

CAUTION: BAPA IN PROGRESS: USING THE BILINGUAL ARTICULATION
PHONOLOGY ASSESSMENT (BAPA) DURING TELEPRACTICE

by

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TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	v
LIST OF TABLES	1
LIST OF ABBREVIATIONS.....	3
ABSTRACT.....	4
CHAPTER	
I. LITERATURE REVIEW.....	5
II. METHOD	13
III. RESULTS.....	17
IV. DISCUSSION.....	24
REFERENCES.....	27

LIST OF TABLES

Table	Page
1. Summary of Client 1 Phoneme Productions.....	18
2. Summary of Client 2 Phoneme Productions.....	19
3. Summary of Client 3 Phoneme Productions.....	20
4. Client 1 Progress with Manner Categories.....	21
5. Client 2 Progress with Manner Categories.....	21
6. Client 3 Progress with Manner Categories.....	22
7. Transcription Agreement.....	23

LIST OF ABBREVIATIONS

Abbreviation	Description
ASD	Autism Spectrum Disorder
ASHA	American Speech-Language-Hearing Association
BAPA	Bilingual Articulation and Phonology Assessment
CELF-5	Clinical Evaluation of Language Fundamental- Fifth Edition
COVID-19	Coronavirus Disease 2019
CPAC-S	Contextual Probes of Articulation Competence-Spanish
DMES	Direct Magnitude Estimation Scales
IPA	International Phonetic Alphabet
SLP	Speech-Language Pathologist
WHO	World Health Organization

ABSTRACT

Telepractice involves providing a connection between clinician and client in parts of the world that have limited access to speech-language pathologists (SLPs). Speech therapy delivered via telepractice needs to be as good as face-to-face speech therapy. Documenting client progress is a way to provide evidence about the quality of speech therapy delivered via telepractice.

This study focuses on determining if administering the Bilingual Articulation Phonology Assessment (BAPA) is an effective way to measure progress for clients with a repaired cleft palate/lip receiving speech therapy via telepractice. The BAPA is a standardized assessment tool that is designed to evaluate progress when administered in person as part of speech therapy. The BAPA was effective with a client with a severe speech sound disorder secondary to Autism Spectrum Disorder (ASD) via telepractice sessions.

The current study aims to determine if the BAPA is an effective measure for documenting progress for clients with a repaired cleft palate/lip. Weekly speech therapy sessions were conducted with each client. During the telepractice sessions graduate clinicians targeted speech goals. The BAPA was administered by the researcher and the graduate clinicians. The BAPA was determined to be an effective measure when administered via telepractice for clients with a repaired cleft palate/lip. The BAPA has the potential to be used by SLPs because it is user friendly and cost-effective.

Keywords: Bilingual Articulation Phonology Assessment (BAPA), telepractice, speech sound disorders, cleft palate/lip, Latin America

I. LITERATURE REVIEW

In developing countries, such as El Salvador and Guatemala, there is a lack of access to certified speech-language pathologists (SLPs). One option for the delivery of speech therapy is telepractice. According to the American Speech-Language-Hearing Association (ASHA), telepractice is “the application of telecommunications technology for the delivery of speech-language pathology and audiology professional services at a distance by linking clinician to client or clinician to clinician for assessment, intervention, and/or consultation” (ASHA, 2020a, Overview Section). ASHA states that telepractice must be as good as face-to-face therapy. How can we determine the effectiveness of telepractice?

The Bilingual Articulation and Phonology Assessment (BAPA) is a standardized assessment. One purpose of the BAPA is to document client progress during face-to-face speech therapy. The BAPA was successfully used to measure progress for a client with a severe speech sound disorder secondary to Autism Spectrum Disorder (ASD) during telepractice (Garza et al., 2019). To justify the use of the BAPA to document progress during speech therapy delivered via telepractice, the results obtained from the BAPA must be evaluated across multiple speech therapy sessions for multiple clients. The current study aims to determine if the BAPA, when administered to clients with speech sound disorders secondary to cleft palate/lip in Latin America via telepractice, accurately documents the clients’ progress.

Telepractice

Telepractice connects clients to SLPs through different electronic platforms for speech and language services within the country or outside the country (ASHA, 2020a).

Telepractice is a viable option for delivering speech therapy to clients with repaired cleft palate/lip in countries where there is a lack of access to SLPs. The Contextual Probes of Articulation Competence - Spanish (CPAC-S; Goldstein & Iglesias, 2006) documented progress when administered via telepractice to clients in Nicaragua (Glazer et al., 2011).

The CPAC-S is an assessment tool that measures children's speech progress when administered during speech therapy (Goldstein & Iglesias, 2006). Standardized assessments that are not usually administered via telepractice have the potential to be used to document progress for clients participating in speech therapy (Glazer et al., 2011).

Face-to-Face vs Telepractice

ASHA (2020a) states that the "use of telepractice must be equivalent to the quality of services provided in person" (Overview section). With increasing internet access, speech therapy is becoming more accessible via telepractice. From a client's perspective, parents believe that the benefits of telepractice outweigh the disadvantages. Lincoln et al. (2014) reported that "despite the frequency of minor problems with technology...stakeholders were generally satisfied with the technology and expressed the belief that occasional problems with technology were to be expected" (p. 68).

Assessments such as the Clinical Evaluation of Language Fundamentals - Fifth Edition (CELF-5; Wiig et al., 2013) and the CPAC-S (Goldstein & Iglesias., 2006) have been adapted for use via telepractice. The BAPA was not developed for use during telepractice sessions. The aim of this study was to determine if the BAPA can be adapted in a similar fashion to effectively document progress.

Bilingual Articulation and Phonology Assessment (BAPA)

The BAPA is a standardized assessment designed to be administered during face-to-face therapy to measure client progress. Compared to the CPAC-S, the BAPA is cheaper with a cost of \$109.99 (App Store, 2020). The complete kit for the CPAC-S is \$241.00 (Super Duper® Publications, 2020). The time it takes to administer the BAPA is 5-10 minutes (Fernandes et al., 2011) and the CPAC-S takes 25-30 minutes (Goldstein & Iglesias, 2006). The BAPA is available as an app and does not require stimulus books like the CPAC-S. While both the BAPA and CPAC-S have the potential to be used as a way to document progress via telepractice, the BAPA is more cost effective, takes less time to complete, and only requires clinicians to have access to an iPad. Cost effectiveness, time, and required materials were important considerations for researchers documenting progress with international clients.

The BAPA provides information about a client's articulation skills by measuring error types such as deletions, substitutions, distortions, consonant cluster reductions, multisyllabic words, specific phoneme error position, voicing features, and phonemes' manner of articulation (Fernandes et al., 2011). Like other measures originally designed to be used during face-to-face therapy, the BAPA appears to have the potential to effectively document progress during telepractice (Goldstein & Iglesias., 2006; Wiig et al., 2013). Previously, Garza et al. (2019) administered the BAPA with a 10-year-old from Latin America with a severe speech sound disorder secondary to ASD during telepractice. The client made slow and steady progress with his articulation that was accurately documented using the BAPA. The BAPA has potential to document progress for children with speech sounds disorders.

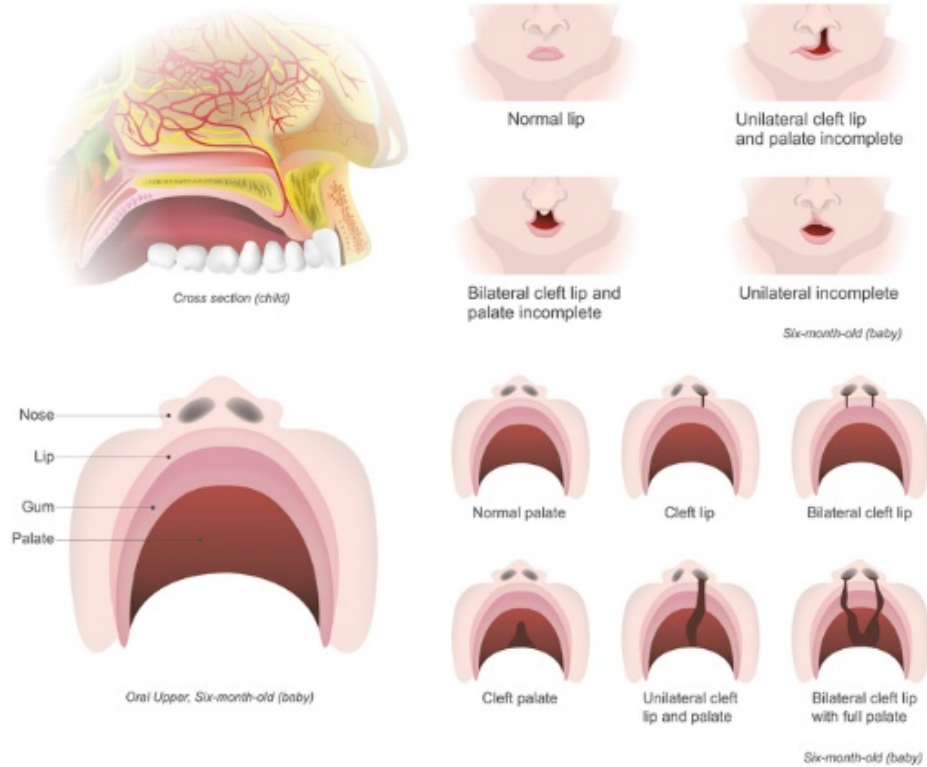
Cleft Palate/Lip

Clients born with a cleft palate/lip who are participating in speech therapy often exhibit slow and steady progress that can be challenging to document. A cleft palate/lip is a craniofacial condition. According to the World Health Organization (WHO) (2001), cleft palate or cleft lip occur in, “1 per 500-700 births, the ratio var[ies] considerably across geographic areas or ethnic groupings” (as cited in ASHA, 2020b, Incidence and Prevalence section). Poverty and environment may also play a role and could be why children in Latin America are roughly twice as likely to be born with orofacial clefts as children in the U.S. (Austin Smiles—The Austin Plastic Surgery Foundation, 2020). Recognizing that a cleft palate/lip is a common medical condition is crucial. A cleft palate/lip can result in communication disorders and affects an individual’s speech.

Each client’s speech will be affected differently and will have unique needs. One reason for these differences is the type of cleft palate/lip. According to ASHA (2020b), there are five common types of cleft palate and cleft lip: “(a) unilateral cleft lip with alveolar involvement, (b) bilateral cleft lip with alveolar involvement, (c) unilateral cleft lip with cleft palate, (d) bilateral cleft lip and palate, (e) and cleft palate only” (Overview section).

Pediatric Cleft Lip and Palate

Cleft lip and cleft palate, also known as orofacial cleft, is a group of conditions that includes cleft lip (CL), cleft palate (CP). A cleft lip contains an opening in the upper lip that may extend into the nose.



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The first surgery is required at a very young age to begin the process of repairing the cleft palate/lip to help alleviate feeding, speech, and breathing difficulties (Austin Smiles—The Austin Plastic Surgery Foundation, 2020). Helping these children by performing surgery can impact their speech development but will not necessarily make their speech intelligible.

Austin Smiles personnel provide surgeries to children with a cleft palate/lip in Latin American countries where they lack the resources to receive medical attention. The

team that goes on these medical missions includes board certified plastic surgeons, anesthesiologists, SLPs, otorhinolaryngologists, surgical nurses, recovery and post recovery nurses, other surgical technologists, etc. (Austin Smiles—The Austin Plastic Surgery Foundation, 2020).

Children with a cleft palate/lip may require as many as 10 procedures. Each procedure is performed at a certain age because of the continuous development of the child. Typically, the first surgery correcting the lip occurs around 0 to 3 months of age. The first surgery to correct the cleft palate occurs around 10-13 months of age (Cleft Lip & Palate Association, 2020). These types of surgeries are important for every child with a cleft palate/lip but in Latin America, access to them is difficult. That is why the volunteer work that Austin Smiles provides these children and their families is vital.

Although surgery is a necessary part of treatment, surgery alone does not make a child intelligible. A combination of both surgery and speech therapy are needed so that the child's speech can become more intelligible. That is why it is crucial to provide speech therapy post-surgery to these children to develop their speech skills.

Speech Sound Disorders

A speech sound disorder occurs when a child is not producing the expected sounds at a certain age (ASHA, n.d.). The range of severity can be mild to severe and depends on the child's misarticulations. Some of the speech sound errors include omitting and substituting sounds. The following are examples of the speech errors:

- Omitting: "all" → "ball" (The b was omitted)
- Substituting: "ret" → "red" (The d was substituted with a t)

These errors can occur at different places in the word. The following are examples:

- Initial position: For the word “cat” the initial sound is the /k/ sound
- Medial position: For the word “lemon” the medial sound is the /m/ sound
- Final position: For the word “boat” the final sound is the /t/ sound

In the case of children with a cleft palate/lip, they are more likely to substitute and omit speech sounds. This is due to “a child’s attempt to produce speech sounds in unusual ways because of physiologic deficiencies...called compensatory articulation” (Hegde, 2010, p. 335). Children with a cleft palate/lip have more difficulty with plosive sounds such as, the /p/ and /b/ and with velar sounds such as the /k/ and /g/. So, can SLPs use the BAPA to document progress via telepractice with children exhibiting these types of misarticulations?

Summary & Research Questions

The use of the BAPA can be a possible resource for documenting progress of Spanish-speaking international clients exhibiting speech sound disorders. The BAPA is a cost-effective standardized assessment that takes 10-15 minutes to administer. It can be administered from an iPad via telepractice and provides detailed information about specific types of errors. The BAPA can provide instant results for tracking client progress across speech therapy sessions. Currently, there are limited studies regarding the use of the BAPA to measure progress during telepractice (Garza et al., 2019). Identifying an efficient and accurate way to track the progress of clients receiving therapy via telepractice will provide bilingual clinicians with a useful tool.

The current study aims to answer the following research questions:

- Is the Bilingual Articulation Phonology Assessment (BAPA) app an accurate method for measuring progress of clients with a speech sound disorder secondary to a cleft palate/lip participating in speech therapy via telepractice?
- Is there agreement on the client's productions by different clinicians for clients with a speech sound disorder secondary to a cleft palate/lip?

The hypothesis for this research is that the BAPA will document progress made by clients with speech sound disorders secondary to cleft palate/lip. Regarding the agreement between the clinicians and the researcher on the transcriptions of the client's productions, we hypothesize that there will be agreement between clinicians and the researcher.

II. METHOD

Participants

The participants for this study consisted of six first-year graduate student clinicians and two second-year graduate student clinicians (who joined late in the study during the COVID-19 pandemic) in a Communication Disorders program as part of a larger study (Resendiz & Gonzales, in progress). All eight clinicians were females. Participants ranged in age from 21 to 24 years. Clinicians had a range of abilities in understanding, speaking, reading, and writing Spanish and English. In partial fulfillment of a bilingual concentration, all clinicians conducted speech therapy sessions via telepractice with clients with repaired cleft palate/lip from El Salvador and Guatemala. The clinicians conducted the telepractice sessions under the supervision of a certified bilingual SLP.

Clients

Three clients received speech therapy via telepractice. Two clients were from El Salvador and one was from Guatemala. All clients had a speech sound disorder secondary to a repaired cleft palate/lip. Client 1 is a 15-year-old female from El Salvador who received several surgeries. Client 2 is a 10-year-old male from El Salvador who also received several surgeries. Client 3 is a 7-year-old male from Guatemala who received several surgeries. Each client was working on individual speech goals via telepractice. To measure each client's progress, the BAPA was administered via telepractice once a month for two months.

Procedures

Bilingual Articulation Phonology Assessment (BAPA) app

The BAPA is an assessment tool that can be downloaded as an app on an iPad.

The BAPA provides a range of words that target different phonemes in different positions to measure a child's speech patterns (Fernandes et al., 2011). The BAPA is used to document progress that a child makes during therapy using picture stimuli that assesses the Spanish phonemes in all positions. The BAPA provides SLPs with information that aids in determining the type of errors with which the child is having difficulty. For example, the BAPA may provide help to the SLP in determining that a child is having difficulty with consonants in initial position (i.e. aso for vaso (glass), ama for cama (bed), ano for mano (hand)). As the BAPA is administered, the complexity of the words increases. For example, motocicleta (motorcycle) is a five-syllable word as compared to pan (bread) , which is a one-syllable word.

The BAPA results are divided into the following categories: (a) position, (b) manner, (c) voicing, (d) multisyllabic words, and (e) error (Fernandes et al., 2011). Position refers to the sounds being in initial, medial, and final position. Manner refers to how the sound is produced. The following are the different types of manner categories: stops, fricatives, affricates, nasals, liquids, and glides. For example, the /p/ sound is a stop sound because in the word "top" the airflow is stopped and released. Voice refers to the presence of a voiced or voiceless sound. For example, a voiced sound would be the "b" sound in "bat" while a voiceless sound, would be the "p" sound in "pat." Information about multisyllabic words aids in identifying if the client has trouble when there is an increase in the number of syllables. Information about errors includes deletion, substitution, distortion, cluster reduction, and sequence reduction (Fernandes et al., 2011).

Eight clinicians delivered speech therapy services via telepractice to clients in

Guatemala and El Salvador. The therapy sessions lasted between 50 minutes to an hour. The clinicians worked in pairs to deliver speech therapy. The BAPA was administered to the clients once a month for two months. Each clinician transcribed their client's speech productions. The transcriptions were then analyzed by the researcher. During the administration of the BAPA, the client was asked to name the picture stimulus and repeat the answer three times. If the client had trouble recognizing the item, the researcher provided the client with the name of the word on the screen. The child's productions were transcribed in real-time by the researcher and clinicians.

Transcriptions

Transcribing is a way to document and evaluate clients' productions. The transcriptions were completed using the International Phonetic Alphabet (IPA). IPA is a system that is used to describe the production of sounds in different languages. Using IPA reduces the confusion between the written alphabet and the sound being produced (Berthiaume, 2018). While the BAPA was administered, the two clinicians transcribed the client's productions while the researcher transcribed at the same time. The client was asked to repeat the words three times to have more consistent and accurate information about their production of the phonemes.

Agreement was established by comparing the researcher's live transcription with the live transcription of the clinicians. The researcher is a native Spanish speaker with previous experience transcribing using IPA (Garza et al., 2019). The researcher's transcriptions were compared with the clinicians' live transcriptions to determine the level of agreement. The agreement was measured by counting the number of phonemes that the researcher and clinicians transcribed similarly for each target word. The number

of phonemes that were transcribed similarly by the researcher and clinicians were divided by the total number of phonemes produced during the administration of the BAPA. The agreement was calculated as a percentage and compared between the researcher and clinicians.

III. RESULTS

BAPA Results

After administering the BAPA, a raw score was calculated that measured the number of phonemes produced correctly. The raw score is a number that indicates the number of phonemes tested minus the number of errors the client exhibited. So, the higher the raw score, the fewer errors demonstrated by the client (Fernandes et al., 2011). Children with more advanced articulation skills earn higher scores and children who have more difficulty with articulation earn lower scores.

A detailed summary of each client's productions was analyzed in depth. From the results, the researcher collected (a) the phonemes that the clients missed and got correct, (b) the raw score, and (c) the phoneme manner. This information helps the clinician identify therapeutic goals and determine progress, regression, or maintenance. Refer to Tables 1, 2, and 3 for a summary of the phonemes the client produced correctly and incorrectly each month.

Table 1*Summary of Client 1 Phoneme Productions (Female, 15 years, El Salvador)*

Month		
	February	April
Initial position	/tʃ/, /b/, /d/, /f/, /fr/, /s/, /x/, /f/, /j/, /l/, /n/, /m/, /p/, /b/, /d/, /t/, /g/, /k/, /r/	/tʃ/, /b/, /d/, /f/, /fr/, /s/, /x/, /f/, /j/, /l/, /n/, /m/, /p/, /b/, /d/, /t/, /g/, /k/, /r/
Medial position	/nk/, /nt/, /sm/, /nd, /mb/, /tʃ/, /kl/, /ð/, /x/, /ɣ/, /f/, /β/, /j/, /w/, /l/, /n/, /m/, /ɲ/, /p/, /t/, /k/, /r/, /r/, /s/**, /βr/**, /s/**,	/nk/, /nt/, /sm/, /nd, /mb/, /tʃ/, /kl/, /ð/, /x/, /ɣ/, /f/, /β/, /j/, /w/, /l/, /n/, /m/, /ɲ/, /p/, /t/, /k/, /r/, /r/, /s/*, /s/*, /βr/**
Final position	/ð/, /l/, /n/, /r/, /s/**	/ð/, /l/, /n/, /r/, /s/*
Raw Score	97	102

Note: * Improved Sounds ** Missed sounds

For the month of February, Client 1, missed three phonemes in medial position and only one phoneme in final position. For the month of April, she made progress by missing only one phoneme in medial position. The raw scores for Client 1 show an increase from February to April.

Table 2*Summary of Client 2 Phoneme Productions (Male, 10 years, El Salvador)*

Month		
	February	March
Initial position	/tʃ/, /bɪ/, /dɪ/, /fɪ/, /s/, /x/, /f/, /j/, /l/, /n/, /m/, /p/, /k/, /fr/**, /b/**, /d/**, /t/**, /g/**, /r/**	/tʃ/, /bɪ/, /fɪ/, /s/, /x/, /f/, /j/, /l/, /n/, /m/, /p/, /k/, /fr*/, /b/*, /d/*, /dɪr*/, /t/**, /g/*, /r/**
Medial position	/nk/, /sm/, /nd/, /kl/, /x/, /f/, /j/, /w/, /l/, /m/, /p/, /t/, /k/, /βɪ/, /ɣ/, /nt/, /s/**, /n/**, /s/**, /ð/**, /β/**, /ɲ/**, /mb/**, /tʃ/**, /ɾ/**, /r/**	/nk/, /sm/, /nd/, /kl/, /x/, /f/, /j/, /w/, /l/, /m/, /p/, /t/, /k/, /βɪ/, /ɣ/**, /nt/**, /s/*, /n/*, /s/*, /ð/*, /β/*, /ɲ/*, /mb/**, /tʃ/**, /ɾ/**, /r/**
Final position	/ð/, /n/, /s/**, /l/**, /ɾ/**	/ð/, /n/, /s/*, /l/**, /ɾ/**
Raw Score	76	94

Note: * Improved Sounds ** Missed sounds

For the month of February, Client 2 missed 10 phonemes in medial position, 6 phonemes in initial position, and 3 phonemes in final position. For the month of March, Client 2 made progress by misarticulating fewer phonemes for each position and articulating phonemes correctly in the initial and medial position. The raw scores for Client 2 increased from February to March.

Table 3*Summary of Client 3 Phoneme Productions (Male, 7 years, Guatemala)*

Month		
	February	March
Initial position	/b/, /d/, /f/, /s/, /x/, /j/, /l/, /n/, /m/, /k/, /b/, /t/, /g/, /r/, /ʃ/, /r/, /f/, /d/, /p/**	/b/, /d/, /f/, /s/, /x/, /j/, /l/, /n/, /m/, /k/, /b/, /t/, /g/, /r/, /ʃ/**, /fr/**, /f/**, /d/**, /p/*,
Medial position	/ls/, /nt/, /sm/, /nd/, /mb/, /ʃ/, /x/, /y/, /f/, /β/, /j/, /w/, /ɲ/, /l/, /m/, /p/, /t/, /k/, /βr/, /r/, /r/n/, /s/, /nk/, /kl/, /ð/**	/ls/, /nt/, /sm/, /nd/, /mb/, /ʃ/, /x/, /y/, /f/, /β/, /j/, /w/, /ɲ/, /l/, /m/, /p/, /t/, /k/, /βr/, /r/, /r/n/, /s/, /nk/**, /kl/**, /ð/*
Final position	/ð/, /l/, /s/**, /r/**, /n/**	/ð/, /l/, /s/**, /r/**, /n/**
Raw Score	96	94

Note: * Improved Sounds ** Missed sounds

For the month of February, Client 3 misarticulated 3 phonemes in final position and only misarticulated 1 phoneme in initial and medial position. For the month of March, Client 3 misarticulated additional phonemes in initial and medial position with no changes for phonemes in final position. Progress involved improvements and regression in the articulation of phonemes. The raw scores for Client 3 decreased slightly from February to March.

Information regarding the phoneme manner categories was collected and organized to identify which types of phonemes were more difficult to produce. Refer to Tables 4, 5, and 6 for client progress.

Table 4*Client 1 Progress with Manner Categories (Female, 15 years, El Salvador)*

MANNER OF PHONEMES									
	Abutting	Affricates	Blend	Fricatives	Glide	Lateral	Nasal	Plosives	Tap-Trill
February	85.7%	100%	83.3%	81.8%	100%	100%	100%	100%	100%
April	100%	100%	83.3%	100%	100%	100%	100%	100%	100%

There was improvement made by Client 1 in each category except for blends where productions remained stable. Blends are composed of two consonants in a word, which are more complex than single phonemes. For example, /tr/ is a blend.

Table 5*Client 2 Progress with Manner Categories (Male, 10 years, El Salvador)*

MANNER OF PHONEMES									
	Abutting	Affricates	Blend	Fricatives	Glide	Lateral	Nasal	Plosives	Tap-Trill
February	71.4%	50%	83.3%	72.7%	100%	75%	78.6%	75%	50%
March	71.4%	75%	83.3%	95.5%	100%	87.5%	100%	91.7%	50%

Improvements were made in each category by Client 2, except for abutting, blends, and tap-trill. Overall, there was either improvement or maintenance of the phonological processes.

Table 6

Client 3 Progress with Manner Categories (Male, 7 years, Guatemala)

MANNER OF PHONEMES									
	Abutting	Affricates	Blend	Fricatives	Glide	Lateral	Nasal	Plosives	Tap-Trill
February	100%	100%	100%	86.4%	100%	100%	92.9%	95.8%	80%
March	85.7%	75%	66.7%	90.9%	100%	100%	92.9%	95.8%	90%

Improvements, regression, and maintenance were observed for Client 3.

Improvements were noted with fricatives and the tap-trill. Regression was observed with abutting, affricates, and blends. Maintenance was noted with glides, laterals, nasals, and plosives.

Transcription Agreement

The agreement between the clinicians and researcher were analyzed by comparing transcriptions and calculating the percentage of agreement. Agreement between clinicians is important because the information regarding the production of phonemes needs to be accurate. Agreement suggests that different clinicians would observe similar changes.

As noted in Table 7 below, Clinicians 1 and 2 were different at administration 1 and administration 2. Percentage of agreement ranged from 78% to 95% overall.

Clinicians 3, 5, and 6 each demonstrated an increase in agreement with the researcher.

The rate of agreement gives us confidence that different clinicians would obtain similar results and observe similar rates of change in the clients.

Table 7*Transcription agreement*

	Client 1		Client 2		Client 3	
	Clinician 1	Clinician 2	Clinician 3	Clinician 4	Clinician 5	Clinician 6
Administration 1	84%	92%	78%	Missing	95%	79%
Administration 2	88%*	79%*	92%	88%	95%	93%

Note: * Clinicians 1 and 2 were different at Administration 2

IV. DISCUSSION

This study was conducted to answer two research questions. The first question dealt with determining if the BAPA is an accurate method for measuring progress when providing services via telepractice. The results suggest that the BAPA is capable of measuring clients' progress. The second question dealt with determining if there was agreement by different clinicians regarding the clients' speech productions. There was agreement during the administration of the BAPA. We consider the BAPA an appropriate tool for determining progress in addition to being cost-effective, time efficient, and easily accessible online.

Compared to other instruments that document progress, the BAPA gives us detailed information about the client's speech productions and data for developing therapy goals. The BAPA provides specific information about the client's phoneme productions and phonological processes. For example, if the client is having difficulty producing the /s/ sound in initial position (i.e. "zapato" (shoe)), one goal for that client would be the production of the /s/ sound in initial position. Therapeutic time would focus on words with /s/ in the initial position. Less emphasis would be placed on words with /s/ in medial and final position since the client can articulate them correctly.

The rate of agreement between the researcher and clinicians with the clients' speech productions gives us confidence that different clinicians would obtain similar results and observe similar rates of change in the clients. This provides support for different clinicians working with the same client to use the BAPA as a way to measure progress with some degree of confidence.

Limitations

There are several limitations with this research study. First, internet availability is essential in order to provide clients with telepractice services. However, in some countries like Guatemala, availability to Wi-Fi is not as accessible compared to El Salvador (Sywulka et al., 2001). If there is no strong Wi-Fi connection, issues like the video call freezing, hanging up, or sudden disconnections can happen during the telepractice sessions that may increase the BAPA administration time, but this would be true for any assessment.

Second, during the research study, the coronavirus disease (COVID-19) pandemic (WHO, 2020) created the need to change clinicians. For Client 1, we had to switch clinicians to two second year clinicians. Also the number of sessions was decreased, causing fewer administrations of the BAPA. In this case, we had to adapt to the situation.

Third, we included only three clients in the study. So, we cannot generalize our findings. However, the results give us valuable information for future studies.

Future Studies

Future studies should include more clients and additional therapy sessions. This would give us the opportunity to use the BAPA to measure progress for a longer period of time. Another study could compare the administration of the BAPA to other formal and informal measures of progress. This would allow for the identification of strengths and weaknesses of assessment tools when administered via telepractice. For example, comparing the use of the BAPA with direct magnitude estimation scales (DMES), an informal measure of progress, would provide information regarding the best tool for determining progress. Gathering language proficiency information from future clinicians will provide insight regarding the role of language experience in the transcriptions for

stimulus items on the BAPA.

In summary, our findings suggest that the BAPA is effective for determining client progress during speech therapy via telepractice. It is a cost effective and user - friendly app that can be downloaded onto an iPad.

References

- American Speech-Language-Hearing Association. (2020a). *Telepractice*. Practice Portal. <https://www.asha.org/Practice-Portal/Professional-Issues/Telepractice/>
- American Speech-Language-Hearing Association. (2020b). *Cleft lip and palate*. Practice Portal. <https://www.asha.org/Practice-Portal/Clinical-Topics/Cleft-Lip-and-Palate/>
- American Speech-Language-Hearing Association. (n.d.). *Speech sound disorders*. Practice Portal. <https://www.asha.org/public/speech/disorders/Speech-Sound-Disorders/>
- Apple Inc. (2020). BAPA Articulation Assessment (5.0) [Mobile App]. App Store. <https://apps.apple.com/us/app/bapa/id460830225>
- Austin Smiles – Austin Plastic Surgery Foundation. (2020). *About cleft lip/palate*. <https://austinsmiles.org/about-orofacial-clefts/>
- Austin Smiles – Austin Plastic Surgery Foundation. (2020). *What happens on a mission?* <https://austinsmiles.org/about-orofacial-clefts/>
- Berthiaume, D., Minor-Corriveau, M., Belanger, C., & Laurence, S. (2018). Reliability of international phonetic alphabet transcriptions generated by applications and websites. *The International Journal of Assessment and Evaluation*, 25(3-4), 29-39. <http://doi.org/10.18848/2327-7920/CGP/v25i02/29-39>
- Cleft Lip & Palate Association. (2020). *Repair Surgery*. <https://www.clapa.com/treatment/repair-surgery/>
- Fernandes, B., Kester, E., Bauman, M., Prath, S. (2011). *Bilingual Articulation and Phonology Assessment (BAPA) Manual*. Retrieved from <http://www.smartyearsapps.com/Bilingual-Articulation-Phonology->

[Assessment.pdf](#)

Garza, A., Resendiz, M., Gonzales, M. D., Rojas, V. (2019). *Administering BAPA via telepractice for a child with ASD*. [Poster Presentation]. ASHA 2019

Conventions, Orlando, FL, United States.

Glazer, C. A., Bailey, P. J., Icaza I. L., Valladares, S. J., Steere, K. A., Rosenblatt, E. S., & Byrne, P. J. (2011). Multidisciplinary care of international patients with cleft palate using telemedicine. *Archives of Facial Plastic Surgery*, 6, 436-438.

<https://doi-org.libproxy.txstate.edu/10.1001/archfacial.2011.72>

Goldstein, B., & Iglesias, A. (2006). *Contextual probes of articulation competence – Spanish (CPAC-S)*. Greenville, SC: Super Duper Publications.

Hedge, M. N. (2010). *Introduction to communicative disorders*. Pro Ed.

Resendiz, M., & Gonzales, M. D. (in preparation). *Delivery of Speech Therapy Via Telepractice To Patients With Cleft Palate*.

Super Duper® Publications. (2020). *CPACTM-S*.

<https://www.superduperinc.com/products/view.aspx?stid=577#.XrdInHdFxPY>

Sywulka, B., Huang, D., Contractor, D., Lu, D. Y. (2001). *Internet in Guatemala* [PDF file]. Stanford University. Retrieved from

<https://web.stanford.edu/class/las194/GroupProjects01/guatemala.pdf>

Wiig, E. H., Semel, E., & Secord, W. A. (2013). *Clinical Evaluation of Language Fundamentals – Fifth Edition (CELF-5)*. San Antonio, TX: Pearson.

World Health Organization. (2020). *Coronavirus*. Health Topics.

https://www.who.int/health-topics/coronavirus#tab=tab_1