Dynamic Assessment of Word Learning Skills: Identifying Language Impairment in Bilingual Children

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Purpose: Bilingual children are often diagnosed with language impairment, although they may simply have fewer opportunities to learn English than English-speaking monolingual children. This study examined whether dynamic assessment (DA) of word learning skills is an effective method for identifying bilingual children with primary language impairment (PLI).

Method: Fifteen 4- and 5-year-old predominantly Spanish-speaking children with typical language development (TLD) and 13 with PLI each participated in a 30- to 40-min session of DA of word learning skills following a pretest-teach-posttest design.

Results: Results indicated that TLD children made associations between the phonological and semantic representations of the new words faster than children with PLI did, showing greater modifiability. Further, a combination of word learning in the receptive modality and the Learning Strategies Checklist (Lidz, 1991; Peña, 1993) provided the best accuracy in identifying PLI in these children.

Conclusion: Findings suggest that a brief DA is a promising method for accurately differentiating children with TLD from children with PLI.

Key Words: language impairment, bilingual, dynamic assessment, word learning

Evaluation of language skills in bilingual children poses a significant challenge. The quantity and quality of input in their native and second languages influence the growth trajectories in those languages (Goldstein, 2004; Hart & Risley, 1992, 1995; Pearson, Fernández, Lewedeg, & Oller, 1997). Given the diversity of language experiences in bilingual children, language proficiency and dominance vary among bilinguals and change as children grow according to children’s experiences in each language (Kohnert & Bates, 2002). Thus, static measures that assess bilingual children’s existing knowledge in a particular domain may lead to incorrect diagnoses of primary language impairment (PLI).1

At young ages, there is underrepresentation of bilinguals in special education because professionals often attribute early language and literacy deficits to difficulties related to learning a second language (e.g., Limbos & Geva, 2001; Samson & Lesaux, 2009). In the later elementary grades, if bilinguals present with low academic skills, concerns increase, and often there is overrepresentation of bilinguals in special education (e.g., Samson & Lesaux, 2009). Research indicates that the norms used for monolingual children in static measures (i.e., standardized measures) do not apply to bilingual/multicultural populations (Horton-Ikard & Ellis Weismer, 2007; Restrepo & Silverman, 2001). For example, Restrepo and Silverman (2001) examined the validity of the Spanish version of the Preschool Language Scale—3 (PLS–3; Zimmerman, Steiner, & Pond, 1993) score interpretations and found that PLS–3 scores over-identified Spanish–English-speaking children as having PLI.

Investigators have evaluated alternative methods of assessment that could reduce the bias of previous language experiences when assessing bilinguals, such as using adaptations of existing measures for different cultural and linguistic populations, measuring processing skills, and using dynamic assessment (DA; e.g., Burton & Watkins, 2007; Campbell, Dollaghan, Needleman, & Janosky, 1997; Gutiérrez-Clellen, Peña, & Quinn, 1995; Peña, Iglesias, & Lidz, 2001; Seiger-Gardner & Brooks, 2008; Windsor,

1We used the term PLI for all terms such as language impairment, specific language impairment, and language disorder found in the literature.
DA

DA is a method derived from Vygotsky’s (1978) sociocultural theory. He observed that immigrants were erroneously identified as having limited intelligence based on standardized static measures. According to his theory, high-level mental processes, such as problem solving, voluntary attention and memory, and concept formation, occur and develop through interaction with the environment in daily activities and socialization. Language serves as a tool that mediates the relationship between cognition and the environment. According to Vygotsky’s sociocultural theory, learning moves gradually from being regulated primarily by the environment to self-regulation (internalization). The more internalized learning processes become, the more independently a person can learn. Vygotsky presented the concept of zone of proximal development (ZPD), which he defined as the distance between the “actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). DA is intended to examine a child’s ZPD through the child’s interaction with a clinician, for instance, to assess the child’s potential for learning independently in a stimulating environment.

Based on Vygotsky’s (1978) ideas or parallel to his work, various approaches of DA have been developed, and some common characteristics of these approaches have been highlighted in reviews of the different types of DA (e.g., Grigorenko, 2009; Grigorenko & Sternberg, 1998; Swanson & Lussier, 2001; Tzuriel, 2001). In DA, a pretest—teaching—posttest method is often applied. During the pretest, the existing level of knowledge of the participant is assessed, often through standardized static tests. During the teaching phase, teaching methods vary; some are less structured, such as those in the mediated learning experience (MLE) approach (Feuerstein, 1979), and others are more structured, such as those in the graduated prompt method (GPM; Campione & Brown, 1987). In the MLE approach, there is not a strict script to follow. The examiner observes how the child learns, detects problems in the learning process, and addresses the problems during the assessment. The child’s response serves as feedback for the effectiveness of the mediation applied, and the examiner adjusts the mediation accordingly during the assessment (Tzuriel, 2001). Conversely, in more structured DA approaches such as the GPM, cues are predetermined and are presented in hierarchical order, with the examiner providing increasing levels of support. The posttest in DA evaluates learning, maintenance, and/or transfer of the concepts or skills addressed in the teaching phase. For less structured dynamic procedures to be successful, the examiner must be highly skilled at mediating and assessing. Also, the less structured the method is, the more difficult it is to standardize. On the other hand, Lidz (1991) argued that structured DA may not be flexible enough to adjust to the particular characteristics of each examinee.

In comparison to static tests, DA addresses not only cognition and/or language, but also the child’s behavioral and motivational factors during his or her interaction with the mediator—elements that are considered critical for learning (Tzuriel, 2001). Further, DA gives weight to social/interpersonal interaction, thereby providing a more naturalistic environment for learning in comparison with static tests. In static tests, the absence of interaction and context may influence the child’s performance negatively, particularly when the child is not familiar with a task, such as pointing to named pictures (e.g., Gutiérrez-Clellen, 1996). In contrast, DA reduces task familiarity biases through interpersonal interaction and contextual assessment, thereby reducing test anxiety (Carlson & Wiedl, 1992). The drawback is that such factors make DA more subjective than static tests.

How DA Differentiates Children With and Without PLI

A number of studies have examined DA as a method to differentiate between children from culturally and linguistically diverse backgrounds with typical language development (TLD) and those with PLI and have reported promising results. Specifically, studies have followed the common DA pretest—teaching—posttest design with a brief intervention to assess children’s learning abilities regarding narrative skills (Peña et al., 2006), categorization skills (Ukrainetz, Harpell, Walsh, & Coyle, 2000), and labeling skills in the Expressive One-Word Picture Vocabulary Test—Revised (EOWPVT–R; Gardner, 1990; Peña et al., 2001). Modifiability assessments have been based on one or both of the following Likert scales: the Learning Strategies Checklist (LSC; Lidz, 1991; Peña, 1993), which assesses the child’s responsivity (i.e., attention, planning, self-regulation, and motivation) and transfer of knowledge or skills, and the Modifiability Scale (MS; Lidz, 1987, 1991), which indicates the effort the examiner made and the support the child needed during the sessions.

In all studies, posttest scores and modifiability yielded the best discrimination. For instance, in the Peña et al. (2006) study, the posttest of narrative skills and modifiability measures provided 100% correct classification of children in both groups, with modifiability being the most accurate individual measure. Although results from this study are
promising for school-age children, a limitation to consider in evaluating preschool children is that storytelling skills, and particularly use of story grammar, are not useful criteria given that in preschool age, these skills are just beginning to emerge (Berman & Slobin, 1994; Muñoz, Gillam, Peña, & Gulley-Faehnle, 2003; Trabasso, Stein, Rodkin, Munger, & Baughn, 1991). In the Ukrainetz et al. (2000) study, based on the posttest scores, sensitivity of the expressive categorization subtests from the Assessing Semantic Skills Through Everyday Themes (ASSET; Barret, Zachman, & Huisenga, 1988) was 75% and specificity was 87%. Modifiability correctly classified the stronger and weaker language learners with 87% sensitivity and 100% specificity; the MS discriminated better than the LSC. Nevertheless, children’s performance in a categorization task may still be influenced by the depth of their vocabulary knowledge, so bilinguals may be disadvantaged by decreased exposure to and use of particular vocabulary rather than due to PLI. Consequently, categorization skills are not an optimal criterion for accurately differentiating preschool children with and without PLI due to biases associated with previous language experience.

Finally, in the study by Peña et al. (2001), results indicated that after working with children on understanding the importance of using “special names/s”ingle words for objects, versus descriptive for example, using 19 words of the test as explanations of when to use “special names,” the sensitivity of the EOWPVT–R based on the posttest was 78%, but specificity was very good (95%; cf. Plante & Vance, 1994). Overall, results showed that DA can limit cultural biases in diagnostic procedures and improve accuracy in classification of bilinguals. Such a DA process addresses communication style bias and potential disadvantage due to lack of test-taking experience (i.e., lack of test-wiseness). However, the main drawback of this approach is that it does not account for differences in vocabulary knowledge due to different language and cultural experiences. The target words are common words, and average exposure to those varies in culturally diverse populations; thus, different levels of performance do not necessarily reflect different language abilities.

The assessment of novel-word learning skills through DA may be a more accurate method than the assessment of existing vocabulary in bilinguals for identification of PLI. Using DA in domains minimally related to previous language experiences and culture may minimize respective biases and help accurately identify children with PLI. Further, language learning tasks would indicate children’s ability to acquire language. Previous studies suggest that children with PLI tend to have difficulties in word learning (e.g., Gray, 2004; McGregor, Newman, Reilly, & Capone, 2002).

**Word Learning Differences Between Children With and Without PLI**

Based on models of lexical processing, words are represented at the phonological, semantic, and syntactic levels (Caramazza, 1997). The phonological representation refers to information related to the sounds or combination of sounds of a word, whereas semantic representation refers to the meaning of a word. Morphological and syntactic information also contribute to the meaning of a word. The form of the word and its position in a sentence provide cues for obtaining information about the word’s meaning (i.e., syntactic bootstrapping; Gleitman, 1990).

Word learning occurs gradually (Bloom, 2001; Nelson, 1985; Vygotsky, 1986). Initially, a single or a few exposures to a novel word create a partial mental representation of that word, which includes only a few word features captured during the initial exposures to the verbal stimulus (fast mapping; Carey & Bartlett, 1978). Then, succeeding exposures to the word in a variety of contexts increase the phonological, semantic, and syntactic information associated with the word and strengthen its mental representations as shown, for example, through reduced naming errors (Gershkoff-Stowe, 2001, 2002; Gershkoff-Stowe & Smith, 1997; Gray, 2004; McGregor et al., 2002), more elaborate definitions (McGregor et al., 2002; Odoñez, Carlo, Snow, & McLaughlin, 2002), and drawings (Gray, 2004; McGregor et al., 2002).

In English-speaking monolingual populations, numerous studies have shown that children with PLI have word learning difficulties (e.g., Alt, Plante, & Creusere, 2004; Gray, 2003, 2004, 2005; Kan & Windsor, 2010; Kiernan & Gray, 1998; Rice, Buhr, & Nemeth, 1990; Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998). To differentiate children with PLI from their TLD peers, researchers have tried to identify word learning phases in which differences between the two groups are maximized. In some studies, investigators have assessed word learning in the initial phases through fast mapping (Carey & Bartlett, 1978) or quick incidental learning (QUIL) tasks (e.g., Rice, Oetting, Marquis, Bode, & Pae, 1994). In such tasks, participants are exposed to novel stimuli once or a few times, and no feedback or support is provided for learning. Other studies have assessed differences in word learning skills between monolingual children with and without PLI in later phases through supportive intervention, in which cues and/or feedback are provided (e.g., Gray, 2004, 2005; Weisman & Hesketh, 1993, 1996, 1998).

A number of studies have shown that word production tasks reveal word learning limitations in children with PLI, which suggests possible limitations in the perception or storage of, or access to, the phonological representations of the words (e.g., Dollaghan, 1987; Kan & Windsor, 2010). In the initial stages of word learning, on a fast mapping task of a single nonword, Dollaghan (1987) found statistically significant differences between preschoolers with and without PLI in word production, but not in word identification. In contrast, Alt et al. (2004) assessed the ability of children with PLI to fast map semantic characteristics of novel words in receptive tasks and found that the children with PLI had
poorer performance than their TLD peers. Past the initial stage of word learning, using supportive word learning intervention, Gray (2005) found restrictions in both phonological and semantic representations in preschoolers with PLI. Gray reported significant between-group differences in the number of words learned as measured in word identification and production tasks, regardless of the type of cues provided, phonological or semantic. In a meta-analysis of word learning studies, Kan and Windsor (2010) reported that word identification and recognition (forced choice given) tasks resulted in greater effect sizes than production tasks, but effect sizes were considered across various types of intervention (e.g., with both low and high numbers of exposures to stimuli). Given that we do not know how other task characteristics affect results, further examination of both word production and identification skills will help determine what type of assessment works best for specific tasks for accurate identification of PLI.

Kiernan and Gray (1998) examined whether a word learning task following a trials-to-criterion approach could accurately differentiate English-speaking preschoolers with and without PLI. Intervention took place during 2–4 days and included three target words, modeling of novel words (e.g., “This is a . . .”), imitation (e.g., “Can you say . . .?”), word production (e.g., “What’s this?”), word identification probes (e.g., “Point to . . .”), and feedback (correct word) in structured play activities. Task administration continued until children achieved 75% accuracy in word production in 2 consecutive days or for 4 days maximum. Kiernan and Gray found significant group differences at the production level, but 73% of the children with PLI produced the same number of words correctly as their TLD peers. Also, children with PLI who had low production scores were able to comprehend most of the target words. Subsequently, Gray (2003) used a similar task to that of Kiernan and Gray using four target words. The trials-to-criterion approach classified English-speaking preschoolers with and without PLI with 90% specificity considering word production and 93% specificity considering word identification. Sensitivity was 77% considering word production and 53% considering word identification. Later, Gray (2004) found significant differences between preschoolers with and without PLI in production, with 30% of scores overlapping between groups. Perhaps increased support through lengthy intervention facilitates word learning for children with PLI enough to reduce the gap in performance between the two groups and limit classification accuracy.

Despite the strong evidence of word learning limitations in monolingual children with PLI (e.g., Alt et al., 2004; Dollaghan, 1987; Gray 2005), to our knowledge, only one study assessed differences in novel-word learning skills between bilinguals with PLI and their TLD peers (Restrepo, 1998). Restrepo (1998) used a trials-to-criterion word learning task as part of a set of measures to assess whether such a task could identify 5- to 7-year-old, predominantly Spanish-speaking bilinguals with PLI. The task included modeling, imitation, word identification, and production probes, but only production was analyzed. Restrepo did not find significant differences in learning performance between children with and without PLI. Similar to the trials-to-criterion approaches reported earlier, it is plausible that the support provided to the children through intensive exposure to novel stimuli reduced cognitive demands and eliminated differences in processing skills between the two groups (e.g., Dollaghan & Campbell, 1998; Edwards & Lahey, 1996; Kohnert, Windsor, & Miller, 2004; Lahey, Edwards, & Munson, 2001; Montgomery & Windsor, 2007).

Factors That Influence Word Learning in Children With and Without PLI

Various studies have examined factors that may influence word learning in children with and without PLI, including the number of presentations in the input, neighborhood density, and phonotactic probability. Rice et al. (1994) investigated the influence of the number of presentations in the input on the word learning performance of 5-year-old children with and without PLI in QUIL tasks. Using eight target words, Rice et al. (1994) assessed participants’ performance when words were repeated three times and 10 times. After three presentations, only the TLD group made statistically significant gains. After 10 presentations, the group with PLI was able to fast map new words and performed similarly to the TLD group. Rice et al. (1990) also presented 20 new words, five times each, in short videos to 5-year-old children. In a word identification posttest, the authors found that the children with PLI scored significantly lower than the groups matched for mean length of utterance (MLU) and age. Results suggest that tasks aiming to differentiate the two groups should be sufficiently easy to avoid floor effects but also challenging enough to reveal the processing limitations of children with PLI.

In a meta-analysis, Kan and Windsor (2010) found that, when comparing children with and without PLI, greater numbers of exposures in a word learning task resulted in larger effect sizes than low numbers of exposures. These results should be interpreted with caution because first, as the authors indicated, there was a limited number (i.e., five) of studies available with high numbers of exposures. Second, there were significant methodological differences across studies. For example, some studies using QUIL tasks (e.g., Rice et al., 1994) were assessed together with studies using trials-to-criterion approaches (e.g., Gray, 2003, 2004, 2005), and the numbers of novel words varied across tasks. Due to methodological differences, the cognitive demands of a task in the high-number-of-exposures condition in one study may be similar to the cognitive demands of a task in the low-number-of-exposures condition in another study.

Neighborhood density (i.e., number of similar words in a given language) of words and phonotactic probability (i.e.,
frequency with which phonemes and phoneme sequences occur in a language) may also influence word learning. High neighborhood density increases cognitive demands for recognition and production because similar words compete for semantic activation (e.g., Garlock, Walley, & Metsala, 2001; Gupta & MacWhinney, 1997; Luce, Goldinger, Auer, & Vitevitch, 2000; Metsala, 1997). The more neighbors a target stimulus has, the more inhibition takes place and the more difficult it is for the target’s semantic information to become activated (Storkel & Morrisette, 2002). In addition, high phonotactic probability facilitates word learning in preschoolers (Storkel, 2001); however, some studies found the opposite pattern in children with phonological deficits (e.g., Storkel, 2004) and in Spanish speakers (e.g., Vitevitch & Stamer, 2006).

In summary, previous studies suggest that supportive novel-word learning tasks may be a promising procedure for the differentiation of children with and without PLI in monolingual populations (e.g., Gray, 2003, 2004, 2005; Kan & Windsor, 2010). DA has shown high accuracy in differentiating bilinguals with and without PLI in various areas by taking into consideration the child’s modifiability and decreasing previous language experience biases. Nonword learning tasks would further reduce such biases by ensuring that none of the children have previously heard the words. A trials-to-criterion approach may provide too much support to bilinguals with PLI and, as a result, decrease classification accuracy in such populations (e.g., Kiernan & Gray, 1998; Restrepo, 1998). A brief DA of nonword learning skills in which number of presentations, word neighborhood density, and phonotactic probability are taken into account to control for cognitive demands could give enough support to children to reveal their learning potential while challenging them cognitively so that processing limitations consistent with children with PLI could be identified correctly (e.g., Kohnert, Windsor, & Yim, 2006).

**Purpose of the Study**

The purpose of this study was to examine whether a brief DA of word learning skills that uses verbal and visual support differentiates preschool bilinguals with PLI from their TLD peers. Specifically, this study evaluated whether a set of word production and word identification scores after nine, 18, or 27 exposures, combined with modifiability scores based on the LSC and MS, could accurately classify preschool bilinguals with and without PLI.

**METHOD**

**Participants**

Twenty-eight predominantly Spanish-speaking children (15 TLD and 13 with PLI) with low socioeconomic status (SES) participated in this study. SES was assessed based on children’s eligibility for free or reduced price lunch. Thirteen children were males (6 TLD and 7 with PLI) and 15 were females (9 TLD and 6 with PLI). The mean ages were 4:9 (years;months, SD = 5.23 months) for the TLD group, and 4:6 (SD = 6.97 months) for the group with PLI. The difference in ages between groups was not statistically significant, t(22) = 1.36, p = .19. All children were recruited from public school programs in a metropolitan area in the Southwest. Consent forms and a short letter were given to teachers to distribute to children. Children whose parents signed and returned the consent forms to the teachers participated in the study. Children attended half-day preschool programs with bilingual staff, but most of the curriculum instruction was in English. All participants met the following criteria:

- Children did not have any significant hearing loss, medical problem, or cognitive problem, based on a pure-tone hearing screening (American National Standards Institute [ANSI], 1969); chart review for children with PLI; and reports from a bilingual speech-language pathologist (SLP), parents, and teachers.
- Children were identified as predominantly Spanish speaking when they met three of the following four criteria:
  - Parents reported on a parent questionnaire that the child spoke Spanish >50% of the time during the day or communicated with the majority of the family members in Spanish.
  - Teachers reported on a teacher questionnaire that the child’s English language skills were lower than those of a native speaker at least at the expressive level.
  - On a language proficiency scale (Smyk, Restrepo, Gorin, & Kapantzoglou, 2009) that uses story retell in both languages (English and Spanish) as a language elicitation technique, children demonstrated better expressive language skills in Spanish by at least .5 point on a 1- to 5-point scale with intervals of .5.
  - On the Expressive One-Word Picture Vocabulary Test—Spanish–Bilingual Edition (EOWPVT–SBE; Brownell, 2001), children named items correctly in Spanish as opposed to English >50% of the time.

All children classified as TLD also met the following criteria:

- Parents reported no concerns regarding their child’s language development (Restrepo, 1998).
- The number of grammatical errors per terminal unit (T-unit) in the Spanish language sample was <18% (Restrepo, 1998).
- A bilingual SLP concurred with the children’s identification as TLD.

All children classified as having PLI also met the following criteria:

- Parents reported concerns regarding their child’s language development.

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• The number of grammatical errors per T-unit in the Spanish language sample was ≥18%.
• A bilingual SLP concurred with the children’s identification as having PLI.

Identification Measures

Parent report. All parents completed a questionnaire requesting demographic information, parents’ and child’s education, child’s language skills, child’s medical history, family history related to language and learning abilities, and child’s exposure to and use of each language. A proxy for family SES was school lunch assistance. Parent questionnaires and consent forms were distributed and collected by the children’s teachers.

Teacher report. All teachers filled out a questionnaire for each child whose parents agreed to participate in the study. Teachers provided information regarding each child’s Spanish and English language abilities; the frequency with which the child spoke each language; and concerns regarding the children’s learning, cognitive, and social skills.

Vocabulary tests. Children took the EOWPVT–SBE, which includes picture labeling and in which responses in both languages are accepted. Naming items correctly in Spanish > 50% of the time was used as one of the criteria for determining Spanish language dominance. The measure was administered according to the instructions in the manual.

Language samples and language proficiency. Children completed a story retelling task in English and Spanish using the books A Boy, a Dog, and a Frog (Mayer, 1967a) and Frog on His Own (Mayer, 1967b). Both stories were available in both languages; the four versions were used in random order. Each language was assessed using different stories to avoid memory effects. All four versions were equivalent regarding length, vocabulary, and complexity (Smyk, Restrepo, Morgan, & Kapantzoglou, 2009). Picture support was provided when the test administrator was reading the story and during the child’s retell to decrease cognitive load. Samples were transcribed and coded using Systematic Analyses of Language Transcripts, research version (Miller & Iglesias, 2008). The language samples were segmented in T-units, which are main clauses with their subordinate clauses (Hunt, 1965). Language samples were evaluated for number of grammatical errors per T-unit (Restrepo, 1998) as a measure of language skills.

The story retelling language samples were also used to assess each child’s language proficiency scale based on a language proficiency scale that measured sentence length and complexity, grammaticality, vocabulary, and fluency in each language. Initially, each area was rated on a 1- to 5-point scale with .5 intervals, and then an overall proficiency level was determined ranging from 1 to 5 (1 = silent/observer; 2 = a few words or formulaic phrases; 3 = short sentences and phrases with multiple grammatical errors; 4 = full sentences with a few grammatical errors; 5 = native-like productions). Language samples were rated immediately after completion of the retelling task by the examiner in each language. Evidence for the validity and reliability of this language proficiency measure has been examined for Spanish–English bilingual children with varying degrees of English proficiency. Scale ratings were highly correlated with language sample analysis results, for example, for grammaticality, \( r = .73 \); for vocabulary with number of tokens, \( r = .62 \); and for MLU, \( r = .66 \). Interrater reliability for language proficiency levels was 96% (Smyk, Restrepo, Gorin, & Kapantzoglou, 2009).

DA Materials

Stimuli. Three unfamiliar target objects (an animal that could not be determined, seeds, and a bubble level presented as a toy) from three semantic categories (animal, food, and toy) and three familiar objects (flower, pizza, and sunglasses) were used. Five adults who work with children agreed that preschoolers could not identify any of the three target objects. The target words were three CVCC (consonant/vowel/consonant/vowel) nonwords ( fote, depa, and kina) that followed Spanish phonological rules. Words were chosen to be CVCC because this is a very frequent phonotactic sequence in Spanish. To minimize word misarticulations, the target words included early acquired consonants.

Nonwords as opposed to unfamiliar real words were used to control for word characteristics. To reduce cognitive demands and facilitate word learning, target words of low neighborhood density and of high phonotactic probability (Table 1) were chosen. Very low neighborhood density words were avoided because words with very few neighbors tend to sound less natural in a language. Very high phonotactic probabilities were avoided as well because word learning may be influenced by previous language experience when using

<table>
<thead>
<tr>
<th>Neighborhood density</th>
<th>Phonotactic probability</th>
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<tbody>
<tr>
<td>Fote (animal)</td>
<td>8</td>
</tr>
<tr>
<td>Depa (food)</td>
<td>9</td>
</tr>
<tr>
<td>Kina (toy)</td>
<td>9</td>
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</tbody>
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Note. Neighborhood density reflects the number of words that sound similar in Spanish due to variations in one phoneme (e.g., zero neighborhood density would indicate that no word in Spanish sounds similar to the nonword with only one phoneme difference). Phonotactic probability reflects how frequently word segments occur in their particular word position based on a database of words encountered in Spanish (e.g., zero phonotactic probability would indicate that none of the nonword segments was in a legal word position for Spanish).
words with frequent combinations of phonemic sounds (Kan & Kohnert, 2008). Less frequent phonemic sounds and combinations are probably unfamiliar to all participants; thus, previous language experience may be less influential. Target words were presented randomly in sentences of similar syntactic complexity.

**DA Procedure**

The DA task was presented in Spanish, which was the children’s stronger language. It followed a pretest–teach–posttest design and was completed in a single session of 30–40 min. Given that we taught three nonwords with three unfamiliar items in a brief session, knowledge of the words before teaching or generalization of word learning skills after teaching was not expected. In the pretest, we asked participants to name all the items to confirm that they could name all of the familiar items and none of the unfamiliar items. No child could name the unfamiliar items. Two children could not name one of the familiar items. In each case, that item was replaced with one the child could name (e.g., a ball).

Target words were taught using a scripted structured play activity following Lidz’s (1991) mediation principles (see script in the Appendix) adapted to the activity and the children’s age. An MLE approach was used with a script for consistency of procedures across participants, allowing feedback adjusted to the children’s responses (Peña et al., 2001). Interactions and the pace of the procedures were adjusted to each child’s needs (contingent responsivity and competence/task regulation). For the play activity, the examiner used puppets. The script was designed for a birthday occasion. It was one of the puppets’ birthday and her friends were coming to bring her presents, which were the three familiar and three unfamiliar objects.

The examiner established rapport with the children before initiating the activity. Affective involvement and enthusiasm were critical elements of the sessions and motivated the participants. In the beginning, the goal of the activity was stated explicitly (mediation of intentionality): “Now, we are going to play and learn some new words. Try to remember the names of the objects...” Also, before each assessment, the examiner said: “Now let’s see if we remember the names of the objects.”

The purpose (mediation of meaning) was communicated mainly by connecting the activities with the children’s previous experiences (mediation of transcendence): “Try to remember the names of these toys, the same way you remember the names of objects you have at home. What kinds of objects do you have at home? Do you have toys? What toys do you have?” If the child did not name any, the examiner said: “Do you have cars? Barbies? You know their names!” The examiner repeated some of the toys the child mentioned and said: “These are the names of your toys.”

Children were helped to develop a plan for this session as follows: “Now I would like you to remember the names of objects we are going to see here. We are going to play and I am going to help you. Do your best. When we are done, you can pick a sticker.” Also, while working on the first two familiar words, the examiner reminded the children to focus on the names of the objects when giving feedback by saying, for example, “Yes, pizza, like this, keep giving me the names of objects.” Finally, before starting each new phase, the examiner said, “Remember, you have to pay attention to the names of the objects. To remember their names really well, we are going to play this game one more time.” At the end of each assessment, the examiner commented on positive change by saying, for example, “You are learning new words!”

Each word was addressed individually, with the following sequence of presentation: two familiar words, so the child would become familiar with the task; two unfamiliar words; then, a familiar word followed by an unfamiliar word, using an alternating pattern to avoid frustration.

Each word was presented nine times in the script, including the feedback (e.g., “yes, it’s a depa” for a correct response or “it’s a depa, what is it?” in case of an incorrect response). The words were always matched with their referents. Imitations were elicited on three occasions. An additional imitation was requested in the cases of incorrect responses without providing additional input or feedback in this case, as seen in the earlier examples. Thus, all children were given the opportunity to produce each word correctly three times. Correct productions were considered those in which the child produced all of the phonemes of the word correctly. Children who presented with phonological processes were identified during the EOWPVT–SBE and the story retelling task. Their responses were considered correct if the children demonstrated consistent phonological processes or phonemic errors.

The examiner provided support for learning for each word as follows: The examiner reported the category in which each item belonged (e.g., animal, food, or toy); talked about its function/use (e.g., she can cook them with meat) using a corresponding gesture at the same time; provided a description (e.g., it has a bubble); allowed the child to manipulate the object to become familiar with its characteristics (e.g., shape); and asked the child to imitate the word on three occasions. The first imitation requested was an immediate imitation (e.g., “Mr. Cow brought her a depa. What is this?”). The second imitation was requested after a gesture (e.g., “Give the depa to Lola. What’s this?”). Finally, the third imitation requested was a delayed imitation (e.g., “The depa tastes good. Lola can cook it with meat. What is this?”).

**Probes.** The script as described previously was used three times in the DA session (Phase 1, Phase 2, and Phase 3). At the end of each phase, the examiner assessed the child’s ability to identify and name the objects. The examiner put all objects, familiar and unfamiliar, on the table and asked the...
considered the two scales separately given that the two scales of the modifiability, called the modifiability index (MI), as the mean of which are scored on a 4-point scale (1–4) and one on a 3-point scale (1–3), for a total of 11 possible points. This measure addresses examiner’s effort, child’s responsivity, and transfer. Peña et al. (2001) calculated a total score for modifiability, called the modifiability index (MI), as the mean of the z scores for each scale. In this study, however, we considered the two scales separately given that the two scales address different constructs.

General Procedure

Each child participated in three sessions of 30–40 min each. Children were seen during the school day in a quiet room in the school. In the first two sessions, preliminary testing was completed for participant recruitment and placement in the appropriate group (TLD or with PLI) by the first author, who was blind to the children’s diagnoses at that time. In the first session, children completed the EOWPVT–BSE and the story retell task in one of the two languages. In the second session, the children completed the Receptive One-Word Picture Vocabulary Test—Spanish-Bilingual Edition (ROWPVT–SBE; Brownell, 2000) and the story retell task in the other language. Results from the ROWPVT–SBE were not used for this study. In the third session, children participated in the three-phase DA task. Sessions were conducted at least 1 day apart to avoid participant fatigue.

DA Training

All DA sessions were conducted by a single research assistant (RA) who was a native Spanish speaker and second-year master student with extensive experience working with children. The RA was blind to the purpose of the study and the children’s diagnoses. Training was provided by the first author in three sessions. At the end of each training session, the RA completed a self-evaluation and the first author assessed the RA’s performance using Lidz’s (1991) mediation principles with a pass/no pass criterion. Training sessions were completed when both the author and the RA agreed that the RA was following the mediation principles.

Reliability

In 57% (16/28) of the sessions, the first author was present to ensure procedural integrity, and scored outcomes simultaneously with the RA. Interrater reliability was calculated for each phase separately based on the word production and word identification scores in that phase, along with the LSC and MS scores. For the LSC scale (0–26 points possible), ratings were considered to be in agreement if the total scores were within two points of difference. For the MS scale (0–11 points possible), ratings were considered to be in agreement if the total scores were within one point of difference. Levels of interrater agreement for word production and identification scores in Phase 1, Phase 2, and Phase 3 were 91%, 100%, and 94%, respectively. Interrater agreement for LSC and MS scores was 94% and 97%, respectively. When there was lack of agreement, the scores of the RA were maintained.

Regarding the language sample analyses, 18% (10/56) of randomly selected samples were double scored. Interrater agreement for total number of words was 99%; for T-units, 98%; and for grammatical errors, 93%.

Data Analysis

Descriptive statistics were estimated for each group and phase separately. Between-group differences for each of the measures were assessed using independent t tests. Three discriminant analyses, one for each phase, were conducted using SPSS for Windows Release 11.0.1 (SPSS Inc., 2001) to assess whether word production, word identification, LSC, and/or MS scores classified children with and without PLI accurately. The Bonferroni procedure was used to control for Type I error, so alpha was set at .016 for each discriminant analysis. The three discriminant functions were assessed based on their level of significance and effect size.

Follow-up analyses were conducted for the statistically significant discriminant function. Sensitivity and specificity were calculated to assess the percentage of children with PLI who were classified as with PLI and the percentage of children with TLD who were classified as with TLD, respectively. To estimate classification accuracy in a hypothetical new sample, the percentage of participants who were correctly classified was also estimated using the leave-one-out
procedure. The correlation between each measure and the discriminant function (structure correlation coefficients), and the unique contribution of each measure with respect to the discriminant function in differentiating groups (standardized discriminant function coefficients) were provided.

RESULTS

Means and standard deviations for word production and word identification for each group for Phases 1–3 are presented in Table 2. As expected, means tended to be higher in the TLD group. A series of t tests allowing for unequal variances between groups showed significant between-group differences for word identification in Phase 1, t(24) = 2.16, p = .04, and for LSC, t(21) = 2.92, p < .01. Between-group differences were not significant for MS, p = .06, or for word production in Phase 1, p = .10, Phase 2, p = .83, and Phase 3, p = .34; or for word identification in Phase 2, p = .10, and Phase 3, p = .32. Correlations among the variables for each group are shown in Table 3. For the TLD group, a significant correlation was found between word production in Phases 1 and 3, r = .60, p = .03; and LSC and MS, r = .90, p < .01.

Three discriminant analyses, one for each phase, were conducted with word production scores, word identification scores, LSC scores, and MS scores entered as predictors. Considering the high correlation between the LSC and the MS in the group with PLI and the small unique contribution of MS with respect to the discriminant function in differentiating groups, MS was removed and the discriminant analyses were conducted again using only word production, word identification, and LSC scores as predictors. Results were very similar for analyses with and without inclusion of MS; therefore, we present only the results of the latter analysis with the most parsimonious group of predictors. Effect sizes and the classification accuracies of the discriminant analyses by phase are given in Table 4.

The discriminant function for Phase 1 was statistically significant, η² = .39, Λ = .61, χ²(3, N = 28) = 12.31, p = .01, indicating that Phase 1 word production and word identification scores, in combination with the LSC scores, differentiated significantly the group with and without PLI. The overall Wilk’s lambda was neither significant for Phase 2, η² = .31, Λ = .69, χ²(3, N = 28) = 9.22, p = .04, nor for Phase 3, η² = .27, Λ = .73, χ²(3, N = 28) = 7.65, p = .05. We focused our follow-up analyses on Phase 1 measures because the greatest differentiation was observed at this phase.

For Phase 1, the discriminant function classified 78.6% of the sample correctly as TLD or PLI. Sensitivity was 76.9%, with 10 of the 13 children with PLI classified correctly. Specificity was 80%, with 12 of the 15 TLD children classified correctly. The leave-one-out procedure yielded cross-validation classification accuracy of 78.6%. Table 5 shows the structure coefficients and standardized discriminant function coefficients for the Phase I discriminant analysis. Based on both sets of coefficients, word identification and especially LSC demonstrated strong relationships with

Table 2. Means and standard deviations of measures by group.

<table>
<thead>
<tr>
<th>Measure</th>
<th>TLD (n = 28)</th>
<th>PLI (n = 13)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Production Phase 1</td>
<td>.33</td>
<td>.49</td>
</tr>
<tr>
<td>Production Phase 2</td>
<td>.27</td>
<td>.46</td>
</tr>
<tr>
<td>Production Phase 3</td>
<td>.53</td>
<td>.74</td>
</tr>
<tr>
<td>Identification Phase 1</td>
<td>2.00</td>
<td>.85</td>
</tr>
<tr>
<td>Identification Phase 2</td>
<td>2.20</td>
<td>.86</td>
</tr>
<tr>
<td>Identification Phase 3</td>
<td>2.33</td>
<td>.90</td>
</tr>
<tr>
<td>LSC</td>
<td>18.13</td>
<td>3.68</td>
</tr>
<tr>
<td>MS</td>
<td>9.53</td>
<td>1.13</td>
</tr>
</tbody>
</table>

Note. TLD = children with typical language development; PLI = children with primary language impairment; LSC = Learning Strategies Checklist (Lidz, 1991; Peña, 1993); MS = Modifiability Scale (Lidz, 1991; Peña, 1993).

Table 3. Correlations among measures for the group with and without PLI.

<table>
<thead>
<tr>
<th></th>
<th>P2</th>
<th>P3</th>
<th>I1</th>
<th>I2</th>
<th>I3</th>
<th>LSC</th>
<th>MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLD (n = 15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>.11</td>
<td>.46</td>
<td>.00</td>
<td>.05</td>
<td>.31</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>–</td>
<td>.03</td>
<td>.19</td>
<td>.22</td>
<td>.23</td>
<td>.40</td>
<td>.26</td>
</tr>
<tr>
<td>P3</td>
<td>–</td>
<td>–</td>
<td>.46</td>
<td>.16</td>
<td>.46</td>
<td>.36</td>
<td>.49</td>
</tr>
<tr>
<td>I1</td>
<td>–</td>
<td>–</td>
<td>.20</td>
<td>.56*</td>
<td>.28</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>I2</td>
<td>–</td>
<td>–</td>
<td>.00</td>
<td>.28</td>
<td>.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I3</td>
<td>–</td>
<td>–</td>
<td>.05</td>
<td>.33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSC</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>.36</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PLI (n = 13) |      |      |      |      |      |      |      |
| P1     | –.16 | .43  | –.07 | .37  | .27  | .06  | .05  |
| P2     | –    | .82**| .06  | .09  | .20  | .50  | .60* |
| P3     | –    | –    | .01  | .30  | .34  | .42  | .52  |
| I1     | –    | –    | .35  | .43  | .09  | .00  |      |
| I2     | –    | –    | .36  | .23  | .18  |      |      |
| I3     | –    | –    | .20  | .16  |      |      |      |
| LSC    | –    | –    | –    | .90**|      |      |      |

Note. P1 = Production Phase 1; P2 = Production Phase 2; P3 = Production Phase 3; I1 = Identification Phase 1; I2 = Identification Phase 2; I3 = Identification Phase 3.

*p ≤ .05; **p ≤ .01.
the discriminant function and were therefore important in distinguishing between groups with and without PLI.

**DISCUSSION**

This study examined whether a DA of word learning skills can accurately differentiate predominantly Spanish-speaking preschoolers with PLI from their TLD peers. Specifically, this study investigated whether word production and word identification scores after nine, 18, or 27 exposures to novel words (Phases 1, 2, and 3), combined with children’s modifiability scores, could accurately classify children with and without PLI. The target words were three nonwords that were associated with three unfamiliar referents. Word production, word identification, and modifiability were addressed using a pretest–teach–posttest design. It was hypothesized that word learning skills assessed based on word production, word identification, and modifiability would classify participants with high accuracy.

Three discriminant analyses were conducted using the word production and identification scores in each phase, respectively, combined with the LSC and the MS scores. Classification was more accurate when scores from Phase 1 were considered in combination with the LSC modifiability scale. Phase 1 included nine exposures to each novel word; three word imitations; and verbal and visual cues such as iconic gestures, descriptions, physical manipulations, the main function, and the semantic category of each word. Overall, 78.6% of the participants were classified accurately, with 76.9% sensitivity and 80% specificity. These results were lower than the 90% classification accuracy suggested for measures of PLI (Plante & Vance, 1994). Nonetheless, considering the low effectiveness or efficiency of existing measures, and that methodological modifications could improve the identification accuracy of the current task, results suggest that DA of word learning skills is a promising tool for screening language skills for PLI in bilinguals. Based on the findings from the discriminant analysis, the word identification and LSC scores were the best predictors of children’s diagnosis as TLD and with PLI.

Our findings are consistent with those of Ukrainetz et al. (2000), who found that modifiability scores were the strongest component that separated strong and weak language learners in Native American kindergartners. However, Ukrainetz et al. reported that the MS was a stronger predictor than the LSC, which is opposite to the findings in the current study. In this study, the unique contribution of the MS with respect to the discriminant function in differentiating groups was small, and classification accuracy remained the same when MS was removed from the predictors. Given the greater variety of behaviors specified and scored with LSC compared to MS, perhaps the LSC facilitated a more refined assessment of children’s modifiability during the task. The results of the current study are also consistent with those reported by Peña et al. (2001), who found that the classification accuracy of a dynamic version of the EOWPVT–R improved when scores were combined with modifiability. Peña et al. combined LSC and MS scale scores by taking the mean of the z scores on each scale, so the individual contribution of each scale to classification accuracy was not reported.

The results of higher classification accuracy when considering word learning after only nine exposures to the novel words coincide with research suggesting that children with PLI have limited abilities to fast map the semantic characteristics of novel words (e.g., Alt et al., 2004; Dollaghan, 1987). In addition, the DA process indicated that word identification scores are a better predictor of children’s language skills in comparison with expressive scores. This is consistent with results by Alt et al. (2004), which suggested that children with PLI have limited abilities to fast map the semantic characteristics of novel words in receptive tasks in relation to their TLD peers. It may be that additional

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Structure coefficients</th>
<th>Standardized discriminant function coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSC</td>
<td>.73</td>
<td>.76</td>
</tr>
<tr>
<td>Identification</td>
<td>.53</td>
<td>.42</td>
</tr>
<tr>
<td>Production</td>
<td>.41</td>
<td>.55</td>
</tr>
</tbody>
</table>
exposures to novel stimuli facilitate learning for the children with PLI, at least at the receptive level, and therefore reduce the difference between the two groups. Results from follow-up $t$ tests for each phase (within-time differences) supported this claim, with statistically significant between-group differences after nine exposures but not after 18 or 27 exposures. A larger sample is necessary to assess group differences across time with adequate precision and power. Limited fast mapping abilities could be an indicator of poor information processing skills, which appears to be a key point of difference between children with and without PLI (e.g., Dollaghan & Campbell, 1998; Gray, 2004; Kohnert et al., 2006).

The result of better differentiation in Phase 1 than in Phase 2 or 3 contrasts those found in Kan and Windsor’s (2010) meta-analysis; their effect size estimates indicated that higher numbers of exposures better shows the differences in learning between groups with and without PLI. As discussed earlier, the meta-analytic results should be interpreted with caution due to the limited number of studies available with high numbers of exposures and to methodological differences in the studies examined. For example, the number of words used in the tasks varied across studies: Rice et al. (1994) used eight words, Gray (2003, 2004, 2005) used four words, and three were used in the present study. Also, Gray (2003, 2004, 2005) used trials-to-criterion approaches, providing minimal contextual support for learning, which probably required more exposures for learning than the current study in which there was more contextual support. Further, what was considered “low” and “high” numbers of presentations also varied across studies. For instance, in the study by Rice et al. (1994), the condition with the higher number of presentations included 10 presentations of each of the eight words, whereas in the current study, the condition with the lowest number of presentations, Phase 1, included almost the same amount of presentations (nine) for each of the three words. Several task characteristics need to be taken into account to make judgments regarding the cognitive demands of each task. Cross-study comparisons at this point do not seem helpful for drawing conclusions regarding how a particular task characteristic, such as number of presentations, influences task effectiveness, because other task features were not held constant across studies.

Better differentiation from word identification rather than expressive scores is consistent with Kan and Windsor’s (2010) meta-analytic findings that word identification and recognition tasks resulted in greater effect sizes than word production tasks. However, these results contrast with those of Gray (2003, 2004) and Kiernan and Gray (1998), who used trials-to-criterion approaches and found that word production measures were more predictive of PLI than word identification in word learning studies. It is possible that the support provided to children through a trials-to-criterion approach helped the children with PLI and minimized their learning differences for word identification but not for word production, which appears to be a more challenging task. By including a brief intervention, DA perhaps helped TLD children establish strong enough representations for word identification while being challenging enough for children with PLI to reveal their limitations in word learning at the identification level. Methodological variations in word learning activities seem to influence the outcomes considerably.

Follow-up $t$ tests for each phase showed no significant differences between the groups with and without PLI in word production after any of the three teaching phases; nevertheless, interpretation of such results should be made cautiously because all children scored poorly on the expressive task. Children in both groups had difficulties naming the novel words accurately even after 27 presentations, suggesting that the naming task may have been too difficult for the participants. Considering similar results from previous studies (e.g., Gray, 2003), learning novel words well enough to name their referents seems to require not only a variety of cues, but also a great number of presentations of the novel words in a variety of supportive contexts. The current study used a 30- to 40-min session for the intervention with a maximum of 27 presentations of each novel word, whereas previous research has used more than one session (e.g., Gray, 2003, used up to four sessions) with similar numbers of presentations per session.

In the current study, even though a variety of cues were provided and word characteristics such as neighborhood density and phonotactic probability were manipulated to decrease cognitive demands for production, this brief task was not sufficient to help children produce the novel words, even for the TLD group. However, making the task easier by reducing the number of words or increasing the number of presentations, for example, may increase differentiation based on production but may also impact word identification, which differentiated the children well. Perhaps these two areas should be assessed separately while providing the adequate level of support in each case to avoid floor or ceiling effects. It is also possible that evaluating partial word learning may be more productive than examining full production probes, as children were able to retrieve a label on the incorrect referent.

At times, children with and without PLI were able to retrieve the novel words but with an incorrect referent, suggesting early phonological mapping of the word. On other occasions, children reported the semantic category or similar real words differing in one or more phonemes. The variety of errors reflects the diversity of challenges that children may face during word learning and demonstrates that partial word learning is taking place, especially in a brief session. Such errors support results from previous studies (e.g., McGregor et al., 2002) indicating that encoding happens gradually and that, although children may be able to produce a word, they may not comprehend it totally. Further, partial word
learning results indicate that in the initial stages of word learning, children may have the phonological or semantic map, but not both. Therefore, use of measures that are more sensitive to partial word learning may lead to better differentiation between groups.

Data from the current experimental study yielded promising results for using DA as an alternative method for evaluating vocabulary learning skills in predominately Spanish-speaking preschoolers. Static vocabulary measures are not accurate in differentiating children with and without PLI and are often biased for bilinguals (e.g., Gray, Plante, Vance, & Henrichsen, 1999; Peña et al., 2001). Children’s potential to change through adult guidance in this word learning task was a good indicator of their overall language abilities (ZPD; Vygotsky, 1978). Further support of such outcomes would have significant clinical implications for the differentiation of bilinguals who present with language difference from those who have language impairment. Assessing language learning skills as opposed to existing knowledge reduces biases of previous language experience (e.g., Peña et al., 2006; Ukrainetz et al., 2000). In addition, assessment of the child’s attention, self-regulation, planning, motivation, and response to intervention seems to provide valuable information for an accurate diagnosis (e.g., Peña, 2000; Peña et al., 2001, 2006; Ukrainetz et al., 2000). Competent SLPs may intuitively take such factors into consideration in both assessment and intervention and provide additional support for learning. In DA, the clinician addresses these areas by following the mediation principles and evaluates them more systematically as part of the assessment process. These results suggest that brief word learning tasks reveal slower learning processes in children with PLI, but longer adult–child interactions also provide necessary information regarding children’s learning strategies and modifiability. Assessing word learning skills at various levels may be the key to an accurate diagnosis of PLI.

Limitations and Future Directions

The current study indicates that DA of word learning skills can be used to screen language skills for PLI in young bilinguals. However, it is important to consider that the cognitive demands of the word learning task are highly sensitive to methodological variations and may influence classification accuracy. This study took into consideration a number of task characteristics, but results indicate that further methodological manipulations could facilitate word production and improve classification accuracy. Systematic manipulations of one task characteristic at a time would facilitate better understanding of how task demands change and influence classification accuracy. The current study assessed changes in classification accuracy when the numbers of exposures changed, but more exposures and/or imitations seem necessary for greater performance across groups in word production. Such modifications and a larger sample size are needed to examine more accurately group differences across times. Examination of partial word learning may also help improve discrimination between groups with and without PLI. Further, in some circumstances, DA of other skills may be more accurate, considering that not all children with PLI may have word learning difficulties (Gray, 2004). For example, Roseberry and Connell (1991) and Anderson (2001) used rule learning rather than a word learning task to examine differences between preschool Spanish speakers with and without PLI.

In summary, the current DA method of word learning shows promise as an adequate tool for screening Spanish-speaking children who are at risk of PLI. It is possible that this measure alone is not sufficient for 90% accuracy in classification (Plante & Vance, 1994). However, classification accuracy is good for screening purposes, and given the brief administration time, the task is clinically efficient. The results indicate that word comprehension after nine exposures in combination with the LSC classified children with near 80% accuracy. Future research may make small modifications to the task to examine improvement in classification accuracy.

REFERENCES


APPENDIX. SCRIPT

The following instructions were provided in Spanish:

“Now, we are going to play and learn some new words. Try to remember the names of the objects. The same way you remember the names of objects you have at home. What kinds of objects do you have at home? Do you have toys? What toys do you have? (If the child doesn’t name any items say: “Do you have cars? Barbies?”) You know their names! (Repeat some of the toys the child mentioned and say: “these are the names of your toys”). Now, I would like you to remember the names of objects we are going to see here. We are going to play and I am going to help you. Do your best. When we are done, you can pick a sticker.”

While working on the first two familiar words, the examiner emphasized to the children to remember the names of the objects when giving feedback by saying for example “yes, pizza, like this, keep giving me the names of objects.” Also, before assessing word identification and production the examiner said: “Now let’s see if we remember the names of the objects.” After the assessment, the examiner said: “You are doing very well! You are learning new words! To remember them really well, we are going to play this game one more time. Remember, you have to pay attention to the names of the objects.”

Example of script (English translation):

(Mr. Chicken/Food - DEPA)

Knock knock… Who is it? It’s Mr. Chicken! The chicken brought her DEPA.

**Imitation:** What’s this?

*Correct response:* Yes, DEPA.

*Incorrect response:* _____________ DEPA, what is it?

*Another incorrect response:* MOVE TO THE NEXT STEP. NO FEEDBACK.

Lola wants you to look at it (use Lola). “Look at my DEPA” (puppet gives object to the child - manipulation 5 sec). Give the DEPA to Lola.

**Imitation:** What is this?

*Correct response:* Yes, DEPA.

*Incorrect response:* _____________ DEPA, what is it?

*Another incorrect response:* MOVE TO THE NEXT STEP. NO FEEDBACK.

Lola liked the DEPA. The DEPA is food! Look, they are small balls. The DEPA tastes good! Lola can cook it (gesture) with meat.

**Imitation:** What is this?

*Correct response:* Yes, DEPA.

*Incorrect response:* _____________ DEPA, what is it?

*Another incorrect response:* MOVE TO THE NEXT STEP. NO FEEDBACK.
Dynamic Assessment of Word Learning Skills: Identifying Language Impairment in Bilingual Children

Maria Kapantzoglou, M. Adelaida Restrepo, and Marilyn S. Thompson

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