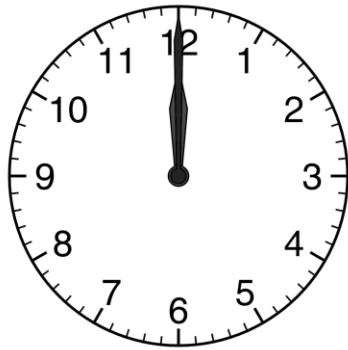
Very  
Important



### 3. How confident are you to continue therapy at home?



# 4. a. How many hours per week do you spend doing language therapy at home?



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
--------	---------	-----------	----------	--------	----------	--------



## 4b. What communication therapy are you doing at home?



1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

4c. Is there anything else you want  
to do at home?

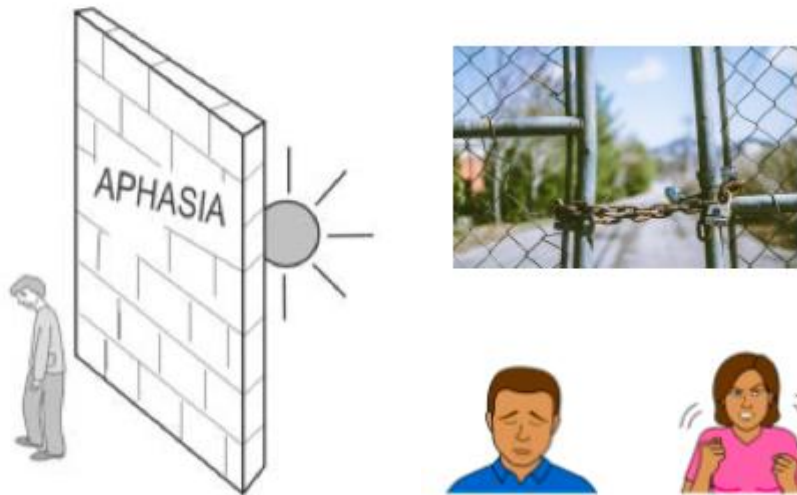


1. \_\_\_\_\_

2. \_\_\_\_\_








3. \_\_\_\_\_

5. a. Are there any barriers that make it hard to do communication therapy at home?



✓	X	?
Yes	No	I don't know

## 5b. If so, what are the barriers?

<i>(Select all that apply.)</i>		
	Physical Challenges (exhaustion, chronic pain, etc.)	
	Health Concerns	
	Support Network (family, friends, colleagues, etc.)	
	Life Changes (moving, etc.)	
	Personal Factors (sad, angry, depressed, worried, anxious)	
	Work/Professional Life	
	Not enough information/Not sure how to do home program	
	Other	(tell us more): _____








## 6. a. Is therapy at home working?



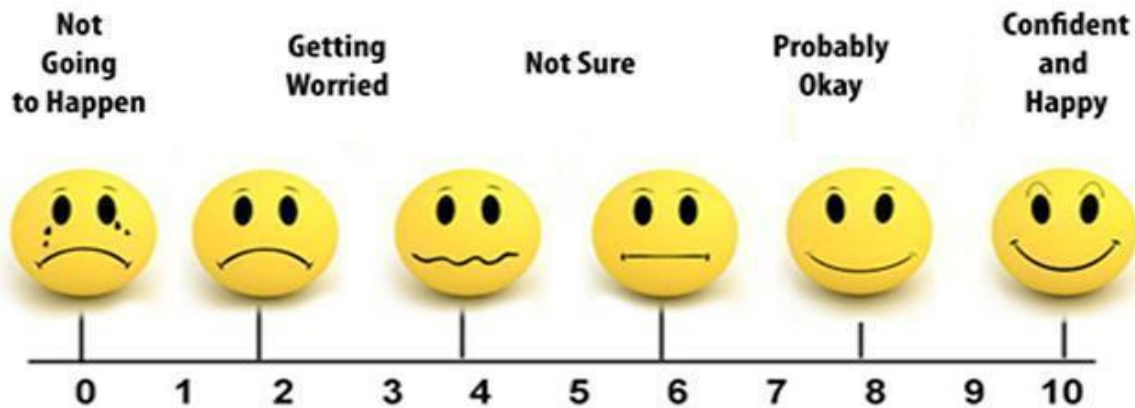
✓	X	?
Yes	No	I don't know



## 6b. If so, what factors do you think have contributed to your success?

<i>(Select all that apply.)</i>		
	Physical Strengths (alertness, energy, etc.)	
	Health Wellness	
	Support Network (family, friends, colleagues, etc.)	
	Life Changes (moving, etc.)	
	Personal Factors (determination, resilience, confidence, self-esteem)	
	Work/Professional Life	
	Thorough information to do home program / Knowledge of home program	
	Other	(tell us more): _____

## 7. How confident are you about getting information about aphasia at home?



**Appendix F: Western Aphasia Battery - Revised (WAB-R)**

- Test Purpose
  - To identify the presence, severity, and type of aphasia, as well as measure level of overall communicative performance, language assets, and deficits.
- Intended Audience
  - Adults or teenage children with an acquired neurological disorder
- Test Administration
  - Part 1: 30 - 45 minutes; Part 2: 45-60 minutes
  - The clinician presents questions verbally and with support of written prompts, manipulatives, and pictures. The client responds verbally, in writing, or with gestures (i.e., pointing).
- Sample Questions
  - 8 total sections; 31 total tasks
    - Part 1
      - Spontaneous Speech
        - ex. A1. What seems to be the trouble?
          - [0-10 for informational content, fluency, grammatical competence, and paraphasias]
      - Auditory Comprehension
        - ex. A19. Is a horse larger than a dog?
          - [accuracy, type of response (verbal, gestural, eye blink, no response)]
        - ex. B11. Point to the flower.
          - [accuracy]
        - ex. C8. Point to the comb with the pen.
          - [accuracy of each component of the multi-part command]
      - Repetition
        - ex. A.13. Repeat these words. Say “delicious freshly baked bread”
          - [accuracy, paraphasias, error in word sequence, and verbal apraxia rating]
      - Naming and Word Finding
        - ex. A12. What is this? (presents key)
          - [accuracy and type of cue (tactile, phonemic, semantic)]
        - ex. B1. Name as many animals as you can in one minute.
          - [one point for each animal named]
        - ex. C3. Complete what I say. Roses are red, violets are \_\_\_\_\_.
          - [accuracy]
        - ex. D3. How many days are in a week?
          - [accuracy]
    - Part 2
      - Reading

- A. “Read this sentence and point to the missing word.”
  - B. “I want you to read this aloud then do what it says.”
  - C. “Point to the object that goes with this word.”
  - D. “Point to the picture that goes with this word.”
  - E. “Point to the word that goes with this picture.”
  - F. “Show me the word \_\_\_\_\_.”
  - G. Letter Discrimination
  - H. “Tell me what word I spell.”
  - I. “Spell the word \_\_\_\_\_.”
- Writing
  - A. Writing Upon Request
  - B. Writing Output
  - C. Writing to Dictation
  - D. Writing Dictated Words
  - E. Alphabet and Numbers
  - F. Dictated Letters and Numbers
  - G. Copying a Sentence
- Apraxia
  - Upper Limb; Facial; Instrumental; Complex
- Constructional, Visuospatial, and Calculation
  - A. Drawing
  - B. Block Design
  - C. Calculation
  - Raven’s Coloured Progressive Matrices (RCPM)
- SUPPLEMENTAL Writing and Reading
  - A. Writing Irregular Words to Dictation
  - B. Writing Non-words to Dictation
  - C. Reading Irregular Words
  - D. Reading Non-words
- Scoring
  - An Aphasia Quotient, Language Quotient, Cortical Quotient, and Aphasia Classification are identified
    - Aphasia Quotient
      - 0-25 = Very Severe; 26-50 = Severe; 51-75 = Moderate; 76 and above = Mild
    - Aphasia Classification: Based on scores (1-10) in: Fluency, Auditory Verbal Comprehension, Repetition, Naming & Word Finding
- Psychometrics
  - Reliability:
    - Intrarater: 0.99; Interrater: 0.99; Test-Retest: 0.99
  - Concurrent Validity:
    - Neurosensory Center Comprehensive Examination for Aphasia (NCCEA): Pearson’s correlation coefficient = 0.96,  $p < .0001$ )
- Reference
  - Kertesz, A., & Raven, J.C. (2007). WAB-R: Western Aphasia Battery-Revised. [Assessment Manual] San Antonio, TX: PsychCorp.

## Appendix G: Example of Goal Attainment Scaling (GAS)

### A. Generic example: Write an Email

<b>+2 Best Expected Outcome</b>	Using an email outline, I will write an email with fewer than 1 error [including 4/4 email components: subject; address line; at least one paragraph with 4-6 correct sentences; closing statement/signature] to a friend, family member, or colleague.
<b>+1 More Than Expected Outcome</b>	Using an email outline, I will write an email with fewer than 3 errors [including 4/4 email components: subject; address line; at least one paragraph with 4-6 correct sentences; closing statement/signature] to a friend, family member, or colleague.
<b>0 Expected Outcome</b>	<b>Using an email outline, I will write an email with fewer than 5 errors [including 4/4 email components: subject; address line; at least one paragraph with 4-6 sentences; closing statement/signature] to a friend, family member, or colleague.</b>
<b>-1 Less Than Expected Outcome</b>	Using an email outline, I will write an email with fewer than 5 errors [including 3/4 email components: subject; address line; at least one paragraph with 4-6 correct sentences; closing statement/signature] to a friend, family member, or colleague.
<b>-2 Worst Expected Outcome</b>	Using an email outline, I will write an email with fewer than 5 errors [including 2/4 email components: subject; address line; at least one paragraph with 4-6 correct sentences; closing statement/signature] to a friend, family member, or colleague.
<b>Comments</b>	<i>Timeline:</i> <i>Strategy:</i>

**B. Participant's individualized Goal Attainment Scaling (GAS)****Short Term Goal 1: Treatment Group 1**

	<b>TAG1901CH</b>	<b>TAG1902IG</b>	<b>TAG1904TH</b>
<b>STG1</b>	To improve his ability to participate in social interactions and communicate basic personal information (e.g., name), CH will independently initiate use of an <b>ID card</b> by presenting it to multiple communication partners and saying his name during a structured group setting in ¾ opportunities.	To improve his ability to participate in social interactions and communicate basic personal information (name, aphasia diagnosis, and contact information), IG will independently initiate use of an <b>ID card</b> by presenting it to multiple communication partners and reading his name during a structured group setting.	To improve his ability to participate in social interactions and communicate basic personal information (name, aphasia diagnosis, and contact information), TH will independently initiate use of an ID card in ¾ opportunities.
<b>2</b>	CH will utilize an ID card by selecting the card from his wallet/array of items and showing it to a conversation partner as an introduction, as well as read his first name out-loud, independently.  Prompt: I am X (clinician introduces themselves) and you are (gesturing with hand)?	Spontaneous use of ID card in group and/or other settings Prompt: I am X (clinician introduces themselves) and you are (gesturing with hand)?  Spontaneously says his first and last name Prompt: Please tell me your 1 <sup>st</sup> and last name	TH will utilize an ID card by selecting the card from his wallet/array of items and showing it to a conversation partner as an introduction, as well as to indicate other information (e.g., I have aphasia; Contact X with minimum prompting.  Prompt: I am X (clinician introduces themselves) and you are (gesturing with hand)?
<b>1</b>	CH will utilize an ID card by selecting the card from his wallet/array of items and showing it to a conversation partner as an introduction independently.  Min cue: Can you show me (get out) your card? Mod cue: Here's my card, can you show me yours?	ID card presented with mid-mod cues Min cue: Can you show me (get out) your card? Mod cue: Here's my card, can you show me yours?  Reads 1 <sup>st</sup> and last name with min cues (phonetic cue: 1 syllable provided)	TH will utilize an ID card by selecting the card from his wallet/array of items and showing it to a conversation partner as an introduction with minimum prompting.  Min cue: Can you show me (get out) your card? Mod cue: Here's my card, can you show me yours?
<b>0</b>	CH will utilize an ID card by selecting the card from his wallet/array of items, showing it to a conversation partner, and saying his name, as an introduction with minimal prompting.  Mod-max cue: select from field of two Max cue: spouse facilitates retrieval of card	ID card presented with mod-max cues Mod-max cue: select from field of two Max cue: spouse facilitates retrieval of card  Reads 1 <sup>st</sup> and last name with mod-max cues (phonetic cue: > 1 syllable provided)	TH will utilize an ID card by selecting the card from his wallet/array of items and showing it to a conversation partner as an introduction with maximum prompting.  Mod-max cue: select from field of two Max cue: spouse facilitates retrieval of card
<b>-1</b>	CH does not currently have an ID card that he uses.	Does not have an ID card available during session  Repeats 1 <sup>st</sup> or last name	TH does not currently have an ID card that he uses.
<b>-2</b>	CH will refuse use of, or be unable to use with maximum support, an ID card in ¾ opportunities.	Refusing to use ID card with maximum cues  Refusing to repeat/say name	TH will refuse use of, or be unable to use with maximum support, an ID card.

**Short Term Goal 2: Treatment Group 1**

	<b>TAG1901CH</b>	<b>TAG1902IG</b>	<b>TAG1904TH</b>
<b>STG2</b>	To improve his ability to participate in social communications, CH will independently say a core set of functional items (X, X, X, Janna, X, X, X) in 3/4 opportunities.	To improve his ability to participate in social interactions and communicate basic personal information, IG will use his ID card to copy his 1 <sup>st</sup> and last name.	To improve his ability to participate in social interactions and communicate basic personal information, TH will independently write or use his ID card to copy his 1 <sup>st</sup> and last name.
<b>2</b>	CH will utilize an ID card by selecting the card from his wallet/array of items and showing it to a conversation partner as an introduction, as well as read his first name out-loud, independently.  Prompt: I am X (clinician introduces themselves) and you are (gesturing with hand)?	Spontaneously writes his first and last name Prompt: Please write (gesture) your 1 <sup>st</sup> and last name	Spontaneously writes his first and last name  Prompt: Please write (gesture) your 1 <sup>st</sup> and last name
<b>1</b>	CH will utilize an ID card by selecting the card from his wallet/array of items and showing it to a conversation partner as an introduction independently.  Min cue: Can you show me (get out) your card? Mod cue: Here's my card, can you show me yours?	Writes name with min. cues Min cue: 1-2 letters provided/copied	Writes name with min. cues  Min cue: 1-2 letters provided/copied
<b>0</b>	CH will utilize an ID card by selecting the card from his wallet/array of items, showing it to a conversation partner, and saying his name, as an introduction with minimal prompting.  Mod-max cue: select from field of two Max cue: spouse facilitates retrieval of card	Writes name with mod cues Mod cue: Spouse/aid places pencil in his hand and writes/provides a model of 1-5 letters IG Writes 7 or more letters of his name independently	Writes name with mod cues  Mod cue: Spouse/aid places pencil in his hand and writes/provides a model of 1-5 letters TH Writes 7 or more letters of his name independently
<b>-1</b>	CH does not currently have an ID card that he uses.	Copies name with max cues Max cue: Spouse/aid places pencil in his hand and writes/provides a model of 6 or more (of 12 possible) letters (IG writes 1-6 letters)	Copies name with max cues  Max cue: Spouse/aid places pencil in his hand and writes/provides a model of 5 or more (of 10 possible) letters (TH writes 1-5 letters)
<b>-2</b>	CH will refuse use of, or be unable to use with maximum support, an ID card in 3/4 opportunities.	Refusing to copy/write name	Refusing to copy/write name

**Short Term Goal 3: Treatment Group 1**

	<b>TAG1901CH</b>	<b>TAG1902IG</b>	<b>TAG1904TH</b>
<b>STG3</b>	To improve his ability to participate in social communications, CH will independently communicate a core set of functional items (X, X, X) by pointing in 3/4 opportunities.	To improve his ability to participate in social interactions and communicate basic personal information, IG will identify (spoken-word to picture + written-word match) 5 family members (wife: X; Children: X, X, X, & X).	To improve his ability to participate in social communications, TH will independently communicate a core set of functional items (X, X, X, X, X, X) by writing family member's names in ¾ opportunities.
<b>2</b>	CH will point to communicate 3/3 personalized vocabulary words in order to establish topic, answer questions, or otherwise engage in social communication independently.  Prompt with picture: Point to ____.	Identifies 5/5 family members and spontaneously reads name of 1 or more family members Prompt: Show me...	TH will write 5/6 personalized vocabulary words in order to establish topic, answer questions, or otherwise engage in social communication independently/with minimal prompting.
<b>1</b>	CH will point to communicate 3/3 personalized vocabulary words in order to establish topic, answer questions, or otherwise engage in social communication with minimal prompting.  Prompt with picture: Point to ____.	Spontaneously (without cueing) identifies (points to) 5/5 family members Prompt: Show me ...	TH will write 4/6 personalized vocabulary words in order to establish topic, answer questions, or otherwise engage in social communication independently/with minimal prompting.
<b>0</b>	CH will point to communicate 3/3 personalized vocabulary words in order to establish topic, answer questions, or otherwise engage in social communication with moderate prompting.	Identifies some (3/5) family members with moderate cueing	TH will write 3/6 personalized vocabulary words in order to establish topic, answer questions, or otherwise engage in social communication with moderate/maximum prompting.
<b>-1</b>	CH does not currently utilize multi-modal communication featuring a set of core words to support social communication.	Does not have family picture board/communication aid available	TH does not currently utilize multi-modal communication featuring a set of core words to support social communication.
<b>-2</b>	CH will refuse use of, or be unable to use with maximum prompting, multi-modal communication featuring a set of core words to support social communication.	Refusing to point to pictures	TH will refuse use of, or be unable to use with maximum prompting, multi-modal communication featuring a set of core words to support social communication.



**Short Term Goal 1: Treatment Group 2**

	<b>TAG1903SH</b>	<b>TAG1905LAR</b>	<b>TAG1906CS</b>
<b>STG1</b>	To improve his ability to participate in social interactions and communicate basic personal information (name, aphasia diagnosis, and contact information), SH will independently initiate use of an <b>ID card</b> by presenting it to multiple communication partners and reading his name during a structured group setting.	To improve her ability to participate in social interactions and communicate basic personal information (name, aphasia diagnosis, and contact information), LAR will independently initiate use of an <b>ID card</b> by presenting it to multiple communication partners and saying her name during a structured group setting.	To improve her ability to participate in social interactions and communicate basic personal information (name, aphasia diagnosis, and contact information), CS will independently initiate use of an <b>ID card</b> by presenting it to multiple communication partners and saying her name during a structured group setting.
<b>2</b>	Spontaneous use of ID card in group and/or other settings Prompt: I am X (clinician introduces themselves) and you are (gesturing with hand)?  Spontaneously says his first and last name Prompt: Please tell me your 1 <sup>st</sup> and last name	Spontaneous use of ID card in group and/or other settings Prompt: I am X (clinician introduces themselves) and you are (gesturing with hand)? OR Can you show me (get out) your card?  Spontaneously says her first and last name Prompt: Please tell me your 1 <sup>st</sup> and last name	Spontaneous use of ID card in group and/or other settings Prompt: I am X (clinician introduces themselves) and you are (gesturing with hand)?  Spontaneously says her first and last name Prompt: Please tell me your 1 <sup>st</sup> and last name
<b>1</b>	ID card presented with mid-mod cues Min cue: Can you show me (get out) your card? Mod cue: Here's my card, can you show me yours?  Reads 1 <sup>st</sup> and last name with min cues (phonetic cue: 1 syllable provided)	ID card presented with mid-mod cues Min cue: Here's my card, can you show me yours?  Says 1 <sup>st</sup> and last name with min cues (phonetic cue: 1 syllable/cue provided)	ID card presented with mid-mod cues Min cue: Can you show me (get out) your card? Mod cue: Here's my card, can you show me yours?  Reads 1 <sup>st</sup> and last name with min cues (phonetic cue: 1 syllable provided)
<b>0</b>	ID card presented with mod-max cues Mod-max cue: select from field of two Max cue: spouse facilitates retrieval of card  Reads 1 <sup>st</sup> and last name with mod-max cues (phonetic cue: > 1 syllable provided)	ID card presented with mod-max cues Mod-max cue: select from field of two Max cue: spouse facilitates retrieval of card  Says 1 <sup>st</sup> and last name with mod-max cues (phonetic cue: > 1 syllable/cue provided)	ID card presented with mod-max cues Mod-max cue: select from field of two Max cue: spouse facilitates retrieval of card  Reads 1 <sup>st</sup> and last name with mod-max cues (phonetic cue: > 1 syllable provided)
<b>-1</b>	Does not have an ID card available during session  Repeats first or last name	Does not have an ID card available during session  Repeats 1 <sup>st</sup> or last name	Does not have an ID card available during session  Repeats 1 <sup>st</sup> or last name
<b>-2</b>	Refusing to use ID card with maximum cues  Refusing to repeat/say name	Refusing to use ID card with maximum cues  Refusing to repeat/say name	Refusing to use ID card with maximum cues  Refusing to repeat/say name

**Short Term Goal 2: Treatment Group 2**

	<b>TAG1903SH</b>	<b>TAG1905LAR</b>	<b>TAG1906CS</b>
<b>STG2</b>	To improve his ability to participate in social interactions and communicate basic personal information, SH will use his ID card to copy his 1 <sup>st</sup> and last name.	To improve her ability to participate in social interactions and communicate basic personal information, LAR will say partner's name (X), names of her two children (X & X), and her three pets (X, X, X).	To improve her ability to participate in social interactions and communicate basic personal information, CS will use her ID card to copy her 1 <sup>st</sup> and last name.
<b>2</b>	Spontaneously writes his first and last name Prompt: Please write (gesture) your 1 <sup>st</sup> and last name	Spontaneously says partner's/children's/pets' name (X)  Prompt: What is your partner's name? Prompt: Shown picture and asked: Who is this? Its...	Spontaneously writes her first and last name Prompt: Please write (gesture) your 1 <sup>st</sup> and last name
<b>1</b>	Writes name with min. cues Min cue: 1-2 letters provided/copied	Reads partner's/children's/pets' name with min cues  (graphemic cues provided)	Writes name with min. cues Min cue: 1-2 letters provided/copied
<b>0</b>	Writes name with mod cues Mod cue: Spouse/aid places pencil in his hand and writes/provides a model of 1-5 letters SH Writes 7 or more letters of his name independently	Reads partner's/children's/pets' name with mod-max cues  (graphemic cue + 1 <sup>st</sup> phoneme... 'its X....')	Writes name with mod cues  Mod cue: Spouse/aid places pencil in her hand and writes/provides a model of 1-5 letters Writes 7 or more letters of her name independently
<b>-1</b>	Copies name with max cues Max cue: Spouse/aid places pencil in his hand and writes/provides a model of 6 or more (of 12 possible) letters (SH writes 1-6 letters)	Repeats partner's/children's/pets' name	Copies name with max cues Max cue: Spouse/aid places pencil in her hand and writes/provides a model of 6 or more (of 12 possible) letters (writes 1-6 letters)
<b>-2</b>	Refusing to copy/write name	Refusing to repeat/say name	Refusing to copy/write name

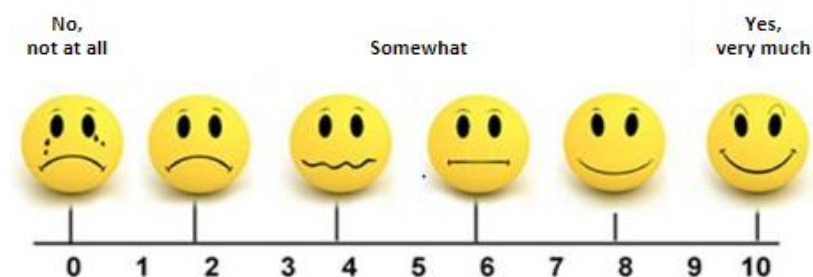
**Short Term Goal 3: Treatment Group 2**

	<b>TAG1903SH</b>	<b>TAG1905LAR</b>	<b>TAG1906CS</b>
<b>STG3</b>	To improve his ability to participate in social interactions and communicate basic personal information, SH will identify (spoken-word to picture+written-word match) 5 family members (wife: X; Children: X, X, X, X, X, X)	To improve her ability to participate in social interactions and communicate basic personal information, LAR will say the following phrases/questions: <ul style="list-style-type: none"> <li>- How are you?/ How was your day?</li> <li>- Clean up/Clean your room</li> <li>- How was school/How is your homework?</li> <li>- Have a great day!</li> </ul>	To improve her ability to participate in social interactions and communicate basic personal information, CS will read her spouse's name and the names of her three children (X, X, & X).
<b>2</b>	Independently or with minimum cueing, identifies 7/7 family members.  [Field of 6] Prompt: Show me/Point to ____.	Spontaneously says phrases questions  Prompt: What would you say, when...	Spontaneously says spouse's name (X) Prompt: What is your husband's name  Spontaneously says 3/3 children's names (X, X, & X) Prompt: Shown picture and asked: Who is ther? Its...
<b>1</b>	With minimum cueing, identifies (points to) 5/7 family members.  [Field of 6] Prompt: Show me/Point to ____.	Reads 3/4 phrases with min cues (graphemic cues provided)	Reads husband's name with min cues (graphemic cues provided)  Reads at least 2/3 children's names with min cues (graphemic cues provided)
<b>0</b>	With moderate to maximum cueing, identifies 5/7 family members.  [Field of 3] Prompt: Show me/Point to ____.	Reads 3/4 phrases with mod-max cues (graphemic cue + 1 or 2 words provided)	Reads name with mod-max cues (graphemic cue + 1 <sup>st</sup> phoneme... 'its E....')  Reads at least 2/3 1 <sup>st</sup> and last name with mod-max cues (graphemic cue + 1 <sup>st</sup> syllable... 'its X....')
<b>-1</b>	Does not have family picture board/communication aid available	Repeats phrase or > 2 words provided	Repeats spouse's name  Repeats at least 2/3 child's name
<b>-2</b>	Refusing to point to pictures	Refusing to repeat/say phrase	Refusing to repeat/say name  Refusing to repeat/say name

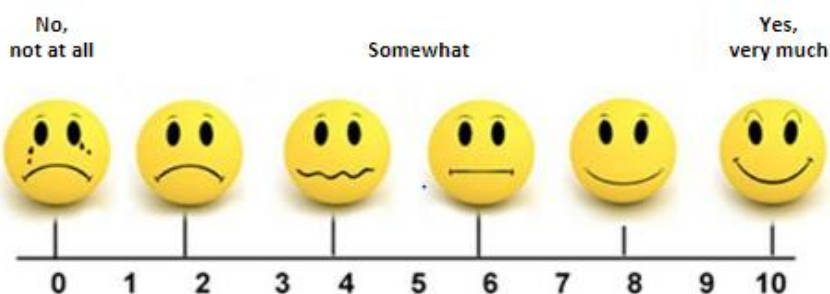
**Appendix H: Teleconnect Aphasia Group (TAG) Therapy Satisfaction Survey**

## Teleconnect Aphasia Group (TAG) Therapy Satisfaction Survey

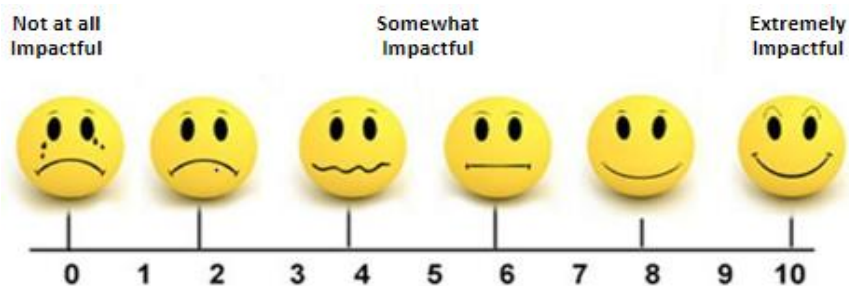
1. Has participation in TAG helped you do treatment at home?



2. Has participation in TAG Therapy helped you communicate with other people?



3. Has participation in TAG Therapy positively impacted your everyday quality of life?



4. What aspects of TAG Therapy did you find most effective and/or helpful?

a. \_\_\_\_\_

b. \_\_\_\_\_

5. What aspects of TAG Therapy could be changed and/or what components could be added to make the sessions more effective and/or helpful?

a. \_\_\_\_\_

b. \_\_\_\_\_

**Appendix I: Treatment Fidelity Checklist**

Timeframe adhered to?		Activity completed?		Comments
:00 - :10		Audiovisual system check, rapport building, and social communication		
:10 - :40		Eight to twelve minutes per person: Discussion of carry-over from therapy goal to real world problem		
:40 - :50		Summarize discussion: Assign homework and synthesize take-home thoughts		
Date:				
Clinician Name (leading session):				
Clinician Name (checking fidelity):				
# of Participants:				
Challenges / Technical Difficulties:				
Successes:				
Comments:				