

Short-form versions of the Spanish MacArthur–Bates Communicative Development Inventories

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ABSTRACT

The Spanish-language MacArthur–Bates Communicative Development Inventories (S-CDIs) are well-established parent report tools for assessing the language development of Spanish-speaking children under 3 years. Here, we introduce the short-form versions of the S-CDIs (SFI and SFII), offered as alternatives to the long forms for screening purposes or in applications requiring a less-demanding instrument. Norming data (SFI: $n = 601$; SFII: $n = 2,534$) from diverse populations in Mexico are described. Developmental trends, gender differences, and socioeconomic status effects are reported that parallel those for the long forms. An additional small-scale study ($n = 62$) demonstrates strong convergence between responses on the long and the short forms. These results provide evidence that the S-CDI SFs have promise for a range of clinical and research applications.

Over the last several decades, parent report has become a popular method for assessing early communicative skills in children under the age of 3 years. Parent-report instruments have been available for young English-speaking children since the late 1980s, notably the MacArthur–Bates Communicative Development Inventories (CDIs; Fenson et al., 1993, 2007) and the Language Development Survey (Rescorla, 1989; Rescorla & Alley, 2001). The CDIs assess a range of communicative skills, including vocabulary comprehension and production, gesture use, early word combinations, and grammatical morphology. These instruments have been shown to be valid, cost-effective alternatives to traditional face-to-face methods for typically developing English-speaking children, and also for language delay

and disordered populations (Charman, Auriol, Baird, & Baird, 2003; Luyster, Qiu, Lopez, & Lord, 2007; Mervis & Robinson, 2000; Miller, Sedey, & Miolo, 1995; Roberts et al., 2005; Singer Harris, Bellugi, Bates, Jones, & Rossen, 1997; Snyder & Scherer, 2004; Thal, 2000; Thal, De Jardin, & Eisenberg, 2007; Yoder, Warren, & Biggar, 1997). Part of the success of the instruments is that they follow a recognition format, providing checklists of words or phrases that ask parents to judge their child's current behaviors.

Recently, there has been increased interest in the extension of the parent-report methodology to Spanish-learning children. This is timely because monolingual or bilingual Spanish speakers from Hispanic families now constitute a large and rapidly increasing proportion of the US population. Many of these children are more likely than their English-speaking peers to come from lower socioeconomic status (SES) backgrounds, and thus, may be at increased risk for language delays (Goldstein, 2004). The interest in valid Spanish-language instruments also stems from the expansion of research and clinical programs that serve monolingual Spanish speakers living in their native countries in Latin America and Spain. Thus, the need for valid, reliable screening instruments for Spanish-language learners is paramount, especially those that offer norms from populations that include children from a diverse range of socioeconomic backgrounds.

Mexican Spanish versions of the CDIs, the *Inventarios del Desarrollo de Habilidades Comunicativas MacArthur–Bates (S-CDIs)*,¹ were developed in 2003 (Jackson-Maldonado et al., 2003). The S-CDIs consist of two forms. The first, *Primeras Palabras y Gestos (First Words and Gestures)* or S-CDI I, is designed for use with typically developing children between 8 and 18 months and assesses general comprehension (28 items), word comprehension and production (428 items), and early symbolic and communicative gestures (64 items). *Palabras y Enunciados (Words and Sentences)* or S-CDI II, appropriate for typically developing children between 16 and 30 months, is composed of checklists assessing vocabulary production (680 items), verb morphology (24 items), and phrase complexity (37 items). Parents are also asked to write in the three longest utterances they have recently heard their child produce.

The S-CDIs were adapted, not translated, from the English versions. Words were added that were linguistically and culturally appropriate to Mexican Spanish speakers, word classes were adapted to be language specific, and gestures were modified according to culturally relevant criteria (Jackson-Maldonado, Marchman, Thal, Bates, & Gutiérrez-Clellen, 1993). Normative data are available based on a large cross-sectional sample of 778 infants and 1,094 toddlers from several areas of Mexico (Jackson-Maldonado et al., 2003). Studies have shown the reliability and validity of the instrument for monolingual Spanish (Thal, Jackson-Maldonado, & Acosta, 2001) and bilingual English-Spanish speakers (Marchman & Martínez-Sussmann, 2002). The S-CDIs have also been used successfully with late talkers (Jackson-Maldonado, 2004) and children with Down syndrome (Jackson-Maldonado, de Santiago, & Sánchez, 2010).

As noted by Fenson, Pethick, Cox, Dale, and Reznick (2000), the comprehensive nature of the CDIs require that many parents devote a considerable amount of time to complete them (~30–45 min). This may limit the effectiveness of this method in educational, research, or clinical settings that desire a quick assessment of the child's communicative ability. For this reason, Fenson et al. (2000) and

Reznick and Goldsmith (1989) developed short-form versions of the English-language CDIs. The short forms have become popular alternatives to the long forms, particularly for users who are interested in using the CDIs as screening tools, rather than for obtaining in depth information about children's progress in vocabulary or grammar. Because of their simplicity, the short forms place fewer demands on the parents, and hence, may be more appropriate than the long forms for use with families from less educated backgrounds. The tradition of developing short forms has been followed by researchers in other languages. For example, Eriksson, Westerlund, and Berglund (2002), in response to a health and educational government demand, developed a screening version of the Swedish Communicative Development Inventory (Berglund & Eriksson, 2000a, 2000b; Eriksson & Berglund, 1999; Westerlund, Berglund, & Eriksson, 2006) for use with 18-month-olds. Based on their Galician long form (Perez-Pereira & Soto, 2003), Perez-Pereira and Resches (2007) have now proposed two short forms that show similar developmental trends as the long versions.

THE SPANISH CDI SHORT FORMS

The current paper introduces the S-CDI short forms (S-CDI SFs). To our knowledge, the S-CDI SFs are the first published instruments specifically focusing on early language skills that are appropriate for use with Spanish-learning children under 3 years. Other screening instruments, such as the Ages and Stages Questionnaire (Squires & Bricker, 2009) are now available in Spanish, but they assess a wide range of general developmental areas and have only a few questions that address early language and communication. The few published language instruments that are currently available, for example, the Preschool Language Scale, Fourth Edition (PLS-4) Spanish Edition (Zimmerman, Steiner, & Pond, 2002) for children 0 to 7, the Developmental Indicators for the Assessment of Learning, Third Edition (Mardell-Czudnowski & Goldenberg, 1998), and the Test de Vocabulario en Imágenes Peabody (Dunn, Jugo, Padilla, & Dunn, 1986) are designed for children older than 2.5 or 3 years and require considerable time and effort to complete. Over the years, several attempts have been made at developing short forms of Spanish-language CDI instruments. For example, Pearson and Rojas (1995a, 1995b), based on their extensively used long-form Cuban Spanish CDI, developed a draft of a short form for their own use. Aguado-Orea (2004) created a short grammar screener designed to identify children with language delay. However, the results and/or norms from these efforts are not publicly available.

Parallel to the long forms, the S-CDI SFs consist of two instruments: one designed for use with children who are 8 to 18 months (SFI), and the other for older toddlers who are 16 to 30 months (SFII). Each form contains a vocabulary checklist, constructed on the basis of responses by participants in the long-form norming study (Jackson-Maldonado et al., 2003). As in the S-CDI long form, parents are asked to indicate on the SFI which words their child understands ("comprende") as well as words their child understands and says ("comprende y dice"). The vocabulary checklist of the S-CDI SFII asks parents to indicate words their child understands and says ("comprende y dice"). Parents are also asked to provide examples of their child's longest utterances. We describe the development of these instruments in more detail below.

THE NORMING STUDY

Normative data for the S-CDI SFI were collected by a team of researchers from a major university in central Mexico, led by the first author. This effort sampled more than 600 participants across seven states, spanning a range of socioeconomic levels. Normative data for the S-CDI SFII were obtained via two parallel means. First, data from a sample of several hundred participants primarily from middle class families were collected following the same method as for the S-CDI SFI. Second, data were obtained through the Oportunidades program in Mexico, a poverty-alleviation initiative developed, administered and funded by the Mexican Government. Oportunidades is a conditional cash transfer program, which has as its main goal to pull families out of extreme poverty. The program is evaluated by a team of researchers from Mexico's National Institute of Public Health (Instituto de Salud Pública) and from universities around the world, and carries out assessments of medical, physical, and cognitive abilities at regular intervals. The CDI Advisory Board developed a short version of the S-CDI SFII for use as part of the evaluation of child development general assessment battery. The instrument was administered in a face-to-face interview by a trained interviewer (usually a nurse or other health practitioner).

The parallel data collection efforts resulted in normative information from a cross section of the Mexican population that is considerably more diverse than in earlier studies. Indeed, it is the first study, to our knowledge, that includes a sample that closely reflects the demographic characteristics of the country. For example, the Mexican 2005 Census (Instituto Nacional de Estadística y Geografía [INEGI], 2005) reported that approximately 70% of women with children have middle school level of education or below. As we discuss in more detail below, this proportion is maintained in the sample for the S-CDI SFII study. The S-CDI SFI group has a smaller, yet still important, representation of low-SES families.

Much of what is known about early language development derives from studies of children from highly educated, middle-class homes. For example, in the norming sample of the English-language CDIs, 70% of the population was college educated and only a few of the participating parents had received less than a high school education. The norming data for the S-CDIs was from a more diverse population than that of the English, but samples for both long forms showed an upward educational bias compared to national demographics of Mexico.

It is becoming increasingly clear that English-speaking children from low-SES backgrounds tend to lag behind their peers from more advantaged backgrounds in vocabulary and grammatical development (Arriaga, Fenson, Cronan, & Pethick, 1998; Dollaghan et al., 1999; Hart & Risley, 1995; Hoff, 2003, 2006). Similar findings have been found with Spanish-speaking children in Mexico and the United States using data from the S-CDI, language samples, as well as experimental measures (Jackson-Maldonado & Bárcenas Acosta, 2006; Rodrigue, 2001, 2006). Nevertheless, obtaining adequate information from parents in low-SES families about their child's development, especially in the area of language, has proven particularly challenging.

Some findings suggest that parents from low-SES families may tend to overestimate their child's abilities compared to higher SES parents, especially for

early comprehension (Dollaghan et al., 1999; Feldman et al., 2000, 2003; Fenson et al., 1993; Reznick, 1990). Other studies have shown that low-SES parents are accurate reporters (Fish & Pinkerman, 2003; Furey, 2011; Rodrigue, 2001, 2006). Still others suggest that parents under report their children's language level (Roberts, Burchinal, & Durham, 1999). Pan, Rowe, Spier, and Tamis-Lemonda (2004) found that vocabulary, using the English Short Form, was not as highly related to word types in a structured situation in low-SES children as it was for middle-class children, but this association was not exclusive to parental report and the relation between instruments, SES, and language changes with age. They suggest that maternal education is not the only factor that predicts future language and literacy abilities. Thus, factors beyond SES level per se should be considered when evaluating assessments for use with low SES families. Although caution should clearly be taken when interpreting data from these populations, our goal here is to obtain norming information from a large sample that reflects the full range of diversity in Spanish-learning children in Mexico.

Following Jackson-Maldonado et al. (2003), the norming data are presented in terms of fitted percentile scores. For all scales, vocabulary responses are presented as a function of gender, given that earlier studies have documented a slight, but reliable, advantage for girls over boys on most measures (Bauer, Goldfield, & Reznick, 2002; Fenson et al., 2007). We further follow the developers of the CDIs in recommending that percentile scores be computed on the basis of both age and sex, and percentile tables are provided for boys and girls separately for all measures. However, for the convenience of users who wish to score the forms without reference to gender, we also provide percentile tables for both genders combined.

CONTINUITY BETWEEN THE S-CDI SHORT AND LONG FORMS

In the final section, we examine the results of a third smaller scale data collection effort designed to assess the degree of concordance in the estimates provided by the short versus the long versions of the S-CDI instruments. Of interest here is whether the probability of parents' choosing a word on the vocabulary checklists might vary as a function of the length of the lists. In one sense, this is a form of concurrent validity, in that we are examining the relation between parents' report of their child's vocabulary on the short form in relation to that child's performance on another established measure of vocabulary, in this case, the long form. Looking at it in a slightly different way, one could frame the short and long forms as simply different versions of the same test. In this sense, a comparison of parents' responses on the short versus the long forms of the S-CDIs is a type of test–retest reliability.

OVERVIEW OF THE CURRENT STUDY

The goals of this paper are to describe the development of the short forms of the S-CDIs and then present normative data from two large-scale cross-sectional studies in Mexico. For the SFI, we provide norms that reflect a similar demographic distribution as that for the original long forms (Jackson-Maldonado et al., 2003).

That is, the norms reflect a broad cross section of the Mexican population, but nevertheless overrepresent families from middle- to upper-SES levels relative to the Mexican population at large. For the SFII, in contrast, we have the opportunity to explore patterns of early vocabulary development in families from a broad but also representative cross section of socioeconomic backgrounds, ranging from extreme poverty to middle- and upper-middle class. Finally, we compare responses from an additional sample of participants who completed both forms, in order to provide information on the convergence between the long and short versions of the forms.

METHOD

Instrument development

Guidelines for generating short form versions of the S-CDI SFs were identical to those used for the English short forms outlined in Fenson et al. (2000). To construct the vocabulary checklists, initial lists of words were selected based on item-response frequencies generated using the LEX Program (Dale & Fenson, 1996). Words were selected in order to achieve approximately 100-item length lists comprising words from a balance of semantic and linguistic categories (e.g., animals, vehicles) and frequency levels. Early appearing words were included so that floor effects could be avoided at each age range. In the same way, later appearing words were added to avoid ceiling effects for the higher scoring children. Words that had a strong dialectal or ethnic bias were avoided as were those that could fall in ambiguous categories. Based on this initial item selection, a simulated short form score was computed for each child in the Spanish norming study (Jackson-Maldonado et al., 2003) as a subset of their long-form item responses ($n = 1,872$). Correlations between these simulated scores and the original vocabulary scores from the long forms were then examined. Items were substituted until a final set of items was identified that achieved the highest correlation between original long form and simulated short form scores across all ages and vocabulary levels.

The final vocabulary checklist for S-CDI SFI consisted of 104 words (see Appendix A). Of these, 49% are nouns, 12.5% are verbs, 6.7% are adjectives, 7.7% are pronouns, 6.7% are social forms, 4.9% sound effects, and 12.5% are other linguistic categories (adverbs and prepositions). Correlations ($n = 778$) between the long form scores and the final simulated short form scores are presented in Table 1 for *Comprende* (Understands) and for *Comprende y Dice* (Understands and Says) in children falling in one of three age groups (8–11, 12–15, and 16–18 months) and one of three percentile levels (0–33rd, 34th–67th, 68th–99th) based on their long-form score. The final vocabulary checklist for the S-CDI SFII consisted of 100 words (see Appendix A) divided in 49% nouns, 16% verbs, 8% adjectives, 8% pronouns, 4% social forms, 5% sound effects, and 10% other linguistic categories (adverbs and prepositions). Correlations between the long-form scores and the simulated short form scores ($n = 1,094$) are presented in Table 2 for five age groups (16–18, 19–21, 22–24, 25–27, and 28–30 months) and three percentile levels (0–33rd, 34th–67th, 68th–99th). The S-CDI SFII also contains

Table 1. *Correlations between scores on the S-CDI I and the virtual scores on the S-CDI SFI by age and percentile rank (n = 778)*

Percentile Level ^a	8–11 Months	12–15 Months	16–18 Months
Comprende (Understands)			
0–33	.96***	.95***	.98***
34–67	.86***	.90***	.83***
68–99	.94***	.95***	.97***
Comprende y Dice (Understands and Says)			
0–33	.93***	.86***	.79***
34–67	.80***	.77***	.73***
68–99	.72***	.98***	.98***

Note: S-CDII and SFI, MacArthur–Bates Spanish-Language Communicative Development Inventories Long Form I and Short Form I.

^aThe percentiles are based on long-form score norms in Jackson-Maldonado et al. (2003).

****p* < .001.

Table 2. *Correlations between scores on the S-CDI II and the virtual scores on the S-CDI SFII by age and percentile rank (n = 1,094)*

Percentile Level ^a	16–18 Months	19–21 Months	22–24 Months	25–27 Months	28–30 Months
0–33	.94***	.93***	.95***	.93***	.92***
34–67	.88***	.91***	.92***	.91***	.89***
68–99	.99***	.96***	.94***	.95***	.95***

Note: S-CDI II and SFII, MacArthur–Bates Spanish-Language Communicative Development Inventories Long Form II and Short Form II.

^aThe percentile levels are based on long-form score norms in Jackson-Maldonado et al. (2003).

****p* < .001.

a section in which parents write in the three longest utterances (as in the long forms), but it will not be discussed in this paper.

Participants

Norming data for the S-CDI SFs were collected by asking parents of young children to complete either the S-CDI SFI or SFII versions, based on their child's age (8–18 months for the SFI and 16–30 months for the SFII).

The sample for the S-CDI SFI consisted of 601 participants from families living in Central and Northern Mexico collected by the first author. Table 3 lists the

Table 3. *Number of participants by age and gender for MacArthur–Bates Spanish-Language Communicative Development Inventories Short Form I*

Age (months)	Female	Male	Total
8	25	26	51
9	29	26	55
10	28	27	55
11	31	25	56
12	30	32	62
13	33	26	59
14	24	28	52
15	31	25	56
16	29	27	56
17	23	26	49
18	23	27	50
Totals	306	295	601

number of participants by age in months and gender. For some analyses, children were categorized into younger (8–12 months) and older (13–18 months) age groups. For the S-CDI SFII, the norming sample consisted of data from a total of 2534 children. Data from 716 children from middle-class families, determined by mothers having a high school education or beyond, were collected by the first author. Data were also available for 1818 children from families living in poverty throughout seven states within Mexico who completed the form as part of their involvement in the Oportunidades program evaluation. In this subsample, mothers typically had less than a middle-school education (primarily elementary school or below), and lived throughout northern, central, southeast, and southwest Mexico (Fernald, Gertler, & Neufeld, 2008, 2009). Table 4 lists the number of children in each of the two subsamples by age in months and gender. For some analyses, children were subgrouped by age into three categories: 16–20, 21–25, and 26–30 months.

Table 5 describes mothers' level of education for the final S-CDI SFI and SFII samples, presented as the proportion of mothers with no schooling or kindergarten only, primaria (elementary), secundaria (middle school), bachillerato (high school) or universidad (university). This table also presents the distribution of educational attainment for mothers in the Mexican population based on census information (INEGI II; Conteo de Poblacion y Vivienda, 2005). Note that the norms for the S-CDI SFI form show an upward educational bias relative to the national demographics. Specifically, nearly twice as many mothers in the S-CDI SFI norming sample are reported to have a high school or college education as seen in the census data. Thus, although a broad range of educational levels are represented, the norms for SFI, like the original norms for the long forms reported in Jackson-Maldonado et al. (2003, their table 4.3), need to be used with caution with low-SES children because they are not appropriately represented in the norms. Analyses of SES

Table 4. *Number of participants sample, age, and gender for MacArthur–Bates Spanish-Language Communicative Development Inventories Short Form II*

Age	Oportunidades Sample		University Sample		Total
	Female	Male	Female	Male	
16	32	33	23	22	110
17	37	31	20	22	110
18	42	33	22	22	119
19	36	42	21	24	123
20	38	36	21	21	116
21	32	21	27	20	100
22	26	35	28	21	110
23	33	31	20	24	108
24	86	79	22	32	219
25	94	85	23	36	238
26	76	106	21	32	235
27	99	88	23	25	235
28	104	135	21	23	283
29	95	95	21	25	236
30	71	67	26	28	192
Totals	901	917	339	377	2534

Table 5. *Education level of mothers in the short-form norming samples (MacArthur–Bates Spanish-Language Communicative Development Inventories Short Forms I and II) compared with education level of mothers in the Mexican population*

Education Level	Mexican Population ^a	SFI	SFII
No schooling	8.9%	0.3	5.3
Primaria	33.7%	12.9	45.1
Secundaria	27.2%	21.8	14.1
Bachillerato	15.7%	33.0	15.6
Universidad	14.5%	32.0	19.9

^aAs reported in the 2005 Mexican census (Instituto Nacional de Estadística, Geografía e Informática—INEGI II Censo de Población y Vivienda) based on the percentage of women over 12 years of age with children. Mother's reported years of education are classified as follows: no schooling or kindergarten only (0–1 years); primaria (elementary: 2–6 years); secundaria (middle: 7–9 years); bachillerato (high school: 10–12 years); universidad (university: 13+ years).

reported here group children in the SFI sample into two groups based on maternal education: bachillerato or lower (high school or below, ≤ 12 years, $n = 406$), and universidad (university, > 12 years, $n = 191$).

As seen in Table 5, the distribution of maternal education for the S-CDI SFII sample shows much less of an upward trend than for the SFI sample, reaching distributions of educational attainment that are similar to that of the Mexican population. In particular, approximately 65% of the mothers in the SFII sample reported 9 years of education or less, nearly reaching the 70% level seen in the Mexican population. Thus, by combining the data from the university and Oportunidades samples, the norms reported here are more likely to be appropriate for use with children from families where the maternal educational attainment is typical of the Mexican population. Here, analyses of SES divided responses from children into two groups: none/primaria/secundaria (≤ 9 years, $n = 1,340$) versus bachillerato and higher ($10+$ years, $n = 739$). Information about years of maternal education was missing for 455 of the participants.

Finally, for purposes of comparing responses on the short versus long forms, an additional 62 families completed either the S-CDI I and SFI ($n = 30$) or the S-CDI II and SFII ($n = 32$). All participating mothers had at least a high school education and lived in central Mexico. The mean age of the children in the S-CDI I/SFI sample was 14.4 months, ranging from 12 to 17 months. The mean age of the children in the S-CDI II/SFII sample was 23.2 months, ranging from 19 to 27 months.

Procedure

Families were initially contacted either by a university research team or via their participation in a government program. For those families contacted through recreational and medical centers or personal/university contacts, a research assistant approached the parent and asked them if they would be willing to participate in a questionnaire study on language development. After obtaining consent, the research assistant gave the parents a brief explanation on how to fill out the S-CDI SF. Parents were also asked to complete a basic information questionnaire, asking about educational background, medical history, hearing and vision issues, family history of language/learning delays, and concerns about their child's language development. Children who were reported to have hearing problems or the mother reported concerns about their child's development were excluded from all analyses. In some cases, the research assistant waited while the parent filled out the forms; in others, the forms were left and picked up no later than 2 weeks after the initial contact. Families typically required about 15 min to complete the forms. For those families contacted through day care centers, the forms were given to the director who then explained them to the parents. Research assistants later picked up the forms from the day care directors. Nurse and health practitioners filled out a comprehensive battery of medical and cognitive assessments that included the S-CDI SFII with families who were contacted through the Oportunidades Project.

For those families who completed both a long and short version of the S-CDIs, families were contacted in person by research assistants through day care centers and personal contacts in two cities in Central Mexico. A brief explanation on how

to fill out the two versions of the forms was given and parents were asked whether they would be willing and able to fill out both forms within a period of 2 weeks. Some families ($n = 26$) were asked to fill out the short form first and others were asked to complete the long form first ($n = 36$). Parents also completed the basic information form asking about educational and medical history. All instruments were picked up in person.

Data reduction and curve fitting

Following procedures outlined in Fenson et al. (2007) and Jackson-Maldonado et al. (2003), mean scores on the vocabulary checklists were computed for each child as a function of age and gender. For each age in months, percentile scores in increments of five, starting with the 5th percentile and ending at the 99th, were computed for both sexes combined and for boys and girls separately. Growth curve modeling at each percentile level was then used to calculate fitted or “smoothed” values over age at each percentile level. The logistic function was used for most of the data described here because logistic functions incorporate a minimum and maximum value. This function thus results in fitted values that typically begin with gradual incremental increases followed by a leveling off in rates of growth, a pattern that is often observed in the acquisition of language and other developmental domains (Burchinal & Appelbaum, 1991).

RESULTS

The results from the current study are presented as follows. Developmental trends in vocabulary development are presented using fitted percentile scores for each age collapsing across genders. These fitted trajectories are presented in graphic form as a function of age in months for the 10th, 25th, 50th (median), 75th, and 90th levels. However, Appendix B provides the full tables listing values at each five percentile increments for females and males separately, as well as for both genders combined. Next, we present analyses that specifically examine patterns of gender differences as a function of age group using raw words understood and words produced scores. SES differences are examined using raw scores for children in younger and older age groups and lower and higher SES groupings. Finally, we examine correlations between short- and long-form scores in an independent sample of children not included in the normative sample.

Developmental trends

S-CDI SFI: Vocabulary comprehension and production. Figure 1 plots the fitted percentile values for words comprehended for both genders combined. As expected, word comprehension shows a steady increase with age across all percentile levels. Even though the checklist on the short form has considerably fewer words than that of the long form, substantial individual differences are still evident. Figure 2 presents fitted percentiles for word production for both genders combined. Again, considerable growth is evident, along with substantial individual variation. As observed on the long form, fitted scores in word production remain near floor

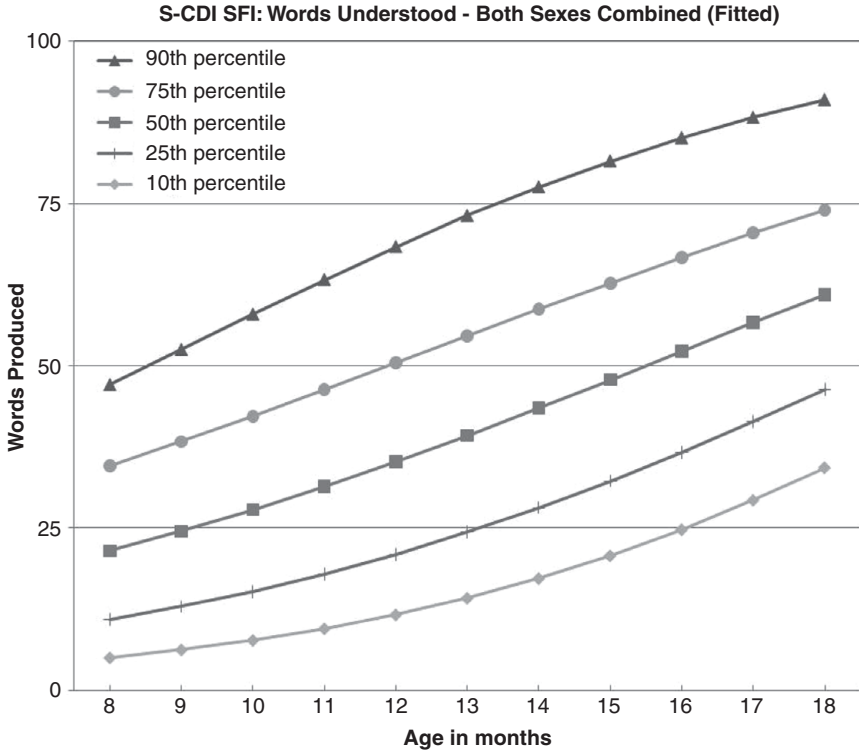


Figure 1. Words understood as a function of age (months) and percentile level (10th, 25th, 50th, 75th, and 90th) for both sexes combined (Spanish-language MacArthur–Bates Communicative Development Inventories Short Form I [S-CDI SFI]).

until about 13 months with few differences in the percentile levels at these younger ages. After this point, there is greater separation between percentile levels in the top half of the distribution, as a greater number of children are reported to produce more of the words on the checklist in the older age groups.

S-CDI SFII: Vocabulary production. Developmental trends for word production on the S-CDI SFII are presented in terms of fitted percentile values (10th, 25th, 50th (median), 75th, and 90th) in Figure 3. The patterns of age-related changes are quite similar to those observed on the long-form of the S-CDI, again showing considerable variability within each age group. Substantial growth is observed over the age range. Until about 19 months, word production is quite limited (below 20 words), most notably in the lower half of the distribution. After 20 months, vocabulary production takes off for all percentile levels. The higher percentile groups begin with higher production levels at the earliest ages and typically are reported to produce most words on the forms after about 27 months. Few ceiling

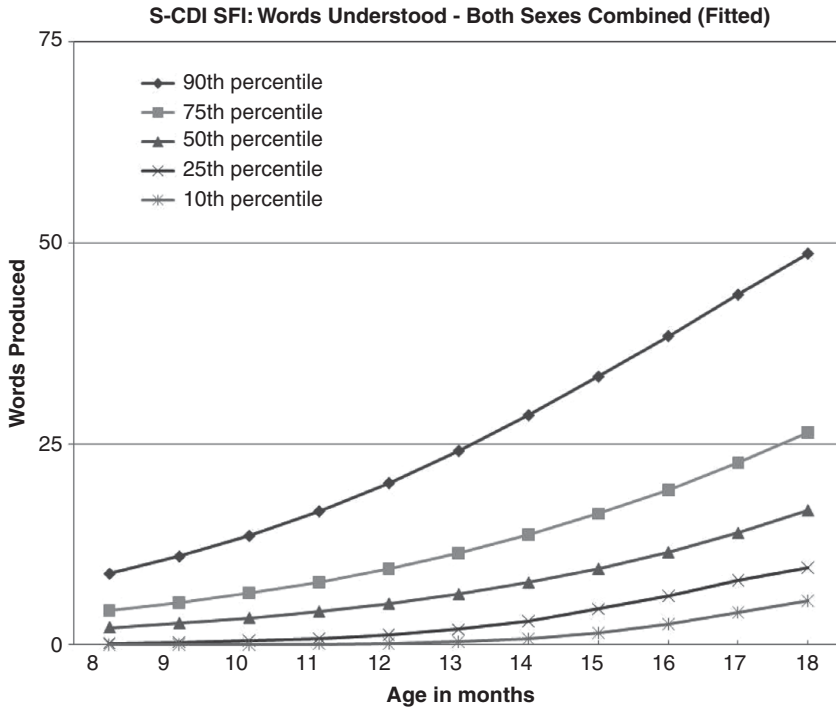


Figure 2. Words produced as a function of age (months) and percentile level (10th, 25th, 50th, 75th, and 90th) for both sexes combined (Spanish-language MacArthur–Bates Communicative Development Inventories Short Form I [S-CDI SFI]).

effects are observed below the 50th percentile level throughout the age range. This suggests that the form may be appropriate for use with children older than 30 months if scores are falling in the lower half of the distribution. Use with higher performing children over 30 months would not be appropriate.

Gender differences

Although the data presented above provide a general pattern of developmental trends across all children, further inspection of the data suggests some evidence for gender differences in the vocabulary measures. Looking first at words understood on the S-CDI SFI, a Gender (2) \times Age Group (2) analysis of variance (ANOVA) indicated a main effect of age group, $F(1, 597) = 120.7, p < .001, \eta_p^2 = 0.17$, but no main effect of gender ($p = .33, \eta_p^2 = 0.002$) and no Gender \times Age Group interaction ($p = .54, \eta_p^2 = 0.001$). In contrast, a 2 (Gender) \times 2 (Age Group) ANOVA on words produced revealed a slight female advantage in the oldest age group. That is, as expected, older children were reported to produce more words

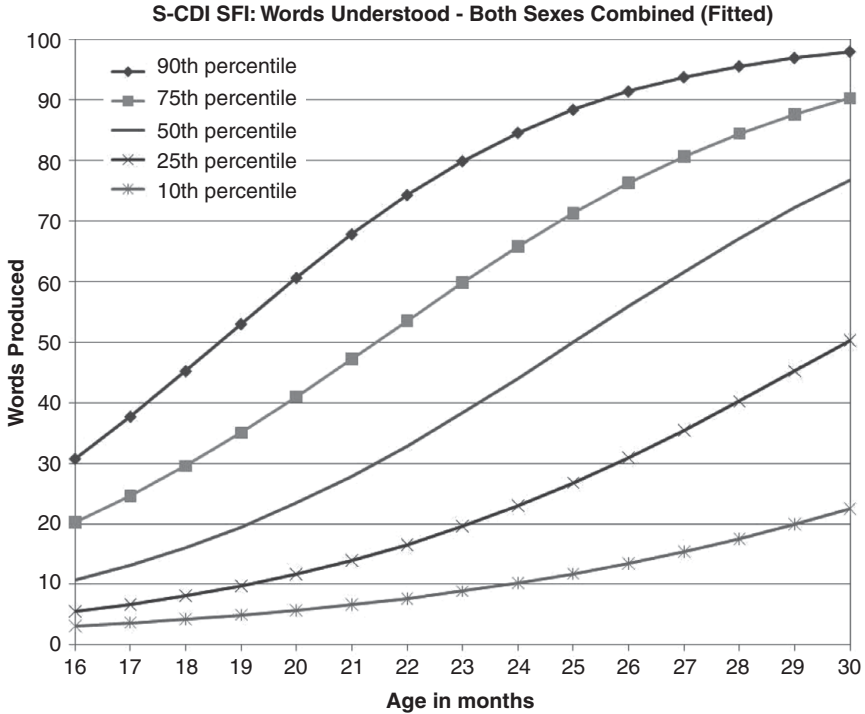


Figure 3. Words produced as a function of age (months) and percentile level (10th, 25th, 50th, 75th, and 90th) for both sexes combined (Spanish-language MacArthur–Bates Communicative Development Inventories Short Form II [S-CDI SFII]).

than younger children, $F(1, 597) = 70.1, p < .001, \eta_p^2 = 0.11$. The main effect of gender was not statistically significant ($p = .22, \eta_p^2 = 0.003$), and there was a significant Age Group \times Gender interaction, $F(1, 597) = 4.8, p < .03, \eta_p^2 = 0.01$. This result reflects that 13- to 18-month-old females were reported to produce more words ($M = 16.9, SD = 16.8$), on average, than 13- to 18-month-old boys ($M = 13.3, SD = 13.1$). As expected, a reliable gender difference was not evident at the younger age group (girls $M = 5.7$ words vs. boys $M = 6.7$ words) as all children were producing very few words in this age group.

Gender differences were even more evident in word production assessed on the S-CDI SFII. To examine these effects, a 2 (Gender) \times 3 (Age Group) ANOVA was conducted, including a dummy variable for sample as a covariate. A significant main effect of age, $F(2, 2527) = 508.0, p < .001, \eta_p^2 = 0.29$, reflects that children of both genders were reported to produce more words in the older than younger age groups (adjusted marginal means: 16–30 months: $M = 20.9, SE = 1.1$; 21–25 months: $M = 42.3, SE = 0.91$; 26–30 months: $M = 61.9, SE = 0.74$). In addition, the main effect of gender was significant, $F(1, 2527) = 25.7, p < .001, \eta_p^2 = 0.01$ (adjusted marginal means: males: $M = 39.0, SE = 0.75$; females: $M = 44.4$,

$SE = 0.74$), but there was no Gender \times Age Group interaction ($p = .42$, $\eta_p^2 = 0.001$). Note that this gender effect, although statistically reliable, was much smaller in magnitude than the effect of age. These results reflect that, controlling for sample, girls were somewhat more likely to have more words reported as produced than boys and that this small, but reliable female advantage was evident at every age group.

Developmental trends as a function of SES

The large and diverse sample available in this norming study allowed us to examine whether vocabulary development as assessed in the S-CDI SFs systematically varied as a function of SES. For this analysis, as in Jackson-Maldonado et al. (2003), maternal education is adopted as an index of SES. Looking first at the SFI, Figure 4a presents mean vocabulary comprehension scores for children in the Less than Bachillerato and Universidad categories as a function of younger (8–12 months) and older (13–18 months) age groups. A 2 (Age) \times 2 (SES) ANOVA revealed the expected main effect of age group, $F(1, 593) = 134.8$, $p < .0001$, $\eta_p^2 = 0.19$, and a marginal main effect of SES, $F(1, 593) = 3.1$, $p < .08$, $\eta_p^2 = 0.01$. As shown in Figure 4a, the Age Group \times SES Group interaction was significant, $F(1, 593) = 10.7$, $p < .005$, $\eta_p^2 = 0.02$, reflecting that, in the younger age group, children from lower SES families were reported to have more words understood than children in the higher SES group. No differences were observed as a function of SES in the older age group. These findings are similar to those reported for the long form in Jackson-Maldonado et al. (2003).

A similar trend was seen in vocabulary production, plotted in Figure 4b. Looking first at age group differences, children in the older age group, regardless of SES group, were reported to have higher vocabulary production scores than children in the younger group, $F(1, 593) = 73.1$, $p < .001$, $\eta_p^2 = 0.11$. Note that although the overall main effect of SES group was not reliable ($p = .99$, $\eta_p^2 = 0.001$), there was a significant interaction of SES and age group, $F(1, 593) = 5.2$, $p = .03$, $\eta_p^2 = 0.01$. As with vocabulary comprehension, this interaction reflected a different impact of SES on responses in the younger versus older children. For younger children, word production scores were lower on average in children from college-educated families and higher in children from less educated families. The opposite pattern was seen in the older group: children from higher SES families had higher word production scores on average than children from lower SES families.

Given the distribution of maternal education for the S-CDI SFI sample (see Table 5), it is important to ask whether these relations to SES would be substantively different if our sample was more representative of the Mexican population. To explore this question, we examined the extent to which mean vocabulary comprehension and production scores changed after statistically adjusting for sampling biases using a poststratification weighting technique. Here, scores for children in each of the maternal education categories in Table 5 were weighted such that the sample data would more closely conform to that of the Mexican population. Results indicated that we could expect a decrease of 0.3 words in overall mean

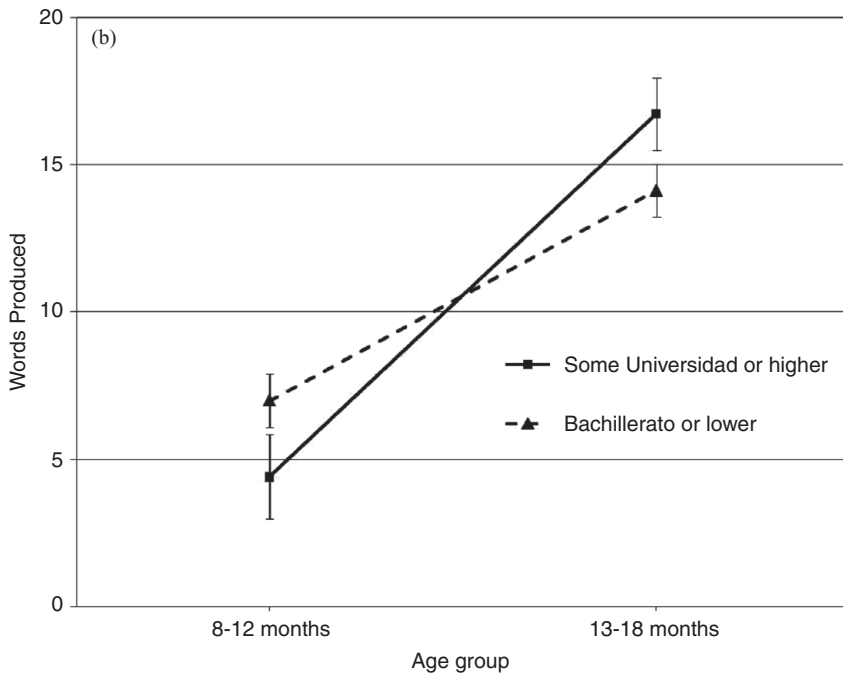
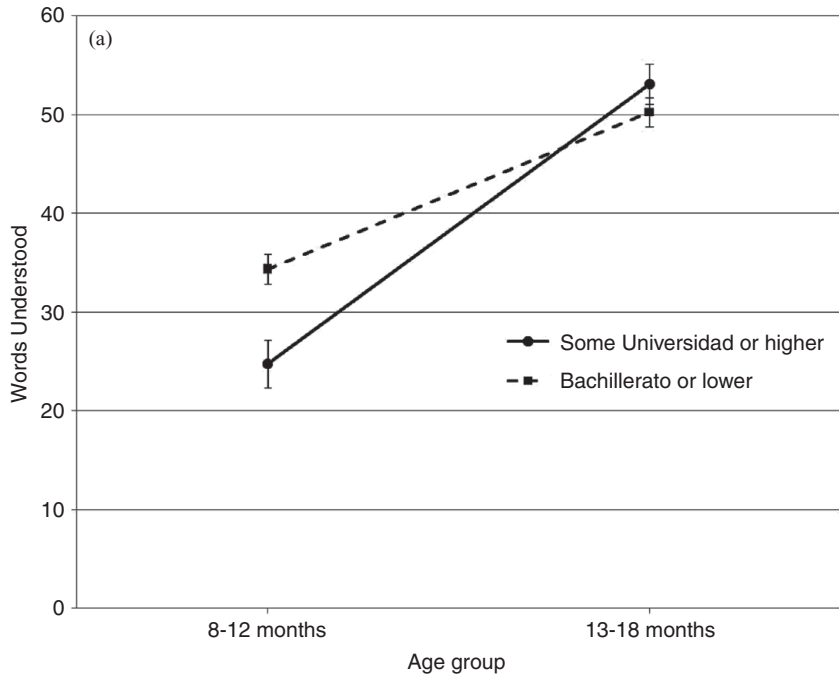


Figure 4. (a) Word comprehension by socioeconomic status and age group (Spanish-language MacArthur–Bates Communicative Development Inventories Short Form I [S-CDI SFI]). (b) Word production by socioeconomic status and age group (S-CDI SFI).

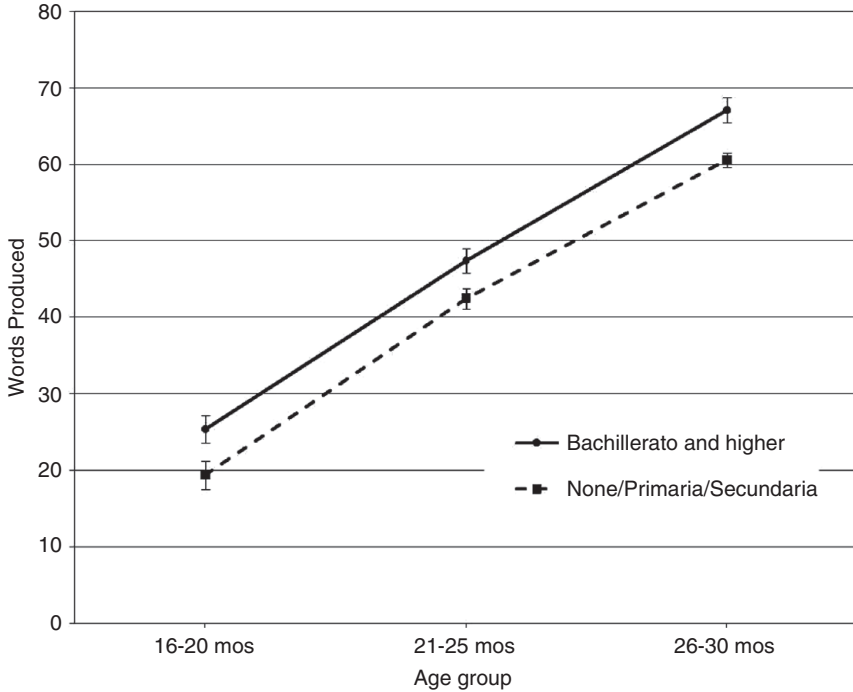


Figure 5. Word production by socioeconomic status and age (Spanish-language MacArthur–Bates Communicative Development Inventories Short Form II [S-CDI SFII]).

vocabulary comprehension, a change of approximately 0.7%. The expected impact on production was somewhat higher but still minor, an increase of 0.4 words, or about 3%. These results suggest a relatively small impact on overall scores after adjusting sample data to conform to the parameters of the population's distribution of SES.

Recall that the distribution of maternal education for the S-CDI SFII sample closely resembled that of the Mexican population (see Table 5). The resulting pattern of SES effects is plotted as a function of age group in Figure 5. These data were analyzed in a 3 (Age Group) \times 2 (SES Group) ANOVA. Here, the results revealed the anticipated significant main effect of age group, $F(2, 2073) = 350.5$, $p < .001$, $\eta_p^2 = 0.25$, a significant main effect of SES group, $F(1, 2073) = 21.1$, $p < .001$, $\eta_p^2 = 0.01$, but no SES Group \times Age Group interaction ($p = .85$, $\eta_p^2 = 0.001$). As seen in Figure 5, children from families with higher education were reported to produce significantly more words than children from families with less education at every age group. Thus, for measures of word production in the age range of the S-CDI SFII, the impact of SES consistently shows an advantage for children from higher SES backgrounds.

Table 6. *Correlations between scores on the S-CDI long and short forms, controlling for age*

	CDI I	CDI I/II
SFI	Comprende	Comprende y dice
Comprende	.81***	.56***
Comprende y dice	.25	.44**
SFII		
Comprende y dice	—	.87***

Note: S-CDI, MacArthur–Bates Spanish–Language Communicative Development Inventories; S-CDI I and II, long forms I and II; SFI and SFII, short forms I and II.

** $p < .01$. *** $p < .001$.

Continuity between the long and short forms

Our final question focuses on the degree to which parents' responses on the newly developed short form align with responses from the long form. Table 6 presents partial correlations between short-form and long-forms scores for those participants who completed both forms, controlling for age in months. Note that the correlation between words understood on the long and short forms was quite strong, suggesting considerable overlap in the rank ordering of children when comprehension is assessed with either form. The correspondence between the short and long forms for word production was considerably weaker. This is likely due to the fact that most children are producing only a few words by this age, and small differences in reporting could have a considerable impact on the rank ordering of the children.

Turning now to the vocabulary production scores for older children derived from the S-CDI II/SFII, the correlations reported in Table 6 again show strong correspondence between the short and long forms. Although these results should be interpreted with caution given the small sample size and the relatively homogeneous demographic distribution of the sample, the generally strong correspondence shown here across the S-CDI I and II forms suggests that the S-CDI SFs have potential to be a useful alternative to the long forms when a global estimate of vocabulary comprehension or production is desired.

DISCUSSION

This paper presents results from a large-scale norming study of the recently developed short form versions of the Spanish-language CDIs. Following the development of the short forms of the English-language instruments, the S-CDI SFs consist of approximately 100-word vocabulary checklists designed to lexical development from 8 to 30 months in Spanish-learning infants and toddlers. Analyses of the fitted percentile scores revealed substantive developmental change in both word comprehension and word production across this important period

of development, but also considerable individual variation. Despite the shortened vocabulary checklists, large ranges of scores were observed in the expected periods of development for both comprehension and production, with scores frequently spanning the full range of the instrument.

Several developmental trends observed in studies using the long-form S-CDIs could also be seen in the current study of the short forms. For example, as reported in Jackson-Maldonado et al. (2003) and Fenson et al. (2007), developmental change in word comprehension tended to occur earlier in the period than word production, resulting in little variation in production prior to 13–14 months of age. However, variation in word production increased after this age point. Using the S-CDI SFII, substantial variation in word production is seen throughout the period, consistent with patterns observed with the long-form versions. In general, these results suggest that, like the long forms, the S-CDI SFs can offer measures of early language that are sensitive to key developmental trends in vocabulary development. In addition, this form may be useful with at-risk children older than 30 months, given that ceiling effects were not observed at the 50th percentile level and below. More research is necessary to fully explicate the clinical utility of this tool, including its validity for use with delayed children who may be older than 30 months.

The analyses of gender effects also revealed patterns of development that were analogous to those seen using the long forms. In particular, girls were shown to have a consistent, but small, advantage over boys, especially in word production. Gender effects also tended to be more evident later, rather than earlier, in development. Small but consistent gender effects concur with the recommendation that users may wish to apply the fitted percentiles separately for boys and girls. Nevertheless, as in earlier studies, gender effects were not nearly as strong as those attributable to age and so, users may prefer to use percentiles that collapse over gender. As such, Appendix B provides fitted percentile tables for boys and girls separately, as well as for the genders combined.

These promising results suggest that the S-CDI SFs have the potential to be a cost-effective substitute for longer and more time-consuming methods of assessing early vocabulary in many research and clinical contexts. This conclusion is further substantiated by the fact that strong cross-form correlations were observed in a separate small-scale study in which parents completed both forms. Continuity across forms was equally strong for early lexical comprehension for the S-CDI SFI and word production for the S-CDI SFII, with much weaker relations seen for word production using the S-CDI SFI. However, it is likely that this modest across-form link was due to floor effects that are characteristic of the limited range in lexical production at this age.

The current study was uniquely positioned to offer a picture of early lexical development in a large and diverse population of Spanish-language learners across Mexico. By providing norms for the S-CDI SFII that mirror the broad range of educational levels seen in the Mexican population, the current study provides information that is more representative of the population of Spanish-language learners in Mexico than those of earlier studies and of most available language tests. For S-CDI SFI, the norming data oversampled children living in high school and college educated families, and undersampled children from families with

only a primary school education. The analyses of SES differences found that the impact of SES was different depending on both the measure and the age group. For younger children, word comprehension scores tended to be higher in families where the mothers had less education than in families where the mothers had higher levels of education.

Although it would be important to further replicate these findings with a truly representative sample, analyses indicated relatively little impact on overall mean scores when sampling biases were corrected statistically. Thus, following Fenson et al. and others (Fenson et al. 2000; Jackson-Maldonado et al., 2003; Reznick & Goldsmith, 1989; Roberts et al. 1999; Rodrigue, 2001), we cautiously interpret this finding to suggest that less-educated mothers may tend to overestimate their child's level of word comprehension, especially early in development, whereas mothers with more education may tend to apply a higher standard when interpreting early comprehension than mothers with less education, resulting in lower scores in this group. Of interest, a recent study of English-language learners found that parents from lower SES backgrounds did not show a systematic reporting bias (Furey, 2011). Nevertheless, the most prudent position is that the potential for reporting bias should be taken into consideration when assessing vocabulary development using parental report in diverse samples of young children. More specifically, although the differences were slight, low-SES children may be reported to comprehend more words than their middle class peers and to produce less words. These factors should be considered if the instruments are to be used for diagnostic purposes.

The opposite impact of SES was seen in word production on the S-CDI SFII. As in earlier studies, children from families where the mother had higher education consistently showed higher scores than children from families in which the mother had less education. Clearly, an important area of ongoing research is to more systematically evaluate the sources of influence that SES may have on vocabulary development. The development of the short forms of the S-CDIs, much shorter and potentially less-intimidating versions of the instruments, is a fruitful first step in this regard (Fenson et al., 2000; Reznick & Goldsmith, 1989).

In general, these results indicate that caution should continue to be taken when evaluating results from this (and any) parent report instrument or observational technique with children from extremely low-SES families. It is the case that most assessment instruments do not have a high percent of low-SES families in their norming samples. Given the potential for reporting biases, particularly in the domain of comprehension, multiple assessment instruments should be applied to establish adequate language levels whenever possible. It may also be the case that the instruments are best completed in the presence of a facilitator, rather than leaving the forms to be filled out on their own. Examples of language behaviors can then be provided in a face-to-face context that may help parents better understand how to complete the form. It may also be particularly important to elaborate on instructions that help parents differentiate between early comprehension and production. Finally, studies that examine the validity of parent report in relation to other assessment tools in families from diverse backgrounds and from

different language-learning groups remain an important research priority (e.g., Furey, 2011).

Although a strong point of this S-CDI SFII norming study is the inclusion of a large and representative sample of low-SES families, this feature may work against us in specific contexts. Recall that the norms for the S-CDI II long form reported in Jackson-Maldonado et al. (2003) does not have a similar population of low-SES families. Thus, the two norming samples are not directly comparable in terms of SES. Nevertheless, very few uses of the instruments necessitates direct comparison of scores from the short and long forms, and thus this limitation is relatively minor and should not detract from the fact that the current S-CDI SFII norms have met the goal of representing the SES distribution of the Mexican population more broadly.

Despite all shortcomings that the different samples may have, it is the case that there are inconsistent findings using different instruments with low-SES families. There is a important need for more and better assessment tools that are adequate for this populations. Thus, it is necessary to find the best means to assess low-SES children. As Pan et al. (2004) have shown, despite inconsistencies, “maternal report can be a useful source” (p. 604)

The S-CDI SFs are likely to be appropriate for use with Spanish-speaking families when the goal is to obtain a quick means for determining whether a child is following typical developmental patterns or whether further testing is required. Clearly, further studies are needed in order to establish the clinical utility of the S-CDI SFs for screening purposes. Nevertheless, the current results demonstrate that the S-CDI SFs have considerable promise as effective vocabulary assessment instruments in Spanish-speaking children between 8 and 30 months. Of course, the short forms cannot replace the longer versions for all purposes. Although the checklists on the S-CDI SFs comprise words from a variety of lexical categories, only global measures are derivable. The numbers of items on the long forms allow the vocabulary checklists to be further subdivided into categories that may be particularly meaningful for some research questions (e.g., a comparison of developmental trends in nominals vs. closed class forms; Bates et al., 1994). This kind of item analyses is not possible with the considerably shorter checklists on the S-CDI SFs. Moreover, unlike the S-CDI I, the S-CDI SFI does not ask about general phrase comprehension, early signs of understanding, or children’s use of symbolic/communicative gestures. Similarly, in contrast to the S-CDI II, which includes questions about children’s use of particular grammatical morphemes and a section that assesses an overall measure of grammatical sophistication, the S-CDI SFII only asks parents to indicate whether their child has begun combining words and to provide examples of their three longest sentences. Although clearly more limited than the S-CDI II, this additional information could be particularly useful for identifying children with potential language delays. Normative data from these two sections are currently undergoing analyses.

In conclusion, the current paper introduced short-form versions of the S-CDIs, providing normative information based on a broad cross section of Spanish-learning children from throughout Mexico. Patterns of gender and SES effects

were found that were analogous to those in earlier studies with the long forms. These findings suggest that the short forms are tapping into similar developmental trends of early lexical comprehension and production as the long forms across this important period of language growth. A small-scale study with middle-class participants demonstrated substantial convergence between scores on the short forms and the long forms. These results converge on the conclusion that the short forms may fill an important research and clinical need, offering alternatives to the long form when screening assessments are desired or when time constraints or the literacy levels of the parents preclude the use of the more comprehensive long forms. Although further research is needed to fully establish the utility of the form for identifying children at risk for later language delays, the current evidence suggests that these short forms may have considerable utility in a broad range of clinical and research applications.

APPENDIX A

Fundación MacArthur Versión Breve del Inventario del Desarrollo de Habilidades Comunicativas. Primeras Palabras y Gestos Palabras y Enunciados

Both forms are copyrighted by the CDI Advisory Board.

FUNDACIÓN MacARTHUR
VERSIÓN BREVE DEL INVENTARIO DEL DESARROLLO DE HABILIDADES:
Primeras Palabras y Gestos

<i>Persona que llenó el cuestionario:</i>	
Madre <input type="checkbox"/>	Padre <input type="checkbox"/>
Otro (especifique) _____	

Nombre del niño _____
Fecha de nacimiento _____ Fecha de hoy _____

Abajo encontrará una lista de palabras frecuentes en el vocabulario de los niños pequeños. Si su hijo ya comprende, pero no dice las palabras, rellene el círculo de la palabra correspondiente en la columna que dice **"comprende"**. Si su hijo dice palabras de la lista aunque de manera distinta (por ejemplo, "bobo" por osos o "ba" por pelota) o con diferente pronunciación (por ejemplo, "tete" por leche), o si su hijo dice otra palabra que se usa en su familia y que significa lo mismo que la que viene en el cuestionario, (por ejemplo, si dice "coca" en vez de "refresco", o "super" en vez de "tienda", o "kleenex" en vez de "pañuelo"), rellene el círculo de la palabra correspondiente en la columna **"comprende y dice"**. Recuerde que esta lista incluye las palabras que muchos niños comprenden o pueden decir. No se preocupe si su hijo no comprende o no dice todas las palabras.

	comp.	comp y dice		comp.	comp y dice		comp.	comp y dice
jay!	<input type="radio"/>	<input type="radio"/>	escoba	<input type="radio"/>	<input type="radio"/>	querer	<input type="radio"/>	<input type="radio"/>
jam!	<input type="radio"/>	<input type="radio"/>	jabón	<input type="radio"/>	<input type="radio"/>	sentar(se)	<input type="radio"/>	<input type="radio"/>
guaguá	<input type="radio"/>	<input type="radio"/>	llaves	<input type="radio"/>	<input type="radio"/>	tener	<input type="radio"/>	<input type="radio"/>
miau	<input type="radio"/>	<input type="radio"/>	vaso	<input type="radio"/>	<input type="radio"/>	tomar(se)	<input type="radio"/>	<input type="radio"/>
quiquiriquí	<input type="radio"/>	<input type="radio"/>	baño	<input type="radio"/>	<input type="radio"/>	ver	<input type="radio"/>	<input type="radio"/>
gato	<input type="radio"/>	<input type="radio"/>	cama	<input type="radio"/>	<input type="radio"/>	estar	<input type="radio"/>	<input type="radio"/>
pollito	<input type="radio"/>	<input type="radio"/>	cocina	<input type="radio"/>	<input type="radio"/>	bonita	<input type="radio"/>	<input type="radio"/>
perro	<input type="radio"/>	<input type="radio"/>	lavabo	<input type="radio"/>	<input type="radio"/>	caliente	<input type="radio"/>	<input type="radio"/>
vaca	<input type="radio"/>	<input type="radio"/>	televisión	<input type="radio"/>	<input type="radio"/>	cansado	<input type="radio"/>	<input type="radio"/>
rana	<input type="radio"/>	<input type="radio"/>	calle	<input type="radio"/>	<input type="radio"/>	grande	<input type="radio"/>	<input type="radio"/>
tigre	<input type="radio"/>	<input type="radio"/>	cielo	<input type="radio"/>	<input type="radio"/>	nuevo	<input type="radio"/>	<input type="radio"/>
mono	<input type="radio"/>	<input type="radio"/>	flor	<input type="radio"/>	<input type="radio"/>	sucio	<input type="radio"/>	<input type="radio"/>
camión/troca	<input type="radio"/>	<input type="radio"/>	iglesia/templo	<input type="radio"/>	<input type="radio"/>	roto	<input type="radio"/>	<input type="radio"/>
carro/coche	<input type="radio"/>	<input type="radio"/>	fiesta	<input type="radio"/>	<input type="radio"/>	ahorita/ahora	<input type="radio"/>	<input type="radio"/>
tren	<input type="radio"/>	<input type="radio"/>	sol	<input type="radio"/>	<input type="radio"/>	hoy	<input type="radio"/>	<input type="radio"/>
agua	<input type="radio"/>	<input type="radio"/>	abuela	<input type="radio"/>	<input type="radio"/>	mañana	<input type="radio"/>	<input type="radio"/>
carne	<input type="radio"/>	<input type="radio"/>	bebé	<input type="radio"/>	<input type="radio"/>	cómo	<input type="radio"/>	<input type="radio"/>
leche	<input type="radio"/>	<input type="radio"/>	familia	<input type="radio"/>	<input type="radio"/>	¿dónde está?	<input type="radio"/>	<input type="radio"/>
helado	<input type="radio"/>	<input type="radio"/>	mamá/mami	<input type="radio"/>	<input type="radio"/>	quién	<input type="radio"/>	<input type="radio"/>
huevo	<input type="radio"/>	<input type="radio"/>	niño	<input type="radio"/>	<input type="radio"/>	ellas	<input type="radio"/>	<input type="radio"/>
pan	<input type="radio"/>	<input type="radio"/>	señora	<input type="radio"/>	<input type="radio"/>	su	<input type="radio"/>	<input type="radio"/>
tortilla	<input type="radio"/>	<input type="radio"/>	adiós/byebye	<input type="radio"/>	<input type="radio"/>	mío	<input type="radio"/>	<input type="radio"/>
collar	<input type="radio"/>	<input type="radio"/>	buenos días	<input type="radio"/>	<input type="radio"/>	éste	<input type="radio"/>	<input type="radio"/>
pantalón	<input type="radio"/>	<input type="radio"/>	por favor	<input type="radio"/>	<input type="radio"/>	un	<input type="radio"/>	<input type="radio"/>
zapato	<input type="radio"/>	<input type="radio"/>	shhh	<input type="radio"/>	<input type="radio"/>	más	<input type="radio"/>	<input type="radio"/>
boca	<input type="radio"/>	<input type="radio"/>	ojitos	<input type="radio"/>	<input type="radio"/>	también	<input type="radio"/>	<input type="radio"/>
brazos	<input type="radio"/>	<input type="radio"/>	uno, dos, tres	<input type="radio"/>	<input type="radio"/>	mucho	<input type="radio"/>	<input type="radio"/>
manos	<input type="radio"/>	<input type="radio"/>	sí	<input type="radio"/>	<input type="radio"/>	no hay	<input type="radio"/>	<input type="radio"/>
ojos	<input type="radio"/>	<input type="radio"/>	caer(se)	<input type="radio"/>	<input type="radio"/>	afuera	<input type="radio"/>	<input type="radio"/>
libro	<input type="radio"/>	<input type="radio"/>	comer	<input type="radio"/>	<input type="radio"/>	ahí	<input type="radio"/>	<input type="radio"/>
osito	<input type="radio"/>	<input type="radio"/>	dormir(se)	<input type="radio"/>	<input type="radio"/>	aquí	<input type="radio"/>	<input type="radio"/>
pelota	<input type="radio"/>	<input type="radio"/>	escribir	<input type="radio"/>	<input type="radio"/>	encima	<input type="radio"/>	<input type="radio"/>
tambor	<input type="radio"/>	<input type="radio"/>	jugar	<input type="radio"/>	<input type="radio"/>	en	<input type="radio"/>	<input type="radio"/>
botella/mamila	<input type="radio"/>	<input type="radio"/>	mirar	<input type="radio"/>	<input type="radio"/>	para	<input type="radio"/>	<input type="radio"/>
dinero	<input type="radio"/>	<input type="radio"/>	poner(se)	<input type="radio"/>	<input type="radio"/>			

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FUNDACIÓN MacARTHUR
VERSIÓN BREVE DEL INVENTARIO DEL DESARROLLO DE HABILIDADES:
Palabras y Enunciados

Persona que llenó el cuestionario:

Madre Padre

Otro (especifique) _____

Nombre del Niño _____

Fecha de nacimiento _____ Fecha de hoy _____

LISTA DE VOCABULARIO
 Los niños comprenden más palabras de las que dicen. Aquí nos interesa las palabras que realmente DICEN. Muchas veces, las palabras que usan son un poco distintas de las que aparecen en esta lista. Por ejemplo, dicen "pupa" en vez de "ombligo" o "pica" en vez de "chile." Rellene el círculo de la palabra correspondiente que viene en la lista.

jay!	<input type="radio"/>	mano	<input type="radio"/>	mamá	<input type="radio"/>	sucio	<input type="radio"/>
guaguá	<input type="radio"/>	brazo	<input type="radio"/>	niño	<input type="radio"/>	grande	<input type="radio"/>
muu	<input type="radio"/>	bigote	<input type="radio"/>	payaso	<input type="radio"/>	roto	<input type="radio"/>
tutú	<input type="radio"/>	pelota	<input type="radio"/>	madrina	<input type="radio"/>	cansado	<input type="radio"/>
quiquiriquí	<input type="radio"/>	libro	<input type="radio"/>	adiós/byebye	<input type="radio"/>	nuevo	<input type="radio"/>
gato	<input type="radio"/>	tambor	<input type="radio"/>	vámonos	<input type="radio"/>	malo	<input type="radio"/>
pato	<input type="radio"/>	botella/mamila	<input type="radio"/>	por favor	<input type="radio"/>	bonita	<input type="radio"/>
vaca	<input type="radio"/>	jabón	<input type="radio"/>	buenas noches	<input type="radio"/>	en la mañana	<input type="radio"/>
rana	<input type="radio"/>	luz	<input type="radio"/>	caer(se)	<input type="radio"/>	hoy	<input type="radio"/>
víbora	<input type="radio"/>	vasos	<input type="radio"/>	dormir(se)	<input type="radio"/>	mío	<input type="radio"/>
tigre	<input type="radio"/>	escoba	<input type="radio"/>	jugar	<input type="radio"/>	ésta	<input type="radio"/>
carro/coche	<input type="radio"/>	cerillos	<input type="radio"/>	comprar	<input type="radio"/>	suya	<input type="radio"/>
camión/troca	<input type="radio"/>	olla	<input type="radio"/>	sentar(se)	<input type="radio"/>	nuestro	<input type="radio"/>
leche	<input type="radio"/>	periódico	<input type="radio"/>	besar	<input type="radio"/>	dónde	<input type="radio"/>
papas	<input type="radio"/>	carna	<input type="radio"/>	oir	<input type="radio"/>	quién	<input type="radio"/>
huevo	<input type="radio"/>	baño	<input type="radio"/>	llover	<input type="radio"/>	cómo	<input type="radio"/>
carne	<input type="radio"/>	televisión	<input type="radio"/>	mirar	<input type="radio"/>	a	<input type="radio"/>
plátano/banana	<input type="radio"/>	puerta	<input type="radio"/>	ganar	<input type="radio"/>	la	<input type="radio"/>
arroz	<input type="radio"/>	sol	<input type="radio"/>	hacer	<input type="radio"/>	sí	<input type="radio"/>
calabaza	<input type="radio"/>	flor	<input type="radio"/>	saltar	<input type="radio"/>	no	<input type="radio"/>
chicharo	<input type="radio"/>	manguera	<input type="radio"/>	saber	<input type="radio"/>	más	<input type="radio"/>
zapato	<input type="radio"/>	timbre	<input type="radio"/>	prender	<input type="radio"/>	no hay	<input type="radio"/>
pantalón	<input type="radio"/>	calle	<input type="radio"/>	estar	<input type="radio"/>	aquí	<input type="radio"/>
camisa	<input type="radio"/>	iglesia/templo	<input type="radio"/>	haber (hay)	<input type="radio"/>	afuera	<input type="radio"/>
falda	<input type="radio"/>	fiesta	<input type="radio"/>	caliente	<input type="radio"/>	entonces	<input type="radio"/>

¿Su hijo ya empezó a combinar palabras, como "papá coche" o "más agua"?

todavía no de vez en cuando muchas veces

Si contestó "todavía no", no siga llenando la forma.
 Si contestó "de vez en cuando" o "muchas veces," por favor siga llenando la forma.

EJEMPLOS: Por favor escriba tres ejemplos de las frases más largas que recuerde que su hijo haya dicho últimamente.

1. _____

2. _____

3. _____

APPENDIX B

The following tables are from the MacArthur–Bates Spanish–Language Communicative Development Inventories Short Form I (SFI) and Short Form II (SFII).

SFI: Fitted percentile scores for words understood for females

Uwords	8	9	10	11	12	13	14	15	16	17	18
99	70	76	81	86	90	93	96	98	99	101	102
95	64	71	77	83	87	91	94	97	99	100	101
90	43	50	57	65	71	77	83	87	91	94	97
85	41	46	51	56	61	66	71	76	80	83	87
80	38	42	47	51	55	60	64	68	72	76	79
75	35	39	43	47	52	56	60	65	69	73	76
70	33	36	41	45	49	53	58	62	66	70	74
65	31	35	39	43	47	51	55	59	63	67	71
60	30	33	37	40	44	48	52	55	59	63	66
55	28	31	34	37	41	44	48	52	56	59	63
50	25	28	31	34	38	42	45	49	53	57	61
45	22	25	28	31	35	38	42	46	49	53	57
40	19	22	25	28	31	35	39	43	47	51	55
35	18	20	23	26	29	33	37	41	45	49	53
30	15	17	20	23	26	30	33	37	42	46	50
25	13	15	17	20	23	26	29	33	37	41	46
20	11	13	15	18	20	23	27	31	35	39	43
15	8	10	12	14	17	20	24	28	32	37	42
10	7	8	10	12	14	16	19	22	26	30	34
5	5	5	6	7	8	9	10	12	13	15	17

SFI: Fitted percentile scores for words understood for males

Uwords	8	9	10	11	12	13	14	15	16	17	18
99	80	86	91	95	98	100	101	103	103	104	104
95	76	80	84	87	90	92	94	96	97	99	100
90	57	61	65	69	73	76	79	82	85	88	90
85	45	49	53	58	62	65	69	73	76	79	82
80	38	42	46	50	54	58	62	65	69	72	76
75	33	36	40	44	48	52	56	60	64	67	71
70	30	33	37	41	44	48	52	57	61	64	68
65	26	30	33	37	41	45	50	54	58	62	67
60	23	26	29	33	37	42	46	51	55	60	64
55	20	24	27	31	35	39	44	48	53	58	62
50	18	21	25	28	32	36	41	46	50	55	60
45	14	17	20	23	27	32	37	42	47	53	58
40	13	16	18	22	25	30	34	39	44	49	55
35	12	14	17	20	24	28	32	37	42	47	52
30	11	13	15	19	22	26	30	35	40	46	51
25	9	11	13	16	19	23	27	32	37	43	48
20	7	8	10	13	16	19	24	28	34	39	45
15	5	7	8	11	13	16	20	24	29	35	40
10	4	5	7	9	11	13	17	21	25	30	36
5	2	3	4	5	6	8	10	12	16	20	24

SFI: Fitted percentile scores for words understood for both sexes combined

Uwords	8	9	10	11	12	13	14	15	16	17	18
99	80	87	93	97	99	101	103	103	104	104	105
95	66	72	77	82	86	90	93	95	97	99	100
90	47	53	58	63	68	73	78	82	85	88	91
85	42	47	51	56	60	65	69	73	77	80	83
80	38	42	46	50	54	59	63	67	71	74	78
75	35	38	42	46	50	55	59	63	67	70	74
70	33	37	40	44	48	51	55	59	63	66	70
65	30	33	37	40	44	48	52	56	60	64	68
60	26	30	33	37	41	45	49	54	58	62	66
55	24	27	30	34	38	42	47	51	55	60	64
50	22	25	28	31	35	39	43	48	52	57	61
45	18	21	24	28	32	36	40	45	50	54	59
40	16	19	22	25	29	33	38	42	47	52	57
35	14	16	19	23	26	30	35	39	44	49	54
30	12	15	17	20	24	28	32	37	42	47	52
25	11	13	15	18	21	24	28	32	37	41	46
20	9	11	13	16	18	22	26	30	34	39	45
15	7	9	11	13	16	19	22	26	31	36	41
10	5	6	8	10	12	14	17	21	25	29	34
5	3	4	5	6	8	10	12	14	18	21	25

SFI: Fitted percentile scores for words produced for females

Pwords	8	9	10	11	12	13	14	15	16	17	18
99	20	26	33	41	49	56	63	68	72	76	78
95	13	18	23	29	36	44	51	58	64	69	73
90	11	13	17	20	25	30	35	40	46	51	56
85	8	10	12	15	18	22	26	30	35	40	46
80	5	7	9	11	13	16	20	24	29	34	39
75	5	6	7	9	11	13	16	19	22	26	31
70	4	5	6	8	10	12	14	17	20	24	28
65	4	4	5	7	8	10	12	15	18	21	25
60	3	4	5	6	7	9	11	13	16	19	22
55	3	3	4	5	6	8	10	12	14	17	20
50	2	3	4	5	6	7	9	11	13	16	19
45	2	3	3	4	5	6	8	10	12	14	17
40	2	2	3	4	4	5	6	8	10	11	14
35	1	2	2	3	3	4	5	7	9	11	13
30	0	0	1	1	2	2	4	6	8	10	13
25	0	0	1	1	1	2	3	5	7	9	12
20	0	0	0	1	1	2	2	4	5	7	10
15	0	0	0	1	1	1	2	3	4	6	7
10	0	0	0	0	0	0	1	1	1	2	4
5	0	0	0	0	0	0	0	0	0	0	0

SFI: Fitted percentile scores for words produced for males

Pwords	8	9	10	11	12	13	14	15	16	17	18
99	20	24	29	35	40	45	49	54	57	60	62
95	17	21	25	29	34	39	44	48	52	55	58
90	9	11	14	17	20	24	28	33	37	42	46
85	6	7	9	10	13	15	18	22	25	29	33
80	5	6	7	8	10	12	14	16	19	22	25
75	4	5	6	7	9	10	12	15	18	21	24
70	3	4	5	6	8	9	11	14	16	19	23
65	3	4	5	6	7	8	10	12	15	18	21
60	3	3	4	5	6	8	9	11	14	16	19
55	2	3	3	4	5	6	8	10	12	14	17
50	2	2	3	3	4	5	7	9	11	13	16
45	1	2	2	3	4	5	6	7	9	11	14
40	1	2	2	3	3	4	5	7	8	10	13
35	1	1	1	2	2	3	4	6	8	10	12
30	0	0	0	0	1	1	3	4	7	9	11
25	0	0	0	0	1	1	2	4	6	8	10
20	0	0	0	0	1	1	2	3	5	7	9
15	0	0	0	0	0	1	1	2	4	6	8
10	0	0	0	0	0	0	1	1	3	4	6
5	0	0	0	0	0	0	0	0	1	1	2

SFI: Fitted percentile scores for words produced for both sexes combined

Pwords	8	9	10	11	12	13	14	15	16	17	18
99	23	29	37	44	52	59	65	70	74	77	79
95	15	19	23	27	32	37	42	48	53	58	62
90	9	11	14	17	20	24	29	33	38	44	49
85	6	8	9	12	14	17	21	25	30	34	39
80	5	6	8	9	11	14	17	20	24	28	32
75	4	5	6	8	9	11	14	16	19	23	26
70	4	5	6	7	8	10	12	15	17	20	24
65	3	4	5	6	7	9	11	13	16	19	22
60	3	4	5	6	7	8	10	12	15	18	21
55	3	3	4	5	6	7	9	11	13	16	19
50	2	3	3	4	5	6	8	9	12	14	17
45	1	2	2	3	4	5	6	8	10	13	15
40	1	2	2	3	4	5	6	7	9	11	14
35	1	2	2	3	3	4	5	7	8	10	12
30	0	0	1	1	2	2	4	5	7	9	11
25	0	0	1	1	1	2	3	4	6	8	10
20	0	0	0	0	1	1	2	3	5	7	9
15	0	0	0	0	1	1	2	3	4	6	8
10	0	0	0	0	0	0	1	1	3	4	6
5	0	0	0	0	0	0	0	0	0	1	1

SFII: Fitted percentile scores for words produced for females

VocProd	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
99	71	77	83	87	91	93	95	97	98	99	99	100	100	100	101
95	45	53	62	70	77	82	87	91	93	95	97	98	99	100	100
90	34	41	49	57	65	72	78	83	87	91	93	95	97	98	99
85	29	35	42	49	56	63	70	75	80	85	88	91	93	95	97
80	26	31	37	43	50	56	63	68	74	79	83	86	89	92	94
75	24	29	34	40	46	52	58	64	69	74	79	82	86	89	91
70	22	26	31	36	41	47	53	59	64	69	74	79	82	86	88
65	18	22	26	31	36	42	47	53	59	65	70	75	79	83	86
60	17	20	24	28	33	39	44	50	56	61	67	72	76	80	84
55	15	18	22	26	30	35	41	46	52	58	63	68	73	78	81
50	12	15	18	22	26	31	36	42	48	54	60	65	70	75	79
45	10	13	16	19	23	27	32	38	43	49	55	61	67	72	76
40	9	12	14	17	21	25	29	34	40	45	51	57	62	68	73
35	8	10	13	15	18	22	26	31	36	41	46	52	58	63	68
30	8	9	11	14	16	19	23	27	32	36	42	47	52	58	63
25	7	8	10	12	14	17	20	23	27	31	36	41	46	51	56
20	6	7	8	10	12	14	17	19	23	26	30	34	39	43	48
15	5	5	7	8	9	11	13	15	18	20	24	27	31	35	39
10	3	4	5	6	6	8	9	10	12	14	16	18	21	23	26
5	2	2	3	3	4	4	5	5	6	7	8	9	10	11	13

SFII: Fitted percentile scores for words produced for males

VocProd	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
99	70	76	81	85	89	92	94	96	97	98	99	99	100	100	100
95	43	51	59	66	73	79	84	88	91	94	95	97	98	99	99
90	29	36	43	51	58	66	72	78	83	87	90	93	95	96	98
85	25	30	36	43	50	57	64	70	76	81	85	88	91	93	95
80	20	25	30	36	42	49	56	62	68	74	79	83	86	89	92
75	18	22	27	32	38	44	50	57	63	69	74	79	83	86	89
70	15	18	23	27	33	38	45	51	57	63	69	74	79	83	87
65	12	15	19	23	28	34	40	46	52	58	65	70	75	80	84
60	12	14	18	21	26	31	36	42	48	54	60	66	71	76	80
55	10	13	16	19	23	28	33	38	44	50	56	61	67	72	77
50	9	11	14	17	20	24	29	34	39	45	51	56	62	67	72
45	8	10	12	15	18	21	25	30	35	40	46	51	57	62	67
40	7	8	10	12	15	18	22	26	31	36	41	47	53	58	64
35	6	7	9	11	13	16	19	23	27	32	37	42	48	54	59
30	5	6	8	10	12	14	17	20	23	27	32	37	42	47	52
25	5	6	7	8	10	12	14	17	20	23	27	31	36	41	45
20	4	5	6	7	8	10	12	14	16	19	22	25	29	33	37
15	3	4	5	5	6	8	9	10	12	14	16	19	22	25	28
10	3	3	3	4	5	5	6	7	8	10	11	13	14	16	19
5	2	2	2	2	3	3	4	4	5	6	6	7	8	10	11

SFII: Fitted percentile scores for words produced for both sexes combined

VocProd	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
99	76	81	85	89	92	94	96	97	98	99	99	100	100	100	101
95	43	51	59	67	74	80	85	89	92	94	96	97	98	99	100
90	31	38	45	53	61	68	74	80	85	88	91	94	96	97	98
85	27	33	39	46	53	60	66	72	77	82	86	89	92	94	95
80	24	29	35	41	47	54	60	66	72	77	81	85	88	91	93
75	20	25	30	35	41	47	54	60	66	71	76	81	84	88	90
70	17	21	26	31	36	42	48	54	60	66	72	76	81	84	87
65	16	19	23	28	33	38	44	50	56	62	68	73	77	82	85
60	13	16	20	24	29	34	40	46	52	58	64	69	74	79	83
55	12	14	18	21	26	31	36	42	48	54	60	66	71	76	80
50	11	13	16	19	23	28	33	38	44	50	56	62	67	72	77
45	9	11	14	17	20	24	29	34	39	45	51	57	62	68	73
40	8	10	12	15	18	21	26	30	35	41	47	52	58	64	69
35	7	9	11	13	16	19	23	27	31	36	42	47	53	58	64
30	6	7	9	11	13	16	19	23	27	31	36	41	47	52	58
25	6	7	8	10	12	14	17	20	23	27	31	35	40	45	50
20	5	6	7	8	10	12	14	16	19	22	26	30	34	38	43
15	4	4	5	6	7	9	10	12	14	17	20	23	26	30	34
10	3	4	4	5	6	7	8	9	10	12	13	15	18	20	23
5	2	2	2	3	3	4	4	5	6	6	7	8	10	11	12

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NOTE

1. In other publications the instrument has been referred to as the "Inventarios."

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