

Starting Over: A Preliminary Study of Early Lexical and Syntactic Development in Internationally Adopted Preschoolers

Joy Geren, M.A.,¹ Jesse Snedeker, Ph.D.,¹ and Laura Ax, Ed.M.¹

ABSTRACT

To explore early language acquisition in internationally adopted preschoolers, we collected parental reports (CDI-2) and speech samples from 14 children adopted from China between the ages of 2 years, 7 months and 5 years, 1 month. Their lexical and syntactic development was qualitatively similar to infants acquiring English as a first language: nouns and social words dominated early vocabularies; verbs and closed-class items became more frequent as vocabulary size increased; and lexical and syntactic development were tightly correlated. This research has several implications for clinicians. First, it demonstrates that parental reports provide valid information during the first year after adoption and could be useful in identifying preschool children in need of further assessment. Nine to 15 months after arrival many children reached the ceiling of the CDI-2, suggesting that this instrument has limited utility after the first year. Finally, the rapid lexical and syntactic growth of these children suggests that many of them may eventually catch up with their native-born peers.

KEYWORDS: International adoption, language development, adopted children, vocabulary

Learning Outcomes: After reading this article, readers will be able to (1) explain why internationally adopted preschoolers are a unique linguistic population, describe why it is difficult to evaluate their language abilities, and articulate the problems that arise from comparing them to other groups of language learners, (2) evaluate the potential role of the MCDI-2 as an instrument to assess this group and list the benefits and limitations of using this measure, and (3) identify some of the similarities and the primary difference between language acquisition in this population and acquisition in English-learning infants.

Internationally Adopted Children: Guidelines for Speech and Language; Editors in Chief, Audrey L. Holland, Ph.D., and Nan Bernstein Ratner, Ed.D.; Guest Editor, Sharon Glennen, Ph.D., CCC-SLP. *Seminars in Speech and Language*, volume 26, number 1, 2005. Address for correspondence and reprint requests: Joy Geren, Laboratory for Developmental Studies, Shannon Hall, 25 Francis Ave., Room 202, Cambridge, MA 02138. E-mail: geren@fas.harvard.edu. ¹Department of Psychology, Harvard University, Cambridge, Massachusetts. Copyright © 2005 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA. Tel: +1(212) 584-4662. 0734-0478,p;2005,26,01,044,053,ftx,en;ssl00224x.

Recently, the number of international adoptions has increased sharply, growing from 6472 in 1992 to 20,099 in the year 2002.¹ While almost half of these children are adopted before 1 year of age and many of the others come as toddlers, thousands of preschoolers and school-aged children are adopted by American families. The language development of these older children may be of particular concern to their families and caregivers. Since expectations of communicative competence are naturally higher for preschoolers than infants, these parents are more likely to wonder whether their children are progressing normally. Parental concerns often intensify as children get closer to starting school. Adopted preschoolers have fewer years than toddlers or infants to catch up with their native English-speaking peers before beginning their formal education, raising questions about their readiness for school and the need for language intervention programs.

The unique linguistic experience of internationally adopted (IA) children raises questions about how to evaluate these children and address these concerns. Evaluating children in their birth language is both difficult and problematic. A native language assessment is possible only when the child's dialect can be accurately identified and there is a fluent speaker available who is capable of evaluating the child's language skills. This problem is particularly difficult for children who were adopted from China. About a third of the people in China are native speakers of languages or dialects other than Mandarin Chinese² and linguistic diversity is particularly pronounced in the southern and western provinces where many of these children are born. Even when a native language evaluation is possible, it may be difficult to interpret. Many children are reluctant to speak their birth language and may even become upset by hearing it.³ Thus, the child's failure to engage in a task or respond to a prompt may not indicate a failure to understand. Because IA children have little opportunity to use their birth language, evaluations that are conducted months or years after the child's arrival in his or her new home may underestimate the level of development that the child had attained at the time of adoption. Gindis³ found 4- to 8-year-old

children who were adopted from Russia showed a rapid decline in native-language production skills within 3 to 6 months after adoption. After 1 year they had no functional command over their birth language.

By adulthood, IA children do not appear to retain any residual knowledge of their birth language. Pallier and colleagues⁴ found that adults who were adopted from Korea by French families in childhood were unable to distinguish Korean utterances from Japanese utterances. The researchers also examined their brain activity in response to these languages using functional magnetic resonance imaging, a technique that detects changes in blood flow related to neural activity. The adoptees, like the native French speakers, showed no unique cortical activations to Korean. However, their neural response to French utterances was quite different from their response to the other languages and closely paralleled that of the native-born controls.

Thus, since most children rapidly become monolingual speakers of their adoptive language, it will typically be most practical and meaningful to evaluate their abilities in this language. But it is unclear what criteria clinicians should apply in these evaluations. Several researchers have evaluated IA children by standards that are typically applied to monolingual age-mates and have found shockingly high rates of language delays in children who have recently arrived in the United States.^{5,6} But there is little reason to assume that these delays have any clinical significance. Preschoolers who are evaluated shortly after arrival will inevitably have a limited knowledge of their new language, simply because they have had very little time in which learn it.

An alternative approach is to dynamically assess IA children as second-language learners, taking into account not only the children's age but also the amount of time that they have had to acquire their new language and monitoring their progress over time. To understand the results of these evaluations, we need more information about the typical trajectory of language acquisition in this unique population. While there is a substantial body of research on the course of second-language acquisition in children, it is not clear that these findings can

be directly applied to international adoptees. Most young children acquire a second language through interactions with peers and teachers in the classroom and on the playground, and typically continue to use their first language with their families. In contrast, most IA children must function in their new language both at home and at school. This situation may present unique advantages and risks. IA children begin losing their first language before they achieve competence in their second language³ which may put them at risk for language delay.⁷⁻⁹ However, immersion at both home and school may increase the amount of linguistic input that the child receives and improve its quality. Wong Fillmore¹⁰ argued that children who learn English in school often must feign competence early on to maintain social interactions, limiting their willingness to experiment, speak on new topics, or risk making errors. In contrast, adopted children have access to conversational partners who are presumably willing to overlook mistakes and may be more likely to tailor their speech to the child's level of expertise.

These differences highlight the need for more information about the trajectory of language acquisition in IA preschoolers. Without such information it is impossible to interpret an individual child's performance. Is a 5-year-old child who is using telegraphic utterances after 9 months in the United States well on the road to catching up with her peers? Or is she experiencing difficulties in language acquisition which might warrant intervention? How rapidly should parents expect their children to progress and when should they seek help? Only by understanding the typical course of acquisition in this unique population will we be able to identify children who appear to be acquiring the language more slowly and may be at risk for language disorders. This information would also help us to pinpoint any common needs within this group of children and provide parents with the information that they need to make choices about their child's education.

This study is an initial step in that direction. Our goals were to document the pace of lexical and grammatical development of preschool children during the first year after adoption and determine whether adopted children

showed the same patterns in acquisition as toddlers learning their first language. This second goal might seem surprising. Adopted preschoolers are considerably older and more cognitively sophisticated than toddlers. Their interactions are more complex and their communicative needs are presumably different. But the situation that the adopted child is in is in some ways quite similar to that of an infant. Like an infant, she must learn her new language without the aid of bilingual informants or text. Like infants, preschoolers lack the metalinguistic reasoning skills that are available to older language learners. An additional goal was to determine whether parental report measures were valid with this population and could be used to track the progress of adopted children over time. For a full empirical report of parent report measures and a discussion of its theoretical implications, see the work of Snedeker and associates.¹¹

METHODS

Subjects

Since relatively few preschoolers are adopted from China each year, we attempted to contact families from across the United States. Information about the study appeared in *Adoption Today* (a national magazine for adoptive families), the online newsletters of regional chapters of Families with Children from China, and other newsletters and discussion boards aimed at families with adopted children. Fourteen children were included in our study. The children had come to the United States between the ages of 2 years, 7 months and 5 years, 1 month (mean = 4 years, 2 months). At the time that the children began participating they had been in the United States for 3 to 16 months (mean = 8.1 months). Parents were invited to participate every 3 months until their child had been in the United States for 18 months. Thus each child participated in 1 to 5 sessions (mean = 2.5) and a total of 34 data points was collected. Children were excluded from the study if their parents used a third language in the home or if the child had a sensory, motor, or developmental disorder that might affect language. Table 1 provides additional information about each child.

Table 1 Participant Information

Participant	Sex	Age at Arrival (months; years)	Native Language Development	Continued Exposure to Native Language	Months in United States at Observation(s)
1	F	2;7	Normal	None	6, 9, 12, 18
2	F	2;11	Normal	1 hr/wk	11
3	M	2;11	No information	12 hr/wk (preschool)	4, 7, 10, 13
4	M	3;4	Normal	None	3, 6
5	M	3;6	Mild delay	None	3, 6, 10, 14
6	F	4;2	Normal	None	9, 13
7	F	4;4	Moderate delay	15 hr/wk (bilingual nanny)	16, 18
8	F	4;7	Normal	None	7
9	F	4;8	Mild delay	1 hr/wk	3, 6
10	F	4;9	Normal	None	13
11	M	4;11	Normal	None	3, 5, 9, 11
12	F	4;11	Normal	None	10, 13
13	F	5;1	Normal	2 hrs/wk	11, 15, 18
14	F	5;1	No information	None	15, 18

Measures

All materials for the study were mailed to the parents who collected the data in their home. Three measures were used: a background questionnaire, the MacArthur-Bates Communicative Development Inventory 2 (CDI-2)¹² and a 1-hour taped language sample. The background questionnaire was adapted from previous studies^{13,14} and asked about the child's history and health and his or her native language development, adoptive family, current use of English and the native language, and current language environment. This information was used to characterize the sample (see Table 1) and to exclude children who did not meet the selection criteria.

We examined the early English development of adopted children from China using the CDI-2.¹² This measure has been validated and normed for children 16 to 30 months.¹² The CDI-2 is a parent report measure which includes a 680-item vocabulary checklist and a 37-item forced-choice sentence-complexity measure, which asks about the child's use of inflectional morphemes and closed-class words. Although the CDI-2 is often used with older children who have developmental disorders or language delays,¹⁵⁻¹⁸ there is no prior research demonstrating its sensitivity to second-

language acquisition, especially in older children. Like all parental reports, this measure reflects parents' beliefs about their children. If these beliefs are inaccurate, then the report will be inaccurate as well. Since adopted preschoolers are more cognitively mature than the younger children for which the measure was designed, parents' expectations about communicative competence of older children could interfere with their ability to accurately monitor their child's progress. To evaluate the validity of the measure we gathered hour-long recorded speech samples of the parent and child playing with a standard set of toys that were provided to all the participants. The language produced by the child during the session could then be compared with the information reported by the parent to see if the two measures were consistent with one another.

Transcript Analyses

To analyze the spontaneous language production of the adopted children, the first speech sample from each participant was transcribed. We analyzed the first 100 utterances of the transcript meeting the guidelines laid out in Johnston.¹⁹ These guidelines exclude

all utterances which are: exact repetitions (either self-repetition or repetition of the conversational partner); responses to questions in which the child only provides the queried information without using a complete sentence or elaborating; or single word utterances which consist of *yes*, *no*, or an equivalent in response to a conversational partner's question or statement. We chose these guidelines over more inclusive standards including those originally proposed by Brown,²⁰ because they may help to remove situational variation in mean length of utterance (MLU) that can be directly attributed to differences in parental discourse style rather than the abilities of the children. The CLAN program²¹ was used to calculate the child's MLU in morphemes, as well as the total number of different word types and the number of noun, verb, and closed-class types used by the child.

These analyses indicate that the CDI-2 is a valid indicator of language production abilities in this population. There was a strong correlation between the number of different word types in the speech sample and the child's total reported vocabulary on the CDI-2 ($r = 0.75$). The transcript analyses also confirmed that the parents provided accurate information about the kinds of words that their children used; there were robust correlations between the number of different nouns, verbs, and closed-class items that were used by each child and the number that their parent checked off on the CDI-2 ($r = 0.53$ for nouns; $r = 0.66$ for verbs; and $r = 0.81$ for closed-class words). Finally, the children's MLU was correlated with their score on the sentence-complexity metric, demonstrating that parents were sensitive to differences in the children's syntactic abilities ($r = 0.61$).

RESULTS

Rate of Acquisition

One of our primary goals was to determine how rapidly IA children were acquiring English. We measured rate of acquisition by examining the change in vocabulary size over time. Vocabulary size can be assessed by totaling the number of words on the 680-word CDI-2 checklist that parents report their child using. Since the number of sessions varied across participants, we conducted the CDI-2 analyses on the first datapoint contributed by each child, as well as on the entire dataset. This was done to ensure that individual differences would not artificially skew the data pattern. However, the results of the two analyses were quite similar and information about both of them is presented below.

Unsurprisingly, vocabulary size increased with the length of time that the child had spent in the United States. As Table 2 suggests, participant 14 was an outlier in this analysis, acquiring reliably fewer words than would be predicted at both observation sessions. When this participant is included, both her observations have absolute standardized residuals greater than 2 (indicating that her performance is substantially different from that of the group) and the logarithmic relation between time and vocabulary is considerably weaker ($p = 0.06$, $r = 0.21$ first session, $p < 0.005$, $r = 0.52$ all sessions). When this participant is excluded from the analysis, there is a robust logarithmic relation between time and vocabulary size ($r = 0.82$ first session, $r = 0.78$ all sessions). Age of arrival was not a significant predictor of vocabulary size, indicating that the older

Table 2 Vocabulary Growth Relative to Time in the United States

Months in the United States	N	Mean Vocabulary	Vocabulary Range	Equivalent CDI Age
3-5	6	337	185-479	24-25 months
6-8	6	501	286-672	28 months
9-11	9	577	487-658	30 months
12-14	6	626	579-674	> 30 months
15-18	7	505	178-670	28 months
15-18*	5	617	582-670	> 30 months

*With outlier removed.

Table 3 Changes in Vocabulary Composition

Vocabulary	N (per group)	% Nouns		% Verbs		% Closed Class	
		Chinese	Control	Chinese	Control	Chinese	Control
100–199	2	50	56	9	9	5	7
200–299	3	55	49	10	18	5	6
300–399	2	47	46	17	16	7	9
400–499	6	46	46	16	16	9	9
500–599	9	42	43	16	16	12	12
600–680	12	41	42	16	16	14	14

adoptees did not learn words any faster than young ones.

This logarithmic, or decelerating, growth curve contrasts sharply with the accelerating growth curve observed in infant learners.²² We suspect that this reflects properties of the instrument rather than an actual deceleration in vocabulary growth. After 12 months many adoptees have developed beyond the point where the CDI-2 provides an accurate estimate of their vocabulary size; in 54% of these sessions the children knew over 90% of the words and had presumably reached the ceiling, or upper limit, of this instrument. This suggests that the CDI-2 is generally useful for children who have been in the United States for less than a year. However, caution should always be taken in interpreting the CDI-2 if an individual's vocabulary approaches the ceiling, because of the possibility of underestimating ability, even if the person has been in the United States well under a year. Conversely, the CDI-2 can be used for longer than 1 year with children who have not yet approached the instrument ceiling.

Compared with infant learners, the early vocabulary growth of adopted children is quite rapid. When infants first begin to produce words they typically add just a few to their productive vocabulary each month.¹⁵ A small study looking at individual children's vocabulary growth from 10 to 50 words found that this process took children on average just over 5 months.²³ In contrast, IA children do not seem to go through these stages of slow early lexical development. They begin to add English words rapidly to their vocabulary soon after arriving into the United States. After just 3 months in the United States, the adopted preschoolers had an average vocabulary score

that was equivalent to the median score for 24-month-old infants,¹² who have often been speaking for about a year.

We have no evidence that adopted children continue to learn words at an accelerated rate beyond the third month in the United States. Between month 3 and month 9 after arrival, adopted children make as much progress as typically developing infants do between 24 and 30 months, though ceiling effects in both groups make this finding difficult to interpret. A different measure would be needed to assess the rate of continued vocabulary growth.

Patterns in Acquisition

Early first-language acquisition is characterized by predictable shifts in the kinds of words that children know and the complexity of their utterances. One goal of this study was to examine whether IA children go through parallel shifts in acquiring English. If adopted children acquire English in the same way as infant learners, then the instruments that are used to assess first language may prove useful for this population as well. This comparison is also interesting for theoretical reasons as documented by Snedeker and colleagues.¹¹ IA preschoolers are clearly more physically and cognitively mature than infant learners. If they pass through many of the same linguistic stages as infant learners, it suggests that those stages are not solely attributable to cognitive immaturity. We explored this question by comparing the parental reports for the adopted preschoolers with those of monolingual infants who had participated in earlier studies.^{24,25} Each session from an adopted child was matched to an infant with approximately the

same vocabulary size. These infants were from 1 year, 7 months to 2 years, 6 months of age (mean = 2 years, 2 months).

The composition of children's early vocabularies has been studied extensively.²⁶ Initially, children seem to learn a disproportionate number of nouns and social words. After their vocabulary reaches ~200 words, the proportion of those words that are nouns typically decreases. Verbs and adjectives gradually increase as a proportion of total vocabulary between 100 to 400 words. After children have ~400 words in their lexicons, the proportion of closed-class items begins increasing sharply. We found many of the same patterns in the adopted preschoolers (see Table 3). Critically, there were no differences in vocabulary composition between the adopted preschoolers and the infant learners who were matched in vocabulary size. When children are near the ceiling of the CDI, vocabulary composition necessarily reflects the composition of the checklist. To ensure that this did not unduly influence our findings, we removed observations where children had vocabularies over 612 words (90% of total) from the analyses of all sessions. The remaining sample included 23 observations. In both groups the proportion of nouns in the child's vocabulary decreased as the lexicon grew ($r=0.70$ first session, $r=0.73$ all sessions), while the proportion of verbs increased logarithmically, or at a decreasing rate, as vocabulary size increased ($r=0.62$ first session, $r=0.71$ all sessions) and the proportion of closed-class items increased linearly ($r=0.85$ first session, $r=0.83$ all sessions).

Next, we compared the patterns of grammatical development in the two groups. There is a strong correlation between vocabulary size

and the complexity of children's utterances in typical development.¹⁵ Infants usually begin combining words when they have a vocabulary of 50 to 200 words.²⁷ Following these early combinations the length and complexity of utterances continues to gradually increase as children add closed-class words and morphological features to their speech. Since all of our participants had vocabularies over 175 words and were combining words, we were unable to examine when the first word combinations occurred in the adopted preschoolers. Instead we focused on the increasing complexity of utterances that is typically observed once children begin to combine words.

For these analyses we used the CDI-2 sentence complexity measure, a 37-item forced-choice measure in which the parent chooses which of two utterances is more like their child's speech. The items focus primarily on the use of grammatical morphemes and closed-class words. A child's score is based on the number of times the more complex utterance was selected. This measure is correlated with MLU in typically developing children²² and in our population (see transcript analyses above). The analyses focused on the relation between vocabulary size and sentence-complexity scores, which are robustly correlated in infants when CDI-2 vocabulary is between 300 to 500 words.²⁷ As Table 4 illustrates, this correlation was confirmed in both the adopted children and the controls ($r=0.77$ first session, $r=0.82$ all sessions) and there were no reliable differences between the two groups. Age of arrival was not a significant predictor of sentence complexity, indicating that the patterns observed in older adopted children were no different than those of younger children.

Table 4 Sentence Complexity Scores Relative to Vocabulary

Vocabulary	N (per group)	Mean Vocabulary		Sentence Complexity	
		Chinese	Control	Chinese	Control
100-199	2	182	192	1.5	2.5
200-299	3	277	269	5.0	7.3
300-399	2	308	307	10.5	8.5
400-499	6	473	473	19.5	20.3
500-599	9	575	574	28.4	29.6
600-680	12	641	648	31.6	33.3

We also looked at a second measure of utterance length and complexity from the CDI-2. This measure asks parents to report three of the longest utterances their child has recently produced. A strong correlation was found between vocabulary size and the MLU for the adopted children with vocabularies less than 550 words ($r = 0.71$). No group differences were found between the adopted children and the controls. After 550 words, MLU became so variable that no significant trends were found in either group.

DISCUSSION

The IA preschool children in our study showed rapid lexical and syntactic development during the first year after they arrived in the United States. These children went through many of the stages that we see in first language acquisition, albeit at a faster pace. Shortly after arrival, they learned many nouns but relatively few verbs. As vocabulary size grew, more verbs and closed-class items began appearing in the children's lexicons. The children's early utterances were short and lacked function morphemes and closed-class words and their lexical and syntactic development were tightly correlated, just as they are in typically developing children.

This study has many limitations. We collected data from a small number of children, limiting our ability to make strong generalizations. Since all of the children were adopted from China and into monolingual English families, we do not know whether our results would extend to children from other countries or in other linguistic environments. Because our study was limited to the earliest stages of acquisition, we do not know when these children will catch up with their monolingual age-mates or whether their subsequent development will continue to follow patterns that are typical of first-language learners. Nevertheless, we believe that this work, limited as it is, has some implications for clinicians.

First, these results demonstrate that the CDI-2 is a valid and useful measure for tracking language acquisition during the first year after adoption. This is shown both by the reliable correlation between the CDI-2 and

measures from spontaneous speech and by the robust increases in vocabulary and sentence-complexity scores over time. The CDI-2 is inexpensive, requires little time to score, and can be used repeatedly with the same child. In contrast, acquiring, transcribing, and coding speech samples is quite time-consuming.

Second, our findings also offer some guidance for clinicians who are using the CDI-2 to evaluate IA children. We found that the children in our sample generally acquired 500 words or more on the CDI-2 by the time that they had been in the United States for 1 year. The one child who failed to meet this benchmark, participant 14, was still progressing more slowly than the others when she exited the study at 18 months. While our sample is clearly too small to establish norms for this population, these results suggest that any child who does not show rapid vocabulary growth during the first year may warrant a more thorough evaluation.

Between 9 and 15 months after adoption, many children have acquired almost all of the words on the CDI-2, indicating that this instrument is of limited use after the first year home. By this time, many adopted children will have reached a level of linguistic development where standardized tests, such as the Clinical Evaluation of Language Functions-Preschool, may be appropriate. Additional research is necessary to establish the validity and utility of these measures for monitoring acquisition in IA preschoolers. In the meantime, we can only offer a tentative suggestion for clinicians who are evaluating preschool children who have been with their birth families for more than 1 year. We found that adopted children's early linguistic development was tightly correlated with their length of residence in the United States but was not reliably correlated with their age. While we do not know whether this pattern persists after the first year, we would encourage clinicians to continue to look at the pace at which the child is acquiring the language in addition to the child's performance relative to his or her age. A child who is behind her peers, but is acquiring language as fast or faster than the typical first-language learner, may simply need more time rather than treatment.

In our sample, parental concerns about language development did not appear to be closely related to the child's rate of acquisition. Our background questionnaire asked parents to rate their level of concern about their child's English-language abilities on a 4-point scale (no concerns, mild concerns, moderate concerns, or severe concerns). We found no clear correlation between these ratings and vocabulary size or MLU. The two children whose parents reported severe concerns appeared to be progressing at the same rate as the children whose parents had no concerns. As we noted earlier, one child in our sample appeared to be progressing more slowly than the others; her parents reported only moderate concerns. We see two possible interpretations of this finding. First, parental concerns may be related to articulation, pragmatics, or some other facet of linguistic development that is not measured by the CDI-2. Second, parent concerns may be unrelated to the child's pace of acquisition because parents, like clinicians, lack an appropriate frame of reference for monitoring their child's progress. Parents who compare their children to native-born peers might experience more concern than those who use other adopted children or their own child's past performance as a frame of reference.

After about a year, the children in our study had lexical knowledge and syntactic abilities that surpassed those of the typical 30-month-old child. Yet they still appeared to have a long way to go before they would catch up with their monolingual peers. Clearly, additional research is needed to track their progress beyond the first year. However, the rapid rate of lexical and syntactic development in our sample, in conjunction with prior research on early second-language acquisition, leads us to be cautiously optimistic about long-term language outcomes for these children.

ACKNOWLEDGMENTS

We thank Isabel Martin who paved the way for this project with her senior thesis work. We are also grateful to Caroline Whiting, Nicole Gavel, and Rachel Springer for help with transcription and data entry. Data collection was supported by the Roger Brown Fund, and the

preparation of this paper (and the ongoing work) is funded by National Science Foundation BCS-0418423. Finally, we thank the families who participated for being so generous with their time.

REFERENCES

1. US Department of State. Number of immigrant visas issued to orphans coming to the US 2003. Available at: http://travel.state.gov/orphan_numbers.html. Accessed April 19, 2003
2. Ramsey SR. *The Languages of China*. Princeton, NJ: Princeton University Press; 1987
3. Gindis B. Language-related issues for international adoptees and adoptive families. In: Tepper T, Hannon L, Sandstrom D, eds. *International Adoption: Challenges and Opportunities*. Meadowlands, PA: First Edition; 1999:98-107
4. Pallier C, Dehaene S, Poline J, et al. Brain imaging of language plasticity in adopted adults: can a second language replace the first? *Cereb Cortex* 2003;13:155-161
5. Albers L, Johnson D, Hostetter M, Iverson S, Miller L. Health of children adopted from the former Soviet Union and Eastern Europe. *JAMA* 1997;278:922-924
6. Miller LC, Hendrie NW. Health of children adopted from China. *Pediatrics* 2000;105:E76
7. Miller N. *Bilingualism and Language Disability*. San Diego, CA: College Hill Press; 1984
8. Schiff-Myers N. Considering arrested language development and language loss in the assessment of second language learners. *Lang Speech Hear Serv Sch* 1992;23:28-33
9. Anderson R. Impact of first language loss on grammar in a bilingual child. *Commun Disord Q* 1999;21:4-16
10. Wong Fillmore L. *The Second Time Around: Cognitive and Social Strategies in Language Acquisition* [dissertation]. Stanford, CA: Stanford University; 1976
11. Snedeker J, Geren JC, Martin I. The acquisition of English by internationally adopted preschoolers: a natural experiment in language development. http://www.wjh.harvard.edu/~lds/pdfs/Snedeker_Geren_Martin_2005.pdf
12. Fenson L, Dale PS, Reznick JS, et al. *MacArthur Communicative Development Inventories: User's Guide and Technical Manual*. San Diego, CA: Singular; 1993
13. Glennen S, Masters MG. Typical and atypical language development in infants and toddlers adopted from Eastern Europe. *Am J Speech Lang Pathol* 2002;11:417-433

14. Pollock K. Early language growth in children adopted from China: issues and preliminary normative data. *Semin Speech Lang* 2005;26:22–32
15. Bates E, Dale PS, Thal D. Individual differences and their implications for theories of language development. In: Fletcher P, MacWhinney B, eds. *The Handbook of Child Language*. Oxford, England: Blackwell Publishers; 1995:96–151
16. Singer-Harris N, Bellugi U, Bates E, Rossen M, Jones W. Emerging language in two genetically based neurodevelopmental disorders. In: Thal D, Reilly J, eds. *Special Issue on Origins of Communication Disorders, Developmental Neuropsychology*; 1997;13:345–370
17. Thal D, O'Hanlon L, Clemmons M, Frailin L. Validity of a parent report measure of vocabulary and syntax for preschool children with language impairment. *J Speech Lang Hear Res* 1999;42:482–496
18. Berglund E, Eriksson M, Johansson I. Parental reports of spoken language skills in children with Down syndrome. *J Speech Lang Hear Res* 2001;44:179–191
19. Johnston JR. An alternate MLU calculation: magnitude and variability of effects. *J Speech Lang Hear Res* 2001;44:156–164
20. Brown R. *A First Language: The Early Stages*. Cambridge, MA: Harvard University Press; 1973
21. MacWhinney B. *The CHILDES Project: Tools for Analyzing Talk*. 3rd ed. Mahwah, NJ: Erlbaum; 2000
22. Fenson L, Dale P, Reznick JS, Bates E, Thal DJ, Pethick SJ. Variability in early communicative development. *Monogr Soc Res Child Dev* 1994;59:1–173; discussion 174–185
23. Robb MP, Bauer HR, Tyler AA. A quantitative analysis of the single-word stage. *First Language* 1994;14:37–48
24. Geren JC. *Children's Understanding of Where, Here, This and Find* [honors thesis]. Stanford, CA: Stanford University; 2001
25. Snedeker J. "With" or "Without": Children's Use of a Functional Preposition in Sentence Comprehension [thesis]. Philadelphia, PA: University of Pennsylvania; 1996
26. Bates E, Marchman VA, Thal D, et al. Developmental and stylistic variation in the composition of early vocabulary. *J Child Lang* 1994;21:85–123
27. Bates E, Goodman JC. On the inseparability of grammar and the lexicon: evidence from acquisition, aphasia, and real-time processing. *Lang Cogn Process* 1997;12:507–584