COMPUTER BASED SPANISH PHONETIC TRANSCRIPTION TRAINING FOR

BILINGUAL SPEECH PATHOLOGY STUDENTS

By

Faith Moore-Thomas

Submitted in partial fulfillment of the

requirements for Departmental Honors in

the Department of Communication Sciences and Disorders

Texas Christian University

Fort Worth, Texas

May 6, 2024

COMPUTER BASED SPANISH PHONETIC TRANSCRIPTION TRAINING FOR

BILINGUAL SPEECH PATHOLOGY STUDENTS

Project Approved:

Supervising Professor: Ahmed Rivera-Campos PhD

Department of Communication Sciences and Disorders

Jean Rivera-Perez PhD

Department of Communication Sciences and Disorders

Jennifer Pankow PhD

Department of Psychology

Abstract

Purpose: This study aimed to assess the presence of a functional relation between a computer-based Spanish transcription training module and pre-service bilingual undergraduate speech language pathology students' Spanish phonetic transcription skills when transcribing word productions from a native Spanish speaker.

Method: A multiple baseline, single-case design was used for data collection and analysis. Participants were bilingual (Spanish and English) undergraduate students and experienced in using the International Phonetic Alphabet (IPA) for phonetic transcription of American English. Participants were provided with a computer-based Spanish phonetic transcription training developed within the Teach- Model-Coach-Review (TMCR) framework. Changes in the dependent variable was measured across time and across conditions. Presence of a functional relation was assessed by visual analysis of the data and effect size measure was calculated using Percentage of Goal Obtained (PoGO).

Results: There is a functional relation between a computer based Spanish transcription training and the pre-service bilingual undergraduate SLP students' Spanish phonetic transcription.

Conclusions: The clinical implications are numerous due to the disparity of education for Spanish Transcription for speech-language pathologists (SLPs). These include the lack of quality training in Spanish Transcriptions and lack of bilingual SLPs and need from the population.

Table of Contents

List of Tables

IPA Transcription Probe Sessions:

Abstract

Purpose: This study aimed to assess the presence of a functional relation between a computer-based Spanish transcription training module and pre-service bilingual undergraduate speech language pathology students' Spanish phonetic transcription skills when transcribing word productions from a native Spanish speaker.

Method: A multiple baseline, single-case design was used for data collection and analysis. Participants were bilingual (Spanish and English) undergraduate students and experienced in using the International Phonetic Alphabet (IPA) for phonetic transcription of American English. Participants were provided with a computer-based Spanish phonetic transcription training developed within the Teach- Model-Coach-Review (TMCR) framework. Changes in the dependent variable was measured across time and across conditions. Presence of a functional relation was assessed by visual analysis of the data and effect size measure was calculated using Percentage of Goal Obtained (PoGO).

Results: There is a functional relation between a computer based Spanish transcription training and the pre-service bilingual undergraduate SLP students' Spanish phonetic transcription.

Conclusions: The clinical implications are numerous due to the disparity of education for Spanish Transcription for speech-language pathologists (SLPs). These include the lack of quality training in Spanish Transcriptions and lack of bilingual SLPs and need from the population.

Literature Review

Background

In the field of speech and language pathology, there is a gap between client and clinician due to the significant lack of bilingual Speech Language Pathologists (SLPs) of the 217,886 professionals the American Speech Hearing Association (ASHA) represents 8.3% self-identify as multilingual service providers (ASHA, 2022). According to ASHA than 2/3 of current licensed speech-language pathologists in the United States are considered to be monolingual English-Speakers, or individuals who consider themselves to only speak one language. Most monolingual SLPs lack the ability to deliver quality services in Spanish, and over 90% of school-based SLPs reported they are not capable to deliver services to culturally and linguistically

diverse children (ASHA, 2016). Over the past decade the United States has also become increasingly more diverse, increasing the need for more multilingual providers. Spanish is spoken at more than half of non-English speaking households in the United States (Venditti, 2022) and being able to provide proper support to clients in their native and most prominent language is critical for their long-term success. With this lack of support and preparedness to treat culturally and linguistically diverse clientele, there is still a need to provide quality therapy of those who speak a language other than English. This allows for opportunity for the integration of teaching new languages for bilingual SLPs.

Clinical Assessment of Speech Sound Disorders

A speech sound disorder is a difficulty with sounds and words past the expected age of the client (Namasivayam, 2020). Speech sound problems include articulation and phonological disorders as well. To be more specific, an articulation disorder is a problem with certain sounds where phonology disorders is a pattern of sound mistakes (Namasivayam, 2020).

There are multiple assessments used in the diagnostic process of speech sound disorders. There are different standardized tests to test for different speech sound disorders, specifically for articulation disorders such as the Goldman-Fristoe Test of Articulation- Third Edition (GFTA-3) and the Clinical Assessment of Articulation and Phonology (CAAP). Some standardized tests used for phonological disorders include the Clinical Evaluation of Language Fundamentals (CELF) and the Arizona-4 (Arizona Articulation and Phonology Scale-Fourth Edition) Being able to foundationally understand speech sound disorders as well as being able to differentiate if it is an articulatory and phonological processing disorder, is critical to begin the diagnostic process for a speech sound disorder.

Speech language pathologists use the International Phonetic Alphabet (IPA) transcriptions to make clinical judgment for diagnosis because rather than being reliant on

traditional spelling, IPA graphemes are used to transcribe an accurate production of the child. Based from the assessment from different standardized testing materials, there is a clinical usage of the transcription and of assessment materials to diagnose a client with accuracy. With an accurate transcription, this would provide an insight into the client's typical language to notate if there is potentially any disordered speech, allowing for the ability of diagnosis and treatment. If there were a misdiagnosis of a speech sound disorder there are several social, emotional, and academic negative impacts including isolation, delay in accurate diagnosis and getting proper help, and residual effects in educational development (Hitchcock, 2015).

Education on Speech Transcription

English speech transcription and IPA are crucial skills that are taught to speech-language pathologists early in their undergraduate careers. From this foundational training of these two skills, are practiced for accuracy beginning at the sound and progressing to the word level. Continuing with this progression, undergraduate speech-language pathology students then practice at the sentence level to continue with accuracy before practicing with videos of clients with disorders in order to gain confidence and accuracy of English speech transcription and IPA. The introduction of phonetics and IPA in English is taught typically over a semester phonetics course which are typically 16 weeks. In the phonetics course specifically, there are several skills that are important to learn throughout the duration of the course, specifically about the consonant and vowel IPA Graphemes used in a typical English production and its transcription.

Due to the lack of proper training in other languages, there is a significant amount of misdiagnosis due to the nature of unique sound production that vary by the language that it is being produced (Oetting, 2016). Based on the language that is being evaluated, there may be some differing productions based on the language spoken and the English production of the client. If the evaluating clinician is not linguistically aware, there is risk for misdiagnosis for a

disorder rather than a language difference. The English centric training limits the educational preparation of undergraduate speech-language pathology students on the foundational skills on speech transcription for the large portion of the United States that speaks additional languages. The limited training not only to fails prepare future speech-language pathologists to support multilingual clientele but also fails the clientele in having quality and accurate care for their specific needs. This then affects children especially in the school system with speech sound disorders receiving speech services in the school system due to this lack of preparedness, as well as limiting many families who are not able to pay for free services outside of schooling.

Generalization of Phonetic Transcription Skills

There are some skills that are taught in during an English phonetics course that can be transferred to other languages. For example, counting sounds, terminology, some vowels (e.g., /a/, /e/, /i/, /o/, /u/), and the many consonants. Counting sounds is taught and applied by counting the number of sounds that make up a word. For example, the Spanish word "comer" / komeɾ / is composed of five sounds; /k/, /o/, /m/, /e/ and /ɾ/. The skill of counting sounds, is foundational for phonetically transcribing a language sample and evaluate the presence of a speech sound disorder. The practice of counting sounds is important for phonetic transcription because with accurate ability to count sounds it also primes for other phonological awareness skills. As it relates to terminology, sound classification, terms, and IPA many IPA graphemes can be transferred from English to Spanish.

There are also specific skills that are not transferrable between the two languages due to the differences in phonology in Spanish and English. These differences include the different IPA based on the language, some consonants and vowels, as well as syllabicity differs in English. Some vowel productions differ between the two languages including allophonic productions in Spanish (Colorado, 2023), including /ʊ/ , /ɛ/ , /ə/ , /æ/ , /ɪ/ , /ɔ/, /ʌ/ , and /ɑ/. Some

consonants differ as well including not using /h/ and the differences between the /r/ in English in Spanish.

Education on Phonetics for Spanish

There are very limited educational sources for learning transcription of Spanish and often times not accurate. Many sources aimed at SLPs have erroneous information about the shared and not shared sounds between Spanish and English. For example, that Spanish does not have /h/ while English does (ASHA, 2024). There are some potential barriers for the education of pre-service SLPs including lack of education, support, and lack of traction from SLPS to create these modules. A potential option for increasing accessibility of education on phonetics for Spanish can be a computer-based training program.

In a recent study, Treviño et. al (2023) studied computer-based Spanish transcription training modules for graduate students pursuing a degree in speech language pathology. In this study there were multiple computer-based modules repeated multiple times following the teach-module- coach- review framework. She pursued a multiple module approach in teaching multiple skills such as syllabicity, stress patterns in transcription, IPA symbology, counting sounds, transcription of words, and allophonic variations for Spanish phonetic and transcription learning.

Teach-Model-Coach-Review for Adult Learning

The Teach-Module-Coach-Review structure for adult learning, as outlined by Fuller (2013), offers a comprehensive framework that not only enhances retention but also engages participants effectively with the material. Having an immediate opportunity where the learning can be applied as well as having more practice in one module impacts participants positively, and also allows for an opportunity to reflect on their own performance of the skill (Fuller, 2013). There are also some studies that use TMCR structure for teaching/training adults in the field of SLP even if the skills that were not are not related to phonetics. There are dozens of research

studies across the nation including at Vanderbilt, Vanderbilt Kids Program training for Caregivers for at home therapy practice, and Northwestern language-based intervention strategies have shown significant evidence that TMCR has been effective at teaching adults (Fuller, 2013). With its proven success, TMCR holds promise for future applications, including teaching languages such as Spanish phonetics.

TMCR can be used to develop a computer-based training program following the framework specifically to teach Spanish transcription training modules. Being able to teach a new skill, model an example in its entirety, promotes learning and then summarize the new skill provides better retention and opportunity for growth (Fuller, 2013). By following TMCR's structured approach, educators can guide learners through skill acquisition, provide ample practice opportunities, introduce new concepts, and summarize key takeaways, thereby facilitating enhanced retention and growth. In teaching the TMCR framework as an computer-based program, there are significant benefits when moving forward on various topics such as the accessibility and pacing benefits from this structure. Incorporating TMCR into undergraduate Spanish phonetics instruction, whether through traditional or computer-based methods, offers students a guided pathway to mastering new skills, learning IPA, and summarizing their progress in a supportive learning environment.

To address the need of training pre-service SLPs in Spanish phonetic transcription for assessment of speech sound errors in children who speak Spanish or are bilingual in the school setting, our study will assess the effectiveness of a computer-based Spanish transcription training. This study aimed to assess if there is a functional relation between the Spanish phonetic transcription skills of pre-service bilingual undergraduate speech language pathology students and a computer-based Spanish transcription training modeled within the Teach, Module, Coach,

Review framework when phonetically transcribing word productions from a native Spanish speaker.

Methods

Study Design

A multiple baseline single-case design was used in this study and the introduction of the independent variable was staggered across participants. The dependent variable of the study was the accuracy of phonetic Spanish transcription and the independent variable was the computer-Based Spanish Transcription training module and if there was a functional relation between the two. The dependent variable was measured across time and conditions and presented as Baseline Probes, Within-Training Probes, and Maintenance Probes.

Consenting Procedures

Participants met individually with a researcher to consent before the research process began. The researcher explained section by section what was in the Informed Consent paperwork and answered any questions participants may have had before signing. After the consents were signed each participant filled out a brief demographic survey. All experimental activities were conducted in a private room at the Miller Speech and Hearing Clinic at TCU. The experimental activities were completed individually and were scheduled based on the participant's availability

Participants and Setting

All participants (n=3) were undergraduate bilingual, Spanish- English, pursuing a degree in speech-language pathology from the Davies School of Communication Sciences and Disorders at Texas Christian University. Two participants were native Spanish speakers and one has spoken Spanish since high school and is in College-Level Spanish courses. Participants were

recruited through word of mouth. See Table 1 and Table 2 for participant background information and Spanish/English language use. All participants met the inclusionary criteria of (1) pursuing a major in speech-language pathology at TCU (2) being bilingual in Spanish and English, (3) have completed an undergraduate level course of phonetics.

Table 1. *Demographic Questionnaire responses reported by participant.*

Participant Number	Grade Classification	Ethnicity	Gender	Clinic Experience	Time Since Phonetics class:	Use of Spanish:
Participant 1	Undergraduate, Junior	Hispanic	Woman	One Semester shadowing	1 Semester	At home daily, not often at school, and consistently in other settings.
Participant 2	Undergraduate, Senior	White	Woman	Two Years	5 Semesters	Daily use at home, school, and various other settings.

Participant 3	Undergraduate, Sophomore	White	Woman	None	1 Semester	At home never, at school 6 hours a week, and once a month at work.

Initial Assessment on Fundamental Skills for Phonetic Transcription

The phonological awareness skill of counting sounds has been linked to pre-service speech language pathologists' skills for phonetically transcribe words. In order to have information on the phonological awareness skills of our participants prior to completing our computer-based Spanish phonetic transcription training, each participant completed the Elision, Phoneme Isolation, and Blending Words subtests of the Comprehensive Test of Phonological Processing Second Edition (CTOPP-2).

The first category completed by participants was the Elision portion which was the removal of a specific sound in different sections of the word. An example of this would be is what is cat without the "k" sound, and the correct answer would be "at". The second category was phoneme isolation referring to the isolation and combination of phonemes such as, "what would is k-a-t". The final section that the participants were tested on was the section of blending words to ensure there was an understanding of each segmentation. An example includes what is the combination of the section's "cow" and "boy".

Table 3. *Results from CTOPP-2*

Participant	Percentile Rank	Raw Score	CTOPP-2 Section
1	84	34	Elison
2	50	31	Elision
3	75	33	Elision

Participant	Percentile Rank	Raw Score	CTOPP-2 Section
1	91	30	Phoneme Isolation
2	98	32	Phoneme Isolation
3	95	31	Phoneme Isolation

Participant	Percentile Rank	Raw Score	CTOPP-2 Section
1	91	31	Blending Words
2	84	30	Blending Words
3	84	30	Blending Words

Data Collection Procedures

Computer-based Spanish Phonetic Transcription Training

The computer-based Spanish phonetic transcription training was developed within the Teach-Model-Coach-Review framework. The computer-based training module focused on: (1) counting the number of sounds that were produced by a native speaker of Spanish when producing a word, (2) knowledge of appropriate International Phonetic Alphabet symbology for phonetic transcription of Spanish words, (3) how to phonetically transcribed Spanish words. The training module utilized the Teach-Model-Teach-Review broken into 3 sections counting sounds, IPA, and allophonic productions. For the module, each participant viewed it a total of 4 times following the Teach-Model-Coach- Review approach. All participants were given two weeks to complete the same module, repeated 4 times. The module begins to work through phonemes and phonemic isolation as well as their similarities and differences between Spanish and English IPA transcription. It also compares and contrasts the English vowel quadrilateral and the Spanish consonant chart and their relationship to transcribing in Spanish. There is also a portion of the modules including allophonic productions with examples and practice for each skill being taught. Participants are expected to progress from their original transcription production to increase their skillset as a result of the modules.

During the Teach phase, the new knowledge, and skills for counting sounds as well as phonetic transcription were introduced. Topics and new skills presented were counting sounds, international phonetic alphabet symbology for Spanish consonantal and vowel sounds, phonetic transcription of words, and allophonic production. During the Model phase, examples on how to apply the new knowledge and skills for accurate phonetic transcription of Spanish words were presented. During the Coach phase, the trainee was provided in application practice where they needed to accurately apply their new knowledge and skills to phonetically transcribed Spanish word productions. Additionally, based on the trainee's performance, feedback was provided as

they completed each application practice item. During the Review phase, trainees were provided with a summary of the new skills they have learned.

Each participant completed the module 4 times, as well as were encouraged to take notes during each viewing of the module. The participants were also allotted to use headphones during their viewing of the modules based on their own preferences.

Probes

Probes for measuring our dependent variable across time (prior to training, during training, and after all training sessions were completed) and conditions were developed by one of the researchers who is a native speaker of Spanish. Probes were developed by randomly assigning fifteen-word audio files from a word bank of 300 Spanish words produced by a native Spanish speaker. To complete each probe, the participant listened to the audio file that matched the words on their probe. After listening, they phonetically transcribed the production as well as determined the number of sounds that were produced by the speaker. For example, the audio file was for the production of the Spanish word flame "candela" /kandela/. The correct phonetic transcription is [kanðela] and correct number of sounds would be seven. Each audio file was repeated 3 times before participants identified the number of sounds and phonetically transcribed the word production. The probe data was collected through a printed data collection sheet to avoid complication on a computerized system to collect the participants' data. The researchers scored each probe based on the accuracy of responses and were given a score based on the accuracy in response from each syllable. Each word list ranged from 44-47 syllables to ensure that there was a close range to be evaluated on. The probes were scored based on their accuracy in each syllable, and then totaled based on the number of correct phonetically transcribed syllables.

Baseline Probes. Prior to the introduction of the computer-based Spanish phonetic transcription training, each participant completed a total of six, nine, or twelve baseline probes. The number of baselines was randomly assigned for each participant.

Within-training Probes. After completion of their assigned baselines probes, a within-training probe was completed after each training session. Each participant completed a total of 4 within-training probes. During the completion of within-training probes, participants were allowed to use their notes, similar to what students do for completion of application practice in their courses.

Maintenance Probes. After completion of all the computer-based Spanish transcription training sessions, each participant completed maintenance probes. Each participant completed a total of 4 maintenance probes (one each day) two weeks after completion of all the within-training probes. Unlike during within-training probes, participants were not allowed to use their notes for completion of maintenance probes.

Data Analysis

Data acquired from each probe was plotted on a graph for each participant. The presence of a functional relation was determined by looking for three instances of effectiveness of the computer-based Spanish transcription training on the accuracy of phonetic transcription on bilingual speech-language pathologists. Effectiveness of the computer-based Spanish transcription training on the accuracy of Spanish transcription was determined by assessing changes in level and trend of the data points across baseline and experimental conditions. Effect size measures were determined by using the percentage of goal obtained (PoGO) based (Patrona et. al, 2022).
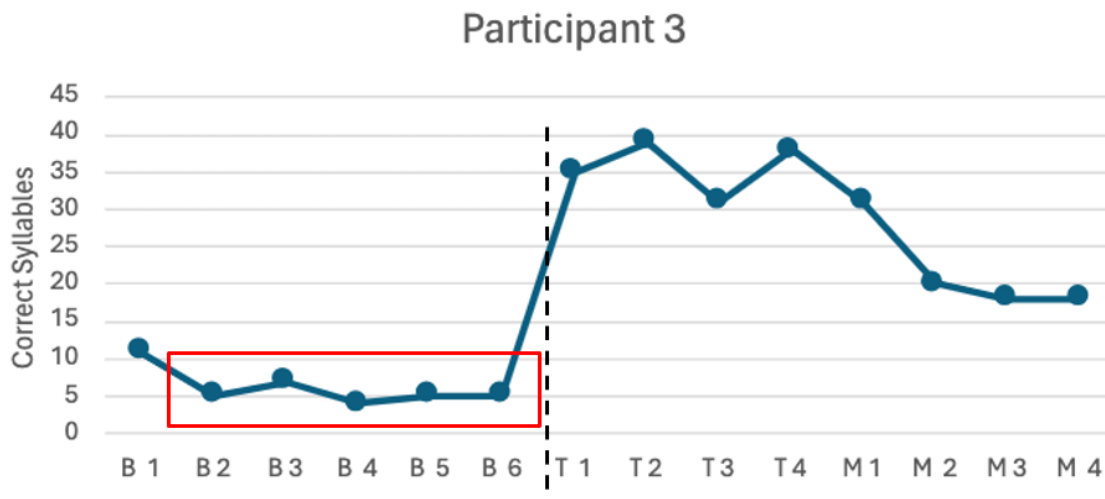
Results

Participant 1

PoGo =109%

Participant 2

PoGo = 88%

Participant 3
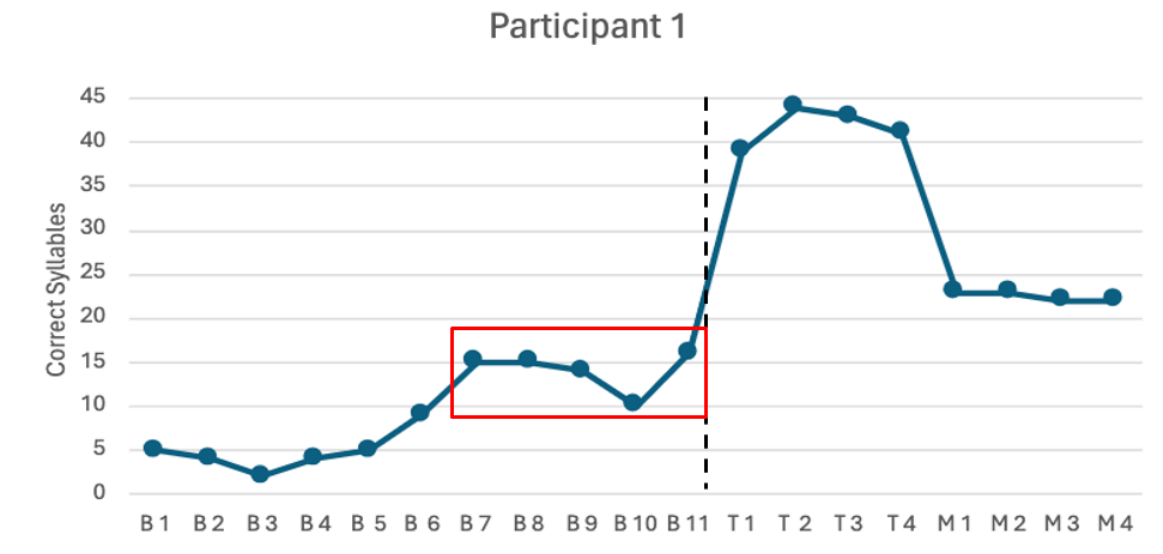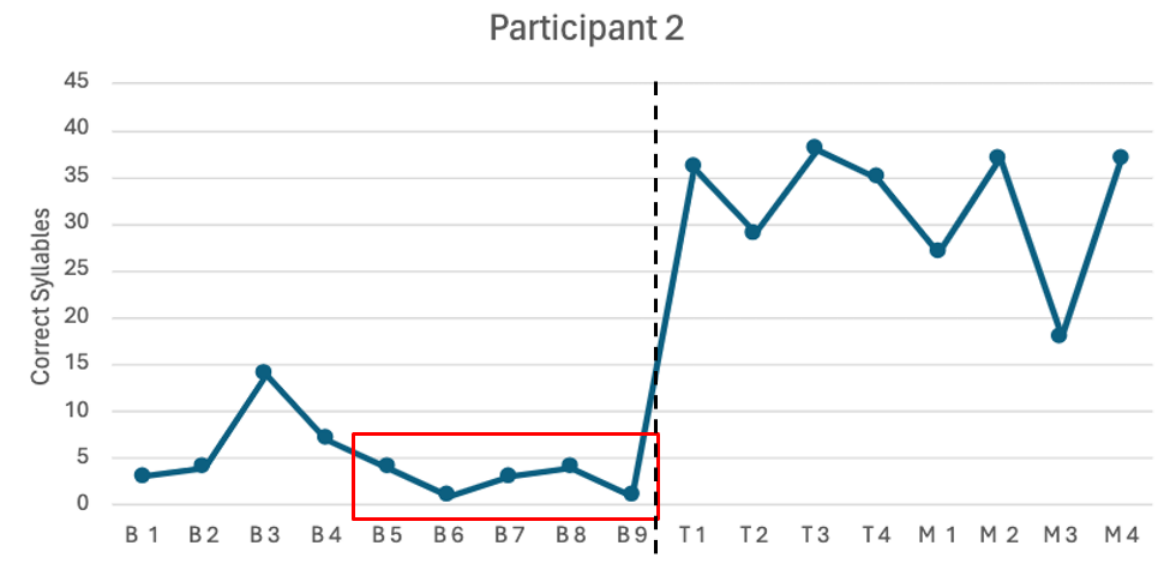
PoGo = 90%

Discussion

This study aimed at assessing if there is a functional relation between the Spanish phonetic transcription skills of pre-service bilingual undergraduate speech language pathology students and a computer-based Spanish transcription training modeled within the Teach, Module, Coach, Review (TMCR) framework when phonetically transcribing word productions from a native Spanish speaker.

Results from all three participants show a positive effect of the from the computer-based Spanish transcription training module as all three participants increased their phonetic Spanish word transcription accuracy. This positive effect was determined by the changes in level as well as trend of the dependent variable across baseline and experimental conditions across all participants. As at least three instances of a positive effect of our computer-based training on the accuracy of Spanish Transcription, we can conclude the presence of a functional relation. Thus, our computer-based Spanish transcription training modeled within the TMCR framework was effective. The effect size measures show that for all three participants, the computer-based

Spanish transcription training modeled within the TMCR framework was highly effective as all participants surpassed the pre-determined goal for demonstrating accurate transcription skills which is a foundational skill for diagnosing speech sound disorders.

Our results are similar to those found by Treviño et.al., (2023) in which the results also demonstrated effectiveness based on the Spanish Transcription Training Module. Though successful, based on Treviño's effectiveness in data and variability in within-training probes, there was a need to make changes. This may have been for a number of reasons including the multitude of skills taught during the study, multiple module approach, or a number of external factors in their research design.

Our study implemented changes based on the previous study and produced more stable and not as much variability as presented by the previous study. Learning from Trevino's research and limitations, it was important to try and make each list as balanced as possible with equal amounts of glides, blends, allophonic productions, as well as Spanish specific IPA. This training focused on more skills that directly precursor to accurate phonetic speech transcription as opposed to teaching a wide variety of skills, although useful for other skills related to assessing speech sound disorders, are not essential for phonetic transcription. Another limitation from Trevino's study was the separation vs combination of each individual word for each probe. In Trevino's study, in each probe the production of each word 3 times in one recording rather than in this study having one production at a time and able to repeat it three times. With this ability to have the participant control the number of times that is listened and the space between it, it still allows for 3 abilities to listen but also gives more time to work and process based on each participants individual pacing.

Also, though not listed as a limitation of Treviño, a change not listed as a limitation is the number of skills that were used, as well as only doing one module multiple times. With more

skills and less practice time across the skills, there was less retention long-term for maintenance probes. In doing this, it allowed for less material to be studied for more repetitions adding to the opportunity to learn with more quality than quantity of work.

The pedagogical implications of the results are in a direct relationship with the clinical assessment of speech sound disorders due to the ability to more accurately transcribe clients who speak Spanish. With the accurate transcription of Spanish speakers this allows for the a ability to more accurately diagnose speech sound disorders. Some other pedagogical affects could include new knowledge and skills, as well as better retention with TMCR framework and accessibility for participants who utilize the module. Another benefit of a computer-based training is that bilingual students interested in pursuing skills for servicing the bilingual population do not need to rely on having an instructor that shares their language. This opens the accessibility of training without the limitation of having an English monolingual instructor.

Findings from the study can impact the education of undergrads and their future as graduate students because it would lay a stronger foundation to prepare to not only be a culturally competent clinician but also to treat clients in their native language based on a disordered need. There are clinical consequences of knowing how to accurately phonetically transcribe Spanish word productions as it relates to bilingual clients.

Limitations

There were various limitations based on the findings of this research study. The first limitation included needed application practice on /a/, /r/, and /ɾ/. For the production of /a/, which is what is typically taught in an English phonetics class needed to be refreshed for the participants. The /r/ and /ɾ/ was taught significantly in the module, but needed to be practiced more thoroughly in the future. A second limitation includes the consistent use of headphones

across probes and participants. Based on participants preferences, during the study there was more flexibility but, in the future, it should be mandated fully one way or another.

References

ASHA. (2022). *2022-profile-of-multilingual-service-providers*. ... Profile of ASHA Multilingual

    Service Providers, Year-End 2022. https://www.asha.org/siteassets/surveys/2022-profile-

    of-multilingual-service-providers.pdf

ASHA. (2024). *Speech sound disorders: Articulation and phonology*. American Speech-

    Language-Hearing Association. https://www.asha.org/practice-portal/clinical-

    topics/articulation-and-phonology/

Colorado, D. (2023, September). *Phoneme similarities and differences in the Spanish and ...*

    Phoneme similarities and differences in the Spanish and English languages.

    https://www.cde.state.co.us/early/spanishenglishphonemes

Fuller, E. (2013). *Beyond "Try This at Home" Using the Teach- Model- Coach- Review*

    Instructional Approach to Teach Parents and Other Professionals Intervention

    Strategies. Vanderbilt Kidtalk. https://kidtalk.vkcsites.org/

    IPA. (2024). International phonetic alphabet usage. *Go to International Phonetic Alphabet*.

        https://www.internationalphoneticalphabet.org/ipa-usage/

Hitchcock, E. R., Harel, D., & Byun, T. M. (2015, November). Social, emotional, and academic

    impact of residual speech errors in school-aged children: A survey study. *Seminars in*

    Speech and Language. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5708870/

Jensen, E. (2023, October 11). The chance that two people chosen at random are of different race or ethnicity groups has increased since 2010. *Census.gov.* https://www.census.gov/library/stories/2021/08/2020-united-states-population-more-racially-ethnically-diverse-than-2010.html#:~:text=Using%20the%20same%20Diversity%20Index,2020%20from%2054.9%25%20in%202010.

ge

Li, Y., Wohlan, B. J., Pham, D.-S., Chan, K. Y., Ward, R., Hennessey, N., & Tan, T. (2023). Improving text-independent forced alignment to support speech-language pathologists with phonetic transcription. *Sensors*, *23*(24), 9650. https://doi.org/10.3390/s23249650

Núñez, G., Buren, M., Diaz-Vazquez, L., & Bailey, T. (2021). Bilingual supports for clinicians: Where do we go from here? *Language, Speech, and Hearing Services in Schools, 52(4), 993–1006.* https://doi.org/10.1044/2021_lshss-20-00176

Namasivayam, A. K., Coleman, D., O'Dwyer, A., & van Lieshout, P. (2020, January 28). Speech sound disorders in children: An articulatory phonology perspective. *Frontiers in Psychology.* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6997346/

Oetting, J. B., Gregory, K. D., & Rivière, A. M. (2016, March). Changing how speech-language pathologists think and talk about dialect variation. *Perspectives of the ASHA Special Interest Groups.* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9590657/

Patrona , E., (2022, December 12). Effects of explicit vocabulary interventions for preschoolers: An exploratory application of the percent of goal obtained effect size metric. *Journal of Speech, Language, and Hearing Research : JSLHR.* https://pubmed.ncbi.nlm.nih.gov/36475914/0

Rivera Pérez, J. F., Creaghead, N. A., Washington, K., Guo, Y., Raisor-Becker, L., & Combs, S. (2019). Using audio prompting to assist monolingual speech-language pathologists to teach English–Spanish vocabulary to English learners. *Communication Disorders Quarterly*, *41*(1), 3–11. https://doi.org/10.1177/1525740118819659

Roberts, D.M. (2008). The Challenges of Bilingual Speech-Language Therapy: Perspectives from Speech-Language Pathologists [unpublished capstone project] Syracuse University.

Treviño, R. (2023). COMPUTER BASED SPANISH PHONETIC TRANSCRIPTION TRAINING FOR BILINGUAL SPEECH LANGUAGE PATHOLOGY STUDENTS [unpublished masters thesis] Texas Christian University.

Wolford, L. L., Wolford, G. W., Smith, L., Clement, A., & de Diego-Lázaro, B. (2023*).* The impact of treating bilingual clients on speech-language pathology students' cultural responsiveness. *American Journal of Speech-Language Pathology, 32(6), 2960–2981.* https://doi.org/10.1044/2023_ajslp-23-00060