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Early lexical development in English- and Korean-speaking children: language-general and language-specific patterns*

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ABSTRACT

The present study examined the composition of the early productive vocabulary of eight Korean- and eight English-learning children and the morpho-syntactic, semantic, and pragmatic characteristics of their caregivers' input in order to determine parallels between caregiver input and early lexical development. Vocabulary acquisition was followed using maternal diary and checklists for the Korean-learning children (from a mean age of 1;6 to 1;9) and for the English-learning children (from a mean age of 1;4 to 1;8). Results showed that both Korean-learning and English-learning children acquired significantly more nouns than verbs at the 50-word mark. However, Korean children learned significantly more verbs than did English-learning children. The relative ease with which Korean learners, as compared to English learners, acquired verbs parallels several differences in the linguistic and socio-pragmatic characteristics of the input addressed to them. Korean-speaking caregivers presented more activity-oriented utterances, more verbs, and more salient cues to verbs than did English-speaking caregivers. These data suggest that both general and language-specific factors shape the early lexicon.

INTRODUCTION

The primacy of nouns, especially object labels, in the early lexicon has been reported for language communities as different as English, German,

[*] The authors thank Dedre Gentner and two anonymous reviewers for making valuable comments on an early draft of the manuscript. Christine Brennan and Hyunjue Oh transcribed and coded the language samples for reliability. We extend special thanks to all children and caregivers who participated in this study. Address for correspondence: Mikyong Kim, Department of Communication Sciences and Disorders, 2299 N. Campus Drive, Northwestern University, Evanston, IL 60208–3540, USA. e-mail: m-kim3@northwestern.edu

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Japanese, Kaluli, Mandarin, Turkish, Italian, and Hebrew (Gentner, 1982; Dromi, 1987; Goldfield, 1993; Shatz, 1994; Caselli, Bates, Casadio, Fenson, Fenson, Sanderl & Weir, 1995). Nouns not only predominate in the period of first words but also in the period of the vocabulary spurt, which is commonly characterized by an accelerated rate of noun learning (Goldfield & Reznick, 1990; Bates, Marchman, Thal, Fenson, Dale, Reznick, Reilly & Hartung, 1994). Logically, early lexical acquisition in general, and the primacy of nouns in particular, are attributable to child factors, environmental factors, or a combination of the two. Those who focus on child factors include constraint theorists who propose that the task of word learning is simplified by the application of internal linguistic constraints. Early constraints make noun mapping likely. For example, according to the whole object constraint, children initially assume that all words refer to objects and that they refer to the whole object, rather than its parts, attributes, motion, temporary state or other associated properties (Markman, 1987). Others argue for the child's application of principles rather than absolute constraints. Principle theorists suggest that lexical principles are learned to a great extent, hence both child and environmental factors play a role. They view lexical principles essentially as strategies that effectively restrict the search space for the task of word-to-referent mapping (Golinkoff, Mervis & Hirsh-Pasek, 1994). Similar to the whole object constraint, the principle of object scope (Golinkoff *et al.*, 1994) posits that words label whole objects. Upon hearing a novel word and witnessing an unnamed object in a novel event, children using this principle would likely assume that the novel word refers to the object and not the event.

Still others propose that the child does not necessarily require specific linguistic constraints or principles in order to acquire words. Rather, acquisition proceeds as a form of 'social convergence' in which the child with a certain socio-cognitive capacity attempts to make sense of the contextualized language of the adults in her environment (Nelson, 1988; Tomasello, 1992). With regard to noun primacy in particular, Nelson, Hampson & Kessler Shaw (1993) argue that noun to object mapping is an early attainment because of two converging factors. First, the perceptual coherence of objects makes word to referent mapping unambiguous. Here Nelson and her colleagues draw heavily from the NATURAL PARTITIONS HYPOTHESIS (Gentner, 1982), which posits that verbs and other predicate words, in contrast to object nouns, have a less transparent relation to the perceptual world. As Gentner says, languages have more degrees of freedom in lexicalizing predicate terms representing relations than in lexicalizing objects. Thus, different languages use different patterns of conflation in which features of actions are encoded. For example, the conflation pattern of verbs encoding spontaneous motion is different between English and Korean:

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English		Korean		
Verb [Motion + Manner]	Particle [Path]	Verb [Manner]	Verb [Path]	Verb [Motion + Deixis]
run	*up*	*tuio-*	*ola-*	*gada* (run up)

The slower acquisition of verbs as compared to nouns, Gentner argues, results from the fact that the child must discover both how to conflate subpredicates into concepts and how to match these concepts with words. Nouns, on the other hand, are learned early because objects form coherent perceptual entities which allow a transparent semantic mapping of the object-reference terms to the perceptual world.

A second factor in early noun acquisition, according to Nelson *et al.* (1993), is that caregivers provide frequent and salient input that emphasizes and clarifies noun to object mapping. For example, middle-class English-speaking mothers frequently engage their children in the 'object-naming game,' providing and eliciting labels for objects (Ninio & Bruner, 1978; Goldfield, 1993). In such naming games 90% of words elicited are basic level object names (Nelson *et al.*, 1993). Furthermore, caregivers are likely to provide feedback regarding the accuracy of the object names that their children produce in the naming game context (Nelson *et al.*, 1993).

Using data from six very different languages, Genter (1982) argues that nouns are universally more accessible than verbs. The implication is that cognitive ease, or some other child internal factor such as the application of lexical constraints, is more powerful than input in shaping the composition of the early lexicon. However, recent data from Mandarin-(Tardif, 1996) and Korean-(Choi & Gopnik, 1995) learning children revealed that verbs comprised as prominent a category as nouns in the early lexicon. Tardif (1996) reported that nine out of ten Mandarin-speaking children (aged 1;10) in her study produced significantly more main verb types than common noun types in productive speech samples. When proper names were included in the noun category and all verb types were included in the verb category, still the Mandarin-speaking children showed a trend toward producing more verb types than noun types. Choi & Gopnik (1995) compared nine Korean-and English-learning children and found equal proportions of nouns and verbs in the Korean lexicons but more nouns than verbs in the English lexicons. Furthermore, seven of the nine Korean learners, but none of the English learners, demonstrated a verb spurt as well as a noun spurt at around 1;6. These data have sparked renewed interest in analysis of the input language a child receives (e.g. Caselli *et al.*, 1995; Tardif, Shatz & Naigles, 1997).

Pragmatic differences in child-directed input have been reported. Some of these differences may influence the frequency with which certain forms are presented in talk to children. For example, lower SES English-speaking

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mothers tend to talk less, provide fewer object labels, and use utterances that function to direct behaviours (hence, action) more frequently, than higher SES mothers (Lawrence & Shipley, 1996; Hoff-Ginsberg, 1998). Similarly, Korean and Japanese caregivers tend to provide more activity-oriented utterances than do American caregivers (Fernald & Morikawa, 1993; Choi & Gopnik, 1995). Whereas activity-oriented utterances tend to increase the frequency of action words in the input, naming-oriented utterances increase the frequency of object labels in the input. Low frequency of object labelling in caregivers' child-directed speech is associated with small noun vocabularies in their children (Fernald & Morikawa, 1993).

Typological differences will influence the phonological saliency of certain forms in input to children. For instance, Korean is a pro-drop language (and frequently a null-object language) with a canonical SOV word order. The only obligatory element within a clause structure is a verb inflected with a final or a non-final inflectional ending. Thus, it is likely that verb input will not only be more frequent in Korean as compared to languages such as English, but also more salient. Verbs in Korean often occur alone or in utterance-final position. English, being a non-pro-drop language with SVO word order, often involves nouns in utterance-final position. These typological differences between English and Korean are maintained in speech directed to children (Au, Dapretto & Song, 1994). Forms presented alone or in utterance-final position are bounded by silence and lengthened relative to forms earlier in the utterance. These factors may aid the extraction of words in the utterance-final position from the speech stream (Slobin, 1973, 1985; Peters, 1985).

In addition to phonological cues, children may also make use of morpho-syntactic information when determining the referent of a new word (Pinker, 1984; Gleitman & Gleitman, 1992). For instance, Maratsos (1982) argues that English-speaking children form the verb class by induction from co-occurrence of particular lexical items with verb inflections and auxiliary verbs. Behrend, Harris & Cartwright (1995) demonstrate that three-year old English-speaking children use verb inflections as cues to map the meaning of the verb. However, languages differ in the availability and reliability (hence, saliency) of these cues (MacWhinney, Bates & Kliegl, 1984). Perhaps children learning highly inflected languages take advantage of inflectional bootstrapping at an earlier age than those who learn weakly inflected languages. The fact that young Turkish learners depended more upon inflectional strategies for sentence processing than young English learners is suggestive (Slobin & Bever, 1982).

Because of cultural and linguistic differences in talk addressed to children, it is reasonable to expect cultural and language-specific differences in early vocabularies. Even if learning constraints/principles or perceptual coherency do bias children towards noun acquisition, frequent, salient verb input

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presented in socio-pragmatic contexts that refer to actions may well temper this bias. In the current study, we explore this hypothesis as we compare the vocabulary acquisition of children learning English to that of children learning Korean. We also compare the caregiver input in these two communities. Our work builds on that of Choi & Gopnik (1995).

English and Korean were chosen for study because their differing typologies are likely to result in differential saliency of nouns and verbs. Also Korean was of interest because of conflicting reports regarding the noun and verb composition of early Korean vocabularies. Although, as reviewed above, Choi & Gopnik (1995) reported that Korean-speaking children produced as many verbs as nouns at around the 50-word mark, Au *et al*. (1994) reported that nouns predominated in early lexicons of both Korean- and English-speaking children, with a comparable median noun to verb ratio between the two groups. These different results could be due, in part, to differences in data collection methods. Whereas Choi & Gopnik used a combination of maternal diary and observation, Au *et al*. used a checklist. Due to biases inherent in each measure of vocabulary composition, observational measures may produce lower referential vocabulary scores than checklists (Pine, Lieven & Rowland, 1996).

The first set of questions we attempted to answer are the same as those asked in Choi & Gopnik (1995) and Au *et al*. (1994), that is, whether the composition of the early lexicon is different between the two groups of language learners and whether the characteristics of input are different between the two groups of caregivers. We also extend this work by examining more directly and completely any parallels between input characteristics and the child's early lexical output. To achieve this goal, we adopted methods that are different from those of previous studies. First, both child and caregiver data were collected from actual child–caregiver dyads rather than from one sample of children and a different sample of caregivers as in Choi & Gopnik (1995). Also, caregiver data were collected under the same conditions for both language groups, unlike the caregiver data used in Au *et al*. (1994). Caregiver speech samples were obtained by two home visits for both language groups, during which the dyad's interaction was recorded.

Second, we attempted to maximize the reliability of our children's data by using both maternal diary and checklist measures. Whereas maternal diaries were used to collect data throughout the study, checklists were also administered at the beginning and end of the study as a means of determining the reliability of maternal reports. Data from our dyads which were judged to show poor reliability between two measures (based on the comparison of major lexical categories in the diaries and in the checklists) were not used for analyses. In an attempt to further improve the reliability of the children's vocabulary data, we obtained updated diary data from caregivers at regular intervals of approximately 14 days via telephone data collection sessions.

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Finally, we conducted a more complete analysis of caregiver speech samples than in previous studies. In addition to analysing the frequency of noun and verb types and tokens, utterance positions of nouns and verbs, and pragmatic aspects of the caregiver speech, we determined the proportion of nouns and verbs occurring as single word utterances and the consistency of morphological cues for nouns and verbs. These data allowed us to better quantify the phonological and morphological saliency of noun and verb input that is available to the young learners under study.

In sum, we asked a number of questions about the early lexicons of Korean and English learners and about the input available to them for building those lexicons. The specific questions were:

1. Is there a significant difference in the composition of early productive vocabulary between Korean- and English-learning children?
2. Within groups of Korean- and English-learning children, do nouns or verbs predominate in the early productive vocabularies?
3. Is there a significant difference in the input frequency of nouns and verbs between Korean- and English-speaking caregivers' speech?
4. Is there a significant difference in the saliency of nouns and verbs (as defined by final utterance position, single-word utterances, and a high consistency of morphological marking) between Korean- and English-speaking caregivers' speech?
5. Is there a significant difference in the caregivers' interaction style between Korean- and English-speaking caregivers?

METHOD

Subjects

Eleven Korean- and ten English-speaking child–caregiver dyads originally agreed to participate in the study. Because it was found that data from the maternal diary did not agree closely to the checklist data (see Data Collection Methods below) in some dyads, three Korean- and two English-speaking dyads' data were omitted from the analyses. The data from the remaining eight English-speaking and eight Korean-speaking child–caregiver dyads were used for the analyses in the present study. Children were chosen so that both first-borns and later-borns were included. Birth order and gender of children were roughly balanced across groups. Eight Korean children (three girls and five boys) were followed from the mean age of 1;6 to 1;9. Three of the eight children were first-born, and the remaining five children were the later-born child of the family. Eight English-speaking children (three girls and five boys) were followed from the mean age of 1;4 to 1;8. Four of the eight children were first-born, and the remaining four children were the later-born of the family. At the beginning of the study, the total number of words that each Korean child produced ranged from 15 to 54 words (M =

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28·75, S.D. = 13·7). The English-speaking children's productive vocabularies ranged from 2 to 31 words (M = 19, S.D. = 9·4). Except for one Korean child with a productive vocabulary size of 54 words at the initial data collection session, all children had a productive vocabulary size smaller than 50 words. Table 1 shows the age and the size of productive vocabulary at the beginning and the end of the study period for each child.

The English samples were collected from monolingual Caucasian families in the Chicago area of the United States and the Korean samples were collected from monolingual Korean families in the Daegu area of South Korea. Daegu is the third largest city in South Korea. In the United States, subjects were recruited through word of mouth and advertisements posted in businesses that cater to families such as toy stores and bakeries. In Korea, subjects were recruited through word of mouth. All US subjects spoke Standard English and all Korean subjects spoke the Southern dialect of the Daegu area. All participating caregivers were the mothers of the children with one exception. The English-speaking caregiver who took care of JV with three other children in her home daycare centre participated in the study instead of JV's mother. The caregiver spent about 8 hours a day with the child and, thus, was judged to be an appropriate informant. Overall, the Korean caregivers had slightly less education than the American caregivers. Five American caregivers had a 4-year college education, one caregiver had a 3-year college education, and the remaining two caregivers had graduate degrees. Six out of eight Korean caregivers had a 4-year college education and the remaining two were high-school graduates.[1] In both language groups, six of eight caregivers stayed home to care for their children.

All caregivers in the original sample completed a subject information form. The form contained sections for reporting the productive vocabulary of the child, parental educational level, occupation, language spoken at home among parents and to the children, information on siblings and any other family members, and the child's daily routine.

Data collection methods

Procedure. Data were collected during the initial home visit, the subsequent bimonthly telephone data collection sessions, and the final home visit. During the first home visit, the examiner explained the procedure and reviewed the answers to the questions in the subject information form. To eliminate any possible influence of knowledge of the specific purpose of the

[1] Within Korean culture, it is more unusual for females to have college education than it is in the United States. In the population 25 years and over, 44·6% of U. S. females undertook post-secondary level studies (regardless of the completion of the full course) whereas 13·7% of Korean females undertook the same level of studies. Because the communities are very different, the educational attainment of subjects could not be easily matched. Data Source: *UNESCO Statistical Yearbook 1998*, UNESCO Publishing & Bernan Press, 1998. Korean statistics are from 1995 and U.S. statistics are from 1994.

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TABLE 1. *Age and the size of the productive vocabulary (in parenthesis) at the beginning and the end of the study period*

Korean		English	
Child	Study period	Child	Study period
1 TH	1;4.6 (21)–1;6.27 (62)	1 JV	1;2.17 (18)–1;4.27 (106)
2 SY	1;9.12 (34)–2;0.4 (82)	2 LD	1;8.10 (31)–1;10.3 (110)
3 SH	1;5.12 (15)–1;10.14 (66)	3 QD	1;2.28 (30)–1;5.0 (151)
4 TW	1;8.12 (26)–1;11.3 (58)	4 KZ	1;6.9 (18)–1;11.6 (79)
5 MJ	1;10.3 (54)–2;0.12 (109)	5 KC	1;4.30 (13)–1;10.21 (76)
6 SJ	1;6.17 (22)–1;11.10 (68)	6 SA	1;7.6 (17)–2;0.29 (69)
7 YS	1;5.23 (42)–1;8.1 (66)	7 IB	1;5.28 (23)–1;8.6 (84)
8 WJ	1;2.16 (16)–1;7.15 (71)	8 MD	1;0.26 (2)–1;6.22 (82)
Mean	1;6.5 (28.8)–1;9.9 (72.8)	Mean	1;4.9 (19)–1;8.7 (94.6)

study on the reported vocabulary items or on the caregivers' language behaviour, the caregivers were not informed that the focus of the study was noun and verb development. They were told that the examiner was interested in documenting various words children produce during their early language development. The children's lexical development was followed for a period of 3 to 4 months. The purpose of both the first and second home visits was twofold: to check the diary and checklist data on the child's productive vocabulary and to sample the caregiver's input to the child. The purpose of the bimonthly telephone data collection sessions was to closely monitor each child's productive vocabulary growth so that we could pinpoint the content of each child's vocabulary around the 50-word mark as closely as possible. Data collection continued after each child acquired 50 words so that we could document the vocabulary growth to observe any potential spurts. (See Table 1 for the age and the size of productive vocabulary of each child at the end of the study.)

Productive vocabulary measures. The child's productive vocabulary was measured via diaries and checklists. During the first visit, the caregiver was asked to maintain a diary of the child's word productions. To aid in the diary record, the caregiver was given printed instructions that read, 'Please list all new words your child learned to SAY since the last interview. Please refer to the copy of the previous questionnaire and list all new words not reported at the time. Do not include words the child understands but does not say. Do not include the words the child can imitate but does not use spontaneously. Please provide at least two contexts in which the child used each word.' Examples of words from various categories were also provided to remind caregivers indirectly that not only words from major lexical categories (such as nouns, which may be prominent in their minds) but also all other hard-to-categorize words should be reported. During the initial telephone data

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collection session the criteria of 'two contexts' was clarified; caregivers were to write down a new vocabulary item right after the child had produced it on two occasions. The first author phoned twice per month to ask that the caregivers report all new words acquired by their children since the previous home visit or telephone data collection session. The average interval between telephone data collection sessions was 13·9 days (S.D. = 1·6) for the English-speaking subjects and 14 days (S.D. = 1·2) for the Korean subjects.

Caregivers also completed checklists during each home visit. For English-speaking subjects, the MacArthur Communicative Development Inventory (MCDI) was used (Fenson, Dale, Reznick, Thal, Bates, Hartung, Pethick & Reilly, 1993). For Korean-speaking subjects, a checklist was developed based on the words reported by Choi & Gopnik (1995) and the MCDI. The Korean checklist contained 403 items of various word classes, including 136 verbs and 201 nouns. The Korean checklist was similar to the MCDI in that it included the same categories of words. At the beginning of the study, the checklist was used mainly to help caregivers recall words for their first diary entry. At the end of the study, the checklist was used to ensure the reliability of the maternal diary data. When there were minor discrepancies between the two measures, the caregiver was asked to clarify them. However, as mentioned previously, the data collected from child–caregiver dyads that showed poor reliability when the two measures were compared at the end of the study period were discarded. As a result, for all participants, the data obtained from the two measures were highly similar, especially concerning the items from major lexical categories. Maternal diary data did contain some items in the 'Other' category which were not found on the checklist. This tendency was more prominent in Korean data, possibly due to the use of a nonstandardized checklist.

Caregiver speech samples. Caregiver data were collected during the home visits made at the beginning and at the end of the study period. The interaction between the child and the caregiver during a free play session lasting about 30 minutes was videotaped and audiotaped by the examiner. The caregiver was instructed to play with the child using toys provided by the examiner and to interact as naturally as possible. It was explicitly explained that the caregiver did not need to elicit many words from her child because the purpose of videotaping was to observe the natural interaction pattern, not to specifically measure children's use of words. Since the children's vocabularies were small, caregivers did the majority of the talking. Twice during one of these free play observations, the examiner noted the child saying a word that the caregiver had not reported. The examiner asked the caregiver about this and both agreed to add this item to the maternal diary.

During the first home visit, the toys were a miniature house with furniture, a car, a playground set, and figurines. An entirely new toy set was used for

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the second home visit so that the children had novel toys at each visit. During the second home visit, the toys were a miniature house with furniture, a car, a backyard set, and figurines. These toys were selected because they provide opportunities for eliciting both naming- and activity-oriented comments and because they were similar to those used in previous studies (e.g. Choi & Gopnik, 1995). The examiner took notes but did not participate in the interaction.

Coding

Children's data. In the present study, the criterion for accepting a new word was that the child used the word on at least two occasions, with the meaning of the word roughly approximating adult meaning. Over-extended (e.g. calling not only the father but also all adult men *daddy*) and under-extended (e.g. *bear* refers to only small plastic toy bears) uses of words were accepted if they included the adult meaning. Following the procedure used by Choi & Gopnik (1995), both semantic and morphological criteria were used in identifying the grammatical category of a new word. For nouns, the referent had to be concrete, that is, an object or a person.[2] Pronouns, words with ambiguous referents, and onomatopoeic words were excluded from the noun category. The child's word forms had to approximate adults' conventional noun forms morphologically. That is, protowords were not accepted. Verbs had to refer to an action/activity, change of location, change of state, or state (e.g. adjectival verbs in Korean such as *yeppu-ta*: 'is pretty'). The verb forms had to approximate adults' conventional verb forms morphologically.[3] Only main verbs were included in the verb count for both languages. The meaning and the grammatical category of words that are ambiguous in regards to form class (e.g. *brush*) were determined based on the caregiver's description of the contexts in which each word was used. All words other than nouns and verbs were coded as 'Other'. Adjectives, adverbs, and particles were separately coded as 'Predicate' within the other category for

[2] In the present study, we chose to follow the definition of the category of Noun used by Choi & Gopnik (1995, p. 505), which included both object nouns and proper names/kinship terms, to approximate as closely as possible their coding and analyses for comparison purposes. We also conducted the same statistical analyses reported here with proper names/kinship terms excluded from the Noun category and reached the same conclusions.

[3] In certain cases the morphological and semantic criteria for Korean words conflicted. These words were produced with the last syllable of the verb stem ('-ha') and the final ending deleted and thus, were morpho-syntactically closer to noun in the adult category. However, these words describe specific actions/activities and adult speakers frequently produce these words with an incomplete stem as children do, to refer to actions/activities. Therefore, we categorized these as verbs. The Korean words categorized as verbs for the reasons above are: *nenne* ('to sleep'; motherese); *bagsu* ('to clap hands'); *eobuba* ('to carry the child on the back'; motherese); *maymmay* ('to spank the child'; motherese); *sicak* ('to begin'); *ppoppo* ('to kiss').

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English-speaking subjects in order to make a comparison between the number of verbs used by the Korean- and the English-speaking subjects when a broader definition of verb was applied to the English data.

Caregiver data. All interactions between caregiver and child were transcribed verbatim from the videotape and the audiotape by the examiner. Two hundred intelligible utterances per caregiver were selected for analyses from the transcribed speech samples (the first 100 utterances from each play session, excluding unintelligible utterances and abandoned utterances). Language samples were coded for five different types of analyses. First, for a morpho-syntactic analysis, words in the caregiver's utterances were divided into grammatical categories including nouns and verbs. The child's own name used to draw the child's attention (i.e. vocative) and pronouns were not counted as nouns, and copulas and auxiliary verbs were not counted as verbs.

Second, nouns and verbs were categorized semantically. Nouns were divided into two subcategories. Concrete nouns referred to objects or people, and non-object nouns included anything other than objects and people, such as abstract nouns (e.g. *birthday*) and locative nouns (e.g. *park*). Main verbs were further divided between verbs referring to actions or activities and non-action verbs. Non-action verbs included verbs used as attention-getting devices (e.g. *look*!), mental verbs (e.g. *think*) and stative verbs (e.g. *have*, *like*). The main focus of the semantic analysis was the occurrence of concrete nouns and action/activity verbs in the caregiver input.

Third, for the syntactic structure analysis, utterances were coded in terms of the grammatical class of words occurring in the initial and the final positions. This allowed us to determine whether or not canonical word orders were maintained in the Korean and English input to children. In addition, we were particularly interested in which grammatical classes occur in the salient final position. Verbs or nouns occurring alone as complete utterances were also coded.

Fourth, to examine the saliency of morphological cues for nouns and verbs, the use of morphological markings for nouns and verbs were tallied. For English samples, a noun was categorized as marked when it was inflected by the plural *–s* morpheme, possessive *–'s*, or preceded by an article (*a*, *an*, *the*), and as not inflected when occurring alone. A verb was categorized as marked when it was inflected by the third person singular *–s*, the past tense marker *–ed*, the present progressive tense marker *–ing*, or when it was immediately preceded by an auxiliary or a modal verb. A verb was categorized as not inflected when occurring as a bare stem. Both suffixes and functors were counted as morphological cues in English on the grounds that consistent marking of either may cue the child to the form class of the word (Maratsos, 1982). For Korean samples, a noun was categorized as marked when inflected by a case-marking noun particle or by any modifying particle. A verb was categorized as marked when inflected by a final ending of any type.

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Finally, for the pragmatic analysis, utterances were coded as naming- or activity-oriented. Utterances that were used to elicit an object label from the child (e.g. *What is this?*, or *Can you say car?*), or that provided an object label directly or indirectly (e.g. *This is a chair*, or *Here's a doggie*) were coded as naming-oriented. Utterances that suggested some type of action, either explicitly or implicitly, whether or not that action was impending, on-going, or completed (e.g. *What shall we do now?*, *The baby's gonna jump in*, *Mommy is driving the car*, or *You opened the door for the baby!*), were coded as activity-oriented. Exclamations, attention-getting utterances, or other types of utterances, which were neither naming- nor activity-oriented (e.g. *This is so neat!*), were not coded.

Reliability

A manual detailing the coding procedures (as described above plus illustrative examples) for both child and caregiver data was prepared by the examiner.[4] Thirty-eight percent of the diary data were randomly selected and the form class of vocabulary items (noun, verb, predicate terms other than verbs, and other) was coded by a second coder. Thirty-eight percent of the caregiver speech samples were randomly selected, transcribed, and coded by a second coder. The two second coders were graduate students; one a native speaker of English, the other of Korean. Reliability expressed as Cohen's kappa (k) for various linguistic coding ranged from 0·97 to 1·0 for Korean data and from 0·93 to 1·0 for English data.

Data analyses

For all comparisons, t-tests were performed on the data. An alpha level of 0·05 was used for all statistical tests with appropriate adjustments of the alpha level in the case of multiple tests. For the children's productive vocabulary data, analyses were performed on the proportions of nouns and verbs (both including and excluding predicate terms in the English-speaking children's data) in the lexicon at the session closest to the 50-word mark within and between the two language groups.

For caregiver input data, analyses were performed on the total number of noun and verb tokens and types; the total number of concrete nouns, non-object nouns, action verbs, and non-action verbs; the total number of nouns, verbs, concrete nouns, and action verbs occurring in the utterance-final position; the total number of single-noun and single-verb utterances; the proportion of nouns and verbs that included morphological markings; and the proportion of activity-oriented and naming-oriented utterances.

[4] Contact the second author (*k-mcgregor@northwestern.edu*) to obtain the complete coding document.

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TABLE 2a. *Korean children: numbers and percentages of nouns and verbs in children's first 50 words*[a]

Child	Age	N[b]	V	Other	Total	N/V ratio
1 TH	1;6.15	21 (39)	19 (35)	14 (26)	54	1·1:1
2 SY	1;10.10	21 (44)	16 (33)	11 (23)	48	1·3:1
3 SH	1;9.3	22 (44)	14 (28)	14 (28)	50	1·6:1
4 TW	1;10.21	25 (50)	14 (28)	11 (22)	50	1·8:1
5 MJ	1;10.17	29 (49)	15 (25·5)	15 (25·5)	59	1·9:1
6 SJ	1;9.27	22 (47)	11 (23)	14 (30)	47	2:1
7 YS	1;6.20	29 (58)	10 (20)	11 (22)	50	2·9:1
8 WJ	1;6.19	31 (65)	11 (23)	6 (12)	48	2·8:1
Mean	1;8.8	25 (49·5)	14 (26·9)	12 (23·6)	51	1·8:1
SD		4·1 (8·4)	3·0 (5·2)	2·9 (5·5)	4·0	

[a] The session in which the child's cumulative vocabulary size is closest to 50 words.
[b] Numbers are given in the first columns and percentages in parentheses.

TABLE 2b. *English-speaking children: numbers and percentages of nouns and verbs in children's first 50 words*[a]

Child	Age	N[b]	V	Pre.[c]	Other	Total	N/V ratio
1 JV	1;4.12	37 (62)	2 (3)	6 (10)	15 (25)	60	19:1
2 LD	1;9.4	30 (59)	2 (4)	4 (8)	15 (29)	51	15:1
3 QD	1;4.11	42 (63)	2 (3)	3 (4)	20 (30)	67	21:1
4 KZ	1;9.17	30 (60)	2 (4)	2 (4)	16 (32)	50	15:1
5 KC	1;9.15	33 (60)	1 (2)	4 (7)	17 (31)	55	33:1
6 SA	2;0.9	27 (52)	2 (4)	3 (6)	20 (38)	52	14:1
7 IB	1;7.8	28 (55)	6 (12)	4 (8)	13 (25)	51	5:1
8 MD	1;5.22	21 (47)	4 (9)	3 (6)	17 (38)	45	5:1
Mean	1;7.8	31 (57)	2·6 (5)	3·6 (7)	16·6 (31)	53·8	12:1
S.D.		5·0 (5·5)	1·6 (3·5)	1·2 (2·1)	2·5 (5·0)	6·8	

[a] The session in which the child's cumulative vocabulary size is closest to 50 words.
[b] Numbers are given in the first columns and percentages in parentheses.
[c] Number of predicates other than verbs (i.e. number of adjectives, adverbs, and particles).

RESULTS

Children

Productive vocabulary. Tables 2a and b show the proportions of nouns and verbs at the data collection session in which the children's cumulative productive vocabulary size is the closest to 50 words. These tables show that both Korean- and English-speaking children acquired more nouns than verbs at the 50-word mark. The mean proportion of nouns and verbs was significantly different at the 50-word mark for both Korean children ($t = 5{\cdot}01$, df $= 7$, $p = 0{\cdot}002$) and English-speaking children ($t = 18{\cdot}05$, df $= 7$,

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TABLE 3. *Ages of the first noun and verb spurt (total number of words at the time of the spurt in parentheses)*

Korean			English		
Child	Noun spurt	Verb spurt	Child	Noun spurt	Verb spurt
1 TH	No	1;6.15 (54)	1 JV	1;3.15 (35)	No
2 SY	No	No	2 LD	1;9.4 (51)	1;10.3 (110)*
3 SH	No	No	3 QD	1;4.11 (67)	1;5.0 (151)*
4 TW	1;11.3 (58)	No	4 KZ	1;9.17 (50)	No
5 MJ	2;0.12 (109)*	1;11.28 (88)*	5 KC	1;9.15 (55)	No
6 SJ	1;11.10 (68)*	No	6 SA	2;0.22 (58)	No
7 YS	No	No	7 IB	1;6.27 (40)	No
8 WJ	1;7.1 (54)	No	8 MD	1;5.22 (45)	No
Mean age	1;10.5	Not calculated[a]	Mean age	1;7.6	Not calculated

* Spurt occurred after the 50-word mark.
[a] The mean age of the first verb spurt was not calculated because there were only two children who showed a verb spurt in each group.

$p < 0{\cdot}001$). The mean proportion of nouns between the two groups was not significantly different but the mean proportion of verbs between the two language groups was significantly different ($t = 9{\cdot}87$, df = 14, $p < 0{\cdot}001$). Even with the broader definition of verbs (i.e. verbs + predicates) applied to the English-speaking subjects' verb count, the mean proportion of verbs between the two language groups was significantly different ($t = 6{\cdot}26$, df = 14, $p < 0{\cdot}001$). This pattern was also observed at the end of the study period when all children had exceeded 50 words. Thus, the Korean children acquired a significantly greater number of verbs than the English-speaking children during their early lexical development although nouns comprised a more dominant category in both language groups.

Vocabulary spurt. Table 3 shows the pattern of the vocabulary spurt for each child in the two language groups. Following the criterion used by Choi & Gopnik (1995), when 10 or more words in the noun or verb category had been acquired in the span of two sessions, the examiner identified the last of the two sessions as being a noun spurt or a verb spurt session, respectively. The pattern of vocabulary acquisition appeared to be different between the Korean- and English-speaking children. All eight English-speaking children, but only three Korean children, showed a vocabulary spurt around or before the 50-word mark. For all eight English-speaking children, the vocabulary spurt was a noun spurt. Two of them also showed a verb spurt but it occurred after the 50-word mark when their vocabulary size reached over 100 words. Two of the eight Korean children showed a noun spurt around the 50 word-mark and two Korean children showed a verb spurt, one around the 50-word mark and the other after the 50-word mark. The average age of first noun spurt was 1;7.6 for the eight English-speaking children and 1;10.5 for the

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four Korean children. Whereas the English-learning children's mean age of noun spurt was close to their mean age at the 50-word mark (1;7.8), the Korean-learning children's mean age of noun spurt lagged behind their mean age at the 50-word mark (1;8.8).

Caregivers

Caregiver data collected during the first and second home visits were analysed separately. Because data patterns and statistical results were identical, the data were pooled. One exception is noted under Pragmatic analysis below.

Syntactic and semantic analyses at word level. Table 4 shows the average number of different types and tokens of nouns and verbs per 200 utterances in caregivers' speech. Analysis by syntactic form class revealed that the English-speaking caregivers produced a significantly greater number of noun types than the Korean caregivers ($t = 3{\cdot}29$, df = 14, $p = 0{\cdot}005$) but both groups of caregivers used a comparable number of noun tokens in their speech. The Korean caregivers, on the other hand, used a significantly greater number of verb tokens than the English-speaking caregivers ($t = 4{\cdot}52$, df = 14, $p < 0{\cdot}001$) but both groups of caregivers used a similar number of verb types in their language samples.

Results of the semantic analyses showed that the English-speaking caregivers used significantly more concrete noun types ($t = 3{\cdot}43$, df = 14, $p = 0{\cdot}005$), but not tokens, than the Korean caregivers. The Korean caregivers used significantly more action verb tokens ($t = 4{\cdot}9$, df = 14, $p < 0{\cdot}001$), but not more types, than the English-speaking caregivers. There were no significant differences in the mean number of types/tokens of non-object nouns and non-action verbs between the two groups.

Syntactic analyses at utterance level. Table 5 shows the average number of nouns, verbs, concrete nouns, and action verbs in utterance-initial and final positions in the 200 utterances of caregiver language samples. In utterance-initial position, the Korean caregivers produced significantly more nouns – mainly concrete nouns – than the English-speaking caregivers, whereas the English-speaking caregivers produced more verbs than the Korean caregivers ($t = 13{\cdot}3$, df = 14, $p < 0{\cdot}001$ for nouns; $t = 2{\cdot}99$, df = 14, $p = 0{\cdot}01$ for verbs). In contrast, in utterance-final position, the English-speaking caregivers used significantly more nouns – primarily concrete nouns – than the Korean caregivers and the Korean caregivers used significantly more verbs – mainly action verbs – than the English-speaking caregivers ($t = 10{\cdot}24$, df = 14, $p < 0{\cdot}001$ for nouns; $t = 13{\cdot}25$, df = 14, $p < 0{\cdot}001$ for verbs). The finding that the Korean caregivers produced many nouns in the initial position and verbs in the final position indicates that the majority of utterances produced by the Korean caregivers maintained the canonical SOV word order. The English-speaking caregivers, on the other hand, produced mainly nouns in

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TABLE 4. *Mean number (and* S.D.*) of nouns and verbs per 200 utterances in caregivers' speech*

Words	Caregiver group	
	Korean	English
	Nouns	
Concrete nouns		
Type*	20·6 (8·3)	32·3 (5·3)
Token	115·6 (29·3)	103·4 (24·2)
Non-object nouns		
Type	4·9 (3·2)	8·1 (3·0)
Token	16·8 (11·6)	14·4 (6·8)
Total		
Type*	25·5 (11·1)	40·4 (6·3)
Token	132·4 (33·0)	117·8 (24·0)
	Verbs	
Action verbs		
Type	29·5 (5·8)	25·1 (4·4)
Token**	131·1 (24·9)	85·6 (8·1)
Non-action verbs		
Type	7·0 (2·3)	6·6 (1·6)
Token	28·5 (9·7)	28·3 (9·7)
Total		
Type	36·5 (6·8)	31·8 (4·1)
Token**	159·6 (25·5)	113·9 (13·0)

* $p = 0{\cdot}005$; **$p < 0{\cdot}001$.

TABLE 5. *Mean number (and* S.D.*) of noun and verb tokens in the utterance-initial and utterance-final position per 200 utterances in caregivers' speech*

Word	Group	
	Korean	English
	Utterance-initial	
Concrete nouns**	69·4 (13·6)	5·1 (3·0)
Total nouns**	70·9 (13·6)	5·5 (2·9)
Action verbs	3·1 (3·5)	6·6 (3·8)
Total verbs*	3·8 (3·7)	11·0 (5·8)
	Utterance-final	
Concrete nouns**	15·6 (7·1)	67·4 (15·0)
Total nouns**	17·0 (7·4)	77·0 (14·8)
Action verbs**	104·9 (19·8)	25·5 (5·6)
Total verbs**	129·6 (19·7)	33·5 (5·8)

* $p = 0{\cdot}01$; **$p < 0{\cdot}001$.

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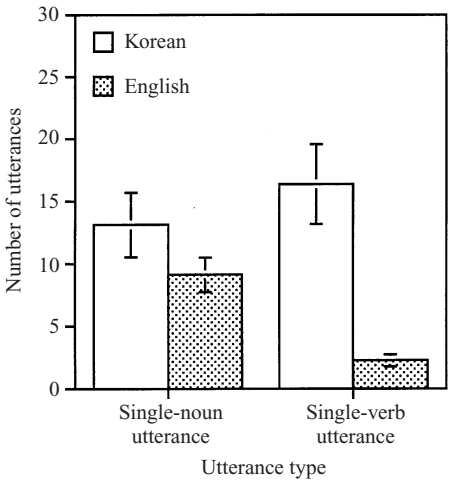


Fig. 1. Mean number of single-noun and single-verb utterances in Korean- and English-speaking caregivers' input of 200 utterances. $n = 8$ in each group. Error bar = S.E.M.

TABLE 6. *Mean percentage of the occurrence of morphological cues for nouns and verbs per 200 utterances in caregivers' speech*

	Language group			
	Korean		English	
	Noun %	Verb %	Noun %	Verb %
Marked	35·8	100	65·3	28·3
Unmarked	64·2	0	34·7	71·7

the final position. In the English-speaking caregivers' speech, the initial position was often occupied by auxiliary verbs and prepositions.

Figure 1 shows that both groups of caregivers used a similar number of single-noun utterances (e.g. *Baby!*, *A table*) but the Korean caregivers produced a significantly greater number of single-verb utterances (e.g. *Taca*, ta- (stem) + -ca (propositive mood final ending) 'Let's hop in') than English-speaking caregivers ($t = 4{\cdot}37$, df = 14, $p = 0{\cdot}001$). The results show that both English- and Korean-speaking caregivers produced single-noun utterances to provide labels for objects in their interaction with the children. The Korean caregiver input appears to reflect the full utilization of syntactic freedom permitted in the language in that they often produced single-verb utterances as well.

Occurrence of morphological cues. Table 6 shows the consistency of inflections/functors co-occurring with nouns and verbs in the caregiver

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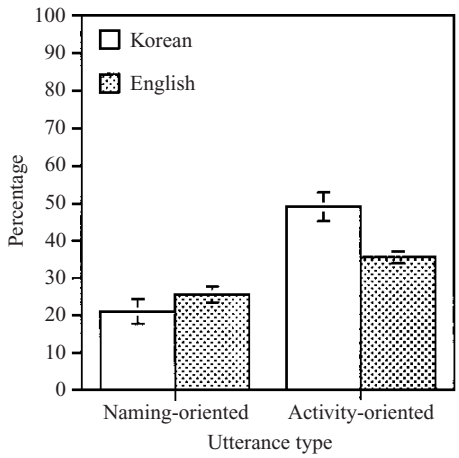


Fig. 2. Mean percentage of activity- and naming-oriented utterances in Korean- and English-speaking caregivers' input of 200 utterances. $n = 8$ in each group. Error bar = S.E.M.

speech of each language group. In the Korean samples, verbs were consistently marked but nouns were not. Neither verbs nor nouns were consistently marked in English although nouns were marked more frequently than verbs.

Caregivers produced sixteen different final endings in the Korean samples. Six of these endings comprised 76·7 % of the total occurrences: -TA (8·2 %), -E/A (34·3 %), -CI (9·4 %), -CA (8·1 %), -KKA (5·6 %), and -YO (11·1 %; more precisely, -YO is a speech style modulator rather than a final ending). Marked nouns were produced with six different noun particles in the Korean samples: -EN/NEN (38·3 %), -TO (29·2 %), -KA (21·9 %), -I (6·2 %), -EL/LEL (2·9 %), and -MAN (1·5 %). In English samples, marked verbs occurred with an auxiliary or modal verb (57·2 %), a third person singular marker *–s* (21·4 %), a present progressive marker *–ing* (18·6 %), or a past tense marker *–ed* (2·8 %). An article (*a*, *an*, *the*) occurred with a noun a majority of the time when it was marked (92·6 %). The occurrence of the plural *–s* or the possessive *–'s* with a noun was rather infrequent (6·6 % and 0·8 %, respectively).

Pragmatic analysis. Figure 2 shows that there were pragmatic differences between the two groups of caregivers. Whereas both the Korean- and the English-speaking caregivers had a similar proportion of naming-oriented utterances in their speech, a greater proportion of the Korean caregivers' utterances was activity-oriented ($t = 3{\cdot}22$, df = 14, $p = 0{\cdot}006$). Examining the differences in each play session separately reveals that the trend for the Korean-speaking caregivers to produce more activity-oriented utterances than the English-speaking caregivers did not reach a statistical significance in

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TABLE 7. *Summary of findings on the relative emphasis of nouns (N) and verbs (V) in caregiver input for English (E) and Korean (K)*

	Within language		
Measures	English	Korean	Between languages
Frequency			
(1) Types	N > V	N < V	(Noun: E > K)
(2) Tokens	N = V	N = V	(Verb: E < K)
Saliency			
Final position	N > V	N < V	(Noun: E > K) (Verb: E < K)
Single-word utterances	N > V	N = V	(Verb: E < K)
Consistency of morphological marking	N > V	N < V	
Interaction style: naming- vs. activity-oriented	N < V	N < V	(Verb: E < K)

Each of the '>' or '<' symbols represents a statistically significant difference. Statistically significant differences between languages are represented in parentheses.

the first play session ($t = 1{\cdot}88$, df = 14, $p = 0{\cdot}082$). The proportion of naming-oriented utterances was similar between the two groups in the first play session. However, both the differences in the proportion of naming-oriented utterances and activity-oriented utterances between the two groups reached a statistical significance for samples collected during the second play session ($t = 2{\cdot}31$, df = 14, $p = 0{\cdot}037$ for naming-oriented utterances; $t = 3{\cdot}65$, df = 14, $p = 0{\cdot}003$ for activity-oriented utterances). When looking at the types of utterances produced in each play session separately, there appeared to be differences in the effect of the toy sets on the pragmatic aspects of caregiver speech. The toy set used during the first play session had more movable parts compared to that used during the second play session. Seven out of eight English-speaking caregivers showed an increase in the proportion of naming-oriented utterances during the second play session as compared to the first. This may be because the toy set used during the second play session provided fewer opportunities to engage in activities but more opportunities to name objects. In contrast, the Korean caregivers' interaction style did not seem to be influenced by the characteristics of the toy set. Only three Korean caregivers showed an increase in the naming-oriented utterances and five caregivers showed a decrease in the naming-oriented utterances during the second play session. In addition, six out of eight Korean caregivers produced more activity-oriented utterances than naming-oriented utterances during both play sessions whereas only three English-speaking caregivers showed the same pattern.

Table 7 provides the summary of findings on the relative emphasis of nouns and verbs in the caregiver input for both languages. As shown in the

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table, Korean input tended to emphasize verbs whereas English input tended to emphasize nouns. Korean input was characterized by significantly more verb than noun types, more verbs than nouns in the salient final position, more consistent morphological markings on verbs than on nouns, and more activity-oriented than naming-oriented utterances. English input contained significantly more noun than verb types, more nouns than verbs in the final position, and more consistent morphological markings on nouns than on verbs. For token counts and interaction style differences, there were similar trends within groups but the between group differences for these measures were significant with Korean input emphasizing verbs more so than English input.

DISCUSSION

Language-general patterns

There were several language-general patterns in the children's data. Both Korean- and English-learning children acquired significantly more nouns than verbs at the 50-word mark and throughout the data collection period. Also, the Korean and English groups acquired a similar number of nouns at the 50-word mark. These similarities are especially compelling given differences in input available to the two groups of children. Korean-speaking caregivers tended to emphasize verbs whereas English-speaking caregivers tended to emphasize nouns in their talk to the children. These results suggest that the child comes to the task of early word learning with some predisposition towards, or capacity for, noun to object mapping.

Our findings are somewhat at odds with the recent report from Choi & Gopnik (1995). They reported equal proportions of nouns and verbs in the Korean lexicon but more nouns than verbs in the English lexicon. Although our Korean participants had more equal noun to verb ratios than our English-speaking participants, we did find that nouns predominated in the lexicons of both English and Korean learners. Some of these conflicting findings are likely attributable to methodological differences. We sampled with different diary procedures and used shorter sampling periods than did Choi & Gopnik. Furthermore, our Korean participants lived in Korea whereas Choi & Gopnik's subjects lived in Southern California. As a result, possible differences in social or familial interaction patterns could have contributed to the differences in our data (see Caselli *et al.*, 1995, p. 194 for a relevant discussion).

Language-specific patterns

There were language-specific as well as language-general patterns in the children's data. Although both groups of children had significantly more nouns than verbs when the within-group comparison was made, the mean

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proportion of verbs was different between the two groups. Verbs comprised a significantly greater proportion of the Korean-learning children's lexicons than the English-learning children's lexicons at the 50-word mark. The Korean children's ratio of nouns to verbs was much more balanced than that of the English learners. In addition, whereas all eight English-learning children showed a noun spurt at or before the 50-word mark, only two Korean children showed a noun spurt around the 50-word mark, two after the 50-word mark, and four showed no noun spurt at all during the data collection period. Thus, while the vocabulary spurt observed in the English-learning children seemed truly to reflect the phenomenon of naming explosion, most Korean children (six out of eight) did not show a comparable increase in naming.

These findings differ to a degree from those of Au *et al*. (1994) who reported similar noun to verb ratios for Korean and English learners. Differences in the vocabulary size of participants in Au *et al*.'s study and our own may account for this conflicting finding. Whereas our data were collected around the 50-word mark, Au *et al*.'s data were collected from children with heterogeneous productive vocabulary sizes. Bates *et al*. (1994) reported that the content of children's lexicons reorganizes as their vocabulary size grows, especially after the acquisition of the first 100 words. Thus, comparing the content of the lexicon between studies that report data collected at different points in lexical development may not be valid. Longitudinal studies are required in order to best understand interactions between developmental status and cross-linguistic differences.

It could be argued that the differences found between Korean and English learners were attributable to individual rather than cross-linguistic factors. After all, the sample size of this study (and of previous studies of similar nature) was small. Compared to the English-learning children, the Korean children could be characterized as expressive language learners: they were less noun biased than the English learners and they tended toward gradual rather than nonlinear lexical growth. Later birth order has been cited as a factor associated with expressive style (Goldfield & Reznick, 1990). In the present study, however, the birth order of the children was roughly balanced between the first- and later-borns. Another consideration is maternal educational attainment. Expressive style is relatively common among children of the working classes, where parental education is at or below average (Nelson, 1973; Parisi & Gianelli, 1974). However, the Korean families in the present study do not belong to the working class nor is their parental education below average. In both groups, the majority of the caregivers stayed home and provided full-time care for their children.

Therefore, we think that it is more likely that the differences in the vocabularies of the Korean and English learners studied here are related to differences in the frequency and saliency of verbs in the input available to

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these learners. Our study does not allow for conclusions of causal effects, rather, we will point out parallels between the characteristics of input to children and the composition and growth of their vocabularies.

Frequency of verbs in input. Korean-speaking caregivers used more verb types than noun types whereas English-speaking caregivers produced a greater variety of noun types than verb types. In addition, Korean-speaking caregivers used significantly more verb tokens, especially more action verb tokens, than English-speaking caregivers. It is likely that the input frequency of nouns and verbs was closely related to what the caregivers chose to talk about when they interacted with their children. The Korean caregivers produced a significantly greater proportion of activity-oriented utterances than the English-speaking caregivers and the Korean caregivers consistently produced more activity-oriented utterances than naming-oriented utterances regardless of the characteristics of the toy sets provided by the examiner. This finding is consistent with previous studies of Korean (Choi & Gopnik, 1995) and Japanese caregivers (Fernald & Morikawa, 1993). In Korean, activity-oriented utterances are likely to include an action verb at the end of the utterance whereas naming-oriented utterances are likely to end with a copula. Thus, a high number of activity-oriented utterances may have contributed to the greater frequency of action/activity verb tokens in Korean, as compared to English input. Several researchers have reported the influence of input frequency on children's early vocabulary acquisition. Goldfield (1993) reported a significant positive correlation between the frequency of noun types and tokens in caregiver speech during toy play, and the proportion of nouns in children's first 50 words. Naigles & Hoff-Ginsberg (1998) reported that the input frequency of specific verbs in the caregiver speech was a significant positive predictor of the children's use of the verbs 10 weeks later. Thus, it is likely that the high frequency of activity-oriented utterances, and hence verbs, addressed to the Korean learners influenced their verb mapping.

Saliency of verbs in input. The typological characteristics of Korean may have enhanced the saliency of verbs. In Korean, a verb occurs at the end of the utterance not only in declarative sentences but also in all other types of sentences (e.g. passives and questions) as long as the canonical word order is used. Since word order is free to vary, however, other words, including nouns, can also occur in the utterance-final position. Our analyses of caregiver speech samples clearly indicate that a large proportion of Korean-speaking caregivers' utterances maintained the canonical SOV or Noun–Verb order. As expected based on language typology, the utterance-final position was often occupied by nouns in the English samples. Since the end unit is typically lengthened and bounded by silence, it may be phonologically more salient than preceding units and thus, easier to extract (Slobin, 1973; Peters, 1985). Because of increased lengthening and slower rate in child-directed as

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opposed to adult-directed speech (see Hoff-Ginsberg & Shatz, 1982), this facilitating effect may be enhanced. Indeed, adults who were faced with learning foreign vocabulary items after only a few exposures were able to do so only when those items were presented in a child-directed speech register and in utterance-final positions (neither alone was sufficient to boost performance above chance) (Golinkoff & Alioto, 1995). Thus, the large proportion of verbs in the final position of utterances addressed to the Korean children may have increased verb saliency.

There is yet another way the language typology of Korean may enhance the saliency of verbs in the input to children. Since Korean is a pro-drop and, frequently, a null-object language, a full verb inflected with a final or non-final sentence ending is the only obligatory element in a clause. Thus, utterances such as *ga-ss-ta* ('Went' go-Past-SE) or *cwu-e* ('Give (me)' give-SE) are grammatical and occur frequently in adult-to-adult conversation when the knowledge of the deleted arguments are clear from the context. This type of single-verb utterances may occur only in certain types of imperatives in English such as *Push*!. Not surprisingly, the mean number of single-verb utterances in Korean caregiver samples was significantly higher than in the English caregiver samples. Single-verb utterances may increase the saliency of the verb due to phonological saliency and possibly due to increased transparency of semantic mapping. Suppose a Korean child who already knows the word *kong* ('ball') is engaged in a turn-taking type of play involving a ball with her caregiver. After the caregiver gives the ball to the child, she can request the child to give the ball to the caregiver by saying *Cwu-e* ('Give (me)' give-SE for request), accompanied by a gesture of request (such as an extended hand). In this case, the verb is not only phonologically salient but also semantically transparent for word-referent mapping.

Finally, morphological cues to verbs were highly salient in Korean input to children. Whereas verbs were inflected with final endings 100% of the time in the Korean samples, nouns were inflected with particles 35·8% of the time. In our English samples, verbs were inflected or preceded by auxiliary or modal verbs 28·3% of the time whereas nouns were inflected or preceded by an article 65·3% of the time. Thus, Korean final endings showed a high cue validity as defined by MacWhinney *et al*. (1984) compared to Korean noun inflections, and as compared to both noun and verb inflections in English. Not only were all verbs in the Korean caregivers' samples inflected with final endings but these final endings consistently attached to the end of the verb, making Verb+X a salient pattern. Furthermore, although there were various types of final endings, a limited set of six accounted for the majority of occurrences. Although the Korean children in the current study were quite young, it is possible that they benefited from morphological cues to verbs. Previous cross-linguistic studies reported an early acquisition of

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grammatical morphemes when these morphemes are regular and obligatory in use (Tanouye, 1979; Slobin & Bever, 1982; Clancy, 1985), as they are in Korean final endings. Also, Korean children acquire some final endings before age two and use them productively (Choi, 1991; Choi & Gopnik, 1995). Because of their early emergence together with their high cue validity, we speculate that final endings may have contributed to the Korean children's mapping of verbs and their meanings.

The findings regarding the differences in the input characteristics between the two language groups are similar to the findings of previous cross-linguistic studies comparing English- to Korean-speaking caregivers (Au *et al.*, 1994; Choi & Gopnik, 1995) and English- and Italian- to Mandarin-speaking caregivers (Tardif, Shatz & Naigles, 1997). Similar to these previous studies, we found that Korean learners, compared to English learners, are exposed to verbs more frequently, that these verbs are more often presented in the salient utterance-final position, and that they occur more frequently in utterances that function to describe activity or action. In addition, we found that verbs were salient in our Korean samples due to a great number of single-verb utterances and a high cue validity of final endings co-occurring with Korean verbs. These trends in input were paralleled by trends in the children's data. The Korean learners apparently found verb mapping to be relatively easier than did the English learners. We hypothesize that this relative ease was attributable to the Korean learners' access to salient and frequent verb presentations in socio-pragmatic contexts that clarified verb to referent mapping. Future studies that test this hypothesis more directly are warranted.

Future studies should address not only cross-linguistic differences in the early lexicon but also how these early differences relate to attainment of other linguistic and cognitive milestones. For example, would the faster verb acquisition characteristic of our Korean subjects hasten their past tense acquisition as suggested by the CRITICAL MASS HYPOTHESIS (Marchman & Bates, 1994)? Zoh's (1982) longitudinal data from five Korean children demonstrate emergence of past tense before expected ages of emergence in English. Further, following the neo-Whorfian view espoused by Gopnik & Meltzoff (1997), we could ask whether early verb acquisition would predict early cognitive attainments that relate to motion or change of state. Gopnik and colleagues' work (e.g. Gopnik, Choi & Baumberger, 1996) on the early emergence of both success-failure words and means-ends skills in Korean learners is suggestive.

CONCLUSION

In the present study, we found that, unlike English learners, Korean learners heard more verb types than noun types in the talk their caregivers addressed to them. The verbs they heard were phonologically and morphologically

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more salient than the nouns they heard. Furthermore, verbs were presented in socio-pragmatic contexts that are likely to facilitate verb to referent mapping. Overall, there were significant differences in English and Korean input with Korean input emphasizing verbs and English input emphasizing nouns. That the Korean learners' lexicons included a greater proportion of verbs than the English learners' lexicons parallelled these trends in input. Despite input conditions that emphasized verbs over nouns, the Korean learners, like the English learners, had more nouns than verbs in their early lexicons. Whether the perceptual coherence of objects or principles and constraints that bias children towards learning object names best explain this language-general pattern remains an open question. We conclude that the composition of the early lexicon is multi-determined. The growth and composition of the early lexicon is likely shaped by complex interactions between the child's own capacities and strategies and the input that is available to her.

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APPENDIX 1

VERBS ACQUIRED BY THE KOREAN CHILDREN DURING THE ENTIRE STUDY PERIOD[a]

Word	Meaning	Word	Meaning
Disappearance/existence verbs			
epsta (8)[b]	'not exist'	*issta* (4)	'exist'
keysita (1)	'exist/live/be' (honorific form)		
Success/failure verbs			
twayssta (6)	'done'		
Request/rejection verbs			
cwuta (7)	'give'	*silhta* (2)	'don't want/like'
Change of location/motion verbs			
epta (8) (including *oebuba*)	'carry on back'	*kata* (6)	'go'
anta (5)	'hold in arms'	*ota* (4)	'come'
sinta (2)	'put shoes on'	*ancta* (2)	'sit down'
tteyta (1)	'take off of a surface'	*ttwuita* (1)	'run'
ilenata (1)	'get up'	*kkakta* (1)	'peel off'
naota (1)	'come out'	*ppaysta* (1)	'take away'
capta (1)	'hold by hand'	*pesta* (1)	'take clothes off'
ssista (1)	'wash up'	*ssotta* (1)	'pour/spill'
ppayta (1)	'take off/out of a tight-fitting base'	*pelita* (1)	'throw away'
ccicta (1)	'tear'	*pikhita* (1)	'go/get away'
pusuta (1)	'break'	*ipta* (1)	'put clothes on'
Activity verbs			
nennehata (7)	'sleep' (motherese)	*shihata* (6)	'wet' ('do pee')
hata (6)	'do'	*ppoppohata* (5)	'kiss'
ttelita (3)	'hit someone'	*maymmayhata* (3)	'spank'
mekta (3)	'eat'	*sicakhata* (2)	'begin'
cata (2)	'sleep'	*eonggahata* (2)	'poop' (motherese)
tusita (1)	'eat' (honorific form)	*pakkuta* (1)	'exchange'
suyounghata (1)	'swim'	*nuta* (1)	'poop'
ssata (1)	'poop/wet'	*paytta* (1)	'spit out'
sesuhata (1)	'wash the face'	*masita* (1)	'drink'
paksuchita (1)	'clap hands'	*nolta* (1)	'play'
shoot (1)	'shoot'		
Change of state verbs			
kkutnata (1)	'end'		
Stative/adjectival verbs			
ttukepta (5)	'be hot' (for things)	*yepputa* (3)	'be pretty'
chakawupta (2)	'be cold' (for things)	*matepsta* (2)	'be not tasty'
chwupta (2)	'be cold' (used for animate beings)	*tepta* (1)	'be hot' (used for animate beings)

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APPENDIX 1 (*cont.*)

Word	Meaning	Word	Meaning
saranghata (1)	'love'	*mipta* (1)	'hate'
maywupta (1)	'be spicy'	*mwusepta* (1)	'be scary'
macta (1)	'be right'	*cohta* (1)	'be good'
masissta (1)	'be tasty'	*naymsaynata* (1)	'smell'
ccata (1)	'be salty'	*cakta* (1)	'be small'
Other			
aphuta (8) (including *ayahata*; motherese)	' (it) hurts'	*alta* (1)	'know'
kkuta (1)	'turn off'	*komapta* (1)	'thank (you)'

Total number of verbs including copula: 71 types.
Total number of verbs produced by more than three children: 18 types (25% of all types).
Total number of verbs produced by less than two children: 53 types (75% of all types).
[a] Numbers in parentheses indicate the number of children who acquired the verb during the study period (total number of Korean children: 8).
[b] All Korean verbs need to be inflected by a final or a non-final ending. The '-ta' suffix at the end of each verb is a final ending which is a standard citation form of dictionary entries for verbs.

APPENDIX 2

NOUNS ACQUIRED BY THE KOREAN CHILDREN DURING THE ENTIRE STUDY PERIOD

Word	Meaning	Word	Meaning
People			
emma (8)	'mommy'	*appa* (8)	'daddy'
aga (6)	'baby'	*halmeni* (6)	'grandma'
acessi (5)	'uncle/adult male'	*enni* (5)	'sister' (used by girls)
halapeci (4)	'grandpa'	*komo* (3)	'aunt' (father's sister)
hyeng (2)	'brother' (used by boys)	*imo* (2)	'aunt' (mother's sister)
oppa (2)	'brother' (used by girls)	*nunah* (1)	'sister' (used by boys)
sahmchon (1)	'uncle'	*ttahl* (1)	'daughter'
Pingkuh (2)	' a cartoon character'	six proper names (learned by 4 children)	
Food			
mwul (8)	'water'	*ppang* (8)	'bread'
wuyu (7)	'milk'	*kkakka* (6)	'cookie'
poto (5)	'grapes'	*bap* (4)	'cooked rice'
koki (4)	'meat'	*subak* (3)	'watermelon'
kimchi (3)	'kimchi' (preserved cabbage)	*icecream* (3)	'icecream'
mamma (4)	'food/rice'	*satang* (3)	'candy'
ppappa (3)	'food/rice'	*sakwa* (2)	'apple'
ttalkiy (2)	'strawberry'	*kola* (2)	'coke'

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APPENDIX 2 (*cont.*)

Word	Meaning	Word	Meaning
juice (2)	'juice'	*gum* (2)	'gum'
swul (1)	'alcoholic beverage'	*pae* (1)	'pear'
kyul (1)	'tangerine'	*kahm* (1)	'persimmon'
kihm (1)	'seaweed'	*ohkswuswu* (1)	'corn'
ahl (1)	'egg'	*ocinge* (1)	'dried squid'
kamca (1)	'potato'	*pizza* (1)	'pizza'
yogurt (1)	'yogurt'		
hopak (1)	'pumpkin'	*coffee* (1)	'coffee'
cheese (1)	'cheese'	*keylan* (1)	'egg'
pahm (1)	'chestnut'		
Clothes			
sinpal (6)	'shoes'	*ot* (6)	'dress'
yangmal (2)	'socks'	*paci* (2)	'pants'
panty (2)	'panties'	*moca* (2)	'hat'
sandal (1)	'sandal'	*ttalttaliy* (1)	'slipper'
Animals			
mengmeng (8)	'bowwow' (dog)	*yaong* (5)	'meow' (cat)
mal (2)	'horse'	*say* (2)	'bird'
sahca (2)	'lion'	*yang* (2)	'sheep'
pellay (1)	'insect'	*kwulkwuliy* (1)	'pig' (babytalk)
kohm (1)	'bear'	*yewuh* (1)	'fox'
ahke (1)	'alligator'	*sahsem* (1)	'deer'
ohliy (1)	'duck'	*khokhiliy* (1)	'elephant'
Body parts			
kho (7)	'nose'	*pal* (5)	'foot'
csicsi (5)	'breast'	*nwun* (4)	'eye'
kwui (4)	'ear'	*son* (4)	'hand'
yi (2)	'teeth'	*ip* (2)	'mouth'
engdengiy (1)	'bottom'	*kochwu* (1)	'penis'
meli (1)	'head'	*baykkop* (1)	'belly button'
Things			
cha/ppangppang (5)	'car'	*kong* (5)	'ball'
tohn (5)	'money'	*yak* (4)	'medicine'
bwul (4)	'light'	*ttong* (3)	'poop'
chissol (3)	'toothbrush'	*cici* (3)	'dirty things'
ppaltey (3)	'straw'	*kkot* (2)	'flower'
sikey (2)	'watch/clock'	*ipwul* (2)	'comforter'
pwungson (1)	'balloon'	*cacenke* (1)	'bicycle'
kasiy (1)	'splinter'	*nengcangko*(1)	'refrigerator'
ppin (1)	'hairpin'	*biht* (1)	'comb'
pwul (1)	'glue'	*chayk* (1)	'book'
mey (1)	'stick (for spanking)'	*shiy* (1)	'pee'
cup (1)	'cup'	*wusan* (1)	'umbrella'
kawui (1)	'scissors'	*hyuci* (1)	'tissue/kleenex'
pihangki (1)	'airplane'	*bus* (1)	'bus'
seesaw (1)	'seesaw'	*yoh* (1)	'futon'
eyca (1)	'chair'	*ankyung* (1)	'glasses'
pohdaykiy (1)	'wrapping material for carrying a baby on the back'		

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APPENDIX 2 (*cont.*)

Word	Meaning	Word	Meaning
pyel (1)[a]	'star'	*tahl* (1)[a]	'moon'
hay (1)[a]	'sun'	*bih* (1)	'rain'
sarang (1)[b]	'love'		
Place			
kyohwey (1)	'church'		

Total: 129 types.
Total number of nouns produced by more than three children: 40 types (31% of all types).
Total number of nouns produced by less than two children: 89 types (69% of all types).
[a] The child used these words only when they were in picture books.
[b] The word was used only to refer to a heart.

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