

Two Spanish Pediatric Speech Recognition Tests: The SPSRT and the SPPIT



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Background

The Hispanic population is one of the fastest growing populations across the United States. By 2016, this population became the largest ethnic group in the US comprising 17.8% of the nation's total population. Between 1996 and 2016, the number of Hispanic students enrolled in schools and colleges in the US doubled from 8.8 million to 17.9 million. Accurately assessing the speech recognition of these individuals has posed quite a challenge to audiologists who have attempted unsuccessfully to modify English speech recognition tests to be used with this population. To date very few standardized tests of speech recognition are available in Spanish. Below we describe the development of two recorded speech recognition tests to be used with Spanish-speaking children that can be administered by clinicians unfamiliar with the Spanish language. These tests will soon be available to the public.

Spanish Pediatric Speech Recognition Test (SPSRT)

Purpose:

To construct a Speech Recognition Threshold (SRT) test for Spanish-speaking children utilizing a picture board and picture-pointing task

Test Development Steps

- 1) Stimulus Selection
- 2) Familiarity Ratings
- 3) Pictorial Representation
- 4) Picture Recognition
- 5) Stimulus Recording
- 6) Validation

Stimulus Selection Criteria

- Bisyllabic Trochaic Words:
 - There are no spondaic words in Spanish
- Pictorial Representation:
 - All stimuli represented pictorially and easily recognized by children
- No Gender Specification:
 - Gender identifying articles ('el' or 'la') were avoided to minimize extra cues to the listener
- Highly familiar Spanish words

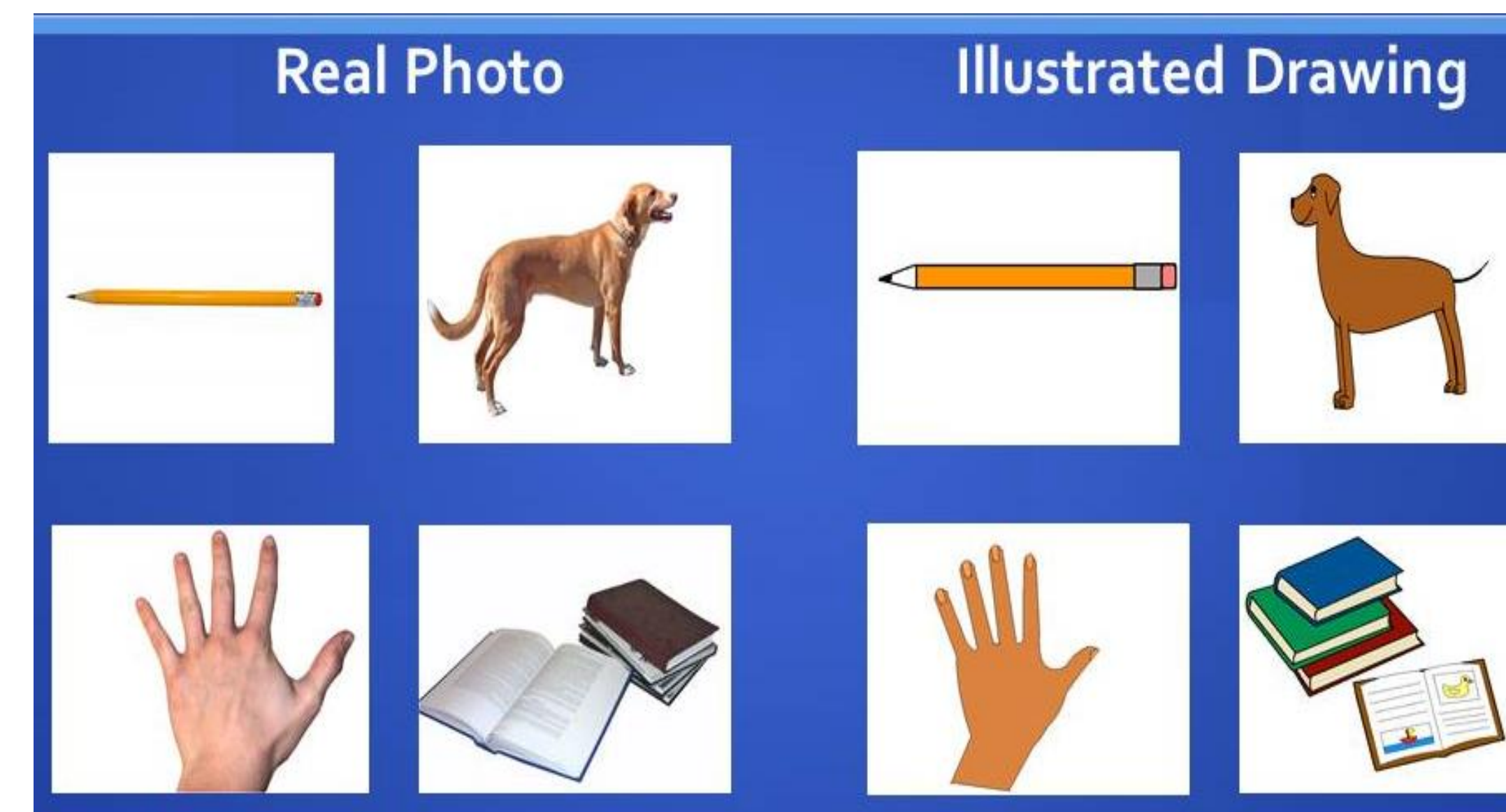
Familiarity Ratings

- 12 Spanish-speaking adults rated the familiarity of a set of 100 words for children 2-5 years old
- Familiarity Scale
 - 1 = Extremely Familiar
 - 2 = Very Familiar
 - 3 = Average Familiarity
 - 4 = Vaguely Familiar
 - 5 = Unfamiliar

- Words with ratings of 1, 2, or 3 (N=37) were rank ordered according to familiarity rating
- The final stimulus set consisted of 25 words that were ranked with high familiarity and selected based on ease of pictorial representation

Pictorial Representation

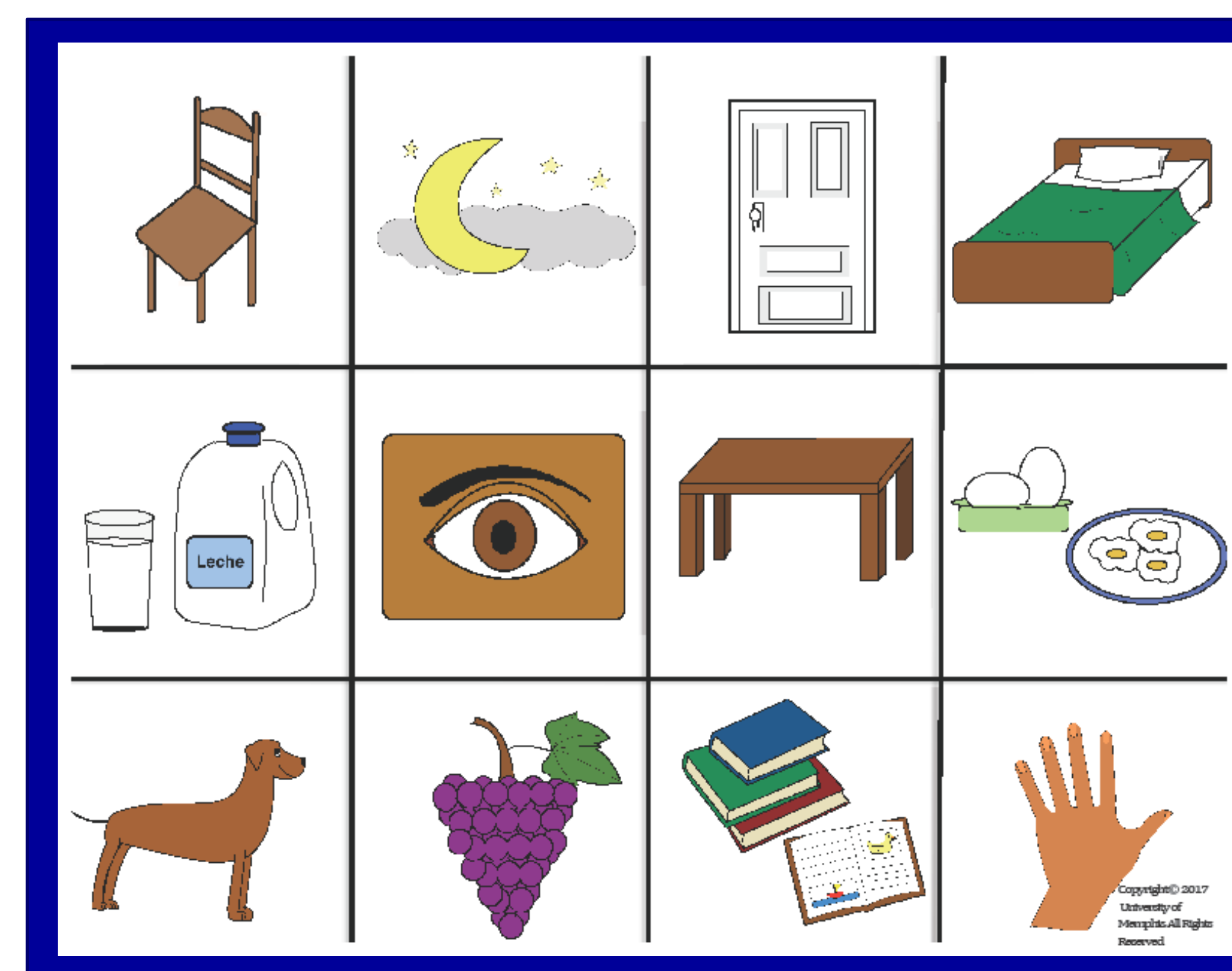
- Pictures were created to represent each target word in two versions: real photos or illustrated drawings



Picture Recognition

- 25 Spanish-speaking children (aged 3-11 years) verbally identified each picture in Spanish
- Words labeled correctly with 80% accuracy were included in the final stimulus set (N=12)
- The illustrated drawings (95%) received higher correct percentages than the real photos (92.25%)

Final SRT Picture Board

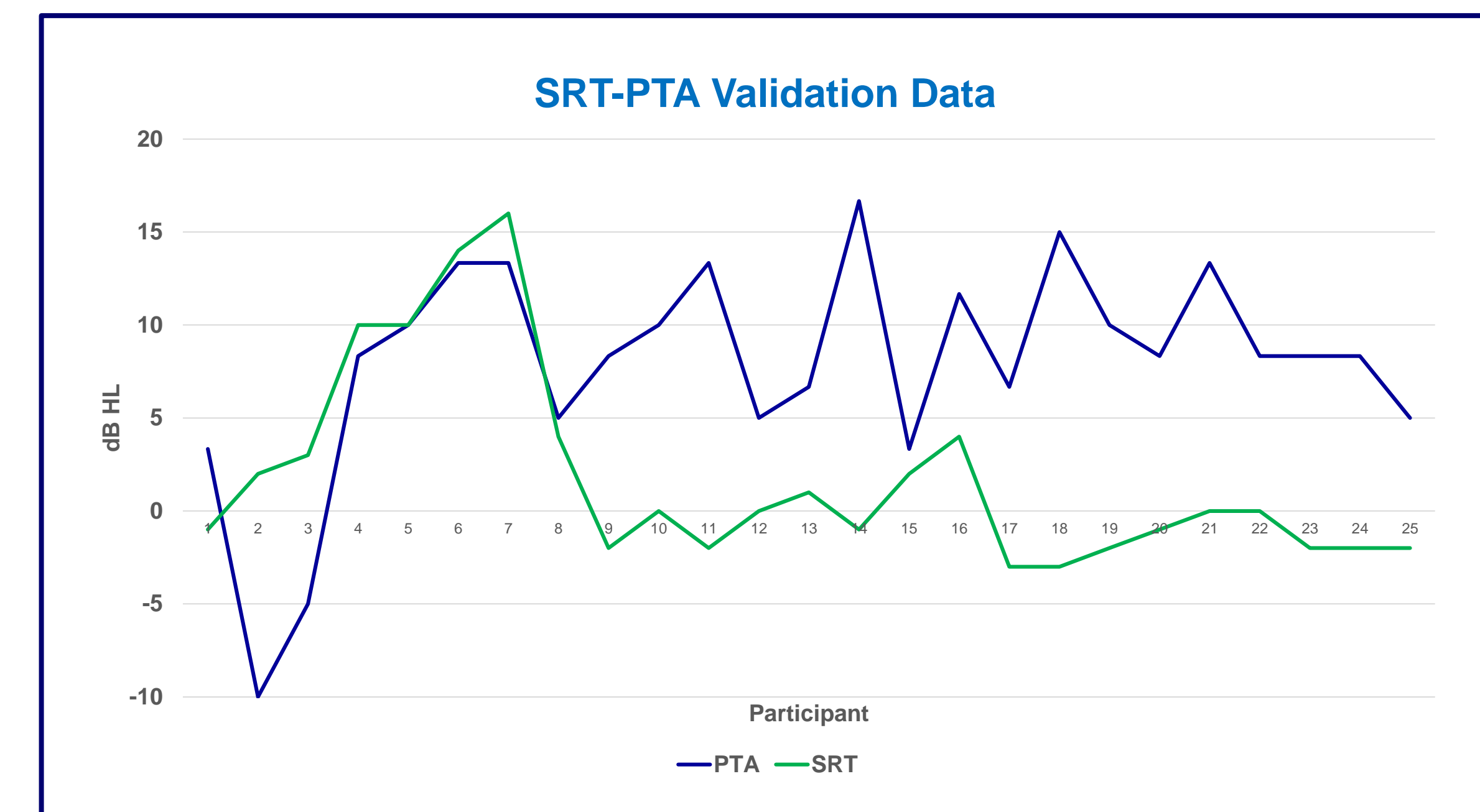


Stimulus Recording

- Two-channel recording
 - Channel 1 = Spanish stimulus item
 - Channel 2 = English translation
- Talker: Adult, female, native Spanish speaker
- Four sequential recordings were made of each stimulus item with and without the carrier phrase "Enseñame" ("Show me")
- The 1st and 4th recordings were discarded and the best of the 2nd or 3rd was selected
- The stimuli were edited using Adobe Audition so that they peaked at the same intensity

Validation of the SPSRT

Normative data for 25 Spanish-speaking children (4-14 years) with normal hearing ranged from -10 to 17 dB and SRTs ranged from -3 to 16 dB. The mean difference between PTA and SRT was 8 dB across all subjects, and PTA/SRT agreement ranged from 2 to 15 dB.



	PTA	SRT
Mean	8 dB	2 dB
SD	6 dB	5 dB

Spanish Pediatric Picture Identification Test (SPPIT)

Purpose:

To construct a word recognition test for Spanish-speaking children utilizing a picture board and picture-pointing task

Test Development Steps

- 1) Stimulus Selection and Recording
- 2) Established List Equivalence
- 3) Pictorial Representation
- 4) Validation with adults and children

Stimulus Selection and Recording

- Four lists of 25 bisyllabic words from Comstock & Martin (1984)
- Recording procedures similar to the SPSRT

List Equivalence

- In the initial validation, List 2 had significantly poorer scores compared to Lists 1, 3, or 4
- Stimulus items from List 2 were redistributed to the other 3 lists to even out the number of errors across lists
- List equivalence was then re-established

Pictorial Representation

- Some pictorial representations of stimulus items were misidentified either because the picture was not easily recognizable to the child or the English translation used to depict the stimulus item was not accurate for Spanish speakers from different regions
- Word lists were reconfigured and rebalanced such that Lists 1, 2, and 3 contained highly recognizable items while List 4 contained non-target items that had poor performance on the picture identification task

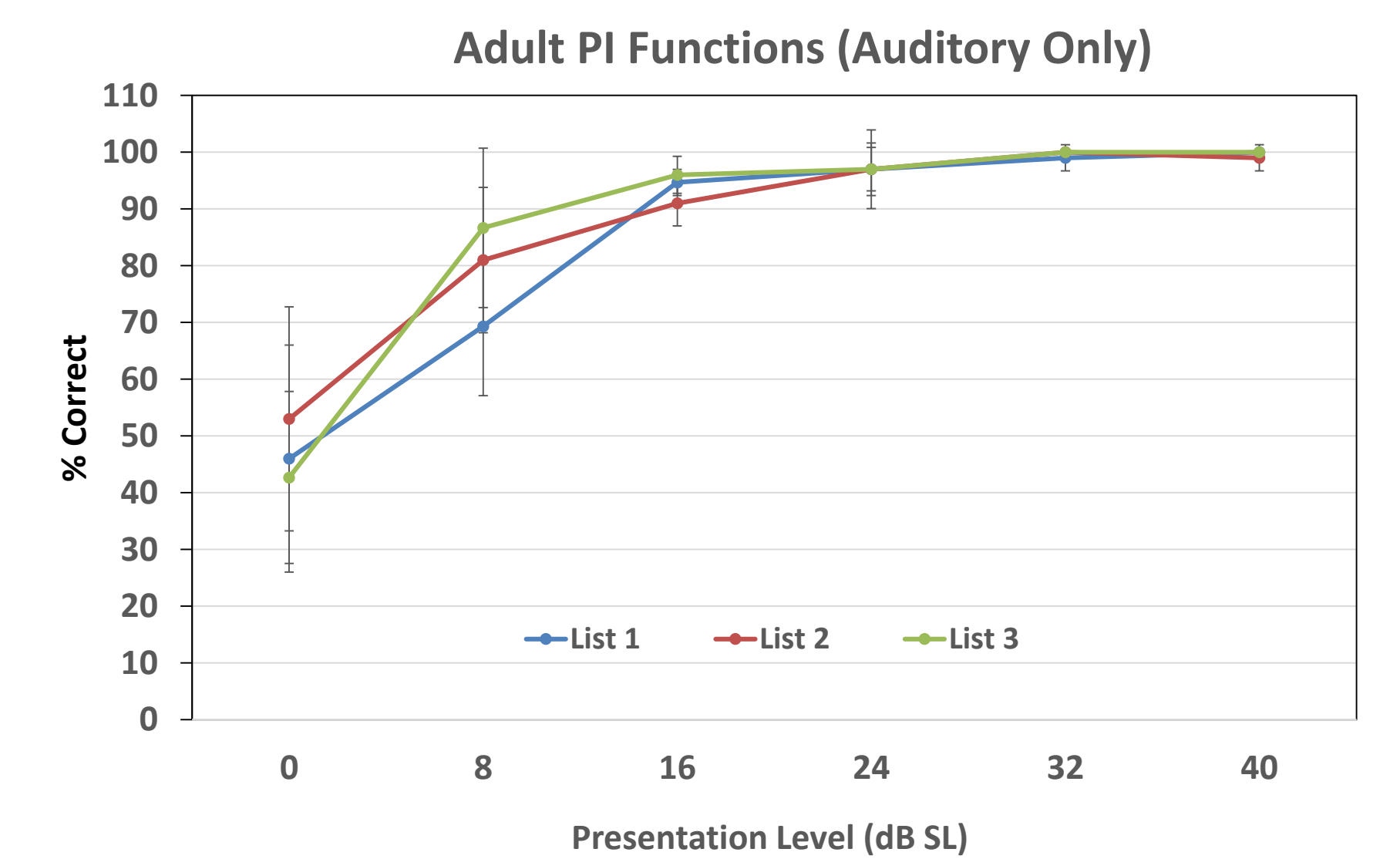
Final Stimulus Set:

- 25 picture boards with 4 illustrations on each representing the 100 stimulus items
- Each picture board contains a target word from Lists 1, 2, and 3 as well as a distractor item from List 4
- The position of each picture was randomly determined so that images were presented on each board in a random order

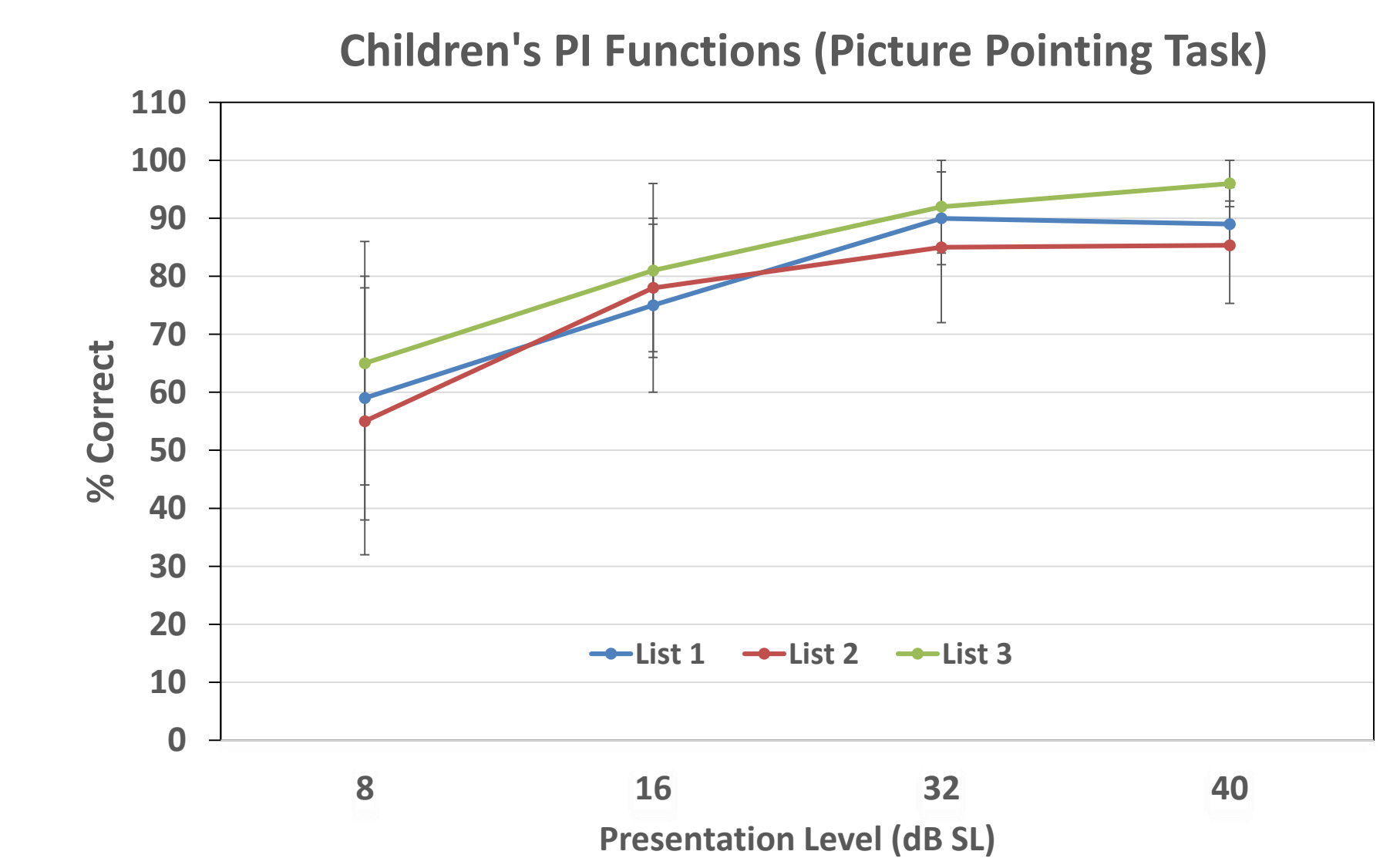


#9) mano (hand) / carro (car) / palo (stick) / sapo (frog)

Validation of the SPPIT



- PI functions for adults revealed no significant differences between lists



- PI functions for children revealed list equivalence for Lists 1 and 2
- Scores on List 3 were significantly greater than those on List 2

Conclusion

The SPSRT and SPPIT are validated picture-pointing Spanish speech recognition tests to be used with Spanish-speaking children. The two-channel recording contains an English translation track making this test easy to administer and interpret for clinicians without knowledge of Spanish.

Reference

Comstock, C.L., & Martin, F.N. (1984). A children's Spanish word discrimination test for non-Spanish-speaking clinicians. *Ear and Hearing*, 5 (3), 166-170.

Acknowledgment

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