All New Spanish-IGDIs: Bilingual Measurement Considerations & S-IGDI Development

A product of the University of Minnesota and Utah State University

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Our Agenda

- What are the Spanish-IGDIs?
- Bilingual Measurement Considerations
- A review of the literature to support measurement targets in Spanish
- New Measure Examples (Hot off the presses!)
- The research and measurement process currently in progress for developing the new S-IGDIs
- Next Steps

Our Team

- University of Minnesota- Measurement content and IGDIs
  - Alisha Wackerle-Hollman
  - Scott McConnell
  - Michael Rodriguez
  - GRAS: Jose Palma & Stephanie Brunner
- Utah State University- SEB expertise
  - Lillian Durán
  - Tim Slocum
  - GRAs: Terry Kohlmeier, Chase Callard
  - Translation support: Lara Linares

What are the Spanish-IGDIs?

- The University of Minnesota and Utah State University were funded in July by the Institute of Educational Sciences under a goal 5 grant to develop a Spanish version of the IGDIs for screening language and literacy abilities of 3-5 year-olds
- In year 4 of the grant we will compare performance of Spanish-English bilingual children on the English IGDIs 2.0 and the new Spanish-IGDIs to be able to provide preschool teachers with a way to consider performance in both languages when screening young bilinguals

A Process of Discovery

- It is important to recognize that this will be a process of discovery for our team as we try new ideas, new measurement targets, and even new ways of measuring Oral Language, Phonological Awareness, and Alphabet Knowledge in Spanish.

Bilingual Measurement Considerations

- Spanish has unique linguistic features that need to be considered. Simply translating the test to Spanish is not psychometrically sound.
- Young Spanish speakers in the US have a wide range of variability in the amount of English and Spanish that they have been exposed to. It is important to consider language background when developing cut-off scores in English and Spanish.

Bilingual Measurement Considerations

- Language and culture are inextricably connected. Young Spanish speakers often have experienced different language socialization patterns that might affect performance on assessment tasks given the type of adult-child interaction that is required. (Hammer & Rodriguez, 2012)
- In addition children's vocabulary knowledge will be influenced by their cultural context i.e. *chile* may be a more familiar item than *apple*

Bilingual Measurement Considerations

- Young simultaneous/relatively balanced bilinguals will have both vocabulary and syntactical skills distributed across both of their languages. It is critical to measure a child in both of his/her languages for an accurate diagnosis of delay.

Peña's Four Tenets

To address these types of issues in bilingual measurement our team has adopted Peña's four tenets (Peña, 2007) as our guiding principles:

1. Functional equivalence
2. Cultural equivalence
3. Metric equivalence
4. Linguistic equivalence

Functional equivalence

- Functional equivalence addresses the question, **"Do items measure the same construct in each language?"**
- Adequately addressing this question involves considering the unique functional and pragmatic features of the target language and the manner in which a skill might be elicited within the structure of that language.
- Assessments that are functionally equivalent in two languages may have different types of items or instructions to access the same construct.
- One example is the Bilingual English Spanish Assessment (BESA; Peña, Gutiérrez-Clellan, Iglesias, Goldstein, & Bedore, n.d.). For example on the BESA Spanish semantics section there are items requiring the child to provide a verb versus on the English version where the focus is primarily on naming nouns given the difference in frequency in early language production of nouns and verbs across English and Spanish.

Cultural equivalence

- Cultural equivalence directly addresses the differences that may be associated with test items and procedures based on cultural aspects. Item presentation or elicitation techniques may have different levels of importance, meaning, or even motivation based on the cultural background of participants. For instance, to ensure cultural equivalence the research team must consider not only the selection of words represented in vocabulary tests, but also the images that represent those words.

Metric Equivalence

- Metric equivalence drives the technical adequacy of any measure.
- In Peña's model, metric equivalence is the extent to which two measures demonstrate similar relations to criterion measures and socially meaningful outcomes
- To address metric equivalence the unique developmental progression of the target language must be considered. The level of difficulty of items may differ with respect to word and grammatical frequency.

Linguistic Equivalence

- Linguistic equivalence is the extent to which measures relate to essential linguistic features of a particular target language.
- English instruments are often translated into other languages using an expert translator and "back translated" to ensure accuracy.
- This process does not address linguistic features that may be unique to the other language. For example there may be differences in frequency of occurrence, developmental or chronological sequencing, or familiarity with referenced words, phrases, or concepts in English and the other target language

Framework for Design

Figure 4. Wilson's Measurement Model

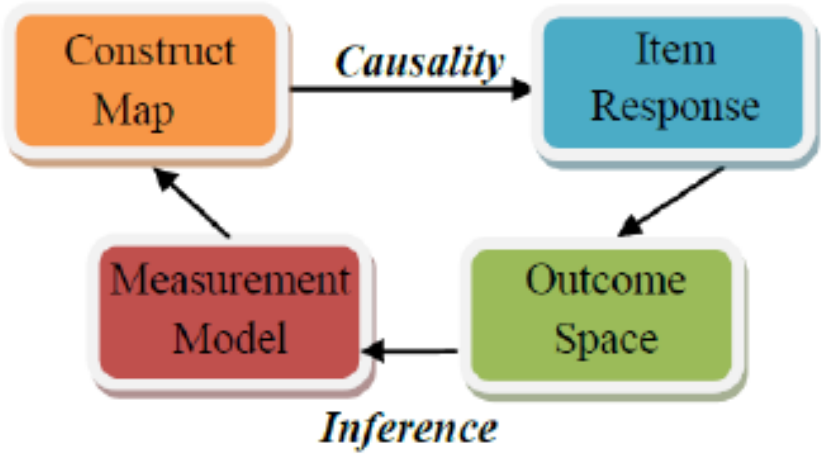


Figure 4. The four building blocks of an item response model approach to measurement construction (Wilson, 2005).

New Measures

Spanish-Individual Growth and Development Indicators

Research Process

- Extensive Literature Reviews
- Robust analyses of component skills for each early literacy area: Alphabet Knowledge, Oral Language, and Phonological Awareness
- Research Design, New Measures and Pilot implementation
- Next Steps

Literature Review

- We conducted a thorough literature review to identify targets for measurement in Oral Language, Phonological Awareness, and Alphabet Knowledge in Spanish
- Our goal is to choose targets in Spanish that have been found to be correlated with both later English and Spanish reading ability.

Oral Language

- We have used the research on the semantic development of young Spanish speakers to identify targets such as identifying functions of items, verb knowledge, and category recognition, in addition to picture naming as measurement targets (Peña, Bedore, and Rappazzo, 2003; Peña, Kester, & Sheng, 2012)
- We have also included both receptive and expressive items

Oral Language

- We also used the literature on language socialization of young Spanish speakers in the US to consider items that include more naturalistic communication and we are in the process of developing a play-based assessment similar to the Early Communication IGDI and a new narrative assessment (Hammer & Rodríguez, 2012)

Construct Definitions

Spanish IGDIs Construct Definitions	
Phonological Awareness	The meta-linguistic ability to understand that spoken words are comprised of small sound units; to detect, discriminate between, and manipulate these structural components; and to perform these skills independent of word meaning (Durgunoglu, Nagy & Hancin-Bhatt, 1993; Branum-Martin, Mehta et al., 2006; Cardenas-Hagan, Carlson & Pollard-Durodola, 2007; Kuo & Anderson, 2010; Gorman & Gillam, 2003; Anthony et al., 2011; Cisero & Royer, 1995).
Oral Language	The ability to use words to communicate thoughts and ideas to other, and in turn, understand ideas and thoughts from others (Dunst, Trivette, Masiello, Roper, & Robyak, 2008; Morgan & Meier, 2008). • Expressive language: the use of words to express meaning. • Receptive language: the ability to listen, process, and understand the meaning of spoken language.
Alphabet Knowledge	Knowledge about the names, sounds, and symbolic representation of the 27 letters of the alphabet (McBride-Chang, 1999; Davison & Brea-Spahn, 2012).

Example Measures

Oral Language

Which one doesn't belong?

Sample A

Vamos a ver algunas figuras y decidir cuál de ellas no pertenece a las demás.

Primero, me toca a mí: Pelota, pantalones, camisa. *(Señale cada figura a medida que las va enumerando.)*

Ahora voy a decidir cuál figura no pertenece a las demás.

La pelota no pertenece. *(Señale a la pelota.)*

Los pantalones y la camisa son ropa, pero la pelota no pertenece porque es un juguete.

camisa pantalones pelota

Functions

Sample A

Vamos a ver algunas figuras y a continuacion tú me dices para que sirven cada una de éstas.

Primero, me toca a mí: Cama. *(Señale cada imagen a medida que las va enumerando.)*

Ahora voy a decidir para qué se usa.

El uso de la cama es para dormir.

dormir

Verbs

Sample A

Vamos a ver algunas figuras de personas haciendo algo y a continuación tú escoges la figura que mejor represente la acción que te digo.

Primero, me toca a mí. Voy a escoger la persona que come.

Esta niña come. *(Señale a la niña que come el helado.)*

La otra figura representa un niño que recorta un papel con tijeras.

comer

recortar

Picture Naming

Sample A

Voy a mirar estas figuras y decir lo que representa cada figura.

león

Receptive Vocabulary

Sample A

Vamos a jugar un juego en el que tienes que encontrar la figura de lo que te digo.

Primero me toca a mí. Voy a escoger el oso.

Este es el oso. *(Señale al oso.)*

correo oso abeja

Categories

Sample A

Vamos a ver algunas imagenes y decidir a cuál categoria pertenecen.

Primero, me toca a mí: Mesa, plato, cuchara. *(Señale a cada imagen cuando lo denomina.)*

Ahora voy a decidir a cuál categoria pertenecen.

Todos los imagenes son de cosas que relatan a la cocina.

cuchara plato mesa

Respuestas aceptables:

1. La cocina
2. Comer

Example Measures

Phonological Awareness

Phonological Awareness

- There is significant evidence supporting the notion that there is a cross-linguistic transfer of PA skills between Spanish and English (Cárdenas-Hagan, Carlson, & Pollard-Durodola, 2007).
- Targets such as rhyming, alliteration (first sounds), blending, and elision are all related to later reading in English and Spanish
- The syllable as the unit of manipulation may be more salient than the phoneme in Spanish given word structure (i.e. onset-rime does not work as well)

Phonological Awareness

- Varying between multiple choice and free response may produce more range in difficulty and better discrimination than traditional word level manipulation in English in blending and elision tasks (i.e. compound word, syllable, phoneme)(Anthony et al., 2011)

Rhyming

Sample A

Vamos a jugar un juego para encontrar las figuras que rimen.

Primero me toca a mí. *(Señale cada figura a medida que las va enumerando.)*

Gato, manzana, pato.

gato

pato

manzana

Ahora voy a decidir cuales son las palabras que riman: ¿Es gato, manzana *(pausa)* **o gato, pato?**

Es gato, pato. Escucha: gato, pato. Riman.

First sounds

Sample A

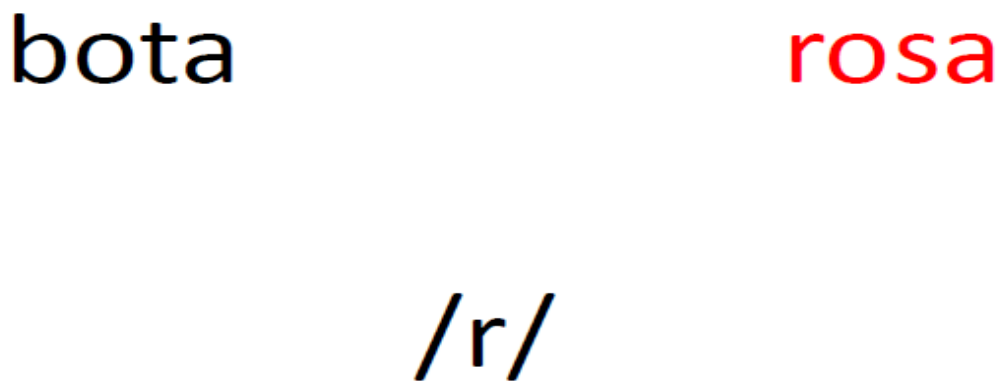
Vamos a jugar un juego para encontrar las palabras que empiezan con este sonido que te digo.

Primero, me toca a mí. *(Señale cada figura a medida que las va enumerando.)*

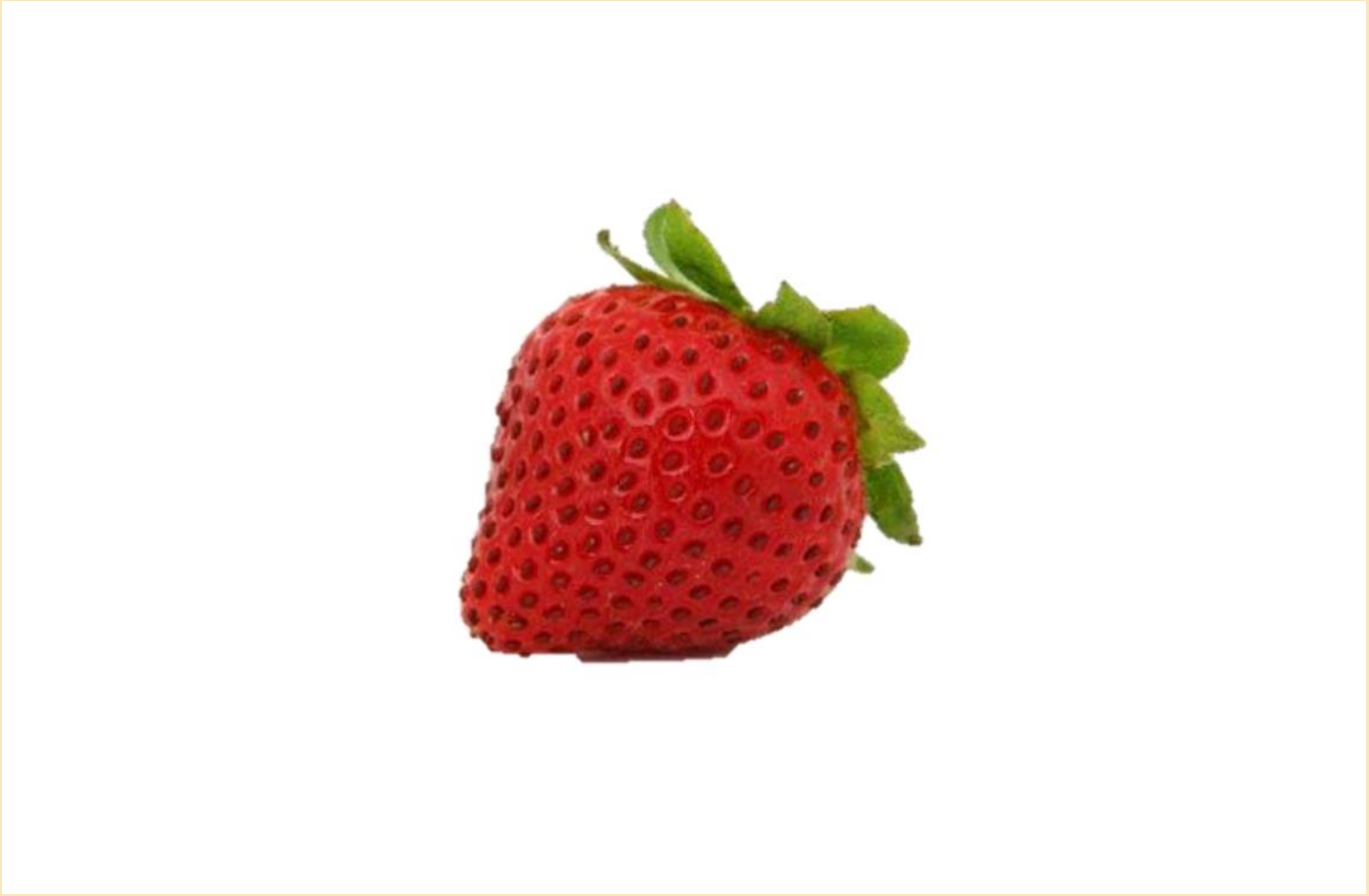
Ahora voy a encontrar la palabra que empieza con /r/.

Rosa *(señale a la rosa)*, rosa empieza con /r/.

Escucha: /r/, rosa.



Detection



Sample A

Vamos a jugar un juego donde tú tienes que decirme cual de las palabras que yo te digo es la correcta y representa esta figura. Escucha con atención lo que te digo.

Es “fres” o “fresa”?

fresa

Measures Examples

Alphabet knowledge

Alphabetic Knowledge

- *Alphabetic principle* is knowledge about the names and sounds of letters (McBride-Chang, 1999).
- There are 27 letters in Spanish including the ñ: ll and ch are no longer recognized as letters.
- We suspect that children's knowledge of Spanish letter names and sounds may be dependent on their exposure to Spanish preschool instructional environments. This may not be commonly taught in home environments

Letter detection

Sample A

Vamos a jugar un juego para decidir lo que es una letra del alfabeto.

Primero me toca a mí.

La M es una letra. *(Señale la M.)*

Los otros dos objetos son símbolos que no son parte del alfabeto.



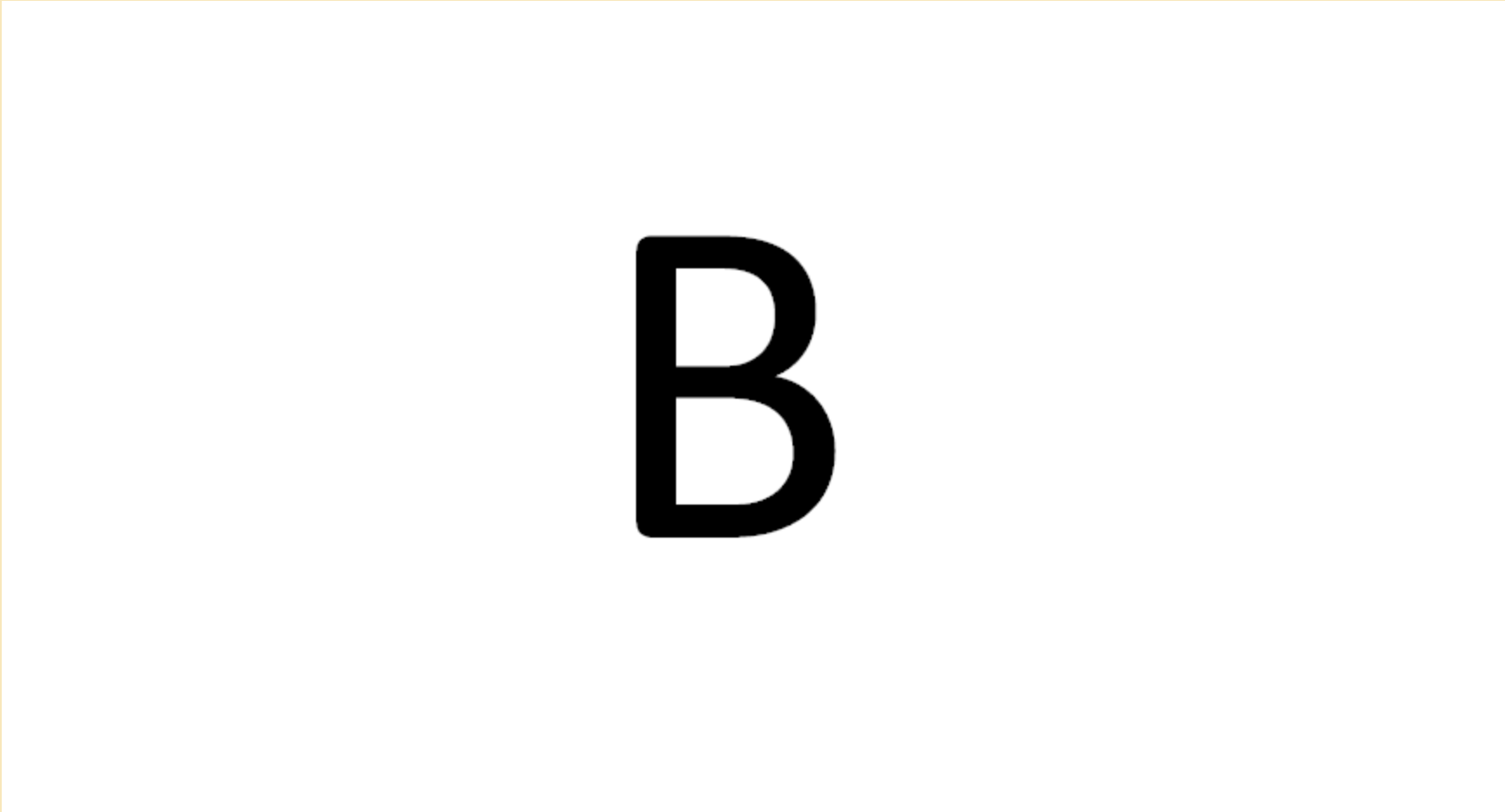
Ñ

Ahora vamos a hacer más ejemplos.

Ñ

Diga: Enséñame la letra del alfabeto.

Letter naming



Sample A

Vamos a jugar otro juego donde diremos algunas letras del alfabeto.

Primero, me toca a mí.

Esta letra es B.

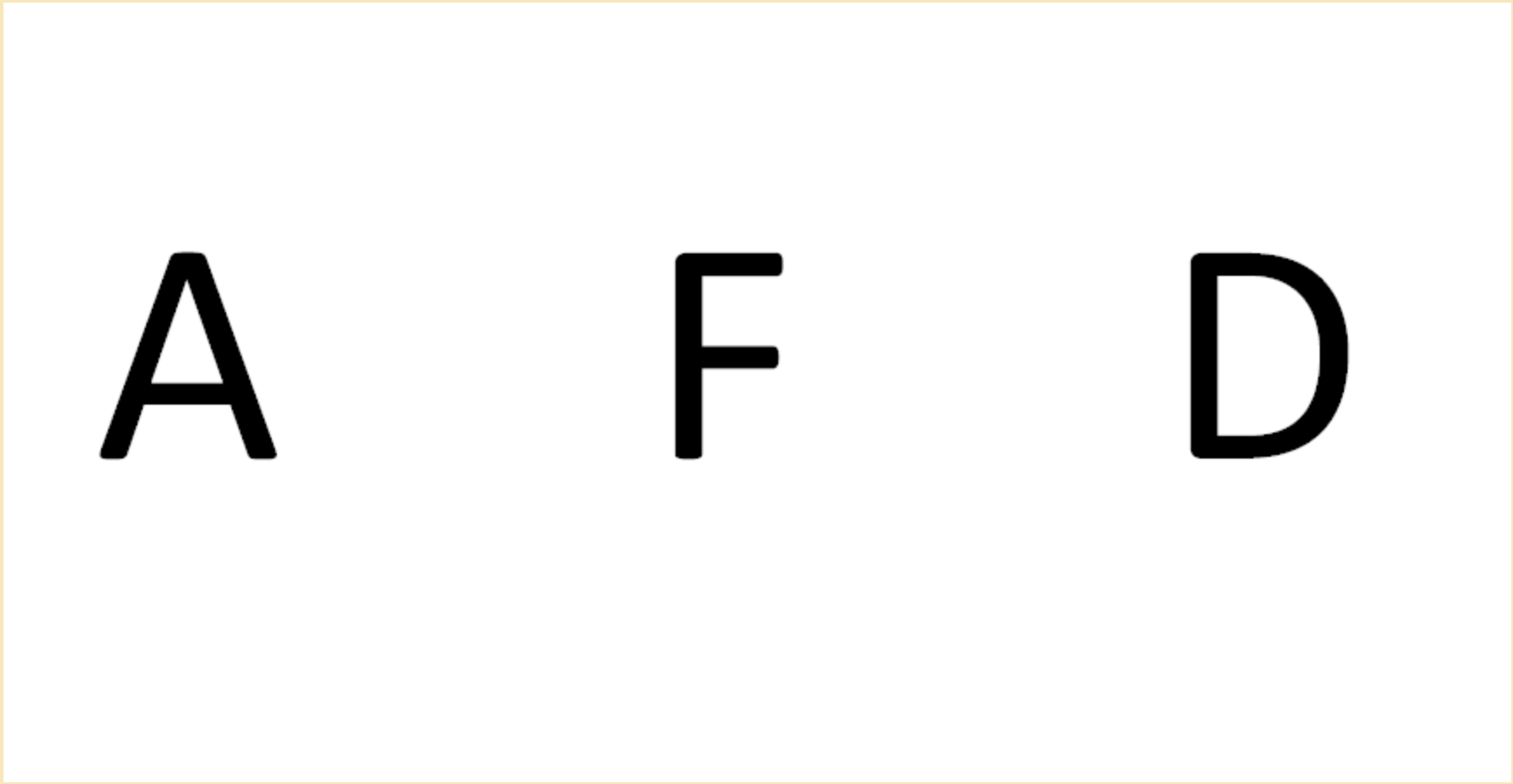
B

B L N

Ahora vas a escoger la letra que digo. ¿Cuál letra es L?

N L B

Sound identification



Sample A

Vamos a ver estas tarjetas y decidir cuál letra hace el sonido que te digo.

Primero me toca a mí. Voy a mostrarte cuál letra hace el sonido /f/.

Esta letra hace el sonido /f/ *(señale)*.

D F A

Research/measurement design

Rasch Modeling

The Rasch Model

- A specific item response theory (IRT) model, which describes the location of cards [items] on the measurement scale in relation to the trait or construct that underlies the measure.
  - Characterizes a construct on a linear scale
  - Locates items on the scale and in turn, locates people on this same scale.
  - Person's ability is independent of items the person is administered.
  - Difficulty of items is independent of the sample of people who received the items.

The Rasch Model

- Rasch provides the probability of correct response for each item, modeled as a logistic function (Rasch, 1960).
  - Examinee ability level
  - Difficulty level of the item, or the ability at which an examinee has a predicted probability .5 of answering the item correctly.
  - Mathematical model of the relation between the probability of success, and the difference between an individual's ability and an item's difficulty.
- These scales typically range from about -4 to +4 with a standard deviation around 1, and are centered around the mean item location for the measure (zero represents the average item location).

TABLE 12.2 Concurrent Calibration for Picture Na ZOU496WS.TXT Aug 9 2:51 2012
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Tier Level Candidacy

IGDI Benchmarks for identification of students in need of Tier 1, Tier 2/3 services within a decision making framework

Decision Making Framework

- IGDIs are one part of the information necessary to determine if a student needs additional services, but are NOT the entire picture.
  - Other sources of data (criterion tests, mastery monitoring information, permanent product reviews)
  - Interviews
  - File history
  - Observations

Benchmarks

- Benchmarks have utility within an identification model to help professionals select which students need additional services. They can tell us:
  - If a student performs below or above a reference point.
  - They can relate the reference point to RTI tier levels

  They can't tell us:
  - If the student is making progress
  - How close or how far away the student is from the reference point

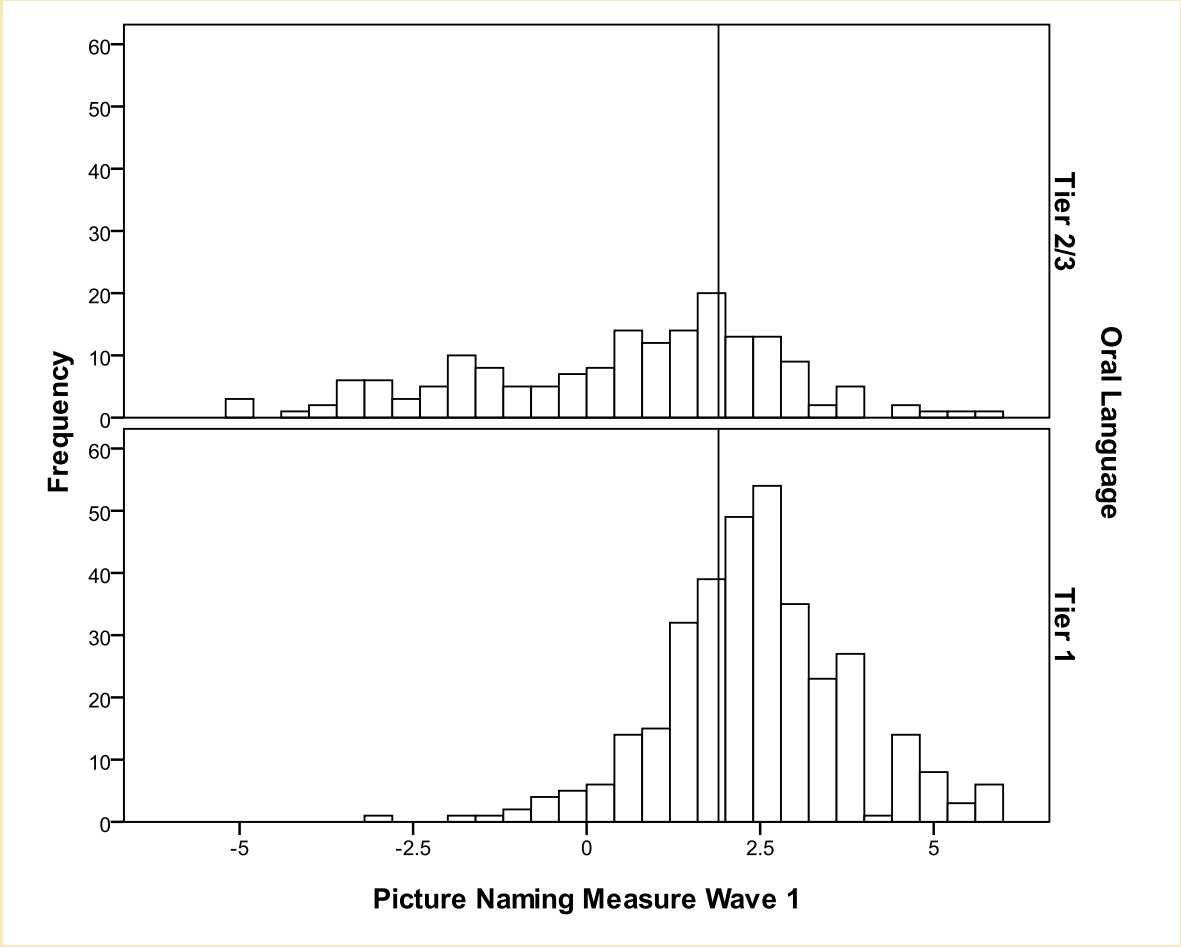
Performance Level Descriptors- Teacher and Parent information and expertise

- The PLDs will ask teachers and parents to use their knowledge of students to rank performance based on operational definitions of each early literacy domain for the Fall, Winter and Spring seasons, with definitions changing respectively over the course of the year.
  - Teachers and Parents placed students in Tier 1, Tier 2 or Tier 3
  - Teachers and Parents indicated to what extent they were confident about the placement

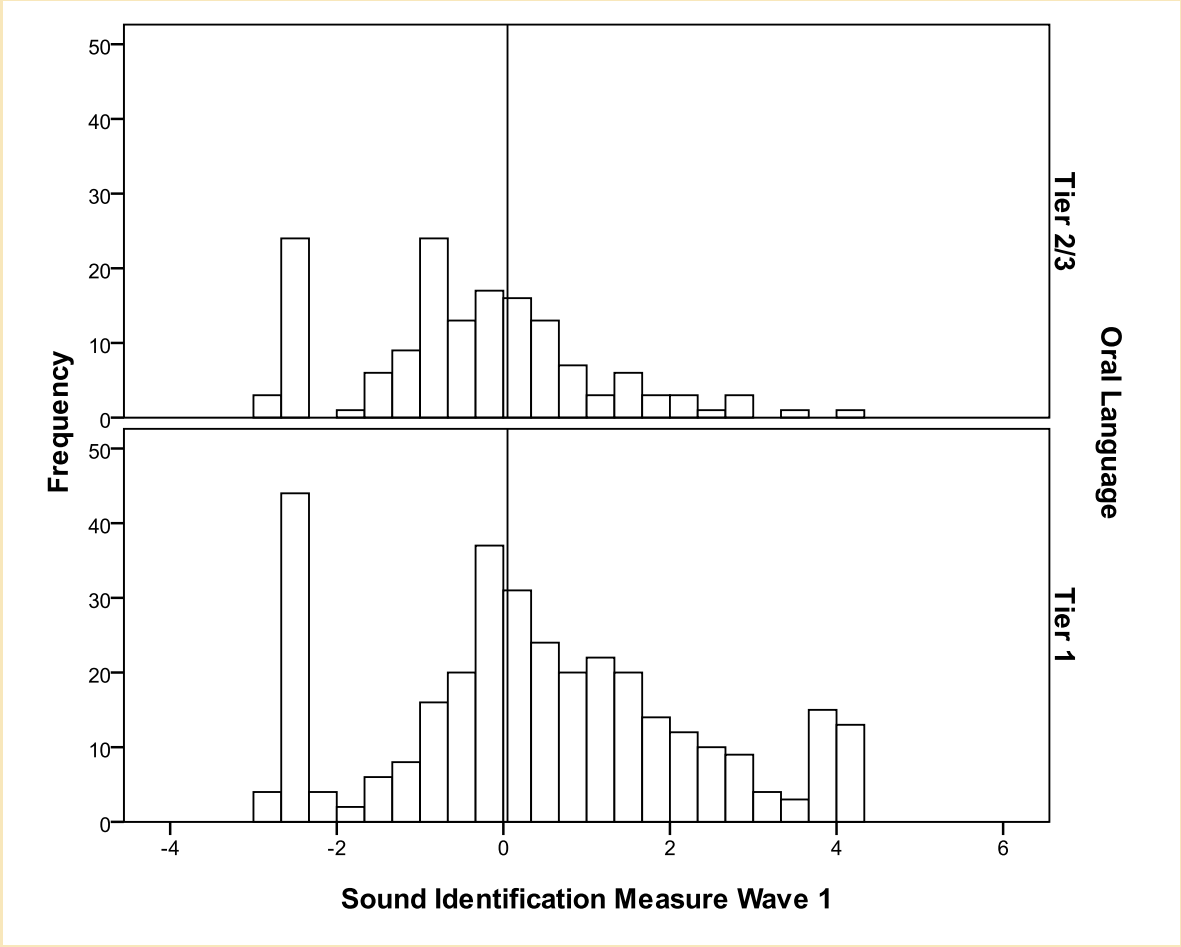
Setting the benchmarks

- A combination of Rasch output, ROC analysis, Regression analysis and contrasting groups design methods will be used to produce Rasch values related to the reference point between Tier 1 and Tier 2/3 performance based on IGDI scores AND teacher + parent evaluation of student performance using Tier Level Descriptors.

Example descriptive of Contrasting group design



Example descriptive of Contrasting group design



Benchmarks

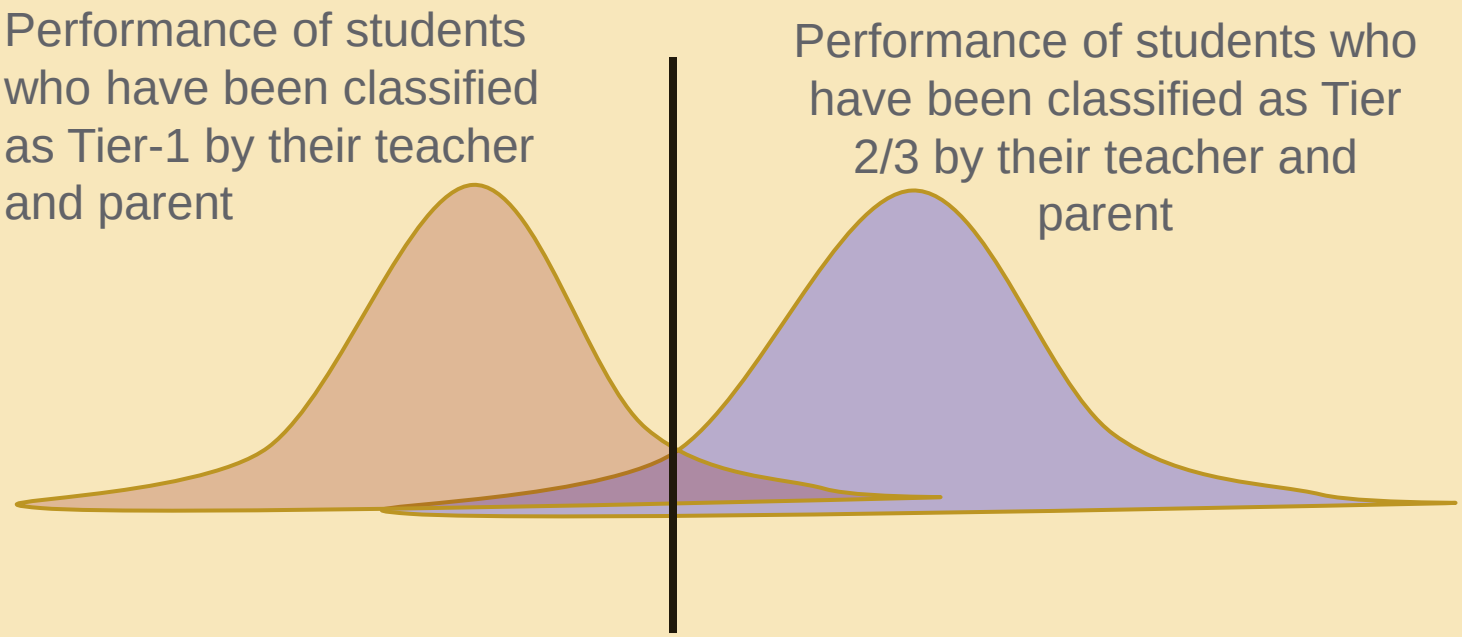

Performance of students who have been classified as Tier-1 by their teacher and parent
Performance of students who have been classified as Tier 2/3 by their teacher and parent
Underlying early literacy trait performance for 4-year olds

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TABLE 12.2 Concurrent Calibration for Picture Na ZOU496WS.TXT  Aug  9  2:51 2012
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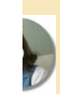

Setting the Benchmarks

- Student abilities (as a function of IGDI responses) will then be converted to a number correct card-count score (number correct expected given the study ability related to tier placement).

Challenges in Benchmarking

- The brevity of the measures makes them less precise.
  - As a result, we aren't yet able to differentiate Tier 2 from Tier 3
- When making decisions considering the transition from Tier 2 to Tier 3 we are still defining the relevant educational features:
  - Consider behavioral or presenting issues
  - Consider responsiveness to Tier 2 services.

Next Steps

- Measurement R&D – "Tools"
  - Defining "constructs" as a way of defining "samples"
  - Elaborating General Outcome Measurement within contemporary measurement models
- Research – "Applications"
  - Unpacking within- and cross-linguistic effects
  - Identifying factors that promote growth
- Policy
  - Providing information that informs what is possible, and what's needed to make it likely

Conclusions

- Where are we in developing General Outcome Measures for language and early literacy for young Spanish speakers?
  - Improved psychometrics given adherence to our guiding principles
  - A focus on innovation in measurement given cross-linguistic and cross-cultural considerations

  How are we getting there?
  - Renewed research and development, based on many researchers' and practitioners' experience
  - Adaptation and addition of new methods, esp. IRT
- Coming attractions
  - New measures
  - Decision criteria designed specifically for young Spanish speakers for tiered intervention

Questions and Comments?