ABSTRACT: Purpose: Vietnamese children's performance on language-based processing tasks of fast-mapping (FM) word-learning and dynamic assessment (DA) word- and rule-learning tasks were investigated.

Method: Twenty-one first- and second-generation Vietnamese preschool children participated in this study. All children were enrolled in 2 Head Start programs in a large city in the Midwest. All children had passed a developmental assessment and routine speech, language, and hearing screenings. All participants were taught 4 invented monosyllabic words in an FM word task, an invented monosyllabic suffix rule (-po) meaning “a part of” in a DA rule task, and 4 invented bisyllabic words in a DA word task. Potential relationships among task performances were investigated. Receptive task performances, expressive task performances, and task totals were added to create receptive total, expressive total, and accumulated performance total (APT) scores. Relationships among receptive total, expressive total, and APT scores were also investigated.

Results: Significant correlations were found between FM word, DA rule, and the receptive total. The expressive total correlated with all task total scores, APT, age, and modifiability scores. Modifiability scores correlated with the two DA tasks, expressive total, and the APT. Findings indicate that FM word and the expressive total were positively correlated with most of the other tasks, composite totals, and age.

Clinical Implications: Performance on language-based processing tasks may provide valuable information for separating typically developing Vietnamese preschool children from their peers with language disorders. Practitioners should consider linguistic characteristics of target stimuli. Comparisons should include task, receptive, expressive, and APT.

KEY WORDS: Vietnamese, language-based processing tasks, fast mapping, dynamic assessment

C hildren from culturally and linguistically diverse (CLD) backgrounds are often overreferred or underreferred for special education services (Donovan & Cross, 2002). In fact, Donovan and Cross found that African American and Native American children tend to be overreferred and Asian and Latino children tend to be underreferred for special education assessment or services. This finding was also supported by a study by Hwa-Froelich and Westby (2003), who found that elementary and Head Start teachers were reluctant to refer Asian children and other children learning English as a second language (ESL) for special education services. To avoid underidentification of Asian children for language-learning problems, it is important to identify appropriate assessment strategies for this population.

SOUTHEAST ASIAN POPULATION

The Asian population is the fastest growing population in the United States, increasing 85% since 1980 and 48% since 1990 (U.S. Bureau of the Census, 2000). Currently, Asians are beginning to migrate to states where few Asians have lived before, and many states are unprepared for meeting the educational needs of Asian children. The Midwest is a good example of a region that has a growing Southeast Asian population, where a 34% to 36% growth occurred in Kansas and Missouri since 1990 (U.S. Bureau of the Census, 2000). The U.S. Census projects that by 2050, one of every ten children will be from Asian/Pacific islander descent (Hendriksson, 2002). The latest surge in
this minority group came from the recent immigration of Southeast Asian refugees (Hmong, Laotian, Cambodian, and Vietnamese). Of these Southeast Asian groups, the Vietnamese have had the largest increase, growing 125% since 1980 and 89% since 1990 (Asian Nation, 2004).

The Vietnamese refugee immigrant population came to the United States in three waves (Chan, 1998). The first wave included well-educated professionals and military personnel. The second wave included high-risk relatives of the first wave and children born of American military personnel, the Amerasians. The third wave included ethnic Chinese who were facing increased discrimination and threats from the government and refugees who were from rural, agricultural, and less educated backgrounds. The third wave of refugees had lower levels of education and less exposure to English than the previous waves. The Southeast Asians (Cambodians, Laotians, Hmong, and Vietnamese) are dispersed throughout the United States and are represented in most states. After the initial migration to the United States, a second migration occurred, in which 69% of the Vietnamese migrated to California and Texas (Chan, 1998).

The Vietnamese language is monosyllabic and tonal (see Hwa-Froelich, Hodson, & Edwards, 2002, for a review). Few consonant clusters exist in the language, and many vowel diphthongs and triphthongs are used. In addition, there are few final consonants or disyllabic combinations. Some phonemes are the same for both Vietnamese and English, but there are many English phonemes that do not exist in Vietnamese and many Vietnamese phonemes that do not exist in English. Vietnamese is also not a highly inflected language. Therefore, the influence of Vietnamese on English words and sentence constructions could impact phonological productions, making language assessment of Vietnamese children challenging.

Both early childhood educators and elementary teachers working with Southeast Asian children have reported that few Asian children are referred for special education services until fifth or sixth grade because of the difficulty in determining whether learning problems are due to learning ESL or to more general language-learning problems (Hwa-Froelich, 2000; Pang & Cheng, 1998). Hwa-Froelich and Westby (2003) found that although an interpreter was used in the assessment of Vietnamese children (Hwa-Froelich, 2000), inappropriate assessment practices were used. Standardized English tests were translated into Vietnamese, when no normative data existed for Vietnamese children’s performance on these standardized measures. In addition, little training was given to the interpreter as to how to administer tasks or interpret responses to score the items accurately. Early referral/identification of Southeast Asian immigrant children with learning difficulties would lead to timely intervention and a reduction of significant academic problems in the future.

**Language Assessment of Bilingual Children**

Not all bilingual children have equal exposure to both languages. Thus, one of the major problems in the assessment and identification of language-learning problems in bilingual children is the assessment of multiple languages that may be at different stages of acquisition. Many children learn one language at home and begin to learn a second language (L2) when they attend school. Some may attend preschool at age 3; others may have their first exposure to school at age 5. Cummins (1985) hypothesized that a critical threshold of competency (i.e., an ability to produce and interpret intelligible utterances) in the native language is needed to support positive, linguistic knowledge transfer to develop language and literacy in the L2. However, not all children reach this level of competency in one language before being exposed to another language, nor do they receive equal levels of exposure or quality in multiple languages. Both the quality and quantity of exposure to the L2 influences L2 acquisition (Fillmore, 1982). In addition, not all children may have similar developmental acquisition patterns for both languages (Kohnert, Bates, & Hernandez, 1999), and some may not have achieved linguistic competence in either language at the time of testing. It is difficult to determine whether a lack of linguistic competence is due to a language disorder or a difference in L2 acquisition. Because of these challenges involved in the assessment of children from CLD backgrounds, these children often do not receive appropriately matched educational services.

It has been suggested that children’s academic performance is significantly related to their language-learning ability (see Gutierrez-Clellen, 1999a & b, for reviews). Because children may not have competence in either their native language or their L2, perhaps the one way to assess whether a child has a language-learning disorder is by assessing his or her language-learning ability. Therefore, assessment tools that assess the process of language learning, such as fast mapping (FM), quick incidental learning (QUIL), and dynamic assessment (DA), may be a viable alternative to traditional static or knowledge-based measures of language.

**Language-Based Processing Tasks**

Assessments of the language-learning process involve measuring the rate of learning, strategies the learner used, or the amount of assistance the learner needed to learn novel stimuli. FM and QUIL refer to the learning skills that children use to cognitively map novel stimuli or partial meanings of novel from familiar stimuli presented in different contexts. Carey (1978) hypothesized that children are exposed to a new word and mentally record (fast map) information about the new word after a single or few experiences with the word. This initial map is refined through additional encounters with the word and as the child gains additional information. Early FM studies involved measurement of word knowledge after a onetime presentation of a novel word and referent (Carey, 1978; Carey & Bartlett, 1978; Dollaghan, 1985). In comparison, Rice and colleagues (Rice, Buhr, & Nemeth, 1990; Rice & Woodsmall, 1988) and Oetting, Rice, and Swank (1995) contended that children learn words in the context of an adult interacting with the child by introducing a novel
name for an unfamiliar object or object characteristic. Thus, QUIL involves a more complex learning context where children must quickly map novel referents within a continuous verbal dialogue of both novel and familiar words. Similarly, in studies using miniature artificial languages, researchers theorized that grammatical relationships are learned passively and implicitly from exposure or observation (see McLaughlin, 1980, for a review).

In both FM and QUIL, children participate in an activity in which they hear novel or unfamiliar stimuli. The adult does not attempt to teach the target stimuli to the child, but simply provides opportunities for the child to hear the words or concepts. Children are then presented tasks requiring them to display their ability to comprehend and/or produce the spoken target stimuli with picture or object stimuli.

In contrast to FM and QUIL tasks, DA tasks involve active teaching by adults who carefully mediate the child’s learning (Feuerstein, Rand, Morgens, Kaniel, & Tzuriel, 1987). These mediated learning experiences (MLEs) should include several types of mediation (Litz, 1991):

- **Mediation of intentionality:** communicating to the child the purpose for the interaction and attempting to maintain the child’s involvement in the interaction.
- **Mediation of meaning:** focusing the child’s attention on what is important in a given context and helping the child understand its value and relevance.
- **Mediation of transcendence:** bridging concepts and events beyond the immediate task by relating specifics of the interaction to other experiences that the child has had or may have in the future.
- **Mediation of competence:** encouraging a strategic, deliberate approach to problem solving and manipulating the task to enable the child to be and feel successful.

In DA, the focus is not simply on what children are able to learn, but also on how they learn. Measurement of learning may include rate and amount of novel stimuli learned as well as an examiner’s judgment of the modifiability of the child in terms of attention to the task, accuracy of responses, and amount of examiner effort expended during the mediation and administration of the tasks.

Modifiability is defined as a child’s “changeability” when he or she is given the opportunity to learn in a supportive environment through mediated learning [and is] a combination of planning, attention to task/discrimination, motivation, transfer, responsivity, and examiner effort. (Peña, 2000, p. 87)

Research involving these kinds of process-based language-learning tasks will be described in a later section.

**FM or QUIL.** Several researchers have studied the hypothesis generated by Carey (1978) that children fast map novel stimuli after one or a few exposures. FM and QUIL have been studied in young children both to understand typical language acquisition (Behrend, Scovel, & Kleinneck, 2001; Bloom & Markson, 2001; Dollaghan, 1985; Halberda, 2003; Landau & Shipley, 2001; McIlvane & Wilkinson, 2001) and as a method for discriminating between children with typical language-learning development and children who have language-learning difficulty (Braine, Brody, & Brooks, 1990; Rice et al., 1990; Oetting et al., 1995; Wilkinson & Green, 1998).

In an FM investigation, Dollaghan (1985) exposed 35 typically developing preschool children between the ages of 2:1 (years;months) and 5:11 to a monosyllabic nonsense word (koob) and a novel referent (white, ring-like shape) along with a pen and a fork and three hiding places (box, cup, wrapping paper). The children were asked to hide the pen and the fork and then the koob. Two unfamiliar objects were added to the array, and the children were asked to feed a puppet the pen, then the koob, and then the fork. They were then asked to label the pen, fork, and koob. After the first exposure, 91% of the participants selected the koob object when asked to hide it, 81% identified the object from the five objects when they heard the nonsense word label, and 45% produced two of the three phonemes. Thus, expressive learning was more challenging than receptive learning.

To explore FM ability in more natural contexts of continuous adult discourse and novel referents intermixed with familiar referents, Rice and colleagues (1990) explored the use of QUIL with children with and without language impairments. They presented videotaped stories to 3- to 5-year-olds with language impairments, typically developing children matched for mean length of utterance (MLU), and age-matched typically developing children. While watching the videotapes, the children heard unfamiliar vocabulary for objects, actions, attributes, and affective states four times during the video story. For example, for the words nurturant and artisan, the children heard, “The artisan comes down the road. The artisan is a kind nurturant man. ‘Come with me,’ says the nurturant artisan. ‘Wait here,’ says the nurturant artisan.” Children were then shown plates of four photographs and asked to point to the targeted word. Although the children with specific language impairment (SLI) exhibited some FM ability, their performance was significantly less than that of their MLU- and age-matched comparison groups. The grammatical function of the words, whether they were object or attribute but not action or affective state words, influenced group performance.

This study was replicated with older children from 6 to 8 years of age (Oetting et al., 1995). Although these older children learned more words than the preschool children did, all children showed the most gains on learning object labels. There were significant differences between typically developing children and children with SLI, who exhibited greatest difficulty in learning action words.

FM or QUIL has also been used to investigate language learning by Spanish-speaking children. Jacobs (1998) created a computerized language screening test using invented words and morphemes to denote objects, characters, and actions on a computer screen. Test instructions were designed to model appropriate responses without using either the English or Spanish language. Twenty-nine Anglo/English-speaking and 31 Hispanic/Spanish-speaking 7- to 8-year-olds completed the screening test. Twenty-one children were language-learning disabled and 39 were non-language-learning disabled. Overall, the children without impairment
learned more language items than did the children with language impairment.

These FM and QUIL studies show three main findings: (a) Learnability increases from preschool to elementary years, (b) learnability is influenced by the grammatical class of language elements to be learned, and (c) English- and Spanish-speaking children with language-learning disorders have greater difficulty learning novel or invented linguistic stimuli than do typically developing English- or Spanish-speaking peers. Children with language-learning problems may exhibit FM or QUIL skills with lexical stimuli that typically developing children learn at earlier ages. In addition, performance on both FM and QUIL tasks seems more highly correlated with receptive than expressive language learning (Dollaghan, 1985; Gray, 2003; Rice et al., 1990).

Although these studies indicate that different types of learnability measures may be needed for children of different ages, it is unknown whether different tasks are needed to measure expressive language performance and for children speaking languages that are linguistically dissimilar from English, such as Vietnamese. In contrast to English and Spanish, Vietnamese is a monosyllabic language with reduplicated monosyllabic affixes instead of a single phonemic or nonduplicated affixes (Hwa-Froelich et al., 2002). It is also unknown how vocabulary is acquired in Vietnamese children or how they may perform on FM or QUIL tasks due to language impairment or sociocultural influences.

DA of mediated language learning. Several studies have been published on the DA of mediated language learning. Effective language assessment methods that discriminate between typically developing children and those who have language-learning difficulty have been studied with both European American children defined as White or Anglo (Lidz, 1987, 1991; Lidz & Thomas 1987; Olswang & Bain, 1996) and children from CLD backgrounds, including Spanish-speaking, African American, and Native American children (Anderson, 2001; Jacobs, 1998, 2001; Peña, 1993, 2000; Roseberry & Connell, 1991; Ukrainetz, Harpell, Walsh, & Coyle, 2000). The results of these studies have indicated that DA tasks show promise as an assessment that differentiates stronger and weaker language learners for both children from the mainstream and children from diverse backgrounds. To date, no studies have included children from Asian backgrounds speaking an Asian language.

DA performance correlates with language-learning progress for European American children. Olswang and Bain (1996) compared five static measures (i.e., intelligence measure, developmental scale, receptive vocabulary test, receptive and expressive language test, and parent report measure of vocabulary) and DA results to determine their relationship to measuring language performance. This DA procedure involved clinicians manipulating objects and providing verbal prompts and cues to elicit a variety of two-word utterances. Scores on the DA were based on the level of cue explicitness that children required before they responded. Olswang and Bain found that DA outcomes were more highly correlated with immediate language growth, implying that DA may be related more to expressive language-learning ability than the static measures.

DA is also related to word-learning success. Peña (1993, 2000) hypothesized that the poor performance of some children from CLD backgrounds on standardized tests was due to being unfamiliar and inexperienced with the expectations of the assessment process. She applied DA procedures with Spanish-speaking and African American children in Head Start to teach them expressive labeling behavior in the child’s preferred language. DA tasks of word learning with Spanish and African American Head Start children consisted of MLEs of novel words and a checklist to measure the child’s modifiability index. Children’s scores on a modifiability index were highly correlated to their word-learning performance.

An investigation of Native American kindergartners indicated that the children’s performance on DA word-learning tasks was not correlated with that of weaker and stronger mostly developing language learners (Ukrainetz et al., 2000). The Native American children may have already learned labels for objects. After observing the children’s performance with category labels, however, DA tasks were created to stimulate learning category labels, which was correlated to learning ability for weaker and stronger language learners (Ukrainetz et al., 2000). It was important in this study that learning novel stimuli (i.e., categories) be used to discriminate weaker and stronger language performance.

In another study, Roseberry and Connell (1991) taught an invented morpheme in English as a rule-learning DA task with typically developing Spanish-speaking children. Better performance on this task was correlated with weaker and stronger language learners. Although Roseberry and Connell labeled this rule-learning task as FM, 10 picture sets were used to teach a novel rule before measuring learning. This training involved more mediation than a onetime presentation or incidental exposure as in other FM or QUIL tasks. Thus, this study is included as a type of DA.

Except for the Spanish DA word-learning study (Peña, 2000), what is similar in most of these studies is that the novel words or rule being taught were all in English and were presented to children from diverse linguistic backgrounds. It is important to consider the linguistic differences between the language of assessment and the children’s familiarity with this language. Kohnert (2001) replicated the Roseberry and Connell (1991) rule-learning task in Spanish and English with typically developing Spanish-speaking children learning ESL and found that their performance was better in Spanish. She hypothesized that variable performance may be related to normal differences in language-specific experiences and learning style in developing bilingual children.

In a small pilot study (Hwa-Froelich, 2000) with 12 Vietnamese children, FM word and DA rule and word tasks were presented. The results from this study indicated that only the FM word task was correlated with investigator observation of communication performance. None of the tasks correlated with Vietnamese children’s performance on a nonverbal developmental assessment. Because of the small sample size, however, these findings need to be replicated.
The literature is lacking in studies that have compared children’s ability to learn words with their ability to learn a rule. Nor have studies compared children’s word-learning performance on FM tasks with mediated word learning as in DA. It may be possible that each of these tasks measures different aspects of language learning (i.e., phonological processing, semantic recall, and learning and recall of linguistic rule patterns). All of these linguistic skills may be needed to learn language. In addition, little research has been done with Vietnamese children, where Vietnamese cultural and linguistic differences may influence children’s performances on language-learning tasks. Because of the lack of research with Vietnamese children and comparative performance on FM and DA tasks, it is important to include both FM and DA word and rule tasks that are representative of both the native language (L1) and L2 for a more representative understanding of performance on language-based processing tasks. Therefore, two questions are addressed in this study:

- Are there relationships among FM word and DA word and rule measures for Vietnamese children’s receptive, expressive, and cumulative performance, modifiability, and age?
- Which variables have significant associations with measures of modifiability in Vietnamese children?

### Table 1. Participant demographics and scores.

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<td>1</td>
<td>20</td>
<td>5</td>
<td>25</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
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<td>6</td>
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</tbody>
</table>

Score range: 0–4, 0–4, 0–8, 0–20, 0–20, 0–40, 0–4, 0–8, 0–9, 0–28, 0–28, 0–56

*M* = 4.81, *SD* = 0.54.

**Note.** Gen = generation, age = years/months; FMWR = fast-mapping word receptive, FMWE = fast-mapping word expressive, FMWT = fast-mapping word total, DARR = dynamic assessment rule receptive, DARE = dynamic assessment rule expressive, DART = dynamic assessment rule total, DAWR = dynamic assessment word receptive, DAWE = dynamic assessment word expressive, DAWT = dynamic assessment word total, Modify. = modifiability, RecT = receptive total, ExpT = expressive total, and APT = accumulated performance total.

### METHOD

#### Participants

Twenty-four Vietnamese children (12 boys and 12 girls) were recruited from two Head Start centers located in a large city in the Midwest. Three males were excluded because one had more exposure to English than the other subjects and two did not have developmental assessments completed at the time of this study, resulting in a total of 21 participants (9 boys and 12 girls). All children were between the ages of 3;6 and 5;6 (*M* = 4.81, *SD* = 0.54).

The teachers, parents, and interpreters reported these children to be typically developing from the children’s performance on a developmental assessment, The Early Screening Inventory—Revised (Meisels, Marsden, Wiske, & Henderson, 1997); a speech-language screening, the Assessment of Phonological Processes—Revised (Hodson, 1986); a hearing screening, the Fluharty Preschool Speech and Language Screening Test (Fluharty, 1978); and teacher observations. Whether the children were first- or second-generation immigrants was reported but not controlled. All of the children spoke some Vietnamese and some English. Six (29%) were first-generation immigrants with parents who primarily spoke Vietnamese at home; 15 (71%) were second-generation immigrants. Vietnamese was the language...
Procedures

General procedures. For Session 1, children were tested in English and Vietnamese on their knowledge of the familiar objects. Table 2 provides a description of when English and Vietnamese languages were used. Next, children were presented with the FM word task. Two weeks later during Session 2, children were presented with the DA rule task followed by the DA word task. Children were involved in play-like hide-and-seek procedures with a dinosaur puppet to teach invented words and an invented grammatical rule. Because the FM word task and DA word task were both presented in a hide-and-seek framework, these tasks were separated by the DA rule task. To further remove effects of the hide-and-seek framework affecting DA scores, the FM word task was presented on 1 day and then 2 weeks later the DA rule and DA word tasks were presented. The FM word task was presented before the DA word task in order to avoid any effects of DA mediation on the FM word-learning task.

The sequence of tasks was organized to facilitate optimal cooperation and response from the children. Because the DA word task used bisyllabic novel words, which are atypical in Vietnamese phonology (see Hwa-Froelich et al., 2002, for a review) and consequently a more difficult task, the DA word task was presented last. During a previous study (Hwa-Froelich, 2000), the first author observed that both Korean and Vietnamese children refused to respond when they were asked to guess or when difficult tasks were presented. To avoid this situation, in this study, the tasks were presented in a sequential order, with the most difficult task presented last. In addition, because Vietnamese is a tonal language, a mid-level falling tone was used with pronunciations of all invented words and morphemes to avoid any confusion with tonal differences.

All task directions were translated into Vietnamese by a Vietnamese interpreter who was employed by the university’s Institutional Review Board (IRB) and were reviewed by a second IRB Vietnamese interpreter. The interpreters at both centers read these Vietnamese directions to the children.

A culturally familiar examiner, an Asian graduate student who was enrolled in the Department of Communication Sciences and Disorders, presented all procedures (Cheng, 1991). All sessions were videotaped for reliability measures. Specific procedures for each task are described in the next sections.

FM familiar and novel objects. Pretest measures included assessment of the children’s English and Vietnamese receptive and expressive knowledge of familiar objects (e.g., cup, soap, shoe, sock, crayon, marker, pencil, toothbrush, chopsticks). Familiar objects were selected in consultation with the preschool teachers and interpreters and were then tested with the Vietnamese children. English labels were presented first. If children did not correctly respond to English labels, Vietnamese labels were provided. Only those items for which the children were familiar were used as stimuli for the task. Thus, presentation of Vietnamese or English labels for familiar objects was individualized based on each child’s performance on pretest measures. The appropriate label (Vietnamese or English) was used when familiar objects were presented with each novel object in the FM task.

Novel objects and foils were objects that had no obvious name or advertised label. Novel objects for the FM task included (a) the base and top of a stackable object, (b) brightly colored oblong links hooked together, (c) several knix (constructive manipulatives) pieces connected together, and (d) a blue plastic piece shaped like the letter H connected by a plastic bolt to an oblong piece. Eight foils included (a) a crochet hook; (b) an oblong rubber piece with two humps; (c) a quilting frame; (d) a blue, rubber, bulb-shaped object; (e) a hair diffuser attachment for a hair dryer; (f) a garlic press; (g) a set of heel slip guards on a piece of paper; and (h) a small battery-operated mosquito repellent.

DA rule pictures. Picture stimuli of common objects were selected for the DA rule task. A teacher of Vietnamese language and the two Head Start interpreters listed

<table>
<thead>
<tr>
<th>Session and task</th>
<th>Directions</th>
<th>Questions*</th>
<th>Familiar object/Picture labels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>English &amp; Vietnamese</td>
<td></td>
<td>English &amp; Vietnamese</td>
</tr>
<tr>
<td>FM word</td>
<td>English &amp; Vietnamese</td>
<td></td>
<td>English &amp; Vietnamese</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>English &amp; Vietnamese</td>
</tr>
<tr>
<td>Session 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DA rule</td>
<td>English &amp; Vietnamese</td>
<td></td>
<td>English</td>
</tr>
<tr>
<td>DA word</td>
<td>English &amp; Vietnamese</td>
<td></td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

*Questions included, “Where is the _____?” and “What is this?” for FM and DA word. DA rule involved a sentence completion task, “This is a chair. What is this? It is a ______.”
common pictures that they believed would be familiar to Vietnamese children. On the basis of their suggestions, 30 pictures of familiar objects and a diagonal crosscut (as described in Roseberry & Connell, 1991) of each familiar object were selected. Ten picture sets were used for teaching the rule and 20 sets were used as the target stimuli. The crosscut picture of half of the object was labeled as the English word and the morpheme suffix (-po).

The first author elected to teach the novel part/whole concept and reduce the array of pictures to a choice of two because Vietnamese children may not be socialized to pay attention to part/whole relationships and/or selection from a choice of three pictures. This was evident during a previous study (Hwa-Froelich, 2000) when Vietnamese children were asked to “pick two pictures that you like” from a choice of three pictures on the part/whole and iconic/symbolic subtests of the Muma Assessment Program (MAP; Muma & Muma, 1979). The assumption of these subtests is that children make selections following a rule that parts go with a whole such as a bee and flower or a taxonomy rule where a bee and butterfly would be chosen because they are both insects (part/whole subclass). The iconic/symbolic subtest is based on the assumption that children will select pictures based on a selection rule of object function, color, or shape. Twelve Vietnamese children did not demonstrate selection patterns that reflected any of these rules.

**DA word novel objects.** Different novel objects were used for the DA word task. These objects had no obvious name or advertised label. These objects included (a) a purple, squeezable, round object mounted on a black platform; (b) a three-pronged, padded, colorful, cloth-covered object; (c) a cylindrical lavender, squeezable object; and (d) a circular, expandable, pleated, fanlike object attached to a black stick. No foils were included with this task. The children received instructions to mediate their learning experience with four invented bisyllable words: /gobi, lɔtwe, rttu, femə/. These instructions are described in the section titled DA Word Procedures.

**Target words and morphemes.** All novel words and morphemes consisted of phonemes that are common in the Vietnamese language. FM novel words were monosyllabic and were created with Vietnamese phonemes to resemble Vietnamese. The target words were /hə, mɔ, te, jətə/. The novel suffix (-po) meaning part of was created to resemble a Vietnamese syllable. Because there is no developmental information regarding the acquisition of suffixes or vocabulary development in Vietnamese (see Hwa-Froelich et al., 2002, for a review), the DA task in Hwa-Froelich (2000) involved a prefix (po-) but the task was not positively correlated with other learning tasks. Because suffixes are more salient across languages (Slobin, 1973), the DA rule task used a suffix for this study. The novel rule involved pairing the novel suffix with English open class words, as in the Roseberry and Connell (1991) study. DA words were bisyllabic to resemble English words but contained Vietnamese phonemes to avoid native-language phonologic interference with word productions. These words were /gobi, lɔtwe, rttu, femə/.

**FM procedures.** The Vietnamese interpreter read the following directions in Vietnamese and the student clinician read the directions in English to each child before the procedure.

Danny the dinosaur and Mary are going to play a game with you. Danny the dinosaur will hide the toys. Then Danny will ask you to hide the toys. After you hide the toys, you will have a turn to be a teacher and you will tell Danny to hide the toys.

In English, the student clinician instructed a dinosaur puppet to hide two familiar objects and one unfamiliar object (using an invented word). Dependent on the child’s previous performance with labeling the familiar objects, the Vietnamese or English label was provided. To measure receptive FM, novel objects were presented with two familiar objects and two foils. The child was asked in English to find the toys selecting the familiar and novel object from the array of five objects (1 novel, 2 familiar, and 2 foils). If the child did not respond, the question was repeated in Vietnamese. Then the child was told to tell Danny to hide the two familiar and one novel toy as the expressive measure and was asked in English, “What is this?” for each toy. If the child did not respond, the question was repeated in Vietnamese. This procedure was completed four times to present and measure learning for each of the four invented words: /hə, mɔ, te, jətə/. Scores for both receptive and expressive tasks ranged from zero to four correct responses.

**DA rule procedures.** The Vietnamese interpreter and student clinician read in Vietnamese and English the following directions to each child before the procedures:

Danny is going to learn to say some new words and he will teach you to say the new words.

Mediation of the children’s learning consisted of presenting and labeling each picture. For example, a picture of a chair was presented and the student clinician said in English, “This is a chair”; for the crosscut picture of a chair, she said, “This is a chair-po.” Ten picture pairs were used for the MLE for learning the rule. Twenty new picture pairs were presented and the children were asked in English to point to the word -po for each pair as the receptive measure. Following the receptive measure, the children were then asked to label the crosscut picture as the expressive measure. Receptive and expressive scores ranged from 0 to 18 for each measure.

**DA word procedures.** The instructions were presented in Vietnamese and English as follows:

We are going to play with some new toys. Each toy has a name. How do names help us? (They help us tell things apart.) If I call this (shoe) a “pot” and tell you to “go get your pots,” will you know what I am talking about? (No.) At home you also have special names. What are some of the special names you use for your family? (Help child say some names of family members.) What if you call your mom (or dad) Susan (or Tom), instead? Will your mom (or dad) know who you are talking to? Special names help us tell people and things apart. Saying new names out loud helps us remember them. We are going to ask you to say some new names. If you work very hard and try to learn the names, you will get to choose a prize.

The children were encouraged to pay attention to the new names by repeating the names several times (a minimum of three times aloud) and to themselves. The student clinician played a hiding game with the child and
asked the child in English to find each novel object. Then all objects were presented to the child and the child was asked in English, “Where is the ____.” If the child did not respond, the question was repeated once in Vietnamese. When the child selected the incorrect object, the student clinician encouraged the child to think of the object’s name. If the child was unable to recall the name, the student clinician used mnemonic cues or sentence completion prompts in English. These included (a) *It rhymes with baby* and (b) *It is a g___.* This procedure was repeated twice. After the second presentation of the hiding game, receptive word learning was measured. Objects were presented and the child was asked in English to select the correct toy. Then the child was asked to name the toy as the expressive measure. The child was asked in English first and then, if he or she did not respond to the English question, in Vietnamese. After the posttest measures, the student clinician completed the modifiability measure, which can be reviewed in the Appendix. Modifiability was based on a 4-point scale ranging from 0 to 3 points (Peña, 1993). The examiner rated each child’s responsivity (0 = no response to 3 = very responsive), examiner’s effort expended in teaching (0 = maximum effort to 3 = no effort), and child’s learning (0 = no learning to 3 = 4 or more correct responses) during DA.

Reliability

The first author was present for all procedures and supervised the research assistant. Thus, scoring for FM, DA rule, and DA word learning were at a 100% level of agreement. Twenty percent (5) of the modifiability measures were completed by the first author and were compared with the research assistant’s modifiability scores for each area, responsivity, effort required in teaching, and learning. The total number of agreements were divided by the total number of scores (15). A 93% level of agreement was achieved.

RESULTS

Composite measures for each of the scales of FM word, DA rule, and DA word, and composite measures of receptive and expressive scores, were computed to obtain a representative understanding of children’s performance on language-based processing tasks. This method was used because most available standardized tests combine individual items for statistical analysis. For each child, expressive and receptive scores for each rank-ordered task were added to create task composite totals for FM word, DA rule, and DA word. Then, receptive scores and expressive scores from each of the tasks were added together for each child to create receptive and expressive totals. These receptive and expressive totals present a more representative understanding of children’s performance on language-based processing tasks. Finally, all receptive and expressive scores for each task were added together to create an accumulated performance total (APT). Pearson’s product–moment correlations were used to explore relationships among these variables. Cohen’s statistical power analysis (1988) was used to figure effect size statistics.

To rule out differences due to instructional or environmental differences between the two centers, first and second generation, and gender, a simple t test was used to compare children’s total scores for FM word, DA rule, DA word, receptive and expressive totals, APT, and modifiability. Significant differences were found between genders for modifiability scores, t(19) = −2.69, p = .007; d = 1.08, and between centers on DA word, t(19) = −1.82, p = .043; d = 0.81. In other words, females were perceived by the examiner to be more modifiable than males, and the children at one center learned more words with mediation than did the children at the other center. No significant differences were found between first or second generation for any task score or for receptive or expressive total (Table 3).

Individual participant demographic information, task total, and modifiability scores are listed in Table 1. The range of possible scores, means, and standard deviations are provided for each task immediately below task titles. Table 4 shows means, standard deviations, and correlation coefficients of the variables analyzed in this study. These correlation relationships will be described further in the following section.

<table>
<thead>
<tr>
<th>Measure</th>
<th>t</th>
<th>df</th>
<th>Significant (one-tailed) Effect sized</th>
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<tr>
<td>FM word</td>
<td>−0.13</td>
<td>19</td>
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<tr>
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<tr>
<td>Receptive total</td>
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*Effect size was calculated by $d = (M1 − M2)/s$ (Cohen, 1988).
Table 4. Intercorrelations between composite measures for children’s performance, modifiability, and age.

<table>
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<td>.577**</td>
<td>.371*</td>
<td>.542**</td>
<td>.329</td>
<td>.345</td>
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<td>2. DA rule total</td>
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<td>.180</td>
<td>.815**</td>
<td>.868**</td>
<td>.991**</td>
<td>.467*</td>
<td>.582**</td>
<td></td>
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<tr>
<td>3. DA word total</td>
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<td></td>
<td>.053</td>
<td>.456*</td>
<td>.274</td>
<td>.715**</td>
<td>.292</td>
<td></td>
</tr>
<tr>
<td>4. Receptive total</td>
<td></td>
<td></td>
<td></td>
<td>.445*</td>
<td>.807**</td>
<td>.331</td>
<td>.435*</td>
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</tr>
<tr>
<td>5. Expressive total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.888**</td>
<td>.559**</td>
<td>.576**</td>
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<tr>
<td>6. APT</td>
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<td></td>
<td></td>
<td></td>
<td>.538**</td>
<td>.603**</td>
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<td>7. Modifiability (learnability)</td>
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<td></td>
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<td>.237</td>
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<td>8. Age of children by month</td>
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</table>

*p < 0.05, **p < 0.01

*Note.* APT score of language learning is a composite score of six variables: receptive and expressive FM, receptive and expressive DA rule, and receptive and expressive DA word.

FM Word

Significant correlations with small and moderate effect sizes were found between FM word total (i.e., sum of receptive and expressive FM word scores) and DA rule (r = .472, p < .05; r² = .222), receptive total (r = .577, p < .01; r² = .332), expressive total (r = .371, p < .05; r² = .138), and APT (r = .542, p < .01; r² = .293). These findings indicate that children who scored high on the FM word task also scored high on the DA rule task, the receptive and expressive totals, and the APT. It is worth noting that a stronger correlation exists between the FM word task and receptive total than between the FM word task and expressive total. The effect sizes reported by r² as the total variation of FM word total explained by the other variable ranged between 14% and 33%, suggesting that these significant correlations have small to medium effect sizes.

When looking at individual cases, differences among the children are observable. For example, children 6, 7, and 9 performed poorly on the FM task but well on the DA word task.

DA Rule

For both sections, receptive and expressive, children performed beyond a 50% level of chance. Although the receptive portion of DA rule presented two picture choices, all children performed beyond chance on this section of the task. With a possible score of 20, 86% (18) received a score of 18 or higher and 14% (3) received a score of 0. Therefore, either the children demonstrated comprehension of the rule concept or they did not. For the expressive section, children were expected to recall and express the morpheme suffix (-po). Forty-three percent (9) received a score of 14 from a possible 20 and 57% (12) received a score of 5 or less.

DA rule total (i.e., sum of receptive and expressive DA rule scores) had very significant and high correlations with all variables except for DA word total. Correlation coefficients for DA rule total with the receptive total (r = .815, p < .01; r² = .664), expressive total (r = .868, p < .01; r² = .753), and APT (r = .991, p < .01; r² = .982) were very high with large effect sizes. These correlations suggest that children who scored high on the DA rule total also scored high on the receptive total, expressive total, and APT. DA rule total also had significant correlations with modifiability (r = .467, p < .01; r² = .218) and with age (r = .582, p < .01; r² = .339), meaning that children who scored high on modifiability also scored high on DA rule total, and that older children scored higher on DA rule total than did younger children. These two correlations had small and medium effect sizes.

It is again interesting to study individual cases. Child 11 performed equally well on both word-learning tasks but not the rule-learning task. It may be possible that this child is a stronger word learner than rule learner. On the other hand, children 5 and 8 performed better on the rule-learning task than either of the word-learning tasks; it may be possible that they are better rule learners than word learners.

DA Word

DA word total did not have significant correlations with any of the variables except for expressive total (r = .456, p < .05; r² = .208) and modifiability (r = .715, p < .01; r² = .511), indicating that children who scored high on the DA word total also scored high on the expressive total and modifiability. These two correlations’ effect sizes were small to medium. These correlations suggest that this DA word task was more difficult for these children, and that children who were more modifiable were able to score high on this task. It is also worth noting that the DA word total was not significantly correlated with the receptive total, APT, or age.

In reviewing individual cases, there was 1 child who performed poorly on this task. Child 1 performed well on the FM word and DA rule task but not the DA word task. This performance could indicate a dependence on stimuli that are more Vietnamese like. Children 19, 20, and 21,

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however, only performed well on the DA word task. In this example, these children may have needed mediation to learn novel linguistic stimuli.

Receptive, Expressive, and Accumulated Performance Totals

Receptive total and expressive total also had some significant correlations with other variables. Receptive total had moderate correlations with expressive total ($r = .445, p < .05; r^2 = .198$) and age ($r = .435, p < .05; r^2 = .189$), and it also had a high correlation with the APT score ($r = .807, p < .01; r^2 = .651$). The effect sizes varied between small to large. These correlations suggest that children who scored high on the receptive total also scored high on the expressive total, and older children scored high on the receptive total. It is also worth noting that the receptive total did not have a significant correlation with modifiability. The expressive total had very high correlations with the APT score ($r = .888, p < .01; r^2 = .789$), modifiability ($r = .559, p < .01; r^2 = .313$), and age ($r = .576, p < .01; r^2 = .332$), with medium to large effect sizes, indicating that children who scored high on modifiability also scored high on the expressive total and that older children scored high on the expressive total. Finally, the APT score had relatively high correlations with modifiability ($r = .538, p < .01; r^2 = .296$) and age ($r = .603, p < .01; r^2 = .364$), providing evidence that children who scored high on modifiability performed better in many tasks measured by the APT score and that older children scored higher on the APT task score.

Modifiability

When the correlations between modifiability and other performance variables explained previously were examined, all performance variables except for FM word total and receptive total had significant correlations, suggesting that children who scored high on modifiability also scored high on DA rule, DA word, expressive total, and APT. Nonsignificant correlations between modifiability and FM word total and the receptive total calls for further research.

To summarize these results, the only tasks that correlated with each other were FM word and DA rule performance. FM word also correlated with APT and the expressive and receptive totals. The expressive total correlated with all composite scores, age, and modifiability. Modifiability was only correlated with DA rule and word, the expressive total, and the APT.

DISCUSSION

Although the constraints on the use of language-based processing tasks such as individual performance, gender, and site differences found in this study limit the generalizability of group data from research studies to individuals in a clinical setting, the results from this study support three implications for use of language-based processing tasks with bilingual speakers: (a) FM and DA tasks may measure different aspects of language learning, (b) stimuli used for FM and DA tasks should include native and English phonologically similar stimuli to assess learnability in both languages, and (c) overall performance scores such as an APT, a receptive total and an expressive total may offer valuable information regarding overall language-learning ability. The findings begin to answer some of the research questions in this study, but further study with Vietnamese as well as other Asian groups is warranted. This section will discuss the results in light of the questions asked at the beginning of this article.

Language-Based Processing Task Relationships

Two significant differences were found between children from two different centers and between genders. Children from one center performed better than children from a different center on DA word tasks. This finding may be due to one center having more resources. This particular center had more toys, books, and computers for the children. It is noteworthy, however, that differences were not found for other word-learning tasks such as FM word.

The DA word task performances may reflect a gender bias favoring female learning styles in that female children were found to have higher modifiability scores than males. One possible explanation could be the uneven number of females (12) and males (9). There is also some evidence that girls have different language-learning styles and performances than males (Gurian & Henley, 2001; Maccoby, 1998). This factor may have influenced modifiability scores. No other differences between sexes, centers, or first and second generation were found on other measures, indicating that these variables did not have influence across tasks or measures.

The first question asked was, “Are there relationships among the measures for children’s performance, modifiability, and age?” Three significant relationships were supported by the results of this study. First, FM word learning was correlated to performance on the DA rule task but with a small effect. None of the other tasks correlated with each other. One possible explanation for these findings may be that each task measures different kinds of language learning. FM word learning may be more related to receptive learning, that is, the ability to quickly map an association with a novel referent and object. In addition, FM word total was moderately related to the receptive total and APT score. FM word total scores were positively related to the expressive total, with small effect sizes. These findings indicate that performance on the FM word task provides a significant impact on composite receptive language scores more than expressive, but may not be sensitive to age. This finding is generally consistent with earlier FM findings. For example, Dollaghan (1985) found that children had better receptive than expressive performance, and Gray (2003) found that for typical language learners, FM word comprehension scores predicted expressive scores. This relationship may explain the significant relationship with FM word and expressive total scores.
In general, the FM word task was more highly correlated to receptive total, expressive total, and cumulative scores than any other task. This finding supports earlier results with 12 Vietnamese children (Hwa-Froelich, 2000), where FM word task scores correlated significantly with investigator observation of communication skills. In the Hwa-Froelich (2000) study, no significant relationships were found for DA rule and DA word scores.

The FM word task was not significantly correlated with age. This finding may be related to the types of stimuli used for this study. Rice and colleagues (1990) and Oetting and colleagues (1995) found that as children aged, they focused on and learned different types of words. Typically developing preschoolers learned more noun and attribute words, whereas early elementary school-aged children learned more action and attribute words than children with SLI. Because invented nouns were used instead of a mixture of nouns and attribute words, age may not have correlated with FM word performance. Further research using noun, attribute, and action words or verbs should be included as stimuli.

A second significant relationship was that more mature language learners performed better than their younger peers on DA rule total, APT, and receptive and expressive totals, with a small effect for receptive total. These findings provide evidence that combining scores of tasks that may measure different kinds of language learning can provide meaningful information about developmental language learning. More research is needed to determine why age was not correlated with the other two tasks, FM word and DA word, or modifiability measures. The lack of association of age with modifiability and DA word may be due to the difficulty of the task or the fact that stimuli resembled English syllable structure that perhaps gives a more accurate measure of English-language-learning ability.

The third significant finding was that the expressive total was correlated with all task totals, modifiability, and age, with moderate to large effect sizes. This result may support earlier studies reporting that expressive performance rather than receptive discriminates weaker from stronger language learners (Dollaghan, 1985; Gray, 2003). Gray suggested that the number of novel words the child is exposed to may influence the phonological and semantic information needed to retrieve and produce the words. In other words, it is easier to recall the referent associated with an object than it is to semantically recall and produce the word phonologically. Consequently, the expressive task may be more difficult for weaker and younger typically developing language learners.

**Modifiability Associations**

The second research question was “Which variables have significant associations with measures of modifiability?” Modifiability scores were correlated with the two DA tasks, the expressive total, and the APT scores. The largest effect size was found for modifiability and DA word total, with moderate effect for expressive total and APT scores. Because modifiability measures the amount and quality of a child’s learning skills, it is logical that modifiability would correlate highly with mediated learning tasks and not those involving presentation/association kinds of learning, as measured in FM. Although FM may be related to word-learning skills, it may also more accurately measure receptive word-learning skills. DA, on the other hand, may measure expressive skills that are more related to storage and retrieval (Gray, 2003; Olswang & Bain, 1996). The small effect size associated with DA rule may indicate that different skills are involved when learning a rule. Children may attend more to similarities when learning a pattern and may focus more on differences when learning words. It may be cognitively easier to learn a single morpheme rule than four different bisyllable words. In other words, the level of difficulty may have been greater for the DA word task and the expressive total, which may account for these correlations.

Modifiability scores included the student clinician’s subjective evaluation of whether the child was attentive and successful, the amount of examiner effort required to teach the task, and the amount of learning the child demonstrated. Thus, children’s performance on two sections of the modifiability score was directly tied to overall performance, which may explain the correlations to the expressive total and APT scores. Modifiability scores were based on the child’s performance for DA word only. Thus, it is logical that the greatest effect size was for the relationship between modifiability and DA word. Further research is needed to study the usefulness of measures of modifiability.

**Limitations**

Limitations for this study center around sample variables and the linguistic constraints used to create novel stimuli. Even though effect size statistics showed a range of small to large effect sizes, the sample size (21) was relatively small and was mixed with first- and second-generation participants. It is unknown whether the children in this study were the first, second, or third child born in the family. No measures of the children’s language levels in either language were taken. Varying language levels in Vietnamese and English may have influenced these results. Regardless of the degree of linguistic experience, however, children are more likely to recall and produce sound patterns that are more familiar even when the stimuli are novel. The learning task for both FM word and DA rule involved stimuli that were more Vietnamese-like than the word stimuli in the DA word task. Because all of the children spoke primarily Vietnamese at home, their familiarity with Vietnamese may have been stronger than with English. This finding is similar to the Kohner (2001) study, where Spanish-speaking children performed the DA rule task better in Spanish than they did in English. These children were more familiar with the Vietnamese language, which may have influenced their performance on the FM word and DA rule tasks.

In this study, all target stimuli were invented. The FM and DA rule stimuli were created using Vietnamese phonemes and syllable structure following Vietnamese grammatical structure. The advantage of using invented stimuli is the reduction of interference from L1 or L2...
knowledge and exposure, thus providing a potentially more accurate measure of language-learning ability. The limitations for this study were deciding whether to make stimuli more similar to one language than the other, and to what degree this similarity should be. For example, the Vietnamese-like suffix was paired with English words in the DA rule task, which may have been linguistically confusing for the children. It may be more linguistically appropriate to use Vietnamese open-class words with the invented Vietnamese-like suffix. FM word and DA rule scores were positively correlated to each other, however, which indicates that the children were not confused by the use of English words.

The DA word stimuli were more English like in that these words were bisyllabic using Vietnamese phonemes, whereas the FM words were more Vietnamese-like monosyllabic words. These differences may account for the lack of correlation between FM and DA word-learning tasks and the confounding of these linguistic characteristics among the two languages may have influenced the findings. On the other hand, Hwa-Froelich (2000) found that even when the same stimuli taught in the FM word tasks were taught in a sequential DA word task, Vietnamese children’s scores were not correlated to each other, and DA word scores were not correlated to investigator observation of children’s communication skills. Thus, FM and DA tasks may measure different kinds of language skills. Using both native and English-like tasks may provide a measure of learning for both the native language and English as an L2. Stronger English-language learners may have been the children who scored high on the DA word, expressive total, and modifiability measures that may provide a potentially more accurate measure of language-learning ability. The limitations for this study were deciding whether to make stimuli and the level of difficulty need to be for children from CLD backgrounds, more representative information regarding children’s communication skills. Thus, FM and DA tasks with children from CLD backgrounds, more restrictive studies replicating FM and DA with Vietnamese and other Asian children are needed.

Another limitation of this study was the mediation provided during the DA word task. Phonological prompts were not helpful mediation support perhaps because of language differences between the cultures. Vietnamese parents may not use phonological scaffolding strategies such as phonemic prompts and rhyme for word learning. Because the Vietnamese language is monosyllabic, the children may attend more to syllables than to phonemes. Consequently, the phonetic prompts may have been meaningless to these children. These phonological strategies may not have been developmentally, culturally, or linguistically appropriate for Vietnamese preschool children.

In addition to these limitations, the use of two pictures instead of three or four for the receptive portion of the DA rule task may have been too easy for the children. It is difficult to gauge the level of difficulty for each task when designing culturally and linguistically appropriate tasks. In this study, the receptive DA rule task may have been too easy and the DA word task may have been too difficult. In addition, the DA rule task involved less mediation than the DA word task, which may have affected the children’s scores. It is noteworthy, however, that all subjects scored beyond chance, indicating that each child learned or did not learn the rule. This study needs to be replicated using a larger array of choices for the receptive portion of the DA rule task and simpler stimuli and culturally appropriate mediation for the DA word task.

CONCLUSION

Language-based processing tasks are a viable option for measuring language-learning ability in children who speak languages other than English. Practitioners must consider several factors when devising assessment tasks. First, when using invented stimuli, practitioners must consider the level of linguistic similarity with the L1 and L2. If the stimulus is more similar to the L2, learning this stimulus may be more difficult for the child and may or may not be an indication of a language-learning disorder but may be an indication of difficulty in learning English. As discussed earlier, English-speaking children with SLI have difficulty learning novel English words or nonsense words. Second, practitioners must measure multiple kinds of language learning. FM and DA word and rule learning should be included because they may measure different language-learning skills.

Finally, it is recommended that practitioners include composites for receptive, expressive, and APT scores, which may be more reflective of overall language-learning skills than task subtotal scores. It will also be important for future studies to investigate the significance of individual differences observed in this study to determine if group results found in the present and previous studies can be reconciled with the variable performances found across children. This information is needed to separate language differences from language disorders in individual children.

From these results, other researchers and clinicians using informal language-learning tasks should take into consideration the phonemes and syllable structure of their novel stimuli and the level of difficulty for both the receptive and expressive portions of each task. Additionally, investigators should analyze receptive and expressive composite totals, APT scores, and modifiability measures that may provide more representative information regarding children’s performance on language-based processing tasks. Although these findings provide further support for the use of FM and DA tasks with children from CLD backgrounds, more research is needed to determine how specific the target stimuli and the level of difficulty need to be for children from different linguistic and cultural backgrounds.

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REFERENCES


APPENDIX. MODIFIABILITY INDEX

Responsivity
0 – Does not pay attention and responds inconsistently or not at all
1 – Inconsistent attention or focus and inconsistent responses
2 – Pays attention or focuses on task but responds inconsistently
3 – Maintains attention and focus and responds consistently

Examiner Effort for DA2
0 – Tired after working with child; child unsuccessful (Cues given for 4 items)
1 – Harder to work with child, takes longer to complete task, child needs consistent help to succeed (Cues given for 4 items)
2 – Easy to work with child but requires some help to succeed (Cues given for 3 items)
3 – Easy to work with child, child succeeds (Cues given for 2 or fewer items)

Transfer for DA2
0 – 0 or 1 correct response
1 – 2 correct responses
2 – 3 correct responses
3 – 4 or more correct responses